

# City of San Diego

**CONTRACTOR'S NAME:** PCL Construction Inc

**ADDRESS:** 3750 Schaufele Ave., Ste 270, Long Beach, CA 90808

**TELEPHONE NO.:** 480-829-6333 **FAX NO.:** 480-829-8252

**CITY CONTACT:** Rosa Riego, Senior Contract Specialist, Email: [RRiego@sandiego.gov](mailto:RRiego@sandiego.gov)

Phone No. (619) 533-3426

L. Arikat / A. Jaro / R. Dinjotian

## BIDDING DOCUMENTS



**FOR**

## PURE WATER PROGRAM: METRO BIOSOLIDS CENTER IMPROVEMENTS

**BID NO.:** K-21-1867-DBB-3

**SAP NO. (WBS/IO/CC):** B-17006, S-17013

**CLIENT DEPARTMENT:** 2000

**COUNCIL DISTRICT:** 6

**PROJECT TYPE:** BO

### **THIS CONTRACT WILL BE SUBJECT TO THE FOLLOWING:**

- PROJECT LABOR AGREEMENT (PLA)
- PHASED-FUNDING
- FEDERAL EQUAL OPPORTUNITY CONTRACTING REQUIREMENTS.
- ELIGIBLE FOR JOINT VENTURE PREQUALIFICATION STATUS (see Instructions to Bidders)
- PREVAILING WAGE RATES: STATE  FEDERAL
- SKILLED AND TRAINED WORKFORCE
- THIS IS A CASRF AND EPA FUNDED CONTRACT THROUGH THE STATE OF CALIFORNIA AND ENVIRONMENTAL PROTECTION AGENCY AND BUREAU OF RECLAMATION (BOR).

### **BID DUE DATE:**

**2:00 PM**

**APRIL 6, 2021**

**CITY OF SAN DIEGO'S ELECTRONIC BIDDING SITE, PLANETBIDS**

<http://www.sandiego.gov/cip/bidopps/index.shtml>

**ENGINEER OF WORK**


The engineering Specifications and Special Provisions contained herein have been prepared by or under the direction of the following Registered Engineers:

  
\_\_\_\_\_  
1) Registered Engineer

1/28/2021  
Date

Seal:



  
\_\_\_\_\_  
2) For City Engineer

02/02/2021  
Date

Seal:





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## REQUIRED DOCUMENTS SCHEDULE DURING BIDDING AND AWARDING

The Bidder's attention is directed to the City's Municipal Code §22.0807(e), (3)-(5) for important information regarding grounds for debarment for failure to submit required documentation.

The specified Equal Opportunity Contracting Program (EOCP) forms are available for download from the City's web site at:

<http://www.sandiego.gov/eoc/forms/index.shtml>

### FEDERAL DOCUMENTS SUBMITTAL REQUIREMENTS

ITEM	DOCUMENT TO BE SUBMITTED	WHEN DUE	FROM
1.	Bid Bond (PDF via PlanetBids)	At Time of Bid	ALL BIDDERS
2.	Contractors Certification of Pending Actions	At Time of Bid	ALL BIDDERS
3.	Mandatory Disclosure of Business Interests	At Time of Bid	ALL BIDDERS
4.	Disclosure of Lobbying Activities	At Time of Bid	ALL BIDDERS
5.	Form 4500-3: DBE Subcontractor Performance Form	At Time of Bid	ALL BIDDERS
6.	Form 4500 -4: DBE Subcontractor Utilization Form	At Time of Bid	ALL BIDDERS
7.	Commitment to Comply with Skilled and Trained Workforce Certification Forms	At Time of Bid	ALL BIDDERS
8.	Debarment and Suspension Certification for Prime Contractors	At Time of Bid	ALL BIDDERS
9.	Debarment and Suspension Certification for Subcontractors, Suppliers & Mfgs	At Time of Bid	ALL BIDDERS
10.	Bid Bond (Original)	By 5PM, 3 working days After Bid Opening	ALL BIDDERS
11.	Federal Good Faith Documentation	By 5PM, 4 working days After Bid Opening	ALL BIDDERS
12.	Form AA61 – List of Work Made Available	By 5PM, 4 working days After Bid Opening	ALL BIDDERS
13.	Form AA62 – Summary of Bids Received	By 5PM, 4 working days After Bid Opening	ALL BIDDERS
14.	Form AA63 – Good Faith Effort List of Subcontractors Solicited	By 5PM, 4 working days After Bid Opening	ALL BIDDERS

<b>ITEM</b>	<b>DOCUMENT TO BE SUBMITTED</b>	<b>WHEN DUE</b>	<b>FROM</b>
15.	Escrow Bid Document, See Attachment H	By 5PM, 4 working days After Bid Opening	ALL BIDDERS
16.	If the Contractor is a Joint Venture: <ul style="list-style-type: none"> <li>• Joint Venture Agreement</li> <li>• Joint Venture License</li> </ul>	Within 10 Working Days of receipt By bidder of contract forms	AWARDED BIDDER
17.	Phase Funding Schedule Agreement	Within 10 working days of receipt by the bidder of the Notice of Intent to Award	AWARDED BIDDER
18.	Payment & Performance Bond; Certificates of Insurance and Endorsements	Within 10 working days of receipt by bidder of contract forms and NOI	AWARDED BIDDER
19.	Signed Contract Agreement Page	Within 3 working days of receipt by bidder of Contract Agreement	AWARDED BIDDER
20.	PLA FORMS, See Attachment I	Within 10 working days of NOI	AWARDED BIDDER
21.	OCIP Credit Worksheet. See Notice Inviting Bids, Section 18.	Within 10 working days of Notice of Intent to Award.	AWARDED BIDDER
22.	OCIP Enrollment Forms	Within 15 working days of NOI	AWARDED BIDDER
23.	Form UR-334: California State Revolving Funds (CASRF)	Annually. See Attachment D requirements.	AWARDED BIDDER
24.	Form 4500 -2: DBE Subcontractor Participation Form	See Attachment D requirements.	AWARDED BIDDER
25.	Skilled and Trained Workforce Certification Forms	Monthly. See NIB Section 8	AWARDED BIDDER

## NOTICE INVITING BIDS

1. **SUMMARY OF WORK:** This is the City of San Diego's (City) solicitation process to acquire Construction services for **Pure Water Program: Metro Biosolids Center Improvements**. For additional information refer to Attachment A.
2. **FULL AND OPEN COMPETITION:** This solicitation is subject to full and open competition and may be bid by Contractors on the City's approved Prequalified Contractors List. For information regarding the Contractors Prequalified list visit the City's web site: <http://www.sandiego.gov>.
3. **ESTIMATED CONSTRUCTION COST:** The City's estimated construction cost for this project is **\$35,500,000**.
4. **BID DUE DATE AND TIME ARE: APRIL 6, 2021 at 2:00 PM**
5. **PREVAILING WAGE RATES APPLY TO THIS CONTRACT:** Refer to Attachment D.
6. **LICENSE REQUIREMENT:** To be eligible for award of this contract, Prime contractor must possess the following licensing classification: **A**
7. **ESCROW BID DOCUMENT APPLY TO THIS CONTRACT:** Refer to Attachment H.
8. **SKILLED AND TRAINED WORKFORCE LABOR REQUIREMENTS:**

- 8.1. The Contractor and its subcontractors at every tier shall use a skilled and trained workforce to perform all work on the project or contract that falls within an apprenticeable occupation in the building and construction trades, as set forth in 8California Public Contract Code section 2601, including the exceptions in sections 2601(d)(5) and 2601 (d)(6). Contractor shall provide to the City a report demonstrating compliance with this section on a monthly basis, to be included with monthly pay requests. The City may withhold progress payments or retention in accordance with California Public Contract Code section 2602(b) if the Contractor fails to provide the monthly report required by this section, provides a report that is incomplete, or provides a report that does not demonstrate compliance with this section. Payment may be withheld until the Contractor provides a plan to achieve substantial compliance with this section prior to completion of the contract that is acceptable to the City, with respect to the relevant apprenticeable occupation.

This section references provisions of the California Public Contract Code for convenience only. The City is not electing to incorporate other provisions of Chapter 2.9 of the California Public Contract Code not referenced herein, including but not limited to provisions for State enforcement. Instead, failure to comply with this section is considered a material breach of this contract which could affect the Contractor's ability to perform future work for the City pursuant to Chapter 2, Article 2, Division 8 of the San Diego Municipal Code regarding debarment.

### 8.2. Submittal Requirements

Contracts must submit proof of a Commitment to Comply with Skilled and Trained Workforce Requirements at bid due date. Contractor and its subcontractors at every tier will use a skilled and trained workforce to perform all work on the project or a contract that falls within an apprenticeship occupation in the building and construction trades in accordance with Chapter 2.9 (commencing with Section 2600) of Part 1 of Division 2 of the Public Contract Code. City will monitor Contractor's compliance with these requirements and Contractor, on behalf of itself and its subcontractors at every tier, shall provide on a monthly basis a Skilled and Trained Workforce Certification Form and Skilled and Trained Workforce Monthly Compliance Report demonstrating compliance. If the monthly Skilled

and Trained Workforce Certification Form and Monthly Compliance Report are not provided within 30 days or if Contractor provides a report that is incomplete, City shall withhold further payments until a complete report is provided. If the Skilled and Trained Workforce Certification form does not establish compliance with Section 132354.7, City shall withhold further payments until Contractor provides a plan to achieve substantial compliance with the skilled and trained workforce requirements, with respect to the relevant apprenticeable occupation, prior to the completion of the project. Any withholding will be released for payment on the monthly estimate for partial payments next following the date that all the satisfactory compliance of the requirements for which the retention was made are submitted.

**9. VETERANS OUTREACH:**

Military veterans bring unique skills to City projects due to their mission-oriented training and experience, and dedication to the job. The City desires to facilitate the entry into the building and construction trades for veterans interested in careers in the industry. Within (30) days after notice that it is the apparent low bidder. Contractor shall contact "Helmets to Hardhats" or "UA Veterans in Piping" on behalf of itself and its subcontractors, for potential job referrals and employment of veterans on the project. Contractor may contact other veterans programs in its discretion, but if neither of the above referenced programs are contacted, the Contractor must receive prior written approval from the City that it is an equivalent veterans program. Contacting multiple veterans programs is highly encouraged, but not required. Within ninety (90) days after issuance of a Notice to Proceed for construction of the project. Contractor shall provide the City with a written report detailing the veterans programs contacted, opportunities offered by the Contractor and its subcontractors, applications received and for what construction trades, and how many veterans were hired through the programs. Hiring veterans to work on the project is not mandatory, but information received from the Contractor may be used by the City in the future to develop a veteran's outreach program for City contracting.

**10. BUSINESS COOPERATION TAX PROGRAM:**

You must exercise your right to obtain a California State of Board of Equalization (BOE) sub-permit for the jobsite and allocate all eligible Bradley-Burns Uniform Local Sales and Use Tax (Use Tax) to the City.

The Contractor and Subcontractors who meet the minimum California Department of Tax and Fee Administration (CDTFA) contract threshold (currently \$5M) and who are purchasing materials and/or fixtures over \$100,000 in value, must apply for a jobsite sub-permit (job-site specific sellers permit), prior to NTP. In addition, you will ensure that all eligible subcontractors will exercise their right to obtain this BOE sub-submit and allocate all eligible Use Tax to the City. The City will not issue a notice to proceed unless you and your eligible subcontractors have obtained this sub-permit from the BOE. If there is added work at a later date that meets this criteria the same process shall apply prior to purchasing material and/or fixtures for added work. And it will also be part of the close-out process (permit closeout). More information on obtaining this permit can be found by contacting the local BOE office.

**11. PROJECT LABOR AGREEMENT.** As a condition of final contract award, the Awarded Bidder must sign and execute a Letter of Assent to the Project Labor Agreement that the City has negotiated which is listed as Attachment A to the Project Labor Agreement. A copy of the Project Labor Agreement (PLA) is attached as Attachment I of this Contract Document. See also Attachment E SSP, Section 5-3.6, "Project Labor Agreement".

**12. SUBCONTRACTING PARTICIPATION PERCENTAGES:**

**12.1.** The City affirms that in any contract entered into pursuant to this advertisement, DBE firms will be afforded full opportunity to submit Bids in response to this invitation.

- 12.2.** This Federally assisted project includes subcontracting participation percentages for DBE participation. DBE goal commitments and Good Faith Efforts (GFE) shall be made prior to bidding. DBE commitments and GFE made after the Bid opening will not be considered for the Award of Contract.
- 12.3.** This project is subject to the federal equal opportunity regulations and the following requirements. The City reserves the right to audit the Contractor's compliance with the federal requirements set forth below.
- 12.4.** Following are federally subcontracting participation percentages for this contract. For the purpose of achieving the subcontractor participation percentage, Additive or Deductive, and Type II Allowance Bid Items will not be included in the calculation.
- 12.5. Environmental Protection Agency (EPA) -** In accordance with EPA's Program for Utilization of Small, Minority Disadvantaged and Women Business Enterprises in procurement under Federal assistance programs, the Contractor agrees to the applicable "fair share" objectives negotiated with EPA as follows:
- 12.6. California State Water Resources Control Board - Clean Water State Revolving Fund (CWSRF):**

	MBE*	WBE*
1. Construction	2%	1%
2. Supplies	1%	1%
3. Services	1%	1%
4. Equipment (combined in above)	1%	1%

Note: MBEs and WBEs must be certified by EPA, SBA, DOT or by state, local, Tribal, or private entities whose certification criteria match EPAs in order to be counted toward MBE/WBE accomplishments. MBEs and WBEs are a part of the larger universe of DBEs.

- 12.7.** If the Bidder fails any of the following conditions, the Bid **SHALL** be declared non-responsive:
  - 1. Submission of GFE documentation, as specified in Attachment D.
    - a) Submit Good Faith Effort (GFE) documentation, saved in searchable Portable Document Format (PDF), demonstrating the Bidder made a good faith effort to conduct outreach to and include DBE Subcontractors as required in this solicitation by 5 PM 4 Working Days after the Bid opening.
    - b) **All submittals in searchable PDF shall be submitted electronically within the prescribed time identified in the contract documents via PlanetBids by invitation to the point of contact named in the bid provided by the Contract Specialist to all bidders.**
  - 2. Attending one of the Pre-bid Meetings.

**13. MANDATORY ONLINE PRE-BID MEETING VIA GOTOMEETING:**

Bidders are required to attend a Pre-Bid Meeting. Two mandatory online pre-bid meetings will be held.

The **First** Meeting will be on: **Tuesday, February 23, 2021 at 10:00 AM** at GoToMeeting.

Please join the pre-bid meeting from your computer, tablet or smartphone.

<https://global.gotomeeting.com/join/192455973>

You can also dial in using your phone.

United States: +1 (312) 757-3121

Access Code: 192-455-973

The **Second** meeting will be on: **Thursday, February 25, 2021 at 10:00 AM** at GoToMeeting.

Please join the pre-bid meeting from your computer, tablet or smartphone.

<https://global.gotomeeting.com/join/350974797>

You can also dial in using your phone.

United States: +1 (571) 317-3122

Access Code: 350-974-797

New to GoToMeeting? Get the app now and be ready when your first meeting starts:

<https://global.gotomeeting.com/install/883640213>

**Please Note:** You will need to join the meeting with a computer, tablet or smartphone with the GoToMeetings App in place in order to sign in via the Chat feature as attendance at the meeting will be evidenced by the Chat sign-in. The Chat feature will also be used for attendees to ask any questions.

The purpose of the meetings is to discuss the scope of the project, submittal requirements, the pre-qualification process, the Project Labor Agreement requirements, OCIP requirements, and Equal Opportunity Contracting Program requirements and reporting procedures. Failure to attend **ONE** of the Mandatory Pre-Bid Meeting may result in the Bid being deemed non-responsive.

Upon entering the meeting, all attendees **must** use the chat feature to sign in with the following information: Name of firm, Attendee's name, Phone number, and Email address.

The GoToMeetings will open thirty minutes prior to the start times listed above to allow the attendees the opportunity to sign in by the deadline.

Bidders may not be admitted after the specified start time of the mandatory Pre-Bid Meeting.

**14. PRE-BID SITE VISIT:** Due to the current Covid-19 restrictions, the City of San Diego is unable to offer a formal site tour of the Metropolitan Biosolids Center plant. However, the City has prepared site videos to give potential bidders a better understanding of the current site conditions and highlight the key areas that will require work within the plant. Please use the following links below to access videos, a site map, and the corresponding narrative.



**Video Link:**

<https://drive.google.com/drive/folders/1oU7WkoKWxqNCByikoJnFIwwAw-z1DC0R?usp=sharing>

**Narrative and Site Map:**

[https://drive.google.com/drive/folders/17pHxBKx-XRh3K\\_iZs38aCJjgFmWR9V\\_K?usp=sharing](https://drive.google.com/drive/folders/17pHxBKx-XRh3K_iZs38aCJjgFmWR9V_K?usp=sharing)

**15. AWARD PROCESS:**

- 15.1.** The Award of this contract is contingent upon the Contractor's compliance with all conditions of Award as stated within these documents and within the Notice of Intent to Award.
- 15.2.** Upon acceptance of bids and determination of the apparent low bidder, the City will prepare the contract documents for execution within approximately 21 days of the date of the bid opening. The City will then award the contract upon receipt of properly signed Contract, bonds, and insurance documents.
- 15.3.** This contract will be deemed executed and effective only upon the signing of the Contract by the Mayor or his designee and approval as to form by the City Attorney's Office.
- 15.4.** The low Bid will be determined by the Base Bid.

**16. SUBMISSION OF QUESTIONS:**

- 16.1.** The Director (or Designee) of the Engineering & Capital Projects Department is the officer responsible for opening, examining, and evaluating the competitive Bids submitted to the City for the acquisition, construction and completion of any public improvement except when otherwise set forth in these documents. Any questions related to this solicitation shall be submitted to:

Rosa Riego at [RRiego@sandiego.gov](mailto:RRiego@sandiego.gov)

- 16.2.** Questions received less than 14 days prior to the date for opening of Bids may not be considered.
- 16.3.** Questions or clarifications deemed by the City to be material shall be answered via issuance of an addendum and posted to the City's online bidding service.
- 16.4.** Only questions answered by formal written addenda shall be binding. Oral and other interpretations or clarifications shall be without legal effect. It is the Bidder's responsibility to be informed of any addenda that have been issued and to include all such information in its Bid.

**17. PHASED FUNDING:** For Phased Funding Conditions, see Attachment B.

**18. OWNER CONTROLLED INSURANCE PROGRAM (OCIP):** The City has implemented an Owner Controlled Insurance Program (OCIP) for its Pure Water Projects. In this OCIP, the City furnishes Workers' Compensation, General, Excess, Pollution Liability and Builder's Risk insurance associated with construction of the Work, as detailed in Attachment E, Section 5 - LEGAL RELATIONS AND RESPONSIBILITIES. Bidders, as well as all of their subcontractors, with a subcontract amount of greater than one half of one percent of the Contractors bid amount shall complete OCIP credit worksheets. Bidders shall submit these OCIP credit worksheets, including OCIP credit worksheets obtained from all their subcontractors, within 10 Working Days of receipt by bidder of contract forms and Notice of Intent to Award. **Compliance with OCIP credit worksheet requirements shall be a condition for award.**

# INSTRUCTIONS TO BIDDERS

## 1. PREQUALIFICATION OF CONTRACTORS:

- 1.1. Contractors submitting a Bid must be pre-qualified for the total amount proposed, including all alternate items, prior to the date of submittal. Bids from contractors who have not been pre-qualified as applicable and Bids that exceed the maximum dollar amount at which contractors are pre-qualified may be deemed **non-responsive** and ineligible for award.
- 1.2. The completed application must be submitted online no later than 2 weeks prior to the bid opening.
- 1.3. **Joint Venture Bidders Cumulative Maximum Bidding Capacity:** For projects with an engineer's estimate of \$30,000,000 or greater, Joint Ventures submitting bids may be deemed responsive and eligible for award if the cumulative maximum bidding capacity of the individual Joint Venture entities is equal to or greater than the total amount proposed.
  - 1.3.1. Each of the entities of the Joint Venture must have been previously prequalified at a minimum of \$15,000,000.
  - 1.3.2. Bids submitted with a total amount proposed of less than \$30,000,000 are not eligible for Cumulative Maximum Bidding Capacity prequalification. To be eligible for award in this scenario, the Joint Venture itself or at least one of the Joint Venture entities must have been prequalified for the total amount proposed.
  - 1.3.3. Bids submitted by Joint Ventures with a total amount proposed of \$30,000,000 or greater on a project with an engineer's estimate of less than \$30,000,000 are not eligible for Cumulative Maximum Bidding Capacity prequalification.
  - 1.3.4. The Joint Venture designated as the Apparent Low Bidder shall provide evidence of its corporate existence and furnish good and approved bonds in the name of the Joint Venture within 14 Calendar Days of receipt by the Bidder of a form of contract for execution.
- 1.4. Complete information and links to the on-line prequalification application are available at:  
<http://www.sandiego.gov/cip/bidopps/prequalification>
- 1.5. Due to the City's responsibility to protect the confidentiality of the contractors' information, City staff will not be able to provide information regarding contractors' prequalification status over the telephone. Contractors may access real-time information about their prequalification status via their vendor profile on [PlanetBids™](#).

2. **ELECTRONIC FORMAT RECEIPT AND OPENING OF BIDS:** Bids will be received in electronic format (eBids) EXCLUSIVELY at the City of San Diego's electronic bidding (eBidding) site, at: <http://www.sandiego.gov/cip/bidopps/index.shtml> and are due by the date, and time shown on the cover of this solicitation.

- 2.1. **BIDDERS MUST BE PRE-REGISTERED** with the City's bidding system and possess a system-assigned Digital ID in order to submit and electronic bid.

- 2.2.** The City's bidding system will automatically track information submitted to the site including IP addresses, browsers being used and the URLs from which information was submitted. In addition, the City's bidding system will keep a history of every login instance including the time of login, and other information about the user's computer configuration such as the operating system, browser type, version, and more. Because of these security features, Contractors who disable their browsers' cookies will not be able to log in and use the City's bidding system.
- 2.3.** The City's electronic bidding system is responsible for bid tabulations. Upon the bidder's or proposer's entry of their bid, the system will ensure that all required fields are entered. **The system will not accept a bid for which any required information is missing.** This includes all necessary pricing, subcontractor listing(s) and any other essential documentation and supporting materials and forms requested or contained in these solicitation documents.
- 2.4. BIDS REMAIN SEALED UNTIL BID DEADLINE.** eBids are transmitted into the City's bidding system via hypertext transfer protocol secure (https) mechanism using SSL 128-256 bit security certificates issued from Verisign/Thawte which encrypts data being transferred from client to server. Bids submitted prior to the "Bid Due Date and Time" are not available for review by anyone other than the submitter who has until the "Bid Due Date and Time" to change, rescind or retrieve its proposal should it desire to do so.
- 2.5. BIDS MUST BE SUBMITTED BY BID DUE DATE AND TIME.** Once the bid deadline is reached, no further submissions are accepted into the system. Once the Bid Due Date and Time has lapsed, bidders, proposers, the general public, and City staff are able to immediately see the results on line. City staff may then begin reviewing the submissions for responsiveness, EOCP compliance and other issues. The City may require any Bidder to furnish statement of experience, financial responsibility, technical ability, equipment, and references.
- 2.6. RECAPITULATION OF THE WORK.** Bids shall not contain any recapitulation of the Work. Conditional Bids may be rejected as being non-responsive. Alternative proposals will not be considered unless called for.
- 2.7. BIDS MAY BE WITHDRAWN** by the Bidder only up to the bid due date and time.
- 2.7.1. Important Note:** Submission of the electronic bid into the system may not be instantaneous. Due to the speed and capabilities of the user's internet service provider (ISP), bandwidth, computer hardware and other variables, it may take time for the bidder's submission to upload and be received by the City's eBidding system. It is the bidder's sole responsibility to ensure their bids are received on time by the City's eBidding system. The City of San Diego is not responsible for bids that do not arrive by the required date and time.

- 2.8. ACCESSIBILITY AND AMERICANS WITH DISABILITIES ACT (ADA) COMPLIANCE:**  
To request a copy of this solicitation in an alternative format, contact the Engineering & Capital Projects Department Contract Specialist listed on the cover of this solicitation at least five (5) working days prior to the Bid/Proposal due date to ensure availability.

**3. ELECTRONIC BID SUBMISSIONS CARRY FULL FORCE AND EFFECT**

- 3.1.** The bidder, by submitting its electronic bid, acknowledges that doing so carries the same force and full legal effect as a paper submission with a longhand (wet) signature.
- 3.2.** By submitting an electronic bid, the bidder certifies that the bidder has thoroughly examined and understands the entire Contract Documents (which consist of the plans and specifications, drawings, forms, affidavits and the solicitation documents), and that by submitting the eBid as its bid proposal, the bidder acknowledges, agrees to and is bound by the entire Contract Documents, including any addenda issued thereto, and incorporated by reference in the Contract Documents.
- 3.3.** The Bidder, by submitting its electronic bid, agrees to and certifies under penalty of perjury under the laws of the State of California, that the certification, forms and affidavits submitted as part of this bid are true and correct.
- 3.4.** The Bidder agrees to the construction of the project as described in Attachment "A-Scope of Work" for the City of San Diego, in accordance with the requirements set forth herein for the electronically submitted prices. The Bidder guarantees the Contract Price for a period of 120 days from the date of Bid opening. The duration of the Contract Price guarantee shall be extended by the number of days required for the City to obtain all items necessary to fulfill all conditions precedent.

- 4. BIDS ARE PUBLIC RECORDS:** Upon receipt by the City, Bids shall become public records subject to public disclosure. It is the responsibility of the respondent to clearly identify any confidential, proprietary, trade secret or otherwise legally privileged information contained within the Bid. General references to sections of the California Public Records Act (PRA) will not suffice. If the Contractor does not provide applicable case law that clearly establishes that the requested information is exempt from the disclosure requirements of the PRA, the City shall be free to release the information when required in accordance with the PRA, pursuant to any other applicable law, or by order of any court or government agency, and the Contractor will hold the City harmless for release of this information.

**5. CONTRACTOR REGISTRATION AND ELECTRONIC REPORTING SYSTEM:**

- 5.1.** **Prior** to the Award of the Contract or Task Order, you and your Subcontractors and Suppliers must register with the City's web-based vendor registration and bid management system. For additional information go to:  
<http://www.sandiego.gov/purchasing/bids-contracts/vendorreg>
- 5.2.** The City may not award the contract until registration of all subcontractors and suppliers is complete. In the event this requirement is not met within the time frame specified in the Notice of Intent to Award letter, the City reserves the right to rescind the Notice of Award / Intent to Award and to make the award to the next responsive and responsible bidder / proposer.

- 6. JOINT VENTURE CONTRACTORS:** Provide a copy of the Joint Venture agreement and the Joint Venture license to the City within 14 Calendar Days after receiving the Contract forms.
- 7. INSURANCE REQUIREMENTS:**
- 7.1.** All certificates of insurance and endorsements required by the contract are to be provided upon issuance of the City's Notice of Intent to Award letter.
- 7.2.** Refer to sections 5-4, "INSURANCE" of the Supplementary Special Provisions (SSP) for the insurance requirements which must be met.
- 8. REFERENCE STANDARDS:** Except as otherwise noted or specified, the Work shall be completed in accordance with the following standards:

Title	Edition	Document Number
Standard Specifications for Public Works Construction ("The GREENBOOK") <a href="http://www.greenbookspecs.org/">http://www.greenbookspecs.org/</a>	2018	PWPI010119-01
City of San Diego Standard Specifications for Public Works Construction ("The WHITEBOOK")* <a href="https://www.sandiego.gov/ecp/edocref/greenbook">https://www.sandiego.gov/ecp/edocref/greenbook</a>	2018	PWPI010119-02
City of San Diego Standard Drawings* <a href="https://www.sandiego.gov/ecp/edocref/standarddraw">https://www.sandiego.gov/ecp/edocref/standarddraw</a>	2018	PWPI010119-03
Citywide Computer Aided Design and Drafting (CADD) Standards <a href="https://www.sandiego.gov/ecp/edocref/drawings">https://www.sandiego.gov/ecp/edocref/drawings</a>	2018	PWPI010119-04
California Department of Transportation (CALTRANS) Standard Specifications <a href="https://dot.ca.gov/programs/design/ccs-standard-plans-and-standard-specifications">https://dot.ca.gov/programs/design/ccs-standard-plans-and-standard-specifications</a>	2018	PWPI030119-05
CALTRANS Standard Plans <a href="https://dot.ca.gov/programs/design/ccs-standard-plans-and-standard-specifications">https://dot.ca.gov/programs/design/ccs-standard-plans-and-standard-specifications</a>	2018	PWPI030119-06
California Manual on Uniform Traffic Control Devices Revision 5 (CA MUTCD 2014 Rev 5) <a href="http://www.dot.ca.gov/programs/safety-programs/camutcd/camutcd-rev5">http://www.dot.ca.gov/programs/safety-programs/camutcd/camutcd-rev5</a>	2014	PWPI042220-09
<p><b>NOTE:</b> *Available online under Engineering Documents and References at: <a href="https://www.sandiego.gov/ecp/edocref/">https://www.sandiego.gov/ecp/edocref/</a></p> <p>*Electronic updates to the Standard Drawings may also be found in the link above</p>		

- 9. CITY'S RESPONSES AND ADDENDA:** The City, at its discretion, may respond to any or all questions submitted in writing via the City's eBidding web site in the **form of an addendum**. No other responses to questions, oral or written shall be of any force or effect with respect to this solicitation. The changes to the Contract Documents through addenda are made effective as though originally issued with the Bid. The Bidders shall acknowledge the receipt of Addenda at the time of bid submission.

**10. CITY'S RIGHTS RESERVED:** The City reserves the right to cancel the Notice Inviting Bids at any time, and further reserves the right to reject submitted Bids, without giving any reason for such action, at its sole discretion and without liability. Costs incurred by the Bidder(s) as a result of preparing Bids under the Notice Inviting Bids shall be the sole responsibility of each bidder. The Notice Inviting Bids creates or imposes no obligation upon the City to enter a contract.

**11. CONTRACT PRICING:** This solicitation is for a Lump Sum contract with Unit Price provisions as set forth herein. The Bidder agrees to perform construction services for the City of San Diego in accordance with these contract documents for the prices listed below. The Bidder further agrees to guarantee the Contract Price for a period of 120 days from the date of Bid opening. The duration of the Contract Price guarantee may be extended, by mutual consent of the parties, by the number of days required for the City to obtain all items necessary to fulfill all contractual conditions.

**12. SUBCONTRACTOR INFORMATION:**

**12.1. LISTING OF SUBCONTRACTORS.** In accordance with the requirements provided in the "Subletting and Subcontracting Fair Practices Act" of the California Public Contract Code, the Bidder shall provide the **NAME** and **ADDRESS** of each Subcontractor who will perform work, labor, render services or who specially fabricates and installs a portion [type] of the work or improvement, in an amount in excess of 0.5% of the Contractor's total Bid. The Bidder shall also state within the description, whether the subcontractor is a **CONSTRUCTOR, CONSULTANT** or **SUPPLIER**. The Bidder shall state the **DIR REGISTRATION NUMBER** for all subcontractors and shall further state within the description, the **PORTION** of the work which will be performed by each subcontractor under this Contract. The Contractor shall list only one Subcontractor for each portion of the Work. The **DOLLAR VALUE** of the total Bid to be performed shall be stated for all subcontractors listed. Failure to comply with this requirement may result in the Bid being rejected as **non-responsive** and ineligible for award. The Bidder's attention is directed to the Special Provisions - General; Paragraph 2-3, "Subcontracts", which stipulates the percent of the Work to be performed with the Bidders' own forces. The Bidder shall list all SLBE, ELBE, DBE, DVBE, MBE, WBE, OBE, SDB, WoSB, HUBZone, and SDVOSB Subcontractors for which Bidders are seeking recognition towards achieving any mandatory, voluntary (or both) subcontracting participation goals.

Additionally, pursuant to California Senate Bill 96 and in accordance with the requirements of Labor Code sections 1771.1 and 1725.5, by submitting a bid or proposal to the City, Contractor is certifying that he or she has verified that all subcontractors used on this public work project are registered with the California Department of Industrial Relations (DIR). **The Bidder shall provide the name, address, license number, DIR registration number of any Subcontractor – regardless of tier** - who will perform work, labor, render services or specially fabricate and install a portion [type] of the work or improvement pursuant to the contract.

**12.2. LISTING OF SUPPLIERS.** Any Bidder seeking the recognition of Suppliers of equipment, materials, or supplies obtained from third party Suppliers towards achieving any mandatory or voluntary (or both) subcontracting participation goals shall provide, at a minimum, the **NAME, LOCATION (CITY), DIR REGISTRATION NUMBER** and the **DOLLAR VALUE** of each supplier. The Bidder will be credited up to 60% of the amount to be paid to the Suppliers for materials and supplies unless vendor manufactures or substantially alters materials and supplies, in which case, 100% will be credited. The Bidder is to indicate

within the description whether the listed firm is a supplier or manufacturer. If no indication is provided, the listed firm will be credited at 60% of the listed dollar value for purposes of calculating the Subcontractor Participation Percentage.

- 12.3. LISTING OF SUBCONTRACTORS OR SUPPLIERS FOR ALTERNATES.** For subcontractors or suppliers to be used on additive or deductive alternate items, in addition to the above requirements, bidder shall further note "ALTERNATE" and alternate item number within the description.
- 13. SUBMITTAL OF "OR EQUAL" ITEMS:** See Section 4-6, "Trade Names" in The WHITEBOOK and as amended in the SSP.
- 14. AWARD:**
- 14.1.** The Award of this contract is contingent upon the Contractor's compliance with all condition's precedent to Award.
- 14.2.** Upon acceptance of a Bid, the City will prepare contract documents for execution within approximately 21 days of the date of the Bid opening and award the Contract approximately within 7 days of receipt of properly executed Contract, bonds, and insurance documents.
- 14.3.** This contract will be deemed executed and effective only upon the signing of the Contract by the Mayor or his designee and approval as to form the City Attorney's Office.
- 15. SUBCONTRACT LIMITATIONS:** The Bidder's attention is directed to Standard Specifications for Public Works Construction, Section 3-2, "SELF-PERFORMANCE" in The GREENBOOK and as amended in the SSP which requires the Contractor to self-perform not less than the specified amount. Failure to comply with this requirement shall render the bid **non-responsive** and ineligible for award.
- 16. AVAILABILITY OF PLANS AND SPECIFICATIONS:** Contract Documents may be obtained by visiting the City's website: <http://www.sandiego.gov/cip/>. Plans and Specifications for this contract are also available for review in the office of the City Clerk or Engineering & Capital Projects Department, Contracts Division.
- 17. ONLY ONE BID PER CONTRACTOR SHALL BE ACCEPTED:** No person, firm, or corporation shall be allowed to make, file, or be interested in more than one (1) Bid for the same work unless alternate Bids are called for. A person, firm or corporation who has submitted a sub-proposal to a Bidder, or who has quoted prices on materials to a Bidder, is not hereby disqualified from submitting a sub-proposal or quoting prices to other Bidders or from submitting a Bid in its own behalf. Any Bidder who submits more than one bid will result in the rejection of all bids submitted.
- 18. SAN DIEGO BUSINESS TAX CERTIFICATE:** The Contractor and Subcontractors, not already having a City of San Diego Business Tax Certificate for the work contemplated shall secure the appropriate certificate from the City Treasurer, Civic Center Plaza, First floor and submit to the Contract Specialist upon request or as specified in the Contract Documents. Tax Identification numbers for both the Bidder and the listed Subcontractors must be submitted on the City provided forms within these documents.

**19. BIDDER'S GUARANTEE OF GOOD FAITH (BID SECURITY) FOR DESIGN-BID-BUILD CONTRACTS:**

- 19.1.** For bids \$250,000 and above, bidders shall submit Bid Security at bid time. Bid Security shall be in one of the following forms: a cashier's check, or a properly certified check upon some responsible bank; or an approved corporate surety bond payable to the City of San Diego for an amount of not less than 10% of the total bid amount.
- 19.2.** This check or bond, and the monies represented thereby, will be held by the City as a guarantee that the Bidder, if awarded the contract, will in good faith enter into the contract and furnish the required final performance and payment bonds.
- 19.3.** The Bidder agrees that in the event of the Bidder's failure to execute this contract and provide the required final bonds, the money represented by the cashier's or certified check will remain the property of the City; and the Surety agrees that it will pay to the City the damages, not exceeding the sum of 10% of the amount of the Bid, that the City may suffer as a result of such failure.
- 19.4.** At the time of bid submission, bidders must upload and submit an electronic PDF copy of the aforementioned bid security. Whether in the form of a cashier's check, a properly certified check or an approved corporate surety bond payable to the City of San Diego, the bid security must be uploaded to the City's eBidding system. By 5PM, 3 working days after the bid opening date, all bidders must provide the City with the original bid security.
- 19.5.** Failure to submit the electronic version of the bid security at the time of bid submission AND failure to provide the original by 5PM, 3 working days after the bid opening date shall cause the bid to be rejected and deemed **non-responsive**.

Due to circumstances related to Covid-19, until further notice, all original bid bond submittals must be received by 5 PM, 3 working days after bid opening.

Upon circumstances returning to normal business as usual, the original bid bond shall once again be due by 5 PM the day after bid opening.

Original Bid Bond shall be submitted to:  
Engineering & Capital Projects Department, Contracts Division  
525 B Street, Suite 750 (7th Floor)  
San Diego, California, 92101  
To the Attention of the Contract Specialist on the Front Page of this solicitation.

**20. AWARD OF CONTRACT OR REJECTION OF BIDS:**

- 20.1.** This contract may be awarded to the lowest responsible and reliable Bidder.
- 20.2.** Bidders shall complete ALL eBid forms as required by this solicitation. Incomplete eBids will not be accepted.



- 20.3.** The City reserves the right to reject any or all Bids, to waive any informality or technicality in Bids received, and to waive any requirements of these specifications as to bidding procedure.
- 20.4.** Bidders will not be released on account of their errors of judgment. Bidders may be released only upon receipt by the City within 3 Working Days of the bid opening, written notice from the Bidder which shows proof of honest, credible, clerical error of a material nature, free from fraud or fraudulent intent; and of evidence that reasonable care was observed in the preparation of the Bid.
- 20.5.** A bidder who is not selected for contract award may protest the award of a contract to another bidder by submitting a written protest in accordance with the San Diego Municipal Code.
- 20.6.** The City of San Diego will not discriminate in the award of contracts with regard to race, religion creed, color, national origin, ancestry, physical handicap, marital status, sex or age.
- 20.7.** Each Bid package properly signed as required by these specifications shall constitute a firm offer which may be accepted by the City within the time specified herein.
- 20.8.** The City reserves the right to evaluate all Bids and determine the lowest Bidder on the basis of the base bid and any proposed alternates or options as detailed herein.

**21. BID RESULTS:**

- 21.1.** The availability of the bids on the City's eBidding system shall constitute the public announcement of the apparent low bidder. In the event that the apparent low bidder is subsequently deemed non-responsive or non-responsible, a notation of such will be made on the eBidding system. The new ranking and apparent low bidder will be adjusted accordingly.
- 21.2.** To obtain the bid results, view the results on the City's web site, or request the results by U.S. mail and provide a self-addressed, stamped envelope. If requesting by mail, be sure to reference the bid name and number. The bid tabulations will be mailed to you upon their completion. The results will not be given over the telephone.

**22. THE CONTRACT:**

- 22.1.** The Bidder to whom award is made shall execute a written contract with the City of San Diego and furnish good and approved bonds and insurance certificates specified by the City within 14 days after receipt by Bidder of a form of contract for execution unless an extension of time is granted to the Bidder in writing.
- 22.2.** If the Bidder takes longer than 14 days to fulfill these requirements, then the additional time taken shall be added to the Bid guarantee. The Contract shall be made in the form adopted by the City, which includes the provision that no claim or suit whatsoever shall be made or brought by Contractor against any officer, agent, or employee of the City for or on account of anything done or omitted to be done in connection with this contract, nor shall any such officer, agent, or employee be liable hereunder.

- 22.3.** If the Bidder to whom the award is made fails to enter into the contract as herein provided, the award may be annulled and the Bidder's Guarantee of Good Faith will be subject to forfeiture. An award may be made to the next lowest responsible and reliable Bidder who shall fulfill every stipulation embraced herein as if it were the party to whom the first award was made.
- 22.4.** Pursuant to the San Diego City Charter section 94, the City may only award a public works contract to the lowest responsible and reliable Bidder. The City will require the Apparent Low Bidder to (i) submit information to determine the Bidder's responsibility and reliability, (ii) execute the Contract in form provided by the City, and (iii) furnish good and approved bonds and insurance certificates specified by the City within 14 Days, unless otherwise approved by the City, in writing after the Bidder receives notification from the City, designating the Bidder as the Apparent Low Bidder and formally requesting the above mentioned items.
- 22.5.** The award of the Contract is contingent upon the satisfactory completion of the above-mentioned items and becomes effective upon the signing of the Contract by the Mayor or designee and approval as to form by the City Attorney's Office. If the Apparent Low Bidder does not execute the Contract or submit required documents and information, the City may award the Contract to the next lowest responsible and reliable Bidder who shall fulfill every condition precedent to award. A corporation designated as the Apparent Low Bidder shall furnish evidence of its corporate existence and evidence that the officer signing the Contract and bond for the corporation is duly authorized to do so.
- 23. EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE OF WORK:** The Bidder shall examine carefully the Project Site, the Plans and Specifications, other materials as described in the Special Provisions, Section 3-9, "TECHNICAL STUDIES AND SUBSURFACE DATA", and the proposal forms (e.g., Bidding Documents). The submission of a Bid shall be conclusive evidence that the Bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality, and scope of Work, the quantities of materials to be furnished, and as to the requirements of the Bidding Documents Proposal, Plans, and Specifications.
- 24. CITY STANDARD PROVISIONS:** This contract is subject to the following standard provisions. See The WHITEBOOK for details.
- 24.1.** The City of San Diego Resolution No. R-277952 adopted on May 20, 1991 for a Drug-Free Workplace.
- 24.2.** The City of San Diego Resolution No. R-282153 adopted on June 14, 1993 related to the Americans with Disabilities Act.
- 24.3.** The City of San Diego Municipal Code §22.3004 for Contractor Standards.
- 24.4.** The City of San Diego's Labor Compliance Program and the State of California Labor Code §§1771.5(b) and 1776.
- 24.5.** Sections 1777.5, 1777.6, and 1777.7 of the State of California Labor Code concerning the employment of apprentices by contractors and subcontractors performing public works contracts.

**24.6.** The City's Equal Benefits Ordinance (EBO), Chapter 2, Article 2, Division 43 of The San Diego Municipal Code (SDMC).

**24.7.** The City's Information Security Policy (ISP) as defined in the City's Administrative Regulation 90.63.

**25. PRE-AWARD ACTIVITIES:**

**25.1.** The contractor selected by the City to execute a contract for this Work shall submit the required documentation as specified herein and in the Notice of Intent To Award. Failure to provide the information as specified may result in the Bid being rejected as **non-responsive**.

**25.2.** The decision that bid is non-responsive for failure to provide the information required within the time specified shall be at the sole discretion of the City.

## PERFORMANCE BOND, LABOR AND MATERIALMEN'S BOND

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### FAITHFUL PERFORMANCE BOND AND LABOR AND MATERIALMEN'S BOND:

PCL Construction Inc., a corporation, as principal, and ~~Federal Insurance Company, Travelers Casualty and Surety Company of America, Berkshire Hathaway Specialty Insurance Company, Liberty Mutual Insurance Company~~ a corporation authorized to do business in the State of California, as Surety, hereby obligate themselves, their successors and assigns, jointly and severally, to The City of San Diego a municipal corporation in the sum of **Forty Million Eighty Six Thousand Six Hundred Ninety Dollars and Zero Cents (\$40,086,690.00)** for the faithful performance of the annexed contract, and in the sum of **Forty Million Eighty Six Thousand Six Hundred Ninety Dollars and Zero Cents (\$40,086,690.00)** for the benefit of laborers and materialmen designated below.

#### Conditions:

If the Principal shall faithfully perform the annexed contract with the City of San Diego, California, then the obligation herein with respect to a faithful performance shall be void; otherwise, it shall remain in full force.

If the Principal shall promptly pay all persons, firms and corporations furnishing materials for or performing labor in the execution of this contract and shall pay all amounts due under the California Unemployment Insurance Act then the obligation herein with respect to laborers and materialmen shall be void; otherwise, it shall remain in full force.

The obligation herein with respect to laborers and materialmen shall inure to the benefit of all persons, firms and corporations entitled to file claims under the provisions of Article 2, Claimants, (iii) public works of improvement commencing with Civil Code Section 9100 of the Civil Code of the State of California.

Changes in the terms of the annexed contract or specifications accompanying same or referred to therein shall not affect the Surety's obligation on this bond, and the Surety hereby waives notice of same.

The Surety expressly agrees that the City of San Diego may reject any contractor or subcontractor which may be proposed by Surety in fulfillment of its obligations in the event of default by the Principal.

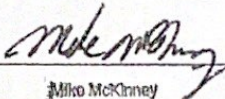
The Surety shall not utilize the Principal in completing the improvements and work specified in the Agreement in the event the City terminates the Principal for default.

PERFORMANCE BOND, LABOR AND MATERIALMEN'S BOND (continued)

Dated June 3, 2021

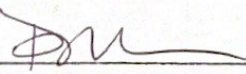
Approved as to Form

PCL Construction, Inc.  
Principal

By   
Mike McKinney  
President

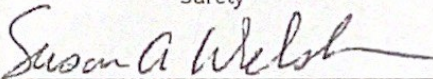
Printed Name of Person Signing for Principal

Mara W. Elliott, City Attorney

By   
Deputy City Attorney

Federal Insurance Company  
Travelers Casualty and Surety Company of America  
Berkshire Hathaway Specialty Insurance Company  
Liberty Mutual Insurance Company

Surety

By 

Attorney-in-fact Susan A. Welsh

202B Hall's Mill Road  
One Tower Square, Bond/5PB  
1314 Douglas Street Suite 1400  
175 Berkeley Street

Local Address of Surety  
Whitehouse Station, NJ 08889

Hartford, CT 06183  
Omaha, NE 68102-1944  
Boston, MA 02116

Local Address (City, State) of Surety

800-392-3770  
800-747-3719  
770-625-2516  
312-454-7750

Local Telephone No. of Surety

Premium \$ 200,385.00

Bond No. K40583610, 107385660, 47SUR300199010004,  
285067153

## CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

A Notary Public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of Illinois

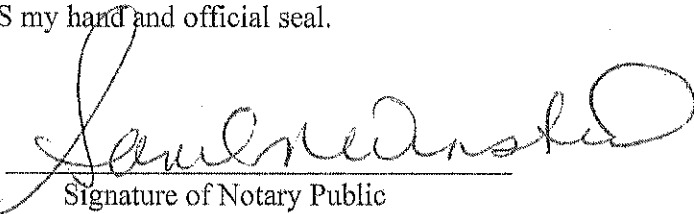
County of Cook

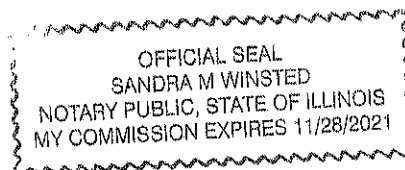
On 3<sup>rd</sup> day of June, 2021, before me, Sandra M. Winsted, Notary Public, personally appeared Susan A. Welsh who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature

  
Signature of Notary Public



Power of Attorney

Federal Insurance Company | Vigilant Insurance Company | Pacific Indemnity Company
Westchester Fire Insurance Company | ACE American Insurance Company

Know All by These Presents, that FEDERAL INSURANCE COMPANY, an Indiana corporation, VIGILANT INSURANCE COMPANY, a New York corporation, PACIFIC INDEMNITY COMPANY, a Wisconsin corporation, WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY corporations of the Commonwealth of Pennsylvania, do each hereby constitute and appoint Samantha Chierici, Jessica B. Dempsey, Derek J. Elston, Rachel Fore, Kristin L Hannigan, Jennifer L. Jakaitis, Andrew Marks, James B. McTaggart, Judith A. Lucky-Eftimov, Sandra M. Nowak, Diane M. O'Leary, Nicholas Pantazis, Christina L. Sandoval, Bartlomiej Siepierski, Christopher P. Troha, Aerie Walton, Susan A. Welsh and Sandra M. Winsted of Chicago, Illinois

each as their true and lawful Attorney-in-Fact to execute under such designation in their names and to affix their corporate seals to and deliver for and on their behalf as surety thereon or otherwise, bonds and undertakings and other writings obligatory in the nature thereof (other than bail bonds) given or executed in the course of business, and any instruments amending or altering the same, and consents to the modification or alteration of any instrument referred to in said bonds or obligations.

In Witness Whereof, said FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, PACIFIC INDEMNITY COMPANY, WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY have each executed and attested these presents and affixed their corporate seals on this 26th day of February, 2021.

Dawn M. Chloros

Dawn M. Chloros, Assistant Secretary

Stephen M. Haney

Stephen M. Haney, Vice President



STATE OF NEW JERSEY
County of Hunterdon

ss.

On this 26th day of February, 2021 before me, a Notary Public of New Jersey, personally came Dawn M. Chloros and Stephen M. Haney, to me known to be Assistant Secretary and Vice President, respectively, of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, PACIFIC INDEMNITY COMPANY, WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY, the companies which executed the foregoing Power of Attorney, and the said Dawn M. Chloros and Stephen M. Haney, being by me duly sworn, severally and each for herself and himself did depose and say that they are Assistant Secretary and Vice President, respectively, of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, PACIFIC INDEMNITY COMPANY, WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY and know the corporate seals thereof, that the seals affixed to the foregoing Power of Attorney are such corporate seals and were thereto affixed by authority of said Companies; and that their signatures as such officers were duly affixed and subscribed by like authority.

Notarial Seal



KATHERINE J. ADELAAR
NOTARY PUBLIC OF NEW JERSEY
No. 2316885
Commission Expires July 16, 2024

Signature of Notary Public

CERTIFICATION

Resolutions adopted by the Boards of Directors of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY on August 30, 2016; WESTCHESTER FIRE INSURANCE COMPANY on December 11, 2006; and ACE AMERICAN INSURANCE COMPANY on March 20, 2009:

"RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into in the ordinary course of business (each a "Written Commitment"):

- (1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.
(2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such person's written appointment as such attorney-in-fact.
(3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
(4) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing to any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
(5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested."

I, Dawn M. Chloros, Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, PACIFIC INDEMNITY COMPANY, WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY (the "Companies") do hereby certify that

- (i) the foregoing Resolutions adopted by the Board of Directors of the Companies are true, correct and in full force and effect,
(ii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Whitehouse Station, NJ, this 6/3/2021



Dawn M. Chloros

Dawn M. Chloros, Assistant Secretary

IN THE EVENT YOU WISH TO VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT:
Telephone (908) 903-3493 Fax (908) 903-3656 e-mail: surety@chubb.com





**Travelers Casualty and Surety Company of America**  
**Travelers Casualty and Surety Company**  
**St. Paul Fire and Marine Insurance Company**

**POWER OF ATTORNEY**

**KNOW ALL MEN BY THESE PRESENTS:** That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint **Susan A. Welsh** of **Chicago Illinois**, their true and lawful Attorney-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

**IN WITNESS WHEREOF**, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this **3rd** day of **February**, 2017.



State of Connecticut

City of Hartford ss.

By:   
 Robert L. Raney, Senior Vice President

On this the **3rd** day of **February**, 2017, before me personally appeared **Robert L. Raney**, who acknowledged himself to be the Senior Vice President of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

**In Witness Whereof**, I hereunto set my hand and official seal.

My Commission expires the **30th** day of **June**, 2021



  
 Marie C. Tetreault, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, which resolutions are now in full force and effect, reading as follows:

**RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

**FURTHER RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

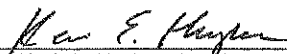
**FURTHER RESOLVED**, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

**FURTHER RESOLVED**, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, **Kevin E. Hughes**, the undersigned, Assistant Secretary of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect.

Dated this 3 day of June 2021



  
 Kevin E. Hughes, Assistant Secretary

**To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.**  
**Please refer to the above-named Attorney-in-Fact and the details of the bond to which the power is attached.**





Power of Attorney

**BERKSHIRE HATHAWAY SPECIALTY INSURANCE COMPANY  
NATIONAL INDEMNITY COMPANY / NATIONAL LIABILITY & FIRE INSURANCE COMPANY**

Know all men by these presents, that **BERKSHIRE HATHAWAY SPECIALTY INSURANCE COMPANY**, a corporation existing under and by virtue of the laws of the State of Nebraska and having an office at One Lincoln Street, 23rd Floor, Boston, Massachusetts 02111, **NATIONAL INDEMNITY COMPANY**, a corporation existing under and by virtue of the laws of the State of Nebraska and having an office at 3024 Harney Street, Omaha, Nebraska 68131 and **NATIONAL LIABILITY & FIRE INSURANCE COMPANY**, a corporation existing under and by virtue of the laws of the State of Connecticut and having an office at 100 First Stamford Place, Stamford, Connecticut 06902 (hereinafter collectively the "Companies"), pursuant to and by the authority granted as set forth herein, do hereby name, constitute and appoint: Sandra M. Winsted, Susan A. Welsh, Derek J. Elston, Sandra M. Nowak, Christopher P. Troha, Jessica B. Demosey, Judith A. Lucky-Eftimov, Christina L. Sandoval, Aerie Walton, Bartlomiej Slepiewski, Rachel Fore, 200 East Randolph St, Aon Center of the city of Chicago, State of Illinois, their true and lawful attorney(s)-in-fact to make, execute, seal, acknowledge, and deliver, for and on their behalf as surety and as their act and deed, any and all undertakings, bonds, or other such writings obligatory in the nature thereof, in pursuance of these presents, the execution of which shall be as binding upon the Companies as if it has been duly signed and executed by their regularly elected officers in their own proper persons. This authority for the Attorney-in-Fact shall be limited to the execution of the attached bond(s) or other such writings obligatory in the nature thereof.

In witness whereof, this Power of Attorney has been subscribed by an authorized officer of the Companies, and the corporate seals of the Companies have been affixed hereto this date of December 20, 2018. This Power of Attorney is made and executed pursuant to and by authority of the Bylaws, Resolutions of the Board of Directors, and other Authorizations of BERKSHIRE HATHAWAY SPECIALTY INSURANCE COMPANY, NATIONAL INDEMNITY COMPANY and NATIONAL LIABILITY & FIRE INSURANCE COMPANY, which are in full force and effect, each reading as appears on the back page of this Power of Attorney, respectively. The following signature by an authorized officer of the Company may be a facsimile, which shall be deemed the equivalent of and constitute the written signature of such officer of the Company for all purposes regarding this Power of Attorney, including satisfaction of any signature requirements on any and all undertakings, bonds, or other such writings obligatory in the nature thereof, to which this Power of Attorney applies.

**BERKSHIRE HATHAWAY SPECIALTY  
INSURANCE COMPANY,**

By: \_\_\_\_\_  
David Fields, Executive Vice President



**NATIONAL INDEMNITY COMPANY,  
NATIONAL LIABILITY & FIRE INSURANCE COMPANY,**

By: \_\_\_\_\_  
David Fields, Vice President

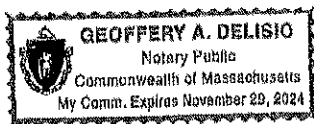


**NOTARY**

State of Massachusetts, County of Suffolk, ss:

On this 20th day of December, 2018, before me appeared David Fields, Executive Vice President of BERKSHIRE HATHAWAY SPECIALTY INSURANCE COMPANY and Vice President of NATIONAL INDEMNITY COMPANY and NATIONAL LIABILITY & FIRE INSURANCE COMPANY, who being duly sworn, says that his capacity is as designated above for such Companies; that he knows the corporate seals of the Companies; that the seals affixed to the foregoing instrument are such corporate seals; that they were affixed by order of the board of directors or other governing body of said Companies pursuant to its Bylaws, Resolutions and other Authorizations, and that he signed said instrument in that capacity of said Companies.

[Notary Seal]



\_\_\_\_\_  
Notary Public

I, Ralph Tortorella, the undersigned, Officer of BERKSHIRE HATHAWAY SPECIALTY INSURANCE COMPANY, NATIONAL INDEMNITY COMPANY and NATIONAL LIABILITY & FIRE INSURANCE COMPANY, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies which is in full force and effect and has not been revoked. IN TESTIMONY WHEREOF, see hereunto affixed the seals of said Companies this 6/3/2021.



\_\_\_\_\_  
Officer

To verify the authenticity of this Power of Attorney please contact us at: BHSI Surety Department, Berkshire Hathaway Specialty Insurance Company, One Lincoln Street, 23rd Floor Boston, MA 02111 | (770) 625-2516 or by email at [Jennifer.Porces@bhsspecialty.com](mailto:Jennifer.Porces@bhsspecialty.com) THIS POWER OF ATTORNEY IS VOID IF ALTERED  
To notify us of a claim please contact us on our 24-hour toll free number at (855) 453-9675, via email at [claims@bhsspecialty.com](mailto:claims@bhsspecialty.com), via fax to (617) 507-8259, or via mail.

**BERKSHIRE HATHAWAY SPECIALTY INSURANCE COMPANY (BYLAWS)**

ARTICLE V.

CORPORATE ACTIONS

....

EXECUTION OF DOCUMENTS:

....

Section 6.(b) The President, any Vice President or the Secretary, shall have the power and authority:

- (1) To appoint Attorneys-in-fact, and to authorize them to execute on behalf of the Company bonds and other undertakings, and
- (2) To remove at any time any such Attorney-in-fact and revoke the authority given him.

**NATIONAL INDEMNITY COMPANY (BY-LAWS)**

Section 4. Officers, Agents, and Employees:

A. The officers shall be a President, one or more Vice Presidents, a Secretary, one or more Assistant Secretaries, a Treasurer, and one or more Assistant Treasurers none of whom shall be required to be shareholders or Directors and each of whom shall be elected annually by the Board of Directors at each annual meeting to serve a term of office of one year or until a successor has been elected and qualified, may serve successive terms of office, may be removed from office at any time for or without cause by a vote of a majority of the Board of Directors, and shall have such powers and rights and be charged with such duties and obligations as usually are vested in and pertain to such office or as may be directed from time to time by the Board of Directors; and the Board of Directors or the officers may from time to time appoint, discharge, engage, or remove such agents and employees as may be appropriate, convenient, or necessary to the affairs and business of the corporation.

**NATIONAL INDEMNITY COMPANY (BOARD RESOLUTION ADOPTED AUGUST 6, 2014)**

RESOLVED, That the President, any Vice President or the Secretary, shall have the power and authority to (1) appoint Attorneys-in-fact, and to authorize them to execute on behalf of this Company bonds and other undertakings and (2) remove at any time any such Attorney-in-fact and revoke the authority given.

**NATIONAL LIABILITY & FIRE INSURANCE COMPANY (BY-LAWS)**

ARTICLE IV

Officers

Section 1. Officers, Agents and Employees:

A. The officers shall be a president, one or more vice presidents, one or more assistant vice presidents, a secretary, one or more assistant secretaries, a treasurer, and one or more assistant treasurers, none of whom shall be required to be shareholders or directors, and each of whom shall be elected annually by the board of directors at each annual meeting to serve a term of office of one year or until a successor has been elected and qualified, may serve successive terms of office, may be removed from office at any time for or without cause by a vote of a majority of the board of directors. The president and secretary shall be different individuals. Election or appointment of an officer or agent shall not create contract rights. The officers of the Corporation shall have such powers and rights and be charged with such duties and obligations as usually are vested in and pertain to such office or as may be directed from time to time by the board of directors; and the board of directors or the officers may from time to time appoint, discharge, engage, or remove such agents and employees as may be appropriate, convenient, or necessary to the affairs and business of the Corporation.

**NATIONAL LIABILITY & FIRE INSURANCE COMPANY (BOARD RESOLUTION ADOPTED AUGUST 6, 2014)**

RESOLVED, That the President, any Vice President or the Secretary, shall have the power and authority to (1) appoint Attorneys-in-fact, and to authorize them to execute on behalf of this Company bonds and other undertakings and (2) remove at any time any such Attorney-in-fact and revoke the authority given.



This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

Certificate No: 8202968-285057

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That The Ohio Casualty Insurance Company is a corporation duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Judy A. Andersen; Samantha Chierici; Jessica B. Dempsey; Debra J. Doyle; Kristin L. Hannigan; Jennifer L. Jakaitis; Judith A. Lucky-Efimov; James B. McTaggart; Sandra M. Nowak; Diane M. O'Leary; Christina L. Sandoval; Susan A. Weish; Sandra M. Winsted

all of the city of Chicago state of IL each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 17th day of January, 2020.



Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

By: David M. Carey
David M. Carey, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, currency rate, interest rate or residual value guarantees.

State of PENNSYLVANIA
County of MONTGOMERY ss

On this 17th day of January, 2020 before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of Liberty Mutual Insurance Company, The Ohio Casualty Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at King of Prussia, Pennsylvania, on the day and year first above written.



COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Teresa Pastella, Notary Public
Upper Merion Twp., Montgomery County
My Commission Expires March 28, 2021
Member, Pennsylvania Association of Notaries

By: Teresa Pastella
Teresa Pastella, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV - OFFICERS: Section 12. Power of Attorney.

Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

ARTICLE XIII - Execution of Contracts: Section 5. Surety Bonds and Undertakings.

Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such Instruments shall be as binding as if signed by the president and attested by the secretary.

Certificate of Designation - The President of the Company, acting pursuant to the Bylaws of the Company, authorizes David M. Carey, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization - By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, Renee C. Llewellyn, the undersigned, Assistant Secretary, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 3 day of June, 2020



By: Renee C. Llewellyn
Renee C. Llewellyn, Assistant Secretary

To confirm the validity of this Power of Attorney call 1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day.

## ATTACHMENTS

**ATTACHMENT A**  
**SCOPE OF WORK**

## SCOPE OF WORK

1. **SCOPE OF WORK:** The Metropolitan Biosolids Center (MBC) is the City's regional biosolids facility that receives and processes solids from both the North City Water Reclamation Plant (NCWRP) and the Point Loma Wastewater Treatment Plant. The NCWRP will undergo an expansion under Phase 1 of the Pure Water Program, increasing biosolids flows and loadings to MBC. To accommodate these increased loadings, upgrades and improvements at MBC will be necessary. Equipment replacements are also recommended due to the age and condition of existing equipment. Improvements will be made to the following process areas: grit removal, biosolids thickening and dewatering, anaerobic digestion, biogas handling and centrate pump station.
  - 1.1. The Work shall be performed in accordance with:
    - 1.1.1. The Notice Inviting Bids and Plans numbered **41198-1001-D** through **41198-1364-D**, inclusive. Plans are provided in the link below.  
[https://drive.google.com/drive/folders/1DHtTQFc\\_t9F\\_cVIj95Tvn7Y3g0jFQGnv?usp=sharing](https://drive.google.com/drive/folders/1DHtTQFc_t9F_cVIj95Tvn7Y3g0jFQGnv?usp=sharing)
2. **LOCATION OF WORK:** The location of the Work is as follows:  
See **Appendix E – Location Map**
3. **CONTRACT TIME:** The Contract Time for completion of the Work, shall be **889 Working Days**.
4. **The project has specific milestones, constraints, testing periods, and completion requirements, which include the following:**
  - 4.1. Milestone 1 Intermediate Substantial Completion – Completion of all requirements defined herein for Intermediate Substantial Completion.
  - 4.2. Milestone 2 Start of 120-Day Integration Period – The 120-Day Integration Period starts with the Intermediate Substantial Completion of the Morena Pump Station and Conveyance, North City Water Reclamation Plant Expansion, North City Pure Water Facility, North City Pure Water Pump Station, and North City Pure Water Pipeline and Dechlorination Facility.
  - 4.3. Milestone 3 Substantial Completion – Occurs after the completion of the Integration Period, including 120-Day Integration Period and subsequent 30-Day Facility Acceptance Tests, and upon completing the prerequisites for Substantial Completion
  - 4.4. Milestone 4 Final Completion and Acceptance – After successful completion of substantial completion requirements, and all aspects of the Contract Closeout have been satisfactorily completed.

Notice of Completion will follow the Final Acceptance and Completion.

**ATTACHMENT B**  
**PHASED FUNDING PROVISIONS**

## **PHASED FUNDING PROVISIONS**

### **1. PRE-AWARD**

- 1.1.** Within 10 Working Days of the Notice of Intent to Award, the Contractor must contact the Project Manager to discuss fund availability for each phase and shall also submit the following:
  - 1.1.1.** Construction Cost Loaded Schedule in accordance with 6-1, "CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK" and 7-3, "PAYMENT."
- 1.2.** Contractor's failure to perform any of the following may result cancelling the award of the Contract:
  - 1.2.1.** Meeting with the City's Project Manager to discuss the Phased Funding Schedule.
  - 1.2.2.** Agreeing to a Phased Funding Schedule within twenty-two days of meeting with the City's Project Manager.

### **2. POST-AWARD**

- 2.1.** Do not start any construction activities for the next phase until the Notice to Proceed (NTP) has been issued by the City. The City will issue a separate NTP for each phase.
- 2.2.** The City may issue the NTP for a subsequent phase before the completion of the preceding phase.



## PHASED FUNDING SCHEDULE AGREEMENT

The particulars left blank below, such as the total number of phases and the amounts assigned to each phase, will be completed with funding specific information from the Pre-Award Schedule and Construction Cost Loaded Schedule submitted to and approved by the City.

**BID NUMBER:** K-21-1867-DBB-3

**CONTRACT OR TASK TITLE:** Metropolitan Biosolids Center Improvements Project

**CONTRACTOR:** PCL Construction, Inc.

Funding Phase	Phase Description	Phase Start	Phase Finish	Not-to-Exceed Amount
1	Mobilization, Bond, Contract execution, submittals, Equipment & Material Procurement	NTP	8/31/2021	S-17013- \$3,321,792.00  B-17006- \$161,280
2	Site work, Yard Pipe, Demo, pipe gallery work, mechanical pipe installation, equipment procurement for areas 72,76,80,10,11,94.	9/1/2021	1/31/2022	S-17013- \$10,259,623  B-17006- \$354,000
3	Mechanical pipe installation, Equipment procurement, Equipment Installation, platform installation, Demo Centrifuge & pumps, reinstall Centrifuge & pumps for areas 72,76,80,10,11,94.	2/1/2022	8/31/2023	S-17013- 18,905,495  B-17006- \$1,562,000
4	Performance testing, Plant operations, Demobilization	9/1/2023	Final Completion & Project Acceptance	S-17013- \$4,700,632  B-17006- \$821,868
<b>Contract Total</b>				<b>\$40,086,690.00</b>

**Notes:**

- 1) WHITEBOOK section 6-1.4, "Phased Funding Compensation" applies.
- 2) The total of all funding phases shall be equal to the TOTAL BID PRICE as shown on BID SCHEDULE 1 - PRICES.
- 3) This PHASED FUNDING SCHEDULE AGREEMENT will be incorporated into the CONTRACT and shall only be revised by written modifications to the CONTRACT.

**CITY OF SAN DIEGO**

PRINT NAME: Michael J. Marks  
**Construction Senior Engineer**

Signature: 

Date: 6/22/21

PRINT NAME: Reyhaneh Martin  
**Design Senior Engineer**

Signature: 

Date: 6/22/2021

**CONTRACTOR**

PRINT NAME: David Griffin

Title: Project Manager

Signature: 

Date: 06/21/2021

**ATTACHMENT C**  
**RESERVED**

**ATTACHMENT D**

**FUNDING AGENCY PROVISIONS**

**CALIFORNIA STATE REVOLVING FUND (CASRF), AND ENVIRONMENTAL  
PROTECTION AGENCY (EPA) REQUIREMENTS:**

**CLEAN WATER STATE REVOLVING FUND (CWSRF)**

**DRINKING WATER STATE REVOLVING FUND (DWSRF)**

**BUREAU OF RECLAMATION (BOR)**

**IN THE EVENT THAT THESE REQUIREMENTS CONFLICT WITH THE CITY'S GENERAL EOC REQUIREMENTS, THE FUNDING AGENCY'S REQUIREMENTS WILL CONTROL.**

**1. CALIFORNIA STATE REVOLVING FUND (CASRF) REQUIREMENTS.**

The City anticipates receiving financial assistance from the Federal Government and the State of California for this project. The following requirements are conditions of the receipt of financial assistance from the United States Environmental Protection Agency and the State Water Resources Control Board under the **California Water State Revolving Fund (CASRF)**. The firm contracting with the City (Contractor) shall comply with all of the following requirements. If there are other provisions in the Contract Documents that address the same subjects as this exhibit, Contractor shall comply with both provisions, with the more stringent requirements controlling. If there is a direct conflict between the Agreement and this exhibit, the requirements of this Exhibit shall control in order to preserve the City's eligibility to receive financial assistance.

**1.1. RECORDS.** Contractor shall maintain separate books, records and other material relative to the Project. Contractor shall also retain such books, records, and other material for itself and for each subcontractor who performed or performs work on this project for a minimum of thirty-six (36) years after Project Completion. Contractor shall require that such books, records, and other material are subject at all reasonable times (at a minimum during normal business hours) to inspection, copying, and audit by the State Water Board, the California State Auditor, the Bureau of State Audits, the United States Environmental Protection Agency (USEPA), the Office of Inspector General, the Internal Revenue Service, the Governor, or any authorized representatives of the aforementioned. Contractor shall allow and shall require its subcontractors to allow interviews during normal business hours of any employees who might reasonably have information related to such records. Contractor agrees to include a similar duty regarding audit, interviews, and records retention in any subcontract related to the performance of this Agreement. The provisions of this section shall survive the termination or expiration of this Agreement. (CWSRF Agmt. § 2.17(b); DWSRF Agmt. Ex. C § C.3.2(d)).

**1.2. BONDS.** For construction contracts of \$250,000 or more, Contractor shall not begin construction until after it has provided the City with performance and payment bonds each for 100% of the contract value. (CWSRF Agmt. § 4.3; DWSRF Agmt. Ex. C § C.3.6).

**1.3. COMPLIANCE WITH LAWS AND REGULATIONS.** Contractor shall, at all times, comply with and require its subcontractors to comply with all applicable federal and state laws, rules, guidelines, regulations, and requirements. Without limitation of the foregoing, to the extent applicable, Contractor shall:

- (a) Comply with and require its subcontractors on the Project to comply with federal DBE requirements.
- (a) Comply with and require its subcontractors to comply with the list of federal laws in this **Attachment D**. (CWSRF Agmt. § 4.5; DWSRF Agmt. Ex. C § C.3.8).

**1.4. INDEMNIFICATION.**

- a) Contractor shall defend, indemnify and hold harmless the State Water Quality Control Board, the California Infrastructure and Economic Development Bank (Bank), and any trustee, and their officers, employees, and agents for the Bonds issued by the Bank, if any, to the same extent Contractor is obligated to defend, indemnify, and hold harmless the City under the Agreement. Contractor shall

require its subcontractors to similarly defend, indemnify, and hold harmless the State Water Quality Control Board, the Bank, and any trustee, and their officers, employees, and agents for the Bonds issued by the Bank, if any, to the same extent its subcontractors are obligated to defend, indemnify, and hold harmless the Contractor. CWSRF Agmt. § 4.11; DWSRF Agmt. Ex. C § C.3.17).

#### **1.5. NON-DISCRIMINATION REQUIREMENTS.**

- a) During the performance of this Agreement, Contractor and its subcontractors shall not unlawfully discriminate, harass, or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religion, religious creed, national origin, sexual orientation, mental or physical disability (including HIV and AIDS), mental disability, medical condition, age, marital status, denial of family and medical care leave, or genetic information, gender, gender identity, gender expression, or military and veteran status.
- b) Contractor and its subcontractors shall ensure that the evaluation and treatment of their employees and applicants for employment are free from such discrimination and harassment.
- c) Contractor and its subcontractors shall comply with the provisions of the Fair Employment and Housing Act and the applicable regulations promulgated thereunder. (Gov. Code, §12990, subds. (a)-(f) et seq.; Cal. Code Regs., tit. 2, § 7285 et seq.) Such regulations are incorporated into this Agreement by reference and made a part hereof as if set forth in full.
- d) Contractor and its subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement. (CWSRF Agmt. § 4.15(e)-(h); DWSRF Agmt. Ex. C § C.3.21(e)-(h)).

**1.6. INSURANCE.** For any policy of general liability insurance concerning the construction of the Project, Contractor will cause, and will require its subcontractors to cause, a certificate of insurance to be issued showing the State Water Quality Control Board, its officers, agents, employees, and servants as additional insured. (CWSRF Agmt. § 4.17; DWSRF Agmt. Ex. C § C.3.25).

**1.7. EXCLUDED PARTIES.** Contractor shall not contract with any party who is debarred or suspended or otherwise excluded from or ineligible for participation in any work overseen, directed, funded, or administered by the State Water Board program for which this funding is authorized. For any work related to this Agreement, Contractor shall not contract with any individual or organization on the State Water Board's List of Disqualified Businesses and Persons that is identified as debarred or suspended or otherwise excluded from or ineligible for participation in any work overseen, directed, funded, or administered by the State Water Board program for which funding under this Agreement is authorized. The State Water Board's List of Disqualified Businesses and Persons is located at:

[http://www.waterboards.ca.gov/water\\_issues/programs/enforcement/fwa/dbp.shtm](http://www.waterboards.ca.gov/water_issues/programs/enforcement/fwa/dbp.shtm)  
(CWSRF Agmt. § 4.18; DWSRF Agmt. Ex. C § C.3.26).

**1.8. PREVAILING WAGES.** Contractor shall comply with all California State and Federal prevailing wage laws. Contractor shall include in its subcontracts the full the language provided in this Attachment D regarding federal prevailing wages. (CWSRF Agmt. § 4.19; DWSRF Agmt. Ex. C § C.3.28).

- 1.9. SIGNAGE.** Upon the direction of the City, Contractor shall place a sign at least four feet tall by eight feet wide made of ¾ inch thick exterior grade plywood or other approved material in a prominent location on the Project site and shall maintain the sign in good condition for the duration of the construction period. The sign must include the following disclosure statement and color logos (available from the State Water Resources Control Board):



*"Funding for this \$[insert value] million [insert name] project has been provided in full or in part by California State Revolving Funds through agreements with the State Water Resources Control Board. California's State Revolving Funds are capitalized through a variety of funding sources, including grants from the United States Environmental Protection Agency and state bond proceeds."*

The Project sign may include another agency's required promotional information so long as the above logos and disclosure statement are equally prominent on the sign. The sign shall be prepared in a professional manner. (CWSRF Agmt. Ex. A § 9; DWSRF Agmt. Ex. A § A.2.3).

See **Attachment E – Supplementary Special Provisions, Section 3-11.2, "Project Identification Sign"** for more information.

- 1.10. DISCLAIMER.** Funding for this project has been provided in full or in part through an agreement with the State Water Resources Control Board. California's State Revolving Funds are capitalized through a variety of funding sources, including grants from the United States Environmental Protection Agency and state bond proceeds. The contents of this document do not necessarily reflect the views and policies of the foregoing, nor does mention of trade names or commercial products constitute endorsement or recommendation for use. (DWSRF Agmt. Ex. A § A.2.1).

- 1.11. FEDERAL AWARD CONDITIONS.** Contractor shall comply with the following federal conditions:

- American Iron and Steel.** Unless the City has obtained a waiver from USEPA on file with the State Water Board or unless this Project is not a project for the construction, alteration, maintenance or repair of a public water system or treatment work, Contractor shall not purchase "iron and steel products" produced outside of the United States on this Project. Unless the City has obtained a waiver from USEPA on file with the State Water Board or unless this Project is not a project for the construction, alteration, maintenance or repair of a public water system or treatment work, Contractor shall ensure that all "iron and steel products" used in the Project were or will be produced in the United States. For purposes of this section, the term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials. "Steel" means an alloy that includes at least 50 percent iron, between .02 and 2 percent carbon, and may include other elements. CWSRF Agmt. Ex. E § A(1); DWSRF Agmt. Ex. C § C.4.3.i;)

2. **Wage Rate Requirements (Davis-Bacon).** Contractor shall include in its subcontracts the full the language provided in Attachment D, Section 10, regarding federal prevailing wages. CWSRF Agmt. Ex. E § A(2); DWSRF Agmt. Ex. C § C.4.3.ii;.
3. **Reserved.**
4. **Copyright and Patent.** USEPA and the State Water Board have the right to reproduce, publish, use and authorize others to reproduce, publish and use copyrighted works or other data developed pursuant to this Agreement. Where an invention is made with Project Funds, USEPA and the State Water Board retain the right to a worldwide, nonexclusive, nontransferable, irrevocable, paid-up license to practice the invention owned by Contractor. Contractor must utilize the Interagency Edison extramural invention reporting system at <http://iEdison.gov> and shall notify the State Water Board when an invention report, patent report, or utilization report is filed. (CWSRF Agmt. Ex. E § A(5)(e); DWSRF Agmt. Ex. C § C.4.3.i)
5. **Credit.** Contractor agrees that any reports, documents, publications or other materials developed for public distribution supported by this Agreement shall contain the following statement (CWSRF Agmt. Ex. E § A(5)(f)):
 

*“ This project has been funded wholly or in part by the United States Environmental Protection Agency and the State Water Resources Control Board. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency or the State Water Resources Control Board, nor does the EPA or the Board endorse trade names or recommend the use of commercial products mentioned in this document.”*
6. **Trafficking in Persons.** Contractor, its employees, its subcontractors and their employees may not engage in severe forms of trafficking in persons during the term of this Agreement, procure a commercial sex act during the term of this Agreement, or use forced labor in the performance of this Agreement. Contractor must include this provision in its subcontracts under this Agreement. Contractor must inform the City immediately of any information regarding a violation of the foregoing. Contractor understands that failure to comply with this provision may subject the State Water Board to loss of federal funds, and the loss of funding for this Project. (CWSRF Agmt. Ex. E § A(5)(h); DWSRF Agmt. Ex. C § C.4.3.xiii).

**1.12. CIVIL RIGHTS OBLIGATIONS.** Contractor shall comply with the following federal non-discrimination requirements CWSRF Agmt. Ex. E § B; DWSRF Agmt. Ex. C § C.4.3.xv);

- a) Title VI of the Civil Rights Act of 1964, which prohibits discrimination based on race, color, and national origin, including limited English proficiency (LEP).
- b) Section 504 of the Rehabilitation Act, 29 USC 794, supplemented by EO 11914, 41 FR 17871, April 29, 1976 and 11250, 30 FR 13003, October 13, 1965, which prohibits discrimination against persons with disabilities.
- c) The Age Discrimination Act, 42 USC 6101 et seq, which prohibits age discrimination.
- d) Section 13 of the Federal Water Pollution Control Act Amendments of 1972, which prohibits discrimination on the basis of sex.
- e) 40 CFR Part 7, as it relates to the foregoing.



- f) Executive Order No. 11246. Contractor shall include in its subcontracts related to the Project the following provisions (41 CFR § 60-1.4(b)):

"During the performance of this contract, the contractor agrees as follows:

- (1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the City setting forth the provisions of this nondiscrimination clause.
- (2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.
- (3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.
- (4) The contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided by the City advising the labor union or workers' representatives of the contractor's commitments under section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (5) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- (6) The contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and

will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

- (7) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- (8) The contractor will include the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such, the contractor may request the United States to enter into such litigation to protect the interests of the United States."

- g) **Disadvantaged Business Enterprises (40 CFR Part 33).** Contractor agrees to comply with the requirements of USEPA's Program for Utilization of Small, Minority and Women's Business Enterprises. The DBE rule can be accessed at [www.epa.gov/osbp](http://www.epa.gov/osbp). Contractor shall comply with 40 CFR Section 33.301, and retain all records documenting compliance with the six good faith efforts. The Contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 40 CFR part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the Contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies. (CWSRF Agmt. Ex. E § D(2); DWSRF Agmt. Ex. A § A.2.2.5;)

**1.13. PROCUREMENT PROHIBITIONS UNDER SECTION 306 OF THE CLEAN AIR ACT AND SECTION 508 OF THE CLEAN WATER ACT, INCLUDING EXECUTIVE ORDER 11738, ADMINISTRATION OF THE CLEAN AIR ACT AND THE FEDERAL WATER POLLUTION CONTROL ACT WITH RESPECT TO FEDERAL CONTRACTS, GRANTS, OR LOANS; 42 USC § 7606; 33 USC § 1368.** Except where the purpose of this Agreement is to remedy the cause of the violation, Contractor may not procure goods, services, or materials from suppliers excluded under the federal System for Award Management: <http://www.sam.gov/>.

**1.14. Debarment and Suspension Executive Order 12549 (1986).** Contractor certifies that it will not knowingly enter into a contract with anyone who is ineligible under the 2 CFR part 180 and part 1532 to participate in the Project. Suspension and debarment information can be accessed at <http://www.sam.gov>. Contractor represents and warrants

that it has or will include a term or conditions requiring compliance with this provision in all of its subcontracts under this Agreement.

**1.15. SECURE CONNECTION.** Contractor agrees that if its network or information system is connected to USEPA networks to transfer data using systems other than the Environmental Information Exchange Network or USEPA’s Central Data Exchange, it will ensure that any connections are secure. (CWSRF Agmt. Ex. E § D(5); DWSRF Agmt. Ex. C § C.4.3.xxii).

**1.16. GEOSPATIAL DATA STANDARDS.** All geospatial data created pursuant to this Agreement that is submitted to the State Water Board for use by USEPA or that is submitted directly to USEPA must be consistent with Federal Geographic Data Committee endorsed standards. Information on these standards may be found at [www.fgdc.gov](http://www.fgdc.gov). (CWSRF Agmt. Ex. E § E; DWSRF Agmt. Ex. C § C.4.3.xxiii)

**1.17. FEDERAL LOBBYING RESTRICTIONS.** Recipients of federal financial assistance may not pay any person for influencing or attempting to influence any officer or employee of a federal agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress with respect to the award, continuation, renewal, amendment, or modification of a federal grant, loan, or contract. These requirements are implemented for USEPA in 40 CFR Part 34, which also describes types of activities, such as legislative liaison activities and professional and technical services, which are not subject to this prohibition. Upon award of this contract, Contractor shall complete and submit to the City the certification and disclosure forms in Appendix A and Appendix B to 40 CFR Part 34. Contractor shall also require all subcontractors and suppliers of any tier awarded a subcontract over \$100,000 to similarly complete and submit the certification and disclosure forms pursuant to the process set forth in 40 CFR 34.110. (WIFIA Agmt. Ex. E, Section 319 of Pub. L. 101-121).

**1.18. CHILD SUPPORT COMPLIANCE ACT.** Contractor shall fully comply with all applicable state and federal laws relating to child and family support enforcement, including, but not limited to, disclosure of information and compliance with earnings assignment orders, as provided in Family Code § 5200 et seq. In addition, the Contractor shall fully complying with the earnings assignment orders of all employees and is providing the names of all new employees to the New Hire Registry maintained by the California Employment Development Department.

**2. NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246) located at 41 CFR § 60-4.2.**

**2.1.** The goal and timetables for minority and female participation, expressed in percentage terms for the Contractor’s aggregate workforce in each trade on all construction work in the covered area, as follows:

	<u>Goal</u>
1. Minority Participation:	16.9%
2. Female Participation:	6.9%

**2.2.** These goals are applicable to all the Contractor’s construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs Work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the Work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both federally involved and non-federally involved Work.

- 2.3. The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals.
- 2.4. The hours of minority and female employment and training shall be substantially uniform throughout the length of the Contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the Contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.
- 2.5. The Contractor shall provide written notification to the Director the Office of Federal Contract Compliance Programs within 10 Working Days of award of any Subcontract in excess of \$10,000 at any tier for Work under the Contract resulting from this solicitation. The notification shall list the name, address and telephone number of the Subcontractor; employer identification number of the Subcontractor; estimated dollar amount of the Subcontract; estimated starting and completion dates of the Subcontract; and the geographical area in which the subcontract is to be performed. The "covered area" is the City of San Diego.

### **3. EQUAL OPPORTUNITY CLAUSES:**

- 3.1. The following equal opportunity clauses are incorporated by reference herein:
  1. The equal opportunity clause located 41 CFR 60.1.4(a), which specifies the obligations imposed under Executive Order 11246.
  2. The equal opportunity clause located at 41 CFR 60-741.5, which contains the obligations imposed by Section 503 of the Rehabilitation Act of 1973.
  3. The "Equal Opportunity Clause" (Resolution No. 765092) filed on December 4, 1978, in the Office of the City Clerk, San Diego, California and incorporated in the "Standard Federal Employment Opportunity Construction Contract Specifications (Executive Order 11246 - Document No. 769023, filed September 11, 1984, in the Office of the City Clerk, San Diego, California) is applicable to all non-exempt City construction contracts and subcontracts of \$2,000 or more.
  4. Age Discrimination Act of 1975, Pub. L. 94-135.
  5. Title VI of the Civil Rights Act of 1964, Pub. L. 88-352.
  6. Section 13 of the Federal Water Pollution Control Acts Amendments of 1972, Pub. L. 92-5200 (the Clean Water Act).
  7. Section 504 of the Rehabilitation Act of 1973, Pub. L. 93-112 (Executive Orders 11914 and 11250).
  8. Women's Minority Business Enterprises, Executive Orders 11625, 12138 and 12432.
  9. Section 129 of the Small Business Administration Reauthorization and Amendment Act of 1988, Pub. L. 100-590.

#### **4. STANDARD FEDERAL EQUAL EMPLOYMENT SPECIFICATIONS:**

**4.1.** The Contractor is required to comply with the 15 "Standard Federal Equal Employment Specifications" in section 4.2 below and also located in 41 CFR 60-4.3 for federal and federally assisted construction contracts in excess of \$10,000.

**4.2.** Standard Federal Equal Employment Specifications.

1. As used in these specifications:
  - a) Covered area" means the geographical area described in the solicitation from which this contract resulted;
  - b) "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
  - c) "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
  - d) Minority" includes:
    - i. Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
    - ii. Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
    - iii. Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
    - iv. American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation, and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to [41 CFR 60-4.5](#)) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in item 7, paragraphs "a" through "p", of this section below. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.
5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, [Executive Order 11246](#), or the regulations promulgated pursuant thereto.
6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
  - a) Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities
  - b) Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
  - c) Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred

back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

- d) Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
- e) Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
- f) Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
- g) Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h) Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
- i) Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- j) Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school,

summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

- k) Validate all tests and other selection requirements where there is an obligation to do so under [41 CFR part 60-3](#).
- l) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
- m) Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
- n) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- o) Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
- p) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (item 7, paragraphs "a" through "p", of this section). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under item 7, paragraphs "a" through "p", of this section that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).



10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, sexual orientation, gender identity, or national origin.
11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to [Executive Order 11246](#).
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to [Executive Order 11246](#), as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and [Executive Order 11246](#), as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in item 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with [41 CFR 60-4.8](#).
14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the [Public Works Employment Act of 1977](#) and the Community Development Block Grant Program).

**4.3** Segregated Facilities (41 CFR 60-1.8). The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensuring that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. This obligation extends to all contracts containing the equal opportunity clause regardless of the amount of the contract. The term "facilities," as used in this section, means waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees; Provided, that separate or single-user restrooms and necessary dressing or sleeping areas shall be provided to assure privacy between the sexes.

**5. VIOLATION OR BREACH OF REQUIREMENTS:**

- 5.1.** If at any time during the course of the Contract there is a violation of the Affirmative Action or Equal Employment Opportunity requirements by the Contractor, or the Subcontractors, the City will notify the Contractor of the breach. The City may withhold any further progress payments to the Contractor until the City is satisfied that the Contractor and Subcontractors are in full compliance with these requirements.

**6. MONTHLY EMPLOYMENT UTILIZATION REPORTS:**

- 6.1.** Refer to GENERAL EQUAL OPPORTUNITY CONTRACTING PROGRAM REQUIREMENTS, CONSTRUCTION CONTRACTOR REQUIREMENTS in The WHITEBOOK and the following:
1. Federal and Non-Federal Work in San Diego County. Submit an updated list only if work is complete or new contracts have been awarded during the span of this project.

**7. RECORDS OF PAYMENTS TO DBEs:**

- 7.1.** The Contractor shall maintain records and documents of payments to DBEs for 5 years following the NOC. These records shall be made available for inspection upon request by any authorized representative of the City, funding agency, or both. The reporting requirement shall be extended to any certified DBE Subcontractor.

**8. FEDERAL WAGE REQUIREMENTS FOR FEDERALLY FUNDED PROJECTS:**

- 8.1.** The successful Bidder's work shall be required to comply with Executive Order 11246, entitled "Equal Employment Opportunity," as amended by Executive Order 11375, and as supplemented in Department of Labor regulations (41 CFR chapter 60).
- 8.2.** This Executive Order pertains to Equal Employment Opportunity regulations and contains significant changes to the regulations including new goals and timetables for women in construction and revised goals and timetables for minorities in construction.
- 8.3.** Minimum wage rates for this project have been predetermined by the Secretary of Labor and are set forth in the Decision of the Secretary and bound into the specifications book. Should there be any difference between the state or federal wage rates, including health and welfare funds for any given craft, mechanic, or similar classifications needed to execute the Work, it shall be mandatory upon the Contractor or subcontractor to pay the higher of the two rates.
- 8.4.** The minimum wage rate to be paid by the Contractor and the Subcontractors shall be in accordance with the Federal Labor Standards Provisions (see below) and Federal Wage Rates (see Wage Rates below) and General Prevailing Wage Determination made by the State of California, Director of Industrial Relations pursuant to California Labor Code Part 7, Chapter 1, Article 2, Sections 1770, 1773 and 1773.1, whichever is higher.
- 8.5.** A Contractor having 50 or more employees and its Subcontractors having 50 or more employees and who may be awarded a contract of \$50,000 or more will be required to maintain an affirmative action program, the standards for which are contained in the specifications.
- 8.6.** To be eligible for award, each Bidder shall comply with the affirmative action requirements which are contained in the specifications

**8.7.** Women will be afforded equal opportunity in all areas of employment. However, the employment of women shall not diminish the standards of requirements for the employment of minorities.

**9. PREVAILING WAGE RATES:** Pursuant to San Diego Municipal Code section 22.3019, construction, alteration, demolition, repair and maintenance work performed under this Contract is subject to State prevailing wage laws. For construction work performed under this Contract cumulatively exceeding \$25,000 and for alteration, demolition, repair and maintenance work performed under this Contract cumulatively exceeding \$15,000, the Contractor and its subcontractors shall comply with State prevailing wage laws including, but not limited to, the requirements listed below.

**9.1. Compliance with Prevailing Wage Requirements.** Pursuant to sections 1720 through 1861 of the California Labor Code, the Contractor and its subcontractors shall ensure that all workers who perform work under this Contract are paid not less than the prevailing rate of per diem wages as determined by the Director of the California Department of Industrial Relations (DIR). This includes work performed during the design and preconstruction phases of construction including, but not limited to, inspection and land surveying work.

**9.1.1.** Copies of such prevailing rate of per diem wages are on file at the City and are available for inspection to any interested party on request. Copies of the prevailing rate of per diem wages also may be found at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Contractor and its subcontractors shall post a copy of the prevailing rate of per diem wages determination at each job site and shall make them available to any interested party upon request.

**9.1.2.** The wage rates determined by the DIR refer to expiration dates. If the published wage rate does not refer to a predetermined wage rate to be paid after the expiration date, then the published rate of wage shall be in effect for the life of this Contract. If the published wage rate refers to a predetermined wage rate to become effective upon expiration of the published wage rate and the predetermined wage rate is on file with the DIR, such predetermined wage rate shall become effective on the date following the expiration date and shall apply to this Contract in the same manner as if it had been published in said publication. If the predetermined wage rate refers to one or more additional expiration dates with additional predetermined wage rates, which expiration dates occur during the life of this Contract, each successive predetermined wage rate shall apply to this Contract on the date following the expiration date of the previous wage rate. If the last of such predetermined wage rates expires during the life of this Contract, such wage rate shall apply to the balance of the Contract.

**9.2. Penalties for Violations.** Contractor and its subcontractors shall comply with California Labor Code section 1775 in the event a worker is paid less than the prevailing wage rate for the work or craft in which the worker is employed. This shall be in addition to any other applicable penalties allowed under Labor Code sections 1720 – 1861.

**9.3. Payroll Records.** Contractor and its subcontractors shall comply with California Labor Code section 1776, which generally requires keeping accurate payroll records, verifying and certifying payroll records, and making them available for inspection. Contractor shall require its subcontractors to also comply with section 1776. Contractor and its subcontractors shall submit weekly certified payroll records online via the City's web-based Labor Compliance Program. Contractor is responsible for ensuring its subcontractors submit certified payroll records to the City.

- 9.3.1.** Contractor their subcontractors shall also furnish records specified in Labor Code section 1776 directly to the Labor Commissioner in the manner required by Labor Code section 1771.4.
- 9.4. Apprentices.** Contractor and its subcontractors shall comply with California Labor Code sections 1777.5, 1777.6 and 1777.7 concerning the employment and wages of apprentices. Contractor is held responsible for the compliance of their subcontractors with sections 1777.5, 1777.6 and 1777.7.
- 9.5. Working Hours.** Contractor and their subcontractors shall comply with California Labor Code sections 1810 through 1815, including but not limited to: (i) restrict working hours on public works contracts to eight hours a day and forty hours a week, unless all hours worked in excess of 8 hours per day are compensated at not less than 1½ times the basic rate of pay; and (ii) specify penalties to be imposed on contractors and subcontractors of \$25 per worker per day for each day the worker works more than 8 hours per day and 40 hours per week in violation of California Labor Code sections 1810 through 1815.
- 9.6. Required Provisions for Subcontracts.** Contractor shall include at a minimum a copy of the following provisions in any contract they enter into with a subcontractor: California Labor Code sections 1771, 1771.1, 1775, 1776, 1777.5, 1810, 1813, 1815, 1860 and 1861.
- 9.7. Labor Code Section 1861 Certification.** Contractor in accordance with California Labor Code section 3700 is required to secure the payment of compensation of its employees and by signing this Contract, Contractor certifies that "I am aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this Contract."
- 9.8. Labor Compliance Program.** The City has its own Labor Compliance Program authorized in August 2011 by the DIR. The City will withhold contract payments when payroll records are delinquent or deemed inadequate by the City or other governmental entity, or it has been established after an investigation by the City or other governmental entity that underpayment(s) have occurred. For questions or assistance, please contact the City of San Diego's Prevailing Wage Unit at 858-627-3200.
- 9.9. Contractor and Subcontractor Registration Requirements.** This project is subject to compliance monitoring and enforcement by the DIR. A contractor or subcontractor shall not be qualified to bid on, be listed in a bid or proposal, subject to the requirements of section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, unless currently registered and qualified to perform public work pursuant to Labor Code section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.
- 9.9.1.** A Contractor's inadvertent error in listing a subcontractor who is not registered pursuant to Labor Code section 1725.5 in response to a solicitation shall not be grounds for filing a bid protest or grounds for considering the bid non-responsive provided that any of the following apply: (1) the subcontractor is registered prior to bid opening; (2) within twenty-four hours after the bid opening, the subcontractor is registered and has paid the penalty registration fee specified in

Labor Code section 1725.5; or (3) the subcontractor is replaced by another registered subcontractor pursuant to Public Contract Code section 4107.

- 9.9.2.** By submitting a bid or proposal to the City, Contractor is certifying that he or she has verified that all subcontractors used on this public work project are registered with the DIR in compliance with Labor Code sections 1771.1 and 1725.5, and Contractor shall provide proof of registration for themselves and all listed subcontractors to the City at the time of bid or proposal due date or upon request.
- 9.10. Stop Order.** For Contractor or its subcontractors engaging in the performance of any public work contract without having been registered in violation of Labor Code sections 1725.5 or 1771.1, the Labor Commissioner shall issue and serve a stop order prohibiting the use of the unregistered contractors or unregistered subcontractor(s) on ALL public works until the unregistered contractor or unregistered subcontractor(s) is registered. Failure to observe a stop order is a misdemeanor.
- 9.11. List of all Subcontractors.** The City may ask Contractor for the most current list of subcontractors (regardless of tier), along with their DIR registration numbers, utilized on this Agreement at any time during performance of this contract, and Contractor shall provide the list within ten (10) working days of the City's request. Additionally, Contractor shall provide the City with a complete list of all subcontractors utilized on this contract (regardless of tier), within ten working days of the completion of the contract, along with their DIR registration numbers. The City shall withhold final payment to Contractor until at least 30 days after this information is provided to the City.
- 9.12. Exemptions for Small Projects.** There are limited exemptions for installation, alteration, demolition, or repair work done on projects of \$25,000 or less. The Contractor shall still comply with Labor Code sections 1720 et. seq. The only recognized exemptions are listed below:
- 9.12.1. Registration.** The Contractor will not be required to register with the DIR for small projects. (Labor Code section 1771.1).
- 9.12.2. Certified Payroll Records.** The records required in Labor Code section 1776 shall be required to be kept and submitted to the City of San Diego but will not be required to be submitted online with the DIR directly. The Contractor will need to keep those records for at least three years following the completion of the Contract. (Labor Code section 1771.4).
- 9.12.3. List of all Subcontractors.** The Contractor shall not be required to hire only registered subcontractors and is exempt from submitting the list of all subcontractors that is required in section 9.11. above. (Labor code section 1773.3).

**10. DAVIS-BACON WAGE RATES AND PROVISIONS:**

**10.1. WAGE RATES** This contract shall be subject to the following Davis-Bacon Wage Decisions:

"General Decision Number: CA20210001 01/01/2021

Superseded General Decision Number: CA20200001

State: California

Construction Types: Building, Heavy (Heavy and Dredging),  
Highway and Residential

County: San Diego County in California.

BUILDING CONSTRUCTION PROJECTS; DREDGING PROJECTS (does not include hopper dredge work); HEAVY CONSTRUCTION PROJECTS (does not include water well drilling); HIGHWAY CONSTRUCTION PROJECTS; RESIDENTIAL CONSTRUCTION PROJECTS (consisting of single family homes and apartments up to and including 4 stories)

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Modification Number	Publication Date
0	01/01/2021

ASBE0005-002 07/06/2020

	Rates	Fringes
Asbestos Workers/Insulator (Includes the application of all insulating materials, protective coverings, coatings, and finishes to all types of mechanical systems).....	\$ 45.39	23.74
Fire Stop Technician (Application of Firestopping Materials for wall openings and penetrations in walls, floors, ceilings and curtain walls).....	\$ 28.92	18.73

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ASBE0005-004 07/01/2019

	Rates	Fringes
Asbestos Removal worker/hazardous material handler (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from mechanical systems, whether they contain asbestos or not).....	\$ 20.63	12.17

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BOIL0092-003 03/01/2018

	Rates	Fringes
BOILERMAKER.....	\$ 44.07	33.52

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\* BRCA0004-008 11/01/2019

	Rates	Fringes
BRICKLAYER; MARBLE SETTER.....	\$ 39.60	18.05

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BRCA0018-004 06/01/2019

	Rates	Fringes
MARBLE FINISHER.....	\$ 33.43	14.11
TILE FINISHER.....	\$ 28.23	12.65
TILE LAYER.....	\$ 40.07	18.36

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BRCA0018-010 09/01/2020

	Rates	Fringes
TERRAZZO FINISHER.....	\$ 33.66	14.20
TERRAZZO WORKER/SETTER.....	\$ 41.60	14.73

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CARP0409-002 07/01/2016

	Rates	Fringes
Diver		
(1) Wet.....	\$ 712.48	17.03
(2) Standby.....	\$ 356.24	17.03
(3) Tender.....	\$ 348.24	17.03
(4) Assistant Tender.....	\$ 324.24	17.03

Amounts in "'Rates' column are per day

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CARP0409-008 08/01/2010

	Rates	Fringes
Modular Furniture Installer.....	\$ 17.00	7.41

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CARP0547-001 07/01/2018

	Rates	Fringes
CARPENTER		
(1) Bridge.....	\$ 42.34	19.17
(2) Commercial Building....	\$ 37.11	19.17
(3) Heavy & Highway.....	\$ 42.21	19.17
(4) Residential Carpenter..	\$ 29.69	19.17
(5) Residential Insulation Installer.....	\$ 18.00	8.16
MILLWRIGHT.....	\$ 42.71	19.17
PILEDRIVERMAN.....	\$ 42.34	19.17

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CARP0547-002 07/01/2017

	Rates	Fringes
Drywall		
(1) Work on wood framed construction of single family residences, apartments or condominiums under four stories Drywall Installer/Lather...\$ 22.95		18.85
Drywall Stocker/Scrapper...\$ 12.50		12.27
(2) All other work Drywall Installer/Lather...\$ 32.00		17.63
Drywall Stocker/Scrapper...\$ 12.50		12.27

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ELEC0569-001 06/01/2020

	Rates	Fringes
Electricians (Tunnel Work)		
Cable Splicer.....	\$ 51.38	3%+14.88
Electrician.....	\$ 50.63	3%+14.88
Electricians: (All Other Work, Including 4 Stories Residential)		
Cable Splicer.....	\$ 45.75	3%+14.88
Electrician.....	\$ 45.00	3%+14.88



ELEC0569-004 06/01/2020

	Rates	Fringes
ELECTRICIAN (Sound & Communications Sound Technician).....	\$ 33.95	13.55
SCOPE OF WORK Assembly, installation, operation, service and maintenance of components or systems as used in closed circuit television, amplified master television distribution, CATV on private property, intercommunication, burglar alarm, fire alarm, life support and all security alarms, private and public telephone and related telephone interconnect, public address, paging, audio, language, electronic, background music system less than line voltage or any system acceptable for class two wiring for private, commercial, or industrial use furnished by leased wire, freuency modulation or other recording devices, electrical apparatus by means of which electricity is applied to the amplification, transmission, transference, recording or reproduction of voice, music, sound, impulses and video. Excluded from this Scope of Work - transmission, service and maintenance of background music. All of the above shall include the installation and transmission over fiber optics.		

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ELEC0569-005 06/01/2020

	Rates	Fringes
Sound & Communications Sound Technician.....	\$ 33.95	13.55
SCOPE OF WORK Assembly, installation, operation, service and maintenance of components or systems as used in closed circuit television, amplified master television distribution, CATV on private property, intercommunication, burglar alarm, fire alarm, life support and all security alarms, private and public telephone and related telephone interconnect, public address, paging, audio, language, electronic, background music system less than line voltage or any system acceptable for class two wiring for private, commercial, or industrial use furnished by leased wire, freuency modulation or other recording devices, electrical apparatus by means of which electricity is applied to the amplification, transmission, transference, recording or reproduction of voice, music, sound, impulses and video. Excluded from this Scope of Work - transmission, service and maintenance of background music. All of the above shall include the installation and transmission over fiber optics.		

SOUND TECHNICIAN: Terminating, operating and performing final check-out

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\* ELEC0569-006 10/01/2020

Work on street lighting; traffic signals; and underground systems and/or established easements outside of buildings

	Rates	Fringes
Traffic signal, street light and underground work		
Utility Technician #1.....	\$ 33.42	3%+7.70
Utility Technician #2.....	\$ 27.85	3%+7.70

STREET LIGHT & TRAFFIC SIGNAL WORK:

UTILITY TECHNICIAN #1: Installation of street lights and traffic signals, including electrical circuitry, programmable controller, pedestal-mounted electrical meter enclosures and laying of pre-assembled cable in ducts. The layout of electrical systems and communication installation including proper position of trench depths, and radius at duct banks, location for manholes, street lights and traffic signals.

UTILITY TECHNICIAN #2: Distribution of material at jobsite, installation of underground ducts for electrical, telephone, cable TV land communication systems. The setting, leveling, grounding and racking of precast manholes, handholes and transformer pads.

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ELEC0569-008 08/31/2020

	Rates	Fringes
ELECTRICIAN (Residential, 1-3 Stories).....	\$ 35.74	7.68

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ELEC1245-001 06/01/2020

	Rates	Fringes
LINE CONSTRUCTION		
(1) Lineman; Cable splicer..	\$ 59.14	20.78
(2) Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), overhead & underground distribution line equipment).....	\$ 47.24	19.59
(3) Groundman.....	\$ 36.12	19.19
(4) Powderman.....	\$ 51.87	18.79

HOLIDAYS: New Year's Day, M.L. King Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day and day after Thanksgiving, Christmas Day

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ELEV0018-001 01/01/2020

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 57.40	34.765+a+b

FOOTNOTE:

- a. PAID VACATION: Employer contributes 8% of regular hourly rate as vacation pay credit for employees with more than 5 years of service, and 6% for 6 months to 5 years of service.
- b. PAID HOLIDAYS: New Years Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Friday after Thanksgiving, and Christmas Day.

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 ENGI0012-003 07/01/2020

	Rates	Fringes
OPERATOR: Power Equipment		
(All Other Work)		
GROUP 1.....	\$ 48.25	27.20
GROUP 2.....	\$ 49.03	27.20
GROUP 3.....	\$ 49.32	27.20
GROUP 4.....	\$ 50.81	27.20
GROUP 5.....	\$ 48.96	25.25
GROUP 6.....	\$ 51.03	27.20
GROUP 8.....	\$ 51.14	27.20
GROUP 9.....	\$ 49.29	25.25
GROUP 10.....	\$ 51.26	27.20
GROUP 11.....	\$ 49.41	25.25
GROUP 12.....	\$ 51.43	27.20
GROUP 13.....	\$ 51.53	27.20
GROUP 14.....	\$ 51.56	27.20
GROUP 15.....	\$ 51.64	27.20
GROUP 16.....	\$ 51.76	27.20
GROUP 17.....	\$ 51.93	27.20
GROUP 18.....	\$ 52.03	27.20
GROUP 19.....	\$ 52.14	27.20
GROUP 20.....	\$ 52.26	27.20
GROUP 21.....	\$ 52.43	27.20
GROUP 22.....	\$ 52.53	27.20
GROUP 23.....	\$ 52.64	27.20
GROUP 24.....	\$ 52.76	27.20
GROUP 25.....	\$ 52.93	27.20
OPERATOR: Power Equipment		
(Cranes, Piledriving & Hoisting)		
GROUP 1.....	\$ 49.60	27.20
GROUP 2.....	\$ 50.38	27.20
GROUP 3.....	\$ 50.67	27.20
GROUP 4.....	\$ 50.81	27.20
GROUP 5.....	\$ 51.03	27.20
GROUP 6.....	\$ 51.14	27.20
GROUP 7.....	\$ 51.26	27.20
GROUP 8.....	\$ 51.43	27.20
GROUP 9.....	\$ 51.60	27.20
GROUP 10.....	\$ 52.60	27.20
GROUP 11.....	\$ 53.60	27.20
GROUP 12.....	\$ 54.60	27.20
GROUP 13.....	\$ 55.60	27.20

	Rates	Fringes
OPERATOR: Power Equipment (Tunnel Work)		
GROUP 1.....	\$ 50.10	27.20
GROUP 2.....	\$ 50.88	27.20
GROUP 3.....	\$ 51.17	27.20
GROUP 4.....	\$ 51.31	27.20
GROUP 5.....	\$ 51.53	27.20
GROUP 6.....	\$ 51.64	27.20
GROUP 7.....	\$ 51.76	27.20

PREMIUM PAY:

\$3.75 per hour shall be paid on all Power Equipment Operator work on the following Military Bases: China Lake Naval Reserve, Vandenberg AFB, Point Arguello, Seely Naval Base, Fort Irwin, Nebo Annex Marine Base, Marine Corp Logistics Base Yermo, Edwards AFB, 29 Palms Marine Base and Camp Pendleton

Workers required to suit up and work in a hazardous material environment: \$2.00 per hour additional. Combination mixer and compressor operator on gunite work shall be classified as a concrete mobile mixer operator.

SEE ZONE DEFINITIONS AFTER CLASSIFICATIONS

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Bargeman; Brakeman; Compressor operator; Ditch Witch, with seat or similar type equipment; Elevator operator-inside; Engineer Oiler; Forklift operator (includes loed, lull or similar types under 5 tons; Generator operator; Generator, pump or compressor plant operator; Pump operator; Signalman; Switchman

GROUP 2: Asphalt-rubber plant operator (nurse tank operator); Concrete mixer operator-skip type; Conveyor operator; Fireman; Forklift operator (includes loed, lull or similar types over 5 tons; Hydrostatic pump operator; oiler crusher (asphalt or concrete plant); Petromat laydown machine; PJU side dum jack; Screening and conveyor machine operator (or similar types); Skiploader (wheel type up to 3/4 yd. without attachment); Tar pot fireman; Temporary heating plant operator; Trenching machine oiler

GROUP 3: Asphalt-rubber blend operator; Bobcat or similar type (Skid steer); Equipment greaser (rack); Ford Ferguson (with dragtype attachments); Helicopter radioman (ground); Stationary pipe wrapping and cleaning machine operator

GROUP 4: Asphalt plant fireman; Backhoe operator (mini-max or similar type); Boring machine operator; Boxman or mixerman (asphalt or concrete); Chip spreading machine operator; Concrete cleaning decontamination machine operator; Concrete Pump Operator (small portable); Drilling machine operator, small auger types (Texoma super economatic or similar types - Hughes 100 or 200 or similar types -

drilling depth of 30' maximum); Equipment greaser (grease truck); Guard rail post driver operator; Highline cableway signalman; Hydra-hammer-aero stomper; Micro Tunneling (above ground tunnel); Power concrete curing machine operator; Power concrete saw operator; Power-driven jumbo form setter operator; Power sweeper operator; Rock Wheel Saw/Trencher; Roller operator (compacting); Screed operator (asphalt or concrete); Trenching machine operator (up to 6 ft.); Vacuum or much truck

GROUP 5: Equipment Greaser (Grease Truck/Multi Shift).

GROUP 6: Articulating material hauler; Asphalt plant engineer; Batch plant operator; Bit sharpener; Concrete joint machine operator (canal and similar type); Concrete planer operator; Dandy digger; Deck engine operator; Derrickman (oilfield type); Drilling machine operator, bucket or auger types (Calweld 100 bucket or similar types - Watson 1000 auger or similar types - Texoma 330, 500 or 600 auger or similar types - drilling depth of 45' maximum); Drilling machine operator; Hydrographic seeder machine operator (straw, pulp or seed), Jackson track maintainer, or similar type; Kalamazoo Switch tamper, or similar type; Machine tool operator; Maginnis internal full slab vibrator, Mechanical berm, curb or gutter (concrete or asphalt); Mechanical finisher operator (concrete, Clary-Johnson-Bidwell or similar); Micro tunnel system (below ground); Pavement breaker operator (truck mounted); Road oil mixing machine operator; Roller operator (asphalt or finish), rubber-tired earth moving equipment (single engine, up to and including 25 yds. struck); Self-propelled tar pipelining machine operator; Skiploader operator (crawler and wheel type, over 3/4 yd. and up to and including 1-1/2 yds.); Slip form pump operator (power driven hydraulic lifting device for concrete forms); Tractor operator-bulldozer, tamper-scraper (single engine, up to 100 h.p. flywheel and similar types, up to and including D-5 and similar types); Tugger hoist operator (1 drum); Ultra high pressure waterjet cutting tool system operator; Vacuum blasting machine operator

GROUP 8: Asphalt or concrete spreading operator (tamping or finishing); Asphalt paving machine operator (Barber Greene or similar type); Asphalt-rubber distribution operator; Backhoe operator (up to and including 3/4 yd.), small ford, Case or similar; Cast-in-place pipe laying machine operator; Combination mixer and compressor operator (guniting work); Compactor operator (self-propelled); Concrete mixer operator (paving); Crushing plant operator; Drill Doctor; Drilling machine operator, Bucket or auger types (Calweld 150 bucket or similar types - Watson 1500, 2000 2500 auger or similar types - Texoma 700, 800 auger or similar types - drilling depth of 60' maximum); Elevating grader operator; Grade checker; Gradall operator; Grouting machine operator; Heavy-duty repairman; Heavy equipment robotics operator; Kalamazoo balliste regulator or similar type; Kolman belt loader and similar type; Le Tourneau blob compactor or

similar type; Loader operator (Athey, Euclid, Sierra and similar types); Mobark Chipper or similar; Ozzie padder or similar types; P.C. slot saw; Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pumpcrete gun operator; Rock Drill or similar types; Rotary drill operator (excluding caisson type); Rubber-tired earth-moving equipment operator (single engine, caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator (multiple engine up to and including 25 yds. struck); Rubber-tired scraper operator (self-loading paddle wheel type-John Deere, 1040 and similar single unit); Self-propelled curb and gutter machine operator; Shuttle buggy; Skiploader operator (crawler and wheel type over 1-1/2 yds. up to and including 6-1/2 yds.); Soil remediation plant operator; Surface heaters and planer operator; Tractor compressor drill combination operator; Tractor operator (any type larger than D-5 - 100 flywheel h.p. and over, or similar-bulldozer, tamper, scraper and push tractor single engine); Tractor operator (boom attachments), Traveling pipe wrapping, cleaning and bending machine operator; Trenching machine operator (over 6 ft. depth capacity, manufacturer's rating); trenching Machine with Road Miner attachment (over 6 ft depth capacity): Ultra high pressure waterjet cutting tool system mechanic; Water pull (compaction) operator

GROUP 9: Heavy Duty Repairman

GROUP 10: Drilling machine operator, Bucket or auger types (Calweld 200 B bucket or similar types-Watson 3000 or 5000 auger or similar types-Texoma 900 auger or similar types-drilling depth of 105' maximum); Dual drum mixer, dynamic compactor LDC350 (or similar types); Monorail locomotive operator (diesel, gas or electric); Motor patrol-blade operator (single engine); Multiple engine tractor operator (Euclid and similar type-except Quad 9 cat.); Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Pneumatic pipe ramming tool and similar types; Prestressed wrapping machine operator; Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Rubber tired earth moving equipment operator (multiple engine, Euclid, caterpillar and similar over 25 yds. and up to 50 yds. struck), Tower crane repairman; Tractor loader operator (crawler and wheel type over 6-1/2 yds.); Woods mixer operator (and similar Pugmill equipment)

GROUP 11: Heavy Duty Repairman - Welder Combination, Welder - Certified.

GROUP 12: Auto grader operator; Automatic slip form operator; Drilling machine operator, bucket or auger types (Calweld, auger 200 CA or similar types - Watson, auger 6000 or similar types - Hughes Super Duty, auger 200 or similar types - drilling depth of 175' maximum); Hoe ram or similar

with compressor; Mass excavator operator less than 750 cu. yards; Mechanical finishing machine operator; Mobile form traveler operator; Motor patrol operator (multi-engine); Pipe mobile machine operator; Rubber-tired earth-moving equipment operator (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck); Rubber-tired self-loading scraper operator (paddle-wheel-auger type self-loading - two (2) or more units)

GROUP 13: Rubber-tired earth-moving equipment operator operating equipment with push-pull system (single engine, up to and including 25 yds. struck)

GROUP 14: Canal liner operator; Canal trimmer operator; Remote-control earth-moving equipment operator (operating a second piece of equipment: \$1.00 per hour additional); Wheel excavator operator (over 750 cu. yds.)

GROUP 15: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine-up to and including 25 yds. struck)

GROUP 16: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 17: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 50 cu. yds. struck); Tandem tractor operator (operating crawler type tractors in tandem - Quad 9 and similar type)

GROUP 18: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, up to and including 25 yds. struck)

GROUP 19: Rotex concrete belt operator (or similar types); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, up to and including 25 yds. struck)

GROUP 20: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar

types in any combination, excluding compaction units - single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 21: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

GROUP 22: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, up to and including 25 yds. struck)

GROUP 23: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating with the tandem push-pull system (multiple engine, up to and including 25 yds. struck)

GROUP 24: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 25: Concrete pump operator-truck mounted; Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

#### CRANES, PILEDIVING AND HOISTING EQUIPMENT CLASSIFICATIONS

GROUP 1: Engineer oiler; Fork lift operator (includes loed, lull or similar types)

GROUP 2: Truck crane oiler

GROUP 3: A-frame or winch truck operator; Ross carrier operator (jobsite)

GROUP 4: Bridge-type unloader and turntable operator; Helicopter hoist operator

GROUP 5: Hydraulic boom truck; Stinger crane (Austin-Western or similar type); Tugger hoist operator (1 drum)

GROUP 6: Bridge crane operator; Cretor crane operator; Hoist



operator (Chicago boom and similar type); Lift mobile operator; Lift slab machine operator (Vagtborg and similar types); Material hoist and/or manlift operator; Polar gantry crane operator; Self Climbing scaffold (or similar type); Shovel, backhoe, dragline, clamshell operator (over 3/4 yd. and up to 5 cu. yds. mrc); Tugger hoist operator

GROUP 7: Pedestal crane operator; Shovel, backhoe, dragline, clamshell operator (over 5 cu. yds. mrc); Tower crane repair; Tugger hoist operator (3 drum)

GROUP 8: Crane operator (up to and including 25 ton capacity); Crawler transporter operator; Derrick barge operator (up to and including 25 ton capacity); Hoist operator, stiff legs, Guy derrick or similar type (up to and including 25 ton capacity); Shovel, backhoe, dragline, clamshell operator (over 7 cu. yds., M.R.C.)

GROUP 9: Crane operator (over 25 tons and up to and including 50 tons mrc); Derrick barge operator (over 25 tons up to and including 50 tons mrc); Highline cableway operator; Hoist operator, stiff legs, Guy derrick or similar type (over 25 tons up to and including 50 tons mrc); K-crane operator; Polar crane operator; Self erecting tower crane operator maximum lifting capacity ten tons

GROUP 10: Crane operator (over 50 tons and up to and including 100 tons mrc); Derrick barge operator (over 50 tons up to and including 100 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 50 tons up to and including 100 tons mrc), Mobile tower crane operator (over 50 tons, up to and including 100 tons M.R.C.); Tower crane operator and tower gantry

GROUP 11: Crane operator (over 100 tons and up to and including 200 tons mrc); Derrick barge operator (over 100 tons up to and including 200 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 100 tons up to and including 200 tons mrc); Mobile tower crane operator (over 100 tons up to and including 200 tons mrc)

GROUP 12: Crane operator (over 200 tons up to and including 300 tons mrc); Derrick barge operator (over 200 tons up to and including 300 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 200 tons, up to and including 300 tons mrc); Mobile tower crane operator (over 200 tons, up to and including 300 tons mrc)

GROUP 13: Crane operator (over 300 tons); Derrick barge operator (over 300 tons); Helicopter pilot; Hoist operator, stiff legs, Guy derrick or similar type (over 300 tons); Mobile tower crane operator (over 300 tons)

#### TUNNEL CLASSIFICATIONS

GROUP 1: Skiploader (wheel type up to 3/4 yd. without attachment)

GROUP 2: Power-driven jumbo form setter operator

GROUP 3: Dinkey locomotive or motorperson (up to and including 10 tons)

GROUP 4: Bit sharpener; Equipment greaser (grease truck); Slip form pump operator (power-driven hydraulic lifting device for concrete forms); Tugger hoist operator (1 drum); Tunnel locomotive operator (over 10 and up to and including 30 tons)

GROUP 5: Backhoe operator (up to and including 3/4 yd.); Small Ford, Case or similar; Drill doctor; Grouting machine operator; Heading shield operator; Heavy-duty repairperson; Loader operator (Athey, Euclid, Sierra and similar types); Mucking machine operator (1/4 yd., rubber-tired, rail or track type); Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pneumatic heading shield (tunnel); Pumpcrete gun operator; Tractor compressor drill combination operator; Tugger hoist operator (2 drum); Tunnel locomotive operator (over 30 tons)

GROUP 6: Heavy Duty Repairman

GROUP 7: Tunnel mole boring machine operator

#### ENGINEERS ZONES

\$1.00 additional per hour for all of IMPERIAL County and the portions of KERN, RIVERSIDE & SAN BERNARDINO Counties as defined below:

That area within the following Boundary: Begin in San Bernardino County, approximately 3 miles NE of the intersection of I-15 and the California State line at that point which is the NW corner of Section 1, T17N,m R14E, San Bernardino Meridian. Continue W in a straight line to that point which is the SW corner of the northwest quarter of Section 6, T27S, R42E, Mt. Diablo Meridian. Continue North to the intersection with the Inyo County Boundary at that point which is the NE corner of the western half of the northern quarter of Section 6, T25S, R42E, MDM. Continue W along the Inyo and San Bernardino County boundary until the intersection with Kern County, as that point which is the SE corner of Section 34, T24S, R40E, MDM. Continue W along the Inyo and Kern County boundary until the intersection with Tulare County, at that point which is the SW corner of the SE quarter of Section 32, T24S, R37E, MDM. Continue W along the Kern and Tulare County boundary, until that point which is the NW corner of T25S, R32E, MDM. Continue S following R32E lines to the NW corner of T31S, R32E, MDM. Continue W to the NW corner of T31S, R31E, MDM. Continue S to the SW corner of T32S, R31E, MDM. Continue W to SW corner of SE quarter of Section 34, T32S, R30E, MDM. Continue S to SW corner of T11N, R17W, SBM. Continue E along south boundary of T11N, SBM to SW corner of T11N, R7W, SBM. Continue S to SW corner of T9N, R7W, SBM. Continue E along south boundary of T9N, SBM to SW corner of T9N, R1E, SBM.

Continue S along west boundary of R1E, SMB to Riverside County line at the SW corner of T1S, R1E, SBM. Continue E along south boundary of T1S, SBM (Riverside County Line) to SW corner of T1S, R10E, SBM. Continue S along west boundary of R10E, SBM to Imperial County line at the SW corner of T8S, R10E, SBM. Continue W along Imperial and Riverside county line to NW corner of T9S, R9E, SBM. Continue S along the boundary between Imperial and San Diego Counties, along the west edge of R9E, SBM to the south boundary of Imperial County/California state line. Follow the California state line west to Arizona state line, then north to Nevada state line, then continuing NW back to start at the point which is the NW corner of Section 1, T17N, R14E, SBM

\$1.00 additional per hour for portions of SAN LUIS OBISPO, KERN, SANTA BARBARA & VENTURA as defined below:

That area within the following Boundary: Begin approximately 5 miles north of the community of Cholame, on the Monterey County and San Luis Obispo County boundary at the NW corner of T25S, R16E, Mt. Diablo Meridian. Continue south along the west side of R16E to the SW corner of T30S, R16E, MDM. Continue E to SW corner of T30S, R17E, MDM. Continue S to SW corner of T31S, R17E, MDM. Continue E to SW corner of T31S, R18E, MDM. Continue S along West side of R18E, MDM as it crosses into San Bernardino Meridian numbering area and becomes R30W. Follow the west side of R30W, SBM to the SW corner of T9N, R30W, SBM. Continue E along the south edge of T9N, SBM to the Santa Barbara County and Ventura County boundary at that point which is the SW corner of Section 34. T9N, R24W, SBM, continue S along the Ventura County line to that point which is the SW corner of the SE quarter of Section 32, T7N, R24W, SBM. Continue E along the south edge of T7N, SBM to the SE corner to T7N, R21W, SBM. Continue N along East side of R21W, SBM to Ventura County and Kern County boundary at the NE corner of T8N, R21W. Continue W along the Ventura County and Kern County boundary to the SE corner of T9N, R21W. Continue North along the East edge of R21W, SBM to the NE corner of T12N, R21W, SBM. Continue West along the north edge of T12N, SBM to the SE corner of T32S, R21E, MDM. [T12N SBM is a thin strip between T11N SBM and T32S MDM]. Continue North along the East side of R21E, MDM to the Kings County and Kern County border at the NE corner of T25S, R21E, MDM, continue West along the Kings County and Kern County Boundary until the intersection of San Luis Obispo County. Continue west along the Kings County and San Luis Obispo County boundary until the intersection with Monterey County. Continue West along the Monterey County and San Luis Obispo County boundary to the beginning point at the NW corner of T25S, R16E, MDM.

\$2.00 additional per hour for INYO and MONO Counties and the Northern portion of SAN BERNARDINO County as defined below:

That area within the following Boundary: Begin at the intersection of the northern boundary of Mono County and the California state line at the point which is the center of Section 17, T10N, R22E, Mt. Diablo Meridian. Continue S then

SE along the entire western boundary of Mono County, until it reaches Inyo County at the point which is the NE corner of the Western half of the NW quarter of Section 2, T8S, R29E, MDM. Continue SSE along the entire western boundary of Inyo County, until the intersection with Kern County at the point which is the SW corner of the SE 1/4 of Section 32, T24S, R37E, MDM. Continue E along the Inyo and Kern County boundary until the intersection with San Bernardino County at that point which is the SE corner of section 34, T24S, R40E, MDM. Continue E along the Inyo and San Bernardino County boundary until the point which is the NE corner of the Western half of the NW quarter of Section 6, T25S, R42E, MDM. Continue S to that point which is the SW corner of the NW quarter of Section 6, T27S, R42E, MDM. Continue E in a straight line to the California and Nevada state border at the point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Then continue NW along the state line to the starting point, which is the center of Section 18, T10N, R22E, MDM.

REMAINING AREA NOT DEFINED ABOVE RECIEVES BASE RATE

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 ENGI0012-004 08/01/2020

	Rates	Fringes
OPERATOR: Power Equipment		
(DREDGING)		
(1) Leverman.....	\$ 56.40	30.00
(2) Dredge dozer.....	\$ 50.43	30.00
(3) Deckmate.....	\$ 50.32	30.00
(4) Winch operator (stern winch on dredge).....	\$ 49.77	30.00
(5) Fireman-Oiler, Deckhand, Bargeman, Leveehand.....	\$ 49.23	30.00
(6) Barge Mate.....	\$ 49.84	30.00

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 IRON0433-006 07/01/2020

	Rates	Fringes
IRONWORKER		
Fence Erector.....	\$ 34.58	24.81
Ornamental, Reinforcing and Structural.....	\$ 41.00	33.45

PREMIUM PAY:

\$6.00 additional per hour at the following locations:

China Lake Naval Test Station, Chocolate Mountains Naval Reserve-Niland, Edwards AFB, Fort Irwin Military Station, Fort Irwin Training Center-Goldstone, San Clemente Island, San Nicholas Island, Susanville Federal Prison, 29 Palms - Marine Corps, U.S. Marine Base - Barstow, U.S. Naval Air Facility - Sealey, Vandenberg AFB

\$4.00 additional per hour at the following locations:

Army Defense Language Institute - Monterey, Fallon Air Base,  
Naval Post Graduate School - Monterey, Yermo Marine Corps  
Logistics Center

\$2.00 additional per hour at the following locations:

Port Hueneme, Port Mugu, U.S. Coast Guard Station - Two Rock

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LABO0089-001 07/01/2020

	Rates	Fringes
LABORER (BUILDING and all other Residential Construction)		
Group 1.....	\$ 34.18	20.48
Group 2.....	\$ 34.86	20.48
Group 3.....	\$ 35.57	20.48
Group 4.....	\$ 36.37	20.48
Group 5.....	\$ 38.30	20.48
LABORER (RESIDENTIAL CONSTRUCTION - See definition below)		
(1) Laborer.....	\$ 30.82	18.80
(2) Cleanup, Landscape, Fencing (Chain Link & Wood).....	\$ 29.53	18.80

RESIDENTIAL DEFINITION: Wood or metal frame construction of single family residences, apartments and condominiums - excluding (a) projects that exceed three stories over a garage level, (b) any utility work such as telephone, gas, water, sewer and other utilities and (c) any fine grading work, utility work or paving work in the future street and public right-of-way; but including all rough grading work at the job site behind the existing right of way

LABORER CLASSIFICATIONS

GROUP 1: Cleaning and handling of panel forms; Concrete Screeding for Rought Strike-off; Concrete, water curing; Demolition laborer; Flagman; Gas, oil and/or water pipeline laborer; General Laborer; General clean-up laborer; Landscape laborer; Jetting laborer; Temporary water and air lines laborer; Material hoseman (walls, slabs, floors and decks); Plugging, filling of Shee-bolt holes; Dry packing of concrete; Railroad maintenance, Repair Trackman and road beds, Streetcar and railroad construction trac laborers; Slip form raisers; Slurry seal crews (mixer operator, applicator operator, squeegee man, Shuttle man, top man), filling of cracks by any method on any surface; Tarman and mortar man; Tool crib or tool house laborer; Window cleaner; Wire Mesh puling-all concrete pouring operations

GROUP 2: Asphalt Shoveler; Cement Dumper (on 1 yard or larger

mixer and handling bulk cement); Cesspool digger and installer; Chucktender; Chute man, pouring concrete, the handling of the chute from ready mix trucks, such as walls, slabs, decks, floors, foundations, footings, curbs, gutters and sidewalks; Concrete curer-impervious membrane and form oiler; Cutting torch operator (demolition); Guinea chaser; Headboard man-asphalt; Laborer, packing rod steel and pans; membrane vapor barrier installer; Power broom sweepers (small); Riiiprap, stonepaver, placing stone or wet sacked concrete; Roto scraper and tiller; Tank sealer and cleaner; Tree climber, faller, chain saw operator, Pittsburgh Chipper and similar type brush shredders; Underground laborers, including caisson bellower

GROUP 3: Buggymobile; Concrete cutting torch; Concrete cutting torch; Concrete pile cutter; Driller, jackhammer, 2 1/2 feet drill steel or longer; Dri Pak-it machine; High sealer (including drilling of same); Hydro seeder and similar type; Impact wrench, multi-plate; Kettleman, potmen and man applying asphalt, lay-kold, creosote, line caustic and similar type materials (applying means applying, dipping, brushing or handling of such materials for pipe wrapping and waterproofing); Operators of pneumatic, gas, electric tools, vibrating machines, pavement breakers, air blasting, come-along, and similar mechanical tools not separately classified herein; Pipelayers back up man coating, grouting, making of joints, sealing, caulking, diapering and including rubber gasket joints, pointing and any and all other services; Rotary Scarifier or multiple head concrete chipping scarifier; Steel header board man and guideline setter; Tampers, Barko, Wacker and similar type; Trenching machine, handpropelled

GROUP 4: Asphalt raker, luterman, ironer, asphalt dumpman and asphalt spreader boxes (all types); Concrete core cutter (walls, floors or ceilings), Grinder or sander; Concrete saw man; cutting walls or flat work, scoring old or new concrete; Cribber, shorer, lagging, sheeting and trench bracing, hand-guided lagging hammer; Laser beam in connection with laborer's work; Oversize concrete vibrator operator 70 pounds and over; Pipelayer performing all services in the laying, installation and all forms of connection of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, metallic or non-metallic, conduit, and any other stationary type of tubular device used for the conveying of any substance or element, whether water, sewage, solid, gas, air or other product whatsoever and without regard to the nature of material from which the tubular material is fabricated; No joint pipe and stripping of same; Prefabricated manhole installer; Sandblaster (nozzleman), Porta shot-blast, water blasting

GROUP 5: Blasters Powderman-All work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Driller-all power drills, excluding jackhammer, whether core, diamond, wagon, track, multiple

unit, and any and all other types of mechanical drills without regard to the form of motive power.

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LABO0089-002 11/01/2020

	Rates	Fringes
LABORER (MASON TENDER).....	\$ 33.00	19.23

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LABO0089-004 07/01/2020

HEAVY AND HIGHWAY CONSTRUCTION

	Rates	Fringes
Laborers:		
Group 1.....	\$ 35.30	20.48
Group 2.....	\$ 35.76	20.48
Group 3.....	\$ 36.17	20.48
Group 4.....	\$ 37.01	20.48
Group 5.....	\$ 40.28	20.48

LABORER CLASSIFICATIONS

GROUP 1: Laborer: General or Construction Laborer, Landscape Laborer. Asphalt Rubber Material Loader. Boring Machine Tender (outside), Carpenter Laborer (cleaning, handling, oiling & blowing of panel forms and lumber), Concrete Laborer, Concrete Screeding for rough strike-off, Concrete water curing. Concrete Curb & Gutter laborer, Certified Confined Space Laborer, Demolition laborer & Cleaning of Brick and lumber, Expansion Joint Caulking; Environmental Remediation, Monitoring Well, Toxic waste and Geotechnical Drill tender, Fine Grader, Fire Watcher, Limbers, Brush Loader, Pilers and Debris Handlers. flagman. Gas Oil and Water Pipeline Laborer. Material Hoseman (slabs, walls, floors, decks); Plugging, filling of shee bolt holes; Dry packing of concrete and patching; Post Holer Digger (manual); Railroad maintenance, repair trackman, road beds; Rigging & signaling; Scaler, Slip-Form Raisers, Filling cracks on any surface, tool Crib or Tool House Laborer, Traffic control (signs, barriers, barricades, delineator, cones etc.), Window Cleaner

GROUP 2: Asphalt abatement; Buggymobile; Cement dumper (on 1 yd. or larger mixers and handling bulk cement); Concrete curer, impervious membrane and form oiler; Chute man, pouring concrete; Concrete cutting torch; Concrete pile cutter; driller/Jackhammer, with drill steel 2 1/'2 feet or longer; Dry pak-it machine; Fence erector; Pipeline wrapper, gas, oil, water, pot tender & form man; Grout man; Installation of all asphalt overlay fabric and materials used for reinforcing asphalt; Irrigation laborer; Kettleman-Potman hot mop, includes applying asphalt, lay-klold, creosote, lime caustic and similar tyhpes of materials (dipping, brushing, handling) and waterproofing; Membrane vapor barrier installer; Pipelayer backup man (coating, grouting, making of joints, sealing caulkiing,

diapering including rubber basket joints, pointing); Rotary scarifier, multiple head concrete chipper; Rock slinger; Roto scraper & tiller; Sandblaster pot tender; Septic tank digger/installer; Tamper/wacker operator; Tank scaler & cleaner; Tar man & mortar man; Tree climber/faller, chainb saw operator, Pittsburgh chipper & similar type brush shredders.

GROUP 3: Asphalt, installation of all frabrics; Buggy Mobile Man, Bushing hammer; Compactor (all types), Concrete Curer - Impervious membrane, Form Oiler, Concrete Cutting Torch, Concrete Pile Cutter, Driller/Jackhammer with drill steel 2 1/2 ft or longer, Dry Pak-it machine, Fence erector including manual post hole digging, Gas oil or water Pipeline Wrapper - 6 ft pipe and over, Guradrail erector, Hydro seeder, Impact Wrench man (multi plate), kettleman-Potman Hot Mop includes applying Asphalt, Lay-Kold, Creosote, lime caustic and similar types of materials (dipping, brushing or handling) and waterproofing. Laser Beam in connection with Laborer work. High Scaler, Operators of Pneumatic Gas or Electric Tools, Vibrating Machines, Pavement Breakers, Air Blasting, Come-Alongs and similar mechanical tools, Remote-Controlled Robotic Tools in connection with Laborers work. Pipelayer Backup Man (Coating, grouting, m makeing of joints, sealing, caulking, diapering including rubber gasket joints, pointing and other services). Power Post Hole Digger, Rotary Scarifier (multiple head concrete chipper scarifier), Rock Slinger, Shot Blast equipment (8 to 48 inches), Steel Headerboard Man and Guideline Setter, Tamper/Wacker operator and similar types, Trenching Machine hand propelled.

GROUP 4: Any worker exposed to raw sewage. Asphalt Raker, Luteman, Asphalt Dumpman, Asphalt Spreader Boxes, Concrete Core Cutter, Concrete Saw Man, Cribber, Shorer, Head Rock Slinger. Installation of subsurface instrumentation, monitoring wells or points, remediation system installer; Laborer, asphalt-rubber distributor bootman; Oversize concrete vibrator operators, 70 pounds or over. Pipelayer, Prfefabricated Manhole Installer, Sandblast Nozzleman (Water Balsting-Porta Shot Blast), Traffic Lane Closure.

GROUP 5: Blasters Powderman-All work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Horizontal directional driller, Boring system, Electronic traking, Driller: all power drills excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and all other types of mechanical drills without regard to form of motive power. Environmental remediation, Monitoring well, Toxic waste and Geotechnical driller, Toxic waste removal. Welding in connection with Laborer's work.

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LABO0300-005 03/01/2020

	Rates	Fringes
Asbestos Removal Laborer.....	\$ 36.13	20.33

SCOPE OF WORK: Includes site mobilization, initial site cleanup, site preparation, removal of asbestos-containing material and toxic waste, encapsulation, enclosure and disposal of asbestos- containing materials and toxic waste by hand or with equipment or machinery; scaffolding, fabrication of temporary wooden barriers and assembly of decontamination stations.

LABO0345-001 07/01/2020

	Rates	Fringes
LABORER (GUNITE)		
GROUP 1.....	\$ 45.05	19.62
GROUP 2.....	\$ 44.10	19.62
GROUP 3.....	\$ 40.56	19.62

FOOTNOTE: GUNITE PREMIUM PAY: Workers working from a Bosn'n's Chair or suspended from a rope or cable shall receive 40 cents per hour above the foregoing applicable classification rates. Workers doing gunite and/or shotcrete work in a tunnel shall receive 35 cents per hour above the foregoing applicable classification rates, paid on a portal-to-portal basis. Any work performed on, in or above any smoke stack, silo, storage elevator or similar type of structure, when such structure is in excess of 75'-0"" above base level and which work must be performed in whole or in part more than 75'-0"" above base level, that work performed above the 75'-0"" level shall be compensated for at 35 cents per hour above the applicable classification wage rate.

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Rodmen, Nozzlemen

GROUP 2: Gunmen

GROUP 3: Reboundmen

LABO1184-001 07/01/2020

	Rates	Fringes
Laborers: (HORIZONTAL DIRECTIONAL DRILLING)		
(1) Drilling Crew Laborer...	\$ 37.85	15.99
(2) Vehicle Operator/Hauler.	\$ 38.02	15.99
(3) Horizontal Directional		
	Rates	Fringes
Drill Operator.....	\$ 39.87	15.99
(4) Electronic Tracking		
Locator.....	\$ 41.87	15.99

	Rates	Fringes
Laborers: (STRIPING/SLURRY SEAL)		
GROUP 1.....	\$ 39.06	19.01
GROUP 2.....	\$ 40.36	19.01
GROUP 3.....	\$ 42.37	19.01
GROUP 4.....	\$ 44.11	19.01

LABORERS - STRIPING CLASSIFICATIONS

GROUP 1: Protective coating, pavement sealing, including repair and filling of cracks by any method on any surface in parking lots, game courts and playgrounds; carstops; operation of all related machinery and equipment; equipment repair technician

GROUP 2: Traffic surface abrasive blaster; pot tender - removal of all traffic lines and markings by any method (sandblasting, waterblasting, grinding, etc.) and preparation of surface for coatings. Traffic control person: controlling and directing traffic through both conventional and moving lane closures; operation of all related machinery and equipment

GROUP 3: Traffic delineating device applicator: Layout and application of pavement markers, delineating signs, rumble and traffic bars, adhesives, guide markers, other traffic delineating devices including traffic control. This category includes all traffic related surface preparation (sandblasting, waterblasting, grinding) as part of the application process. Traffic protective delineating system installer: removes, relocates, installs, permanently affixed roadside and parking delineation barricades, fencing, cable anchor, guard rail, reference signs, monument markers; operation of all related machinery and equipment; power broom sweeper

GROUP 4: Striper: layout and application of traffic stripes and markings; hot thermo plastic; tape traffic stripes and markings, including traffic control; operation of all related machinery and equipment

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LABO1414-003 08/05/2020

	Rates	Fringes
LABORER		
PLASTER CLEAN-UP LABORER....	\$ 36.03	21.01
PLASTER TENDER.....	\$ 38.58	21.01

Work on a swing stage scaffold: \$1.00 per hour additional.

Work at Military Bases - \$3.00 additional per hour:  
 Coronado Naval Amphibious Base, Fort Irwin, Marine Corps Air Station-29 Palms, Imperial Beach Naval Air Station, Marine Corps Logistics Supply Base, Marine Corps Pickle Meadows, Mountain Warfare Training Center, Naval Air

Facility-Seeley, North Island Naval Air Station, Vandenberg AFB.

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PAIN0036-001 07/01/2020

	Rates	Fringes
Painters: (Including Lead Abatement)		
(1) Repaint (excludes San Diego County).....	\$ 29.59	17.12
(2) All Other Work.....	\$ 33.12	17.24

REPAINT of any previously painted structure. Exceptions: work involving the aerospace industry, breweries, commercial recreational facilities, hotels which operate commercial establishments as part of hotel service, and sports facilities.

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PAIN0036-010 10/01/2020

	Rates	Fringes
DRYWALL FINISHER/TAPER		
(1) Building & Heavy Construction.....	\$ 36.69	18.90
(2) Resident Construction (Wood frame apartments, single family homes and multi-duplexes up to and including four stories).....	\$ 27.11	17.51

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PAIN0036-012 10/01/2020

	Rates	Fringes
GLAZIER.....	\$ 45.55	18.06

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PAIN0036-019 06/01/2020

	Rates	Fringes
SOFT FLOOR LAYER.....	\$ 32.27	17.24

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PLAS0200-005 08/07/2019

	Rates	Fringes
PLASTERER.....	\$ 43.73	16.03

NORTH ISLAND NAVAL AIR STATION, COLORADO NAVAL AMPHIBIOUS BASE, IMPERIAL BEACH NAVAL AIR STATION: \$3.00 additional per hour.

PLAS0500-001 07/01/2018

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER		
GROUP 1.....	\$ 26.34	21.12
GROUP 2.....	\$ 27.99	21.12
GROUP 3.....	\$ 30.07	21.12

CEMENT MASONS - work inside the building line, meeting the following criteria:

GROUP 1: Residential wood frame project of any size; work classified as Type III, IV or Type V construction; interior tenant improvement work regardless the size of the project; any wood frame project of four stories or less.

GROUP 2: Work classified as type I and II construction

GROUP 3: All other work

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PLUM0016-006 09/01/2020

	Rates	Fringes
PLUMBER, PIPEFITTER, STEAMFITTER		
Camp Pendleton; Vandenberg Air Force Base.....	\$ 55.88	23.66
Work ONLY on new additions and remodeling of commercial buildings, bars, restaurants, and stores not to exceed 5,000 sq. ft. of floor space.....	\$ 50.70	23.73
Work ONLY on strip malls, light commercial, tenant improvement and remodel work.....	\$ 38.73	22.06
All other work except work on new additions and remodeling of bars, restaurant, stores and commercial buildings not to exceed 5,000 sq. ft. of floor space and work on strip malls, light commercial, tenant improvement and remodel work.....	\$ 52.28	24.71

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PLUM0016-011 09/01/2020

	Rates	Fringes
PLUMBER/PIPEFITTER		
Residential.....	\$ 41.62	20.63

PLUM0345-001 09/01/2020

	Rates	Fringes
PLUMBER		
Landscape/Irrigation Fitter..	\$ 35.30	24.10
Sewer & Storm Drain Work....	\$ 39.39	21.48

ROOF0045-001 07/01/2020

	Rates	Fringes
ROOFER.....	\$ 36.25	9.24

SFCA0669-001 04/01/2020

	Rates	Fringes
SPRINKLER FITTER.....	\$ 41.57	24.10

SHEE0206-001 07/01/2020

	Rates	Fringes
SHEET METAL WORKER		
Camp Pendleton.....	\$ 42.62	29.55
Except Camp Pendleton.....	\$ 40.62	29.55
Sheet Metal Technician.....	\$ 30.51	9.49

SHEET METAL TECHNICIAN - SCOPE:

- a. Existing residential buildings, both single and multi-family, where each unit is heated and/or cooled by a separate system
- b. New single family residential buildings including tracts.
- c. New multi-family residential buildings, not exceeding five stories of living space in height, provided each unit is heated or cooled by a separate system. Hotels and motels are excluded.
- d. LIGHT COMMERCIAL WORK: Any sheet metal, heating and air conditioning work performed on a project

where the total construction cost, excluding land, is under \$1,000,000 e. TENANT IMPROVEMENT WORK: Any work necessary to finish interior spaces to conform to the occupants of commercial buildings, after completion of the building shell

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 TEAM0166-001 09/01/2019

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 18.90	34.69
GROUP 2.....	\$ 26.49	34.69
GROUP 3.....	\$ 26.69	34.69
GROUP 4.....	\$ 26.89	34.69
GROUP 5.....	\$ 27.09	34.69
GROUP 6.....	\$ 27.59	34.69
GROUP 7.....	\$ 29.09	34.69

FOOTNOTE: HAZMAT PAY: Work on a hazmat job, where hazmat certification is required, shall be paid, in addition to the classification working in, as follows: Levels A, B and C - +\$1.00 per hour. Workers shall be paid hazmat pay in increments of four (4) and eight (8) hours.

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Fuel Man, Swamper

GROUP 2: 2-axle Dump Truck, 2-axle Flat Bed, Concrete Pumping Truck, Industrial Lift Truck, Motorized Traffic Control, Pickup Truck on Jobsite

GROUP 3: 2-axle Water Truck, 3-axle Dump Truck, 3-axle Flat Bed, Erosion Control Nozzleman, Dump Crete Truck under 6.5 yd, Forklift 15,000 lbs and over, Prell Truck, Pipeline Work Truck Driver, Road Oil Spreader, Cement Distributor or Slurry Driver, Bootman, Ross Carrier

GROUP 4: Off-road Dump Truck under 35 tons 4-axles but less than 7-axles, Low-Bed Truck & Trailer, Transit Mix Trucks under 8 yd, 3-axle Water Truck, Erosion Control Driver, Grout Mixer Truck, Dump Crete 6.5yd and over, Dumpster Trucks, DW 10, DW 20 and over, Fuel Truck and Dynamite, Truck Greaser, Truck Mounted Mobile Sweeper 2-axle Winch Truck

GROUP 5: Off-road Dump Truck 35 tons and over, 7-axles or more, Transit Mix Trucks 8 yd and over, A-Frame Truck, Swedish Cranes

GROUP 6: Off-Road Special Equipment (including but not limited to Water Pull Tankers, Athey Wagons, DJB, B70 Wuclids or like Equipment)

GROUP 7: Repairman

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the

most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

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#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling



On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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"END OF GENERAL DECISION"

**10.2. CWSRF DAVIS BACON PROVISIONS.** Contractor shall include the following language in this section in all of its subcontracts for the Project. Contractor and all subcontractors working on the Project shall comply with any provisions herein applicable to contractors and subcontractors, respectively:

(1) Minimum wages.

- (i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4).

Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Sub recipients may obtain wage determinations from the U.S. Department of Labor's web site, [www.dol.gov](http://www.dol.gov).

- (ii) (A) The sub recipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the sub recipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the sub recipient (s) to the State award official. The State award official will transmit the request, to the Administrator of the Wage and Hour Division, Employment Standards

Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30- day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the sub recipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

- (iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

- (iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.
  
- (2) Withholding. The sub recipient(s), shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.
  
- (3) Payrolls and basic records.
  - (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

- (ii) (A)The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the sub recipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the sub recipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <https://www.dol.gov/whd/forms/index.htm> or its successor site.

The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker and shall provide them upon request to the sub recipient(s) for transmission to the State or EPA if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sub recipient(s).

(B)Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

1. That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;
2. That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;
3. That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of

work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's

hourly rate) specified in the contractor's or sub contractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal

employment opportunity requirements of Executive Order 11246, as amended and 29 CFR part 30.

- (5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.
- (6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may be appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.
- (7) Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
- (8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.
- (9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and sub recipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.
- (10) Certification of eligibility.
  - (i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
  - (ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
  - (iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001

## **5. Contract Provision for Contracts in Excess of \$100,000.**

- (a) Contract Work Hours and Safety Standards Act. The sub recipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the



clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

- (i) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
  - (ii) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (a)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a)(1) of this section, in the sum of \$25 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (a)(1) of this section.
  - (iii) Withholding for unpaid wages and liquidated damages. The sub recipient, upon written request of the EPA Award Official or an authorized representative of the Department of Labor, shall withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.
  - (iv) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (a)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a)(1) through (4) of this section.
- (b) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Sub recipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number,

correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid.

Further, the Sub recipient shall insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

## **6. Compliance Verification**

(a) The sub recipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(3), all interviews must be conducted in confidence. The sub recipient must use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.

(b) The sub recipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. Sub recipients must conduct more frequent interviews if the initial interviews or other information indicated that there is a risk that the contractor or subcontractor is not complying with DB.

Sub recipients shall immediately conduct interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence.

(c) The sub recipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The sub recipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable, the sub recipient should spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract. Sub recipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB. In addition, during the examinations the sub recipient shall verify evidence of fringe benefit plans and payments there under by contractors and subcontractors who claim credit for fringe benefit contributions.

(d) The sub recipient shall periodically review contractors and subcontractors use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.

(e) Sub recipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at <http://www.dol.gov/whd/america2.htm>.

## 11. AGENCY SPECIFIC PROVISIONS:

Note: Failure to comply with these specifications e.g., taking the specified steps prior to Bid opening and submitting the forms with the Bid, will lead to the Bid being declared **non-responsive** and, therefore, shall be rejected.

### 11.1. EPA Requirements:

1. Federal Disadvantaged Business Enterprise (DBE) regulations apply to this project. (Reference 40 Code of Federal Regulations Part 33 - Participation by Disadvantaged Business Enterprises in U.S. Environmental Protection Agency Programs).
2. The responsive Bid shall conform to GFE to increase DBE awareness of procurement opportunities through race and gender-neutral efforts. Race and gender-neutral efforts are ones which increase awareness of contracting opportunities in general, including outreach, recruitment and technical assistance.
3. Bidder agrees that it will cooperate with and assist the City in fulfilling the DBE Good Faith Effort Requirement achieving "fair share objectives" and will exercise GFE to achieve such minimum participation of small, minority and women owned businesses. In particular, in submitting a bid, the Bidder shall, in the selection of Subcontractors, and Suppliers for the procurement of equipment, supplies, construction, and services related to the project, at a minimum, undertake the affirmative GFE steps.
4. In accordance with EPA's Program for Utilization of Small, Minority Disadvantaged and Women Business Enterprises in procurement under Federal assistance programs, the Contractor agrees to the applicable "fair share objectives" as specified in **Attachment D**.
5. The provisions in the Contract Documents have been incorporated to prevent unfair practices that adversely affect DBEs.
6. If a DBE Subcontractor fails to complete the Work under the subcontract for any reason, the Contractor shall employ the 6 GFE if soliciting a replacement Subcontractor. The Contractor shall employ the 6 GFE described below even if the Contractor has achieved its fair share objectives.
7. Good Faith Efforts:
  - a. The Contractor shall demonstrate that efforts were made to attract DBEs on this contract. The "Good Faith" effort requires the Contractor and any Subcontractors to take the steps listed in these specifications to assure that DBEs are used whenever possible as sources of supplies, construction, equipment, or services even if the Contractor has achieved its fair share objectives.
  - b. If the Contractor awards subcontracts, it shall require the Subcontractors to take the steps in these specifications.
  - c. For the EPA defined GFE, see the steps below:
    - i. Ensure DBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For

Indian Tribal, State and Local and Government recipients, this will include placing DBEs on solicitation lists and soliciting them whenever they are potential sources.

- ii. Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes posting solicitations for bids or proposals for a minimum of 30 Calendar Days (refer to 33 CFR 33.301) before the bid or proposal closing date.
- iii. Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs. For Indian Tribal, State and local Government recipients, this will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process. Include with the GFE documentation a completed copy of the form AA61, "List of Work Made Available".
- iv. Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.
- v. Use the services and assistance of the U.S. Small Business Administration (SBA) and the Minority Business Development Agency (MBDA) of the Department of Commerce (DOC). See "DBE Potential Resources Centers" Section in a later part these specifications.
- vi. If the Contractor awards Subcontracts, the Contractor shall take the steps in the paragraphs above.

## **11.2. California State Revolving Fund (CASRF) Requirements:**

**11.2.1.** Refer to Subsection 11.1, "EPA Requirements" above and the following:

**11.2.2.** The Bidder shall take affirmative steps prior to Bid opening to assure that MBE's and WBE's are used whenever possible as sources of supplies, construction and services.

**11.2.3.** The affirmative steps are defined for contracts funded by the California State Water Resources Control Board as follows:

1. Utilization of US Small Business Administration and Minority Business Development Agency (MBDA) resources is required at no cost. These agencies offer several services, including Internet access to databases of DBEs.
2. For additional assistance, the Contractor can telephone the local offices of both agencies in their area (SBA Minority Enterprise Development Offices and DOC MBDA Regional Centers). The Internet web sites also include names, addresses, and phone or fax numbers of local SBA and MBDA centers. There are contact phone numbers listed in Step 3 that will assist you in reaching the 2 offices if the Internet is unavailable. Do not write to these sources.
3. The Contractor shall provide documentation that the local SBA/MBDA offices or web sites were notified of the contracting bid opportunity at

least 30 Calendar Days prior to Bid opening and solicitation to DBE Subcontractors at least 15 Calendar Days prior to Bid opening. Documentation shall not only include the efforts to contact the information sources and list the Contract opportunity, but also the solicitation and response to the bid request.

4. Include qualified DBEs on solicitation lists and record the information. Solicitation shall be as broad as possible.
5. If DBE sources are not located, explain why and describe the efforts made.
6. The Contractor shall send invitations to at least 10 (or all, if less than 10) DBE vendors for each item of the Work referred by sources contacted. The invitations shall adequately specify the items for which bids are requested. The record of GFE shall indicate a real desire for a positive response, such as a certified mail receipt or a documented telephone conversation.
7. A regular letter or an unanswered telephone call is not an adequate "good faith" effort. A list of all Subcontractors, including the bidders not selected and non DBE Subcontractors, and bid amount for each item of the Work shall be submitted on Form AA62. If a low bid was not accepted, an explanation shall be provided.

**11.2.4.** See "DBE Potential Resources Centers" Section in a later part these specifications.

**11.2.5. Annual DBE Utilization Reporting:**

The Contractor shall report to the City on an annual basis, their utilization of Minority Business Enterprise and Women's Business Enterprise Subcontractors and Suppliers using California State Revolving Funds (CASRF) Form UR-334.

**12. DBE POTENTIAL RESOURCES CENTERS:**

- 12.1.** Utilization of US Small Business Administration and Minority Business Development Agency (MBDA) resources is required at no cost. These agencies offer several services, including Internet access to databases of DBEs.
- 12.2.** For additional assistance, the recipient or contractor can telephone the local offices of both agencies in their area (SBA Minority Enterprise Development Offices and DOC MBDA Regional Centers). The Internet web sites also include names, addresses, and phone or fax numbers of local SBA and MBDA centers. Do not write to these sources
- 12.3.** The Contractor shall provide documentation that the local SBA/MBDA offices or web sites were notified of the contracting bid opportunity at least 30 Calendar Days prior to Bid opening and solicitation to DBE subcontractors at least 15 Calendar Days prior to Bid opening. Documentation shall not only include the efforts to contact the information sources and list the Contract opportunity, but also the solicitation and response to the bid request.
- 12.4.** Include qualified DBEs on solicitation lists and record the information on Form AA63. Solicitation shall be as broad as possible.
- 12.5.** If DBE sources are not located, explain why and describe the efforts made.
- 12.6.** The Contractor shall send invitations to at least 10 (or all, if less than 10) DBE vendors for each item of work referred by sources contacted. The invitations shall adequately specify the items for which bids are requested. The record of "good faith" efforts shall indicate a

real desire for a positive response, such as a certified mail receipt or a documented telephone conversation.

**12.7.** A regular letter or an unanswered telephone call is not an adequate “good faith” effort. A list of all sub-bidders, including the bidders not selected and non-DBE Subcontractors, and bid amount for each item of the Work shall be submitted on Form AA62. If a low bid was not accepted, an explanation shall be provided.

**12.8.** Federal Agencies (must be contacted and solicitations posted on their websites):

Name and Address	Telephone and Web Site
<b>U.S. Small Business Administration</b>	(415) 744-6820 Extension 0
455 Market Street, Suite 600	Dynamic Small Business Search: <a href="https://catalog.data.gov/dataset/dynamic-small-business-search-dsbs-025a1">https://catalog.data.gov/dataset/dynamic-small-business-search-dsbs-025a1</a> <sup>1</sup>
San Francisco, CA 94105	Bid Notification: <a href="https://catalog.data.gov/dataset/subcontracting-network-subnet-system">https://catalog.data.gov/dataset/subcontracting-network-subnet-system</a> <sup>2</sup>
RE: Minority Enterprise Development Offices	
<b>U.S. Department of Commerce</b>	909-315-3339
Minority Business Development Agency	Website:
177 East Colorado Blvd. Suite 200 Space 2054	<a href="https://www.mbda.gov/business-center/pasadena-mbda-business-center">https://www.mbda.gov/business-center/pasadena-mbda-business-center</a> <sup>3</sup>
Pasadena, CA 91105	RE: Business Development Centers

**12.9.** State Agencies (must be contacted):

Name and Address	Telephone and Web Site
<b>California Department of Transportation</b>	Mailing Address: PO Box 942874
(CALTRANS) Business Enterprise Program <sup>4</sup>	Sacramento, CA 94274-0015
1820 Alhambra Blvd.	(916) 227-9599
Sacramento, CA 95816	DBE Database: <a href="https://dot.ca.gov/programs/civil-rights/dbe">https://dot.ca.gov/programs/civil-rights/dbe</a>
<b>CA Public Utilities Commission (CPUC)</b> <sup>5</sup>	
505 Van Ness Avenue	Directory: <a href="https://sch.thesupplierclearinghouse.com/FrontEnd/SearchCertifiedDirectory.asp">https://sch.thesupplierclearinghouse.com/FrontEnd/SearchCertifiedDirectory.asp</a>
San Francisco, CA 94102-3298	

Notes:

1. The Contractor shall use the SBA's Dynamic Business Search database to search for potential subcontractors, suppliers, and/or manufacturers. Bidder must provide a copy of all search records for items of work made available with GFE documentation.
2. Contractor shall use SUB-Net to post subcontracting opportunities. Contractor shall post Subcontractor opportunities at least 15 Working Days prior to bid opening. Small businesses can review this web site to identify opportunities in their areas of expertise. The web site is designed primarily as a place for large businesses to post solicitations and notices. Bidder **must** provide copy of the Display Solicitation Record identifying the date solicitation notice was posted with GFE documentation.
3. Contractor may use MBDA web portal to post subcontracting opportunities. If utilized, the Contractor shall post subcontractor opportunities at least 30 Calendar Days prior to Bid opening. Small businesses can review this web site to identify opportunities in their areas of expertise. The web site is designed primarily as a place for large businesses to post solicitations and notices. Provide copy of the Offer Overview with the GFE documentation.
4. Based on the federal DBE program, CALTRANS maintains a database and provides directories of minority and woman-owned firms. Bidder must provide a copy of all search records for items of work made available with GFE documentation.
5. CPUC maintains a database of DBE-owned business enterprises and serves to inform the public. Bidder **must** provide a copy of all search records for items of work made available with GFE documentation.

**13. GOOD FAITH EFFORT DOCUMENTATION SUBMITTALS:**

- 13.1.** The affirmative GFE steps documentation shall be submitted **within 4 Working Days after the Bid Opening**. If this documentation is not submitted when due, the City will declare the Bid **non-responsive** and reject it.
- 13.2.** The required documentation shall be submitted and logged in at the following address:

CITY OF SAN DIEGO  
ENGINEERING & CAPITAL PROJECTS DEPARTMENT, CONTRACTS DIVISION  
525 B STREET, SUITE 750  
SAN DIEGO, CA 92101

SUBJECT: AFFIRMATIVE GOOD FAITH EFFORT DOCUMENTATION

BID NO. **K-21-1867-DBB-3**

- 13.3.** The Contractor shall maintain the records documenting compliance with requirements including documentation of its GFE and data relied upon in formulating its fair share objectives.

**14. FORMS:**

- 14.1.** The Contractor shall demonstrate that efforts were made to attract DBEs on this contract. The Contractor and Subcontractors shall take the steps listed in these specifications to assure that DBEs are used whenever possible as sources of supplies, construction, equipment, or services. In addition to the specified GFE documentation, the Bidder shall submit the following forms.
  - 14.1.1.** The Contractor shall demonstrate that efforts were made to attract DBEs on this contract. The Contractor and Subcontractors shall take the steps listed in these specifications to assure that DBEs are used whenever possible as sources of

supplies, construction, equipment, or services. In addition to the specified GFE documentation, the Bidder shall submit the following forms.

**14.1.1.1** The following forms shall be submitted **with the Bid submittal**. Failure to include any of the forms shall cause the Bid to be deemed **non-responsive**.

1. Form 4500-3: DBE Subcontractor Performance Form
2. Form 4500-4: DBE Subcontractor Utilization Form

**14.1.1.2** The following forms shall be completed and submitted within **4 Working Days after the Bid opening by 5 PM**. Failure to include any of the forms shall cause the Bid to be deemed **non-responsive**.

1. Form AA61: List of Work Made Available
2. Form AA62: Summary of Bids Received
3. Form AA63: Good Faith Effort List of Subcontractors Solicited

**14.1.2.** The following additional forms shall be submitted annually in accordance with Section 11 "AGENCY SPECIFIC PROVISIONS".

1. Form UR-334: California State Revolving Funds (CASRF)

**14.1.3.** Bidder is to provide the following form to all DBE subcontractors participating on this contract. Submittal of form is dependent on DBE subcontractor and is to be forwarded to the DBE coordinator at any time during the project period of performance.

1. Form 4500-2: DBE Subcontractor Participation Form.



**FUNDING AGENCY PROVISIONS**  
**FORMS**



**Disadvantaged Business Enterprise (DBE) Program  
DBE Subcontractor Performance Form**

This form is intended to capture the DBE<sup>1</sup> subcontractor's<sup>2</sup> description of work to be performed and the price of the work submitted to the prime contractor. A Financial Assistance Agreement Recipient must require its prime contractor to have its DBE subcontractors complete this form and include all completed forms in the prime contractor's bid or proposal package.

Subcontractor Name		Project Name	
Bid / Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact	
Address			
Telephone No.		Email Address	
Prime Contractor Name		Issuing/Funding Entity	

Contract Item Number	Description of Work Submitted from the Prime Contractor Involving Construction, Services, Equipment or Supplies	Price of Work Submitted to the Prime Contractor
DBE Certified By: <input type="checkbox"/> DOT <input type="checkbox"/> SBA Other: _____		Meets/exceeds EPA certification standards? YES      NO      Unknown

<sup>1</sup> A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.2015 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.  
<sup>2</sup> Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an award of financial assistance.

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Title	Date

Subcontractor Signature	Print Name
Title	Date

The public reporting and record keeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Do not send the completed form to this address.

**FORM 4500-3 (DBE Subcontractor Performance Form)**



## Disadvantaged Business Enterprise (DBE) Program DBE Subcontractor Utilization Form

This form is intended to capture the prime contractor's actual and/or anticipated use of identified certified DBE<sup>1</sup> subcontractor's<sup>2</sup> and the estimated dollar amount of each subcontract. A Financial Assistance Agreement Recipient must require its prime contractors to complete this form and include it in the bid or proposal package. Prime contractors should also maintain a copy of this form on file.

Prime Contractor Name		Project Name	
Bid / Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact	
Address			
Telephone No.		Email Address	
Issuing/Funding Entity			

I have identified potential DBE certified subcontractors.      YES      NO If yes, please complete the table below. If no, please explain:			
Subcontractor Name/ Company Name	Company Address / Phone / Email	Estimated Dollar Amount	Currently DBE Certified?

--Continue on back if needed--

<sup>1</sup> A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.2015 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

<sup>2</sup> Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an award of financial assistance.

**FORM 4500-4 (DBE Subcontractor Utilization Form)**

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Title	Date

The public reporting and record keeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency’s need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Do not send the completed form to this address.

**FORM 4500-4 (DBE Subcontractor Utilization Form)**

**LIST OF WORK MADE AVAILABLE**

List items of the Work the Bidder made available to DBE firms. Identify those items of the Work the Bidder might otherwise perform with its own forces and those items that have been broken down into economically feasible units to facilitate DBE participation. For each item listed, show the dollar amount and percentage of the Base Bid. The Bidder must demonstrate that enough work to meet the goal was made available to DBE firms.

SCOPE OF WORK MADE AVAILABLE	NAICS CODE	BIDDER NORMALLY PERFORMS ITEM (Y/N)	ITEM BROKEN DOWN TO FACILITATE PARTICIPATION (Y/N)	AMOUNT	PERCENTAGE OF BASE BID

**SUMMARY OF BIDS RECEIVED**

<b>Company Name</b>	<b>NAICS CODES</b>	<b>Scope of Work</b>	<b>Selected (Y/N)</b>	<b>Bid Amount</b>	<b>DBE</b>	<b>Non-DBE</b>	<b>Explanation for not Selecting</b>

**USE ADDITIONAL FORMS AS NECESSARY**

**DISADVANTAGE BUSINESS ENTERPRISE (DBE)  
GOOD FAITH EFFORT LIST OF SUBCONTRACTORS SOLICITED**

<b>Contractor Name</b>	<b>Contractor Address</b>	<b>How Located</b>	<b>Date of Contact</b>	<b>Contact Method</b>	<b>Scope of Work</b>	<b>Bidding (Yes/No)</b>

**USE ADDITIONAL FORMS AS NECESSARY**





**STATE WATER RESOURCES CONTROL BOARD – DIVISION OF FINANCIAL ASSISTANCE  
DISADVANTAGED BUSINESS ENTERPRISE (DBE) UTILIZATION  
CALIFORNIA STATE REVOLVING FUNDS (CASRF)  
FORM UR-334**

<b>1. Grant/Finance Agreement Number:</b>		<b>2. Annual Reporting Period</b> 10/1/___ through 09/30/___		<b>3. Purchase Period of Financing Agreement:</b>	
<b>4. Total Payments Paid to Prime Contractor or Sub-Contractors During Current Reporting Period: \$</b>					
<b>5. Recipient's Name and Address:</b>			<b>6. Recipient's Contact Person and Phone Number:</b>		
<b>7. List All DBE Payments Paid by Recipient or Prime Contractor During Current Reporting Period:</b>					
Payment or Purchase Paid by Recipient or Prime Contractor	Amount Paid to Any DBE Contractor or Sub-Contractor For Service Provided to Recipient		Date of Payment (MM/DD/YY)	Procurement Type Code** (see below)	Name and Address of DBE Contractor of Sub-Contractor or Vendor
	MBE	WBE			
<b>8. Initial here if no DBE contractors or sub-contractors paid during current reporting period:</b>					
<b>9. Initial here if all procurements for this contract are completed:</b>					
<b>10. Comments:</b>					
<b>11. Signature and Title of Recipient's Authorized Representative</b>				<b>12. Date</b>	

**Email Form UR-334 to:**

[DrinkingWaterSRF@waterboards.ca.gov](mailto:DrinkingWaterSRF@waterboards.ca.gov) OR [CleanWaterSRF@waterboards.ca.gov](mailto:CleanWaterSRF@waterboards.ca.gov)

**Questions may be directed to:**

**\*\*Procurement Type:**

1. Construction
2. Supplies
3. Services (includes business services; professional services; repair services and personnel services)
4. Equipment

**STATE WATER RESOURCES CONTROL BOARD - DIVISION OF FINANCIAL ASSISTANCE  
DISADVANTAGED BUSINESS ENTERPRISE (DBE) UTILIZATION  
CALIFORNIA STATE REVOLVING FUNDS**

**INSTRUCTIONS FOR COMPLETING FORM UR-334**

- Box 1** Grant or Financing Agreement Number.
- Box 2** Annual reporting period.
- Box 3** Enter the dates between which you made procurements under this financing agreement or grant.
- Box 4** Enter the total amount of payments paid to the contractor or sub-contractors during this reporting period.
- Box 5** Enter Recipient's Name and Address.
- Box 6** Enter Recipient's Contact Name and Phone Number.
- Box 7** Enter details for the **DBE purchases only** and be sure to limit them to the current period. 1) Use either an "R" or a "C" to represent "Recipient" or "Contractor." 2) Enter a dollar total for DBE and total the two columns at the bottom of the section. 3) Provide the payment date. 4) Enter a product type choice from those at the bottom of the page. 5) List the vendor name and address in the right-hand column
- Box 8** Initial here if no DBE contractors or sub-contractors were paid during this reporting period.
- Box 9** Initial this box only if all purchases under this financing agreement or grant have been completed during this reporting period or a previous period. If you initial this box, we will no longer send you a survey.
- Box 10** This box is for explanatory information or questions.
- Box 11** Provide an authorized representative signature.
- Box 12** Enter the date form completed.



**Disadvantaged Business Enterprise (DBE) Program  
DBE Subcontractor Participation Form**

A Financial Assistance Agreement Recipient must require its prime contractors to provide this form to its DBE subcontractors. This form gives a DBE<sup>1</sup> subcontractor<sup>2</sup> the opportunity to describe work received and/or report any concerns regarding the funded project (e.g., in areas such as termination by prime contractor, late payments, etc.). The DBE subcontractor can, as an option, complete and submit this form to the DBE Coordinator at any time during the project period of performance.

Subcontractor Name		Project Name	
Bid / Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact	
Address			
Telephone No.		Email Address	
Prime Contractor Name		Issuing/Funding Entity	

Contract Item Number	Description of Work Received from the Prime Contractor Involving Construction, Services, Equipment or Supplies	Amount Received by Prime Contractor

<sup>1</sup> A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.2015 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

<sup>2</sup> Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an award of financial assistance.

Please use the space below to report any concerns regarding the above funded project:

Subcontractor Signature	Print Name
Title	Date

The public reporting and record keeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Do not send the completed form to this address.

**Send completed Form 4500-2 to:**  
Mr. Joe Ochab, DBE Coordinator  
US EPA, Region 9  
75 Hawthorne Street  
San Francisco, CA 94105

**FORM 4500-2 (DBE Subcontractor Participation Form)**

**ATTACHMENT E**  
**SUPPLEMENTARY SPECIAL PROVISIONS**

## **SUPPLEMENTARY SPECIAL PROVISIONS**

The following Supplementary Special Provisions (SSP) modifies the following documents:

1. The **2018 Edition** of the Standard Specifications for Public Works Construction (The "GREENBOOK").
2. The **2018 Edition** of the City of San Diego Standard Specifications for Public Works Construction (The "WHITEBOOK"), including the following:
  - a) General Provisions (A) for all Construction Contracts.

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### **PART 0 – EQUAL OPPORTUNITY CONTRACTING PROGRAM (EOCP)**

#### **SECTION A – GENERAL REQUIREMENTS**

**0-12 CONTRACT RECORDS AND REPORTS.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. You shall maintain records of all subcontracts and invoices from your Subcontractors and Suppliers for work on this project. Records shall show name, telephone number including area code, and business address of each Subcontractor, Supplier, and joint venture partner, and the total amount actually paid to each firm. Project relevant records, regardless of tier, may be periodically reviewed by the City.
2. You shall retain all records, books, papers, and documents pertinent to the Contract for a period of not less than 5 years after Notice of Completion and allow access to said records by the City's authorized representatives.
3. You shall submit the following reports using the City's web-based contract compliance (Prism® portal):
  - a) **Monthly Payment.** You shall submit Monthly Payment Reporting by the 10<sup>th</sup> day of the subsequent month. Incomplete and/or delinquent reporting may cause payment delays, non-payment of invoices, or both.
4. The records maintained under item 1, described above, shall be consolidated into a Final Summary Report, certified as correct by an authorized representative of the Contractor. The Final Summary Report shall include all subcontracting activities and be sent to the EOCP Program Manager prior to Acceptance. Failure to comply may result in assessment of liquidated damages or withholding of retention. The City will review and verify 100% of subcontract participation reported in the Final Summary Report prior to approval and release of final retention to you. In the event your Subcontractors are owed money for completed Work, the City may authorize payment to subcontractor via a joint check from the withheld retention.

## SECTION 1 – GENERAL, TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE, AND SYMBOLS

**1-2 TERMS AND DEFINITIONS.** To the "WHITEBOOK", items 43, 56, 69, and 102, DELETE in their entirety and SUBSTITUTE with the following:

43. **Field Order** -A Field Order is a written agreement by the Engineer to compensate you for Work items in accordance with 2-8, "EXTRA WORK" or 2-9, "CHANGED CONDITIONS". A Field Order does not change the Contract Price, Contract Time, or the scope intent of the Contract. The unused portion of the Field Order shall revert to the City upon Acceptance.
56. **Notice of Completion (NOC)** - A document recorded with the County of San Diego to signify that the Contract Work has been completed and accepted by the City.
69. **Punchlist** - A list of items of Work or corrections generated after a Walk-through that is conducted when you consider that the Work and Services are complete, and as verified by the Owner. The Punchlist may be completed in phases if defined in the Contract.
102. **Walk-through**- An inspection the City uses to verify the completion of the Project or phase of the Project and to generate a Punchlist prior to Acceptance.

To the "WHITEBOOK", item 54, "Normal Working Hours", ADD the following:

The **Normal Working Hours** are **6:00 AM to 5:00 PM.**

To the "WHITEBOOK", ADD the following:

108. **Acceptance** – When all of the Contract Work, including all Punchlist items, is deemed officially complete by the City Asset Owning Department or Deputy City Engineer.
109. **Occupancy** – When the Owner deems a building is ready for use, the Owner will issue a certificate of Occupancy in writing.
110. **Beneficial Use** - The time at which the Work for a specific area or unit process has progressed to the point where, in the opinion of Owner and Construction Manager, the Work for the specific area or unit process is sufficiently complete, in accordance with the Contract Documents, so that the specific area or unit process can be utilized for the purposes for which it is intended.
111. **Construction Manager** - The authorized representative of the Owner, also referred to as the Owner's Representative, who may be assigned to the site or any part thereof. All communication from the Contractor shall be through the Construction Manager. The responsibilities, authority, and limitations of the Construction Manager shall be as shown in the Contract Documents.
112. **Design Engineer** - The person, firm(s) or corporation(s) named as such below:  
CH2M HILL Engineers, Inc.- Prime Design Engineer  
Lopez Engineering, Inc.  
Beyaz and Patel, Inc.  
O'Day Consultants, Inc.  
PW Engineering, Inc.

The authorized Engineer of Record hired by the Owner. The responsibilities, authority, and limitations of the Construction Manager shall be as shown in the Contract Documents. This Design Engineer is also the individual(s) or entity(ies) named as such in the Agreement and established as the Engineer of Record.

113. **Final Completion** - Once Substantial Completion has been achieved, the following items are to be completed prior to the Final Completion by the Contractor:

- a) The Contractor shall complete punch list fix-up as approved by the Construction Manager prior to being provided with Final Completion.
- b) All Work required under Section 01 77 00, Closeout Procedures shall have been completed.

Following Final Completion, the Owner shall provide acceptance of the facilities and take over operation of the facilities.

114. **Intermediate Substantial Completion** – The time at which the Project’s operating facilities or systems are sufficiently complete to provide the Owner with uninterrupted operations and maintenance of the overall facility as required to perform an integrated startup with other facilities within the Program. These facilities include the Morena Pump Station and Conveyance, North City Water Reclamation Plant Expansion, North City Pure Water Facility, North City Pure Water Pump Station, and North City Pure Water Pipeline and Dechlorination Facility. The CONTRACTOR shall support all activities within the Integration Period as described in Section 01 91 14 Testing, Integration, and Startup.

115. **Substantial Completion** –

- a) The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Owner and Construction Manager, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed”, as applied to all or part of the Work, shall refer to Substantial Completion thereof.
- b) The time at which the Project’s operating facilities or systems is sufficient to provide Owner the full time, uninterrupted, and continuous beneficial operation of the Work; and when all required functional, performance, and acceptance or startup testing, and commissioning has been successfully demonstrated for all components, devices, equipment, and instrumentation and control to the satisfaction of the Owner and Construction Manager in accordance with the requirements of the Specifications.
- c) For Substantial Completion, the Contractor shall have completed all interior finish work, electrical, instrumentation and control, mechanical, HVAC, lighting, plumbing, civil, and final grading and paving, and also when, in the opinion of the Construction Manager and the Owner, the plant is essentially complete and ready for operation.



### 1-7.1.3

**Requests for Information (RFI).** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. Should You discover a conflict, omission, errors in the Contract Documents, differences with existing field conditions, or have any questions concerning interpretation or clarification of Contract Documents, or when you propose deviations to the standards or design, you shall submit a Request for Information (RFI) to the City regarding your question or clarification within **1 Working Day**.
2. Your RFI shall meet the following requirements:
  - a) All RFIs, whether by You or your Subcontractor or supplier at any tier, shall be submitted by You to the City.
  - b) RFIs shall be numbered sequentially.
  - c) You shall clearly and concisely set forth the single issue for which interpretation or clarification is sought, indicate Specification Section numbers, Contract Drawing numbers, and details, or other items involved, and state why a response is required from the City.
  - d) RFIs shall be submitted within **1 Working Day** in order that they may be adequately researched and answered before the response affects any critical activity of the Work.
  - e) Should You believe that a response to an RFI causes a change to the requirements of the Contract, you shall, before proceeding, give written notice to the City, indicating that You believe that City response to the RFI to be a Change Order. Failure to give such written notice within **5 Working Days** of receipt of the City's response to the RFI shall waive Your right to seek additional time or cost.
3. The City will respond to RFIs within **5 Working Days** unless the City notifies You in writing that a response will take longer. The **5 Working Days** shall begin when the RFI is received and dated by the City. Responses from the City will not change any requirement of the Contract unless so noted by the City in the response to the RFI. The City will not issue a Change Order for Extra Work or additional time when the issue raised in the RFI was due to your fault, neglect, or any unauthorized deviations from the project design or specifications.
4. If You proceed in resolving a conflict, omission, or any error in the Contract Documents without sending the City an RFI in accordance with the requirements stated above, the City may require You to remove such work at Your cost or back charge You the cost to remove this work.

### 1-7.2

**Contract Bonds.** To the "WHITEBOOK", item 1, DELETE in its entirety and SUBSTITUTE with the following:

1. Before execution of the Contract, file payment and performance bonds with the City to be approved by the Board in the amounts and for the purposes noted. Bonds shall be executed by a responsible surety as follows:
  - a) If the Work is being funded with state or local money, consistent with California Code of Civil Procedure §995.670, the Surety shall be an

"admitted surety" authorized by the State of California Department of Insurance to transact surety insurance in the State.

- b) If the Work is being funded with federal money, the Surety shall be listed in the U.S. Treasury Department Circular 570 and shall be in conformance with the specified Underwriting Limitations.

To the "WHITEBOOK", item 2, subsection "a", subsection "i", DELETE in its entirety and SUBSTITUTE with the following:

- i. A "Payment Bond" (Materials and Labor Bond) is optional. If no bond is submitted, no payment shall be made until 35 Calendar Days after Acceptance and any lien requirements have been fulfilled. If a bond is submitted, progress payments shall be made in accordance with these Specifications.

To the "WHITEBOOK", item 2, subsection "d", DELETE in its entirety and SUBSTITUTE with the following:

- d) For Contracts over \$100,000:
  - i. A "Payment Bond" (Materials and Labor Bond) for 100% of the Contract Price to satisfy claims of material Suppliers and of mechanics and laborers employed on the Work. You shall maintain the bond in full force and effect until Acceptance and until all claims for materials and labor are paid and shall otherwise comply with the Government Code.
  - ii. A "Faithful Performance Bond" for 100% of the Contract Price to guarantee faithful performance of Work, within the time prescribed and in a manner satisfactory to the City, that materials and workmanship shall be free from original or developed defects.

To the "WHITEBOOK", item 7, DELETE in its entirety and SUBSTITUTE with the following:

- 7. You shall require the Surety to mail its standard "Bond Status" form to the Engineer at the following address:  
Deputy Director  
Construction Management and Field Engineering Division  
9573 Chesapeake Drive San Diego, CA 92123

## **SECTION 2 - SCOPE OF THE WORK**

**2-2 PERMITS, FEES, AND NOTICES.** To the "WHITEBOOK", ADD the following:

- 2. The City will obtain, at no cost to you, the following permits:
  - a) Building Permit

**2-10.1.4 City's Final Determination.** To the "WHITEBOOK", item 2, DELETE in its entirety and SUBSTITUTE with the following:

- 1. If you disagree with the City's Final Determination, notify the Engineer in writing of your objection within 15 Working Days after receipt of the written determination in accordance with 2-10.2.1.4, "DRB Traditional Dispute Meeting".

**2-10.2 Dispute Resolution Process.** To the "WHITEBOOK", DELETE all sections and subsections in their entirety and SUBSTITUTE with the following:

**2-10.2 Dispute Resolution Process.**

1. A mandatory Dispute Resolution Board process shall be established in accordance with 2-10.2.1, "Dispute Resolution Board (DRB)" prior to the mandatory mediation as described in 2-10.2.2, "Mandatory Non-binding Mediation".

**2-10.2.1 Dispute Resolution Board (DRB).**

1. The DRB is a 3-member board that you and the City establish prior to beginning work.

**2-10.2.1.1 DRB Member Selection.** Within 45 Working Days of Contract approval, you and the City shall select DRB members and establish the DRB using the following procedure:

1. You and the City each nominates a DRB member candidate who is on the City's approved list. For the list of approved member candidates, go to the City's Division of Construction website.
2. If you or the City nominates someone who is not on that list, the candidate shall:
  - a) Be knowledgeable in the type of construction and contract documents anticipated by the Contract.
  - b) Have completed training by the Dispute Resolution Board Foundation.
  - c) Have no prior direct involvement on this Contract.
  - d) Have no financial interest in the Contract or with the parties, subcontractors, suppliers, consultants, or associated legal or business services within 6 months before award and during the Contract, except for payments for City DRA or DRB services, or payments for retirement or pensions from either party not tied to, dependent on, or affected by the net worth of the party.
3. You and the City shall request a disclosure statement from each nominated DRB member candidate and must each furnish it to the other party. The statement shall include:
  - a) Resume of the candidate's experience.
  - b) Declaration statement that describes past, present, anticipated, and planned professional or personal relationships with each of the following:
    - i. Parties involved in the Contract
    - ii. Parties' principals
    - iii. Parties' counsel
    - iv. Associated subcontractors and suppliers
4. You and the City are allowed:
  - a) One-time objection to the other's candidate without stating a reason.
  - b) Objection to any of the other's subsequent candidates based on a specific breach of the candidate's responsibilities or qualifications under items 1 and 3 of this section.

5. If you or the City objects to the other's candidate, the party whose candidate was objected to must nominate another DRB candidate within 15 Working Days.
6. The 1st candidate from a party that receives no objection becomes that party's DRB member.
7. You and the City each provide written notification to your selected DRB member.
8. Within 15 Working Days of their notifications, the selected DRB members recommend to you and the City the 3rd DRB member candidate and provide that candidate's disclosure statement.
9. Within 15 Working Days of the recommendation, you and the City must each notify the first 2 DRB members whether you approve or disapprove of the recommended 3rd DRB member candidate.
10. If the 2 DRB members cannot agree on the 3rd DRB candidate, they will submit a list of candidates to you and the City for final selection and approval.
11. If the 2 DRB members do not recommend a 3rd DRB candidate within 15 Working Days of notification of their selections, or if you and the City do not agree on the 3rd DRB member candidate within 15 Working Days of the recommendation, or if you and the City do not agree on any of the candidates on the list provided by the first 2 selected DRB members, you and the City each must select 3 candidates from the current list of arbitrators certified by the Public Works Contract Arbitration Committee established by Pub Cont Code § 10245 et seq. who will be willing to serve as a DRB member. The first 2 selected DRB members must select the 3rd member in a blind draw of these 6 candidates.
12. The 3 DRB members then decide which of the three will act as the DRB chairman. If you and the City do not agree with the selected chairman, the 3rd member will act as the DRB chairman.

**2-10.2.1.2 DRB Member Replacement.**

1. The service of a DRB member may end at any time with a notice of at least 15 Working Days if any of the following occurs:
  - a) A member resigns
  - b) The City replaces its selected member
  - c) You replace your selected member
  - d) The City's and your selected members replace the 3rd member
2. Either you or the City replace any member for failing to comply with the required employment or financial disclosure conditions of DRB membership as described in the Contract and in the Dispute Resolution Board Agreement form.
3. Replacing any DRB member shall be accomplished by written notification to the DRB and the other party with substantiation for replacing the member.
4. A replacement DRB member is selected the same way as the original DRB member. Selecting a replacement must start upon determination of the need for a replacement and must be completed within 15 Working Days. The Dispute Resolution Board Agreement form shall be amended to reflect the change to the DRB.

### **2-10.2.1.3 DRB Progress Meetings.**

1. You and the City shall periodically meet with the DRB and visit the job site so the DRB members can keep abreast of construction activities and develop familiarity with the work in progress.
2. The progress meetings shall occur at the start of the project and at least once every 4 months after that.
3. Both parties shall attend each progress meeting.
4. You and the City may agree to waive scheduled progress meetings when the only work remaining is plant establishment.

### **2-10.2.1.4 DRB Traditional Dispute Meeting.**

1. If you disagree with the City's Final Determination, notify the Engineer and DRB in writing of your objection within 15 Working Days after receipt of the determination.
2. A DRB dispute meeting shall be held no sooner than 30 Calendar Days and no later than 60 Calendar Days after the DRB receives your written notice unless you and the City otherwise agree.
3. At least 15 Calendar Days before the scheduled dispute meeting, each party shall furnish the DRB documentation that supports its position and any additional information requested by the DRB.
4. If the DRB requests additional information within 10 Calendar Days after the dispute meeting, the party receiving the request shall furnish this information within 10 Calendar Days of receiving the request.
5. The DRB shall provide a written recommendation report within 30 Calendar Days of the dispute meeting unless you and the City agree to allow more time.
6. Within 10 Calendar Days of receiving the DRB's recommendation report, either you or the City may request clarification of any part of the report. Only one request for clarification from each party is allowed per dispute.
7. Within 30 Calendar Days after receiving the DRB's recommendation, each party shall furnish a written response to the DRB indicating acceptance or rejection of the recommendation. If a party rejects the recommendation and has new information that supports its position, the party may request reconsideration. The reconsideration request shall be made within 30 Calendar Days after receiving the DRB's recommendation. Only one request for reconsideration from each party is allowed per dispute.
8. If both you and the City accept the DRB's recommendation but cannot agree on the time or payment adjustment within 60 Calendar Days of accepting the recommendation, either party may request that the DRB recommend an adjustment.
9. If you reject the DRB's recommendation, notify the Resident Engineer and DRB in writing of your objection within 15 Working Days after receipt of the DRB's recommendation and file a "Request for Mediation" in accordance with 2-10.2.2, "Mandatory Non-binding Mediation".

## **2-10.2.2 Mandatory Non-binding Mediation.**

1. If a dispute arises out of or relates to the Contract, or the breach thereof, and if said dispute cannot be settled through contract provisions provided for the Dispute Resolution Board process, claim settlement, or negotiations, the parties agree to first endeavor to settle the dispute in an amicable manner, using mandatory mediation under the Construction Industry Mediation Rules of the American Arbitration Association or any other neutral organization agreed upon before having recourse in a court of law.

### **2-10.2.2.1 Mandatory Mediation Costs.**

1. The expenses of witnesses for either side shall be paid by the party producing such witnesses. All other expenses of the mediation, including required traveling and other expenses of the mediator and the cost of any proofs or expert advice produced at the direct request of the mediator, shall be borne equally by the parties, unless they agree otherwise.

### **2-10.2.2.2 Selection of Mediator.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. A single mediator, knowledgeable in construction aspects and acceptable to both parties, shall be used to mediate the dispute.
2. To initiate mediation, the initiating party shall serve a Request for Mediation at the American Arbitration Association (AAA) on the opposing party.
3. If AAA is used, the initiating party shall concurrently file with AAA a "Request for Mediation" along with the appropriate fees, a copy of requested mediators marked in preference order, and a preference for available dates.
4. If AAA is selected to coordinate the mediation (Administrator), within 10 Working Days from the receipt of the initiating party's Request for Mediation, the opposing party shall file the following:
  - a) A copy of the list of the preferred mediators listed in preference order after striking any mediators to which they have any objection.
  - b) A preference for available dates.
  - c) Appropriate fees.
5. If the parties cannot agree on a mediator, then each party shall select a mediator and those mediators shall select the neutral third party to mediate the matter.

### **2-10.2.2.3 Conduct of Mediation Sessions.**

1. Mediation hearings shall be conducted in an informal manner and discovery shall not be allowed.
2. Discussions, statements, and/or admissions shall be confidential to the proceedings and shall not be used for any other purpose as it relates to the party's legal position. The parties may agree to exchange any information they deem necessary.

3. Both parties shall have an authorized representative attend the mediation. Each representative shall have the authority to recommend entering into a settlement. Either party may have attorney(s), witnesses, or expert(s) present. Either party may request a list of witnesses and notifications of whether attorney(s) shall be present.
4. Any resulting agreements from mediation shall be documented in writing. Mediation results and documentation, by themselves, shall be "non-binding" and inadmissible for any purpose in any legal proceeding, unless such admission is otherwise agreed upon in writing by both parties. Mediators shall not be subject to any subpoena or liability and their actions shall not be subject to discovery.

**2-10.2.3 Payment.**

1. Pay each DRB member \$1,500 per day for DRB's participation at each on-site meeting.
  - a) If a DRB member serves on more than one DRB, the \$1,500 shall be divided evenly among the contracts.
2. On-site meetings include:
  - a) Initial project meeting
  - b) Scheduled progress meetings for a project with a DRB
  - c) Dispute meetings
3. This payment includes full compensation for on-site time, travel expenses, transportation, lodging, travel time, and incidentals for each day or portion thereof that the DRB member is at a DRB meeting.
4. Before a DRB member spends any time reviewing plans and specifications, evaluating positions, preparing recommendations, or performs any other off-site DRB-related tasks, you and the City shall agree to pay for the tasks. Pay the DRB member \$150 per hour for these tasks. This payment includes full compensation for incidentals such as expenses for telephone, fax, and computer services.
5. The City shall reimburse you for 1/2 of the invoiced costs to the DRB and 1/2 of the costs of any technical services agreed to. Submit a change order bill and associated invoices with the original supporting documents in the form of a canceled check or bank statement to receive reimbursement. Do not add mark-ups to the change order bill.
6. The City will not pay for any DRB-related work performed after Contract acceptance.
7. The City will not pay your cost of preparing for and attending a dispute resolution meeting

**SECTION 3 – CONTROL OF THE WORK**

**3-2 SELF-PERFORMANCE.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. You shall perform, with your own organization, Contract Work amounting to at least 40% of the base Bid.

**3-3 SUBCONTRACTORS.** To the "WHITEBOOK", ADD the following:

6. When a Subcontractor fails to prosecute a portion of the Work in a manner satisfactory to the City, you shall remove such Subcontractor immediately upon written request of the City and shall request approval of a replacement Subcontractor to perform the Work in accordance with California Public Contract Code (PCC), Subletting and Subcontracting, Section 4107, at no added cost to the City.

**3-9 TECHNICAL STUDIES AND SUBSURFACE DATA.** To the "WHITEBOOK", ADD the following:

5. In preparation of the Contract Documents, the designer has relied upon the following reports of explorations and tests at the Work Site:
  - a) Report of Geotechnical Investigation Proposed FIRP/NSPF Project at Southwest Side of Miramar Landfill, City of San Diego dated April 12, 1994 by Metcalf & Eddy, Inc.
  - b) Design of MBC Improvements Potholing Report No. X170497, dated April 5, 2018 by AirX Utility Surveyors Inc.
6. The reports listed above are available for review at the following link:

[https://drive.google.com/drive/folders/1H\\_xQt\\_lHoMQbwIBSoOxeTAWSVjLDUo55?usp=sharing](https://drive.google.com/drive/folders/1H_xQt_lHoMQbwIBSoOxeTAWSVjLDUo55?usp=sharing)

**3-10 SURVEYING.** To the "GREENBOOK" and "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

**3-10 SURVEYING (DESIGN-BID-BUILD).**

**3-10.1 General.**

1. You shall provide all required site layout and general grade checking work not specified in 3-10.2, "Survey Services Provided by City".
2. Notify the City, in writing, at least 2 Working Days prior to requesting survey services provided by the City.

**3-10.2 Survey Services Provided by City (via City Consultant Surveyor).**

1. Monument Perpetuation, including mark-outs. You are responsible for requesting the coordination of these services.
  - a) If at any time a monument will be destroyed or covered, such monument shall be perpetuated in accordance with state law. Inform the City Engineering Support & Technical Services Division's Land Survey Section (LSS), via project Resident Engineer, if any monument will be destroyed or covered during any construction activity.
2. The following surveying services (including construction staking), as defined in California Business & Professions Code §8726, shall be provided by the City:
  - a) Locating or establishing alignment or elevations of all features or structures shown on project Plans.



- b) Locating or establishing geodetic control points for all site feature or structure locations.
  - c) Produce topographic as-built data.
  - d) Locating, establishing, or re-establishing monuments, property lines, right-of-way lines, or easement lines.
  - e) Verifying structure finish grade elevations.
  - f) QA/QC surveys on project settlement monitoring survey reports.
3. All construction survey stakes, control points, and other survey related marks provided by the City shall be preserved for the duration of the Project. If any construction survey stakes, control points, or other survey related marks are lost or disturbed and need to be replaced, such replacement shall be performed at your expense.

**3-10.3 Payment.**

- 1. The payment for site layout and general grade checking Work, coordination, and preservation of all survey related marks shall be included in the Contract Price.

**3-11. 2 Project Identification Signs.** To the "WHITEBOOK", ADD the following:

- 4. The State Revolving Fund requires that the Contractor place (2) temporary signs at least four (4) feet tall by eight (8) feet wide made of three-fourths (3/4) inch thick exterior grade plywood or other approved material in a prominent locations approved by the Engineer. The Contractor shall fabricate, properly mount and maintain both signs. The image cast on the sign should be resistant and protected from weathering. The signs should be mounted firmly and securely at the two sites with proper footing and post, as approved by the Resident Engineer. The Contractor is responsible for maintaining the signs in a manner approved by the Resident Engineer and will remove and dispose of upon completion. The sign shall include the full colored image that will be provided on a CD, at the pre-construction meeting.

**3-12.1 General.** To the "WHITEBOOK", ADD the following:

- 2. You shall provide a PM-10 certified self-loading motorized street sweeper equipped with a functional water spray system for this project.
- 3. You shall sweep all paved areas within the Work site and all paved haul routes as specified below:
  - a) Every Friday on a weekly basis.
  - b) 1 Working Day prior to each rain event.
  - c) As directed by the Engineer.

If these requirements would require you to sweep on a Holiday or Weekend, then you shall sweep the next available Working Day prior to that Holiday or Weekend.

**3-12.7 Drinking Water Discharges Requirements.** To the "WHITEBOOK", ADD the following:

1. You shall record the results for each discharge event on the City's Drinking Water Discharge Monitoring form included as **Appendix H - Monthly Drinking Water Discharge Monitoring Form.**

**3-13.1 Completion.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. You shall submit a written assertion that the Work has been completed and is ready for Owner Acceptance. If, in the Engineer's judgment, the Work has been completed in accordance with the Contract Documents, the Engineer will set forth in writing the date the Work was completed. This will be the date that you are relieved from responsibility to protect and maintain the Work and to which liquidated damages will be computed.
2. For additional requirements related to Closeout items, refer to Technical Specifications, Section 01 77 00 "Closeout Procedures"

**3-13.1.1 Requirements Before Requesting a Walk-through.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

**3-13.1.1 Requirements Before Requesting Substantial Completion.**

1. The following items are required prior to requesting a Substantial Completion:
  - a) Remove temporary facilities from the Site.
  - b) Thoroughly cleaning the Site and removing all mark outs and construction staking.
  - c) Provide completed and signed Red-lines in accordance with 3-7.3 "Redlines and Record Documents".
  - d) Provide all material and equipment maintenance and operation instructions and/or manuals.
  - e) Provide all tools which are permanent parts of the equipment installed in the Project.
  - f) Provide and properly identify all keys for construction and all keys for permanent Work.
  - g) Provide all final Special Inspection reports required by the applicable building Code.
  - h) Provide all items specified to be supplied as extra stock. Wrap, seal, or place in a container all items as necessary to allow for storage by the City for future use. Verify the specified quantities.
  - i) Ensure that all specified EOCP and certified wage rate documentations covering the Contract Time have been submitted.
  - j) If the Work includes installing an irrigation system, provide the spare parts for the proposed irrigation system as specified in the Special Provisions.
  - k) If the Work includes sewer and storm drain installations, the inspection shall include televising in accordance with 306-18, "VIDEO INSPECTION".
  - l) If the Work includes a Plant Establishment Period, Work in accordance with 801-6, "MAINTENANCE AND PLANT ESTABLISHMENT" shall be

completed prior to requesting Substantial Completion, unless approved otherwise by the Owner.

- m) Notify the Engineer to arrange a final inspection of any permanent BMPs installed.

**3-13.1.2 Walk-through and Punchlist Procedure.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. You shall notify the Engineer 15 Working Days in advance of date of anticipated Substantial Completion to allow time for Engineer to schedule a Walk-through. After you complete the requirements in 3-13.1.1, "Requirements Before Requesting Substantial Completion" and when you consider that the Work is Substantially Complete, you will notify the Engineer in writing that the Project is Substantially Complete. The Engineer will review your request and determine if the Project is ready for a Walk-through, by verifying whether you have completed all items as required by 3-13.1.1, "Requirements Before Requesting Substantial Completion". Within 7 Working Days, the City will either reject your request of a Walk-through in writing or schedule a Walk-through inspection. The Engineer shall facilitate the Walk-through.
2. The following documents shall be provided at the time of your Walk-through request: As-Built markup, Plans, specifications, technical data such as submittals and equipment manuals, draft final payment, warranties, material certifications, bonds, guarantees, maintenance service agreements, and maintenance and operating manuals.
3. Written warranties, except manufacturer's standard printed warranties, shall be on a letterhead addressed to you. Warranties shall be submitted in the format described in this section, modified as approved by the City, to suit the conditions pertaining to the warranty. Lack of submitting these items will delay start of Walk-through.
4. The Engineer will provide you with the Punchlist within 15 Working Days after the date of the Walk-through. The City shall not provide a preliminary Punchlist.
5. If the Engineer finds that the Project is not Substantially Complete as defined herein, the Engineer will terminate the Walk-through and notify you in writing.
6. If, at any time during the Engineer's evaluation of the corrective Work required by the Punchlist, the Engineer discovers that additional corrective Work is required, the Engineer may include that corrective Work in the Punchlist.
7. You shall remain solely responsible for the Project Site until the Project is completely operational, all Punchlist items have been corrected, and all operation and maintenance manuals have been accepted by the City.
8. The Engineer shall meet with you within 5 Working Days of notification that all Punchlist items are corrected. You shall complete the Punchlist within 30 Working Days and Working Days will continue to be counted until Acceptance of the Project.

**3-13.2 Acceptance.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. You shall provide the completed, signed, and stamped DS-563 to the Engineer prior to Acceptance.
2. You shall deliver the final As-builts and final billing prior to Acceptance.

3. You shall assemble and deliver to the Engineer a Final Summary Report and Affidavit of Disposal prior to Acceptance.
4. Acceptance shall occur after all of the requirements contained in the Contract Documents have been fulfilled. If, in the Engineer's judgment, you have fully performed the Contract, the Engineer will recommend to the City Engineer that your performance of the Contract be accepted. You shall receive notification of Acceptance in writing from the Owner and counting of working days shall cease and Warranty begins.
5. Retention can be released 35 Calendar Days after NOC. Submit your request for retention to the Resident Engineer and they will mail to you a "Release of Claims" form which shall be completed and returned before the retention will be released.

**3-13.3**

**Warranty.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. You shall warranty and repair all defective materials and workmanship for a period of 1 year. This call back warranty period shall start on the date the Work was accepted by the City unless the City has Beneficial Use or takes Occupancy of the project earlier (excluding water, sewer, and storm drain projects).
2. You shall warranty the Work free from all latent defects for 10 years and patent defects for a period of 4 years.
3. The warranty period for specific items covered under manufacturers' or suppliers' warranties shall commence on the date they are placed into service at the direction of the Engineer in writing.
4. All express warranties from Subcontractors, manufacturers', or Suppliers', of any tier, for the materials furnished and Work performed shall be assigned, in writing, to the City, and shall be delivered to the Engineer prior to the Acceptance of your performance of the Contract.
5. Replace or repair defective materials and workmanship in a manner satisfactory to the Engineer after notice to do so from the Engineer and within the time specified in the notice. If you fail to make such replacements or repairs within the time specified in the notice, the City may perform the replacement or repairs at your expense. If you fail to reimburse the City for the actual costs, your Surety shall be liable for the cost
6. Items that shall be warrantied free from defective workmanship and materials for a period longer than 1 year are as follows:

<b>Specified Item</b>	<b>Minimum Warranty Period</b>
Detectable Warning Tile Construction	3 Years of Manufacturer's Warranty
All Work Under SECTION 500 – PIPELINE REHABILITATION	3 Years
Fiber Optic Interconnect Cables	2 Years
Luminaires*	10 Years of Manufacturer's Warranty
LED Signal Modules	3 Years of Manufacturer's Warranty

Specified Item	Minimum Warranty Period
Field Devices Associated with 700-6.3, "Adaptive Control Note"	See 700-6.3.9, "Warranty"

\* Provide documentation verifying that the induction luminaire models being offered for the Project are covered by the 10-year warranty.

7. If installed, you shall provide the City and property owner a copy of the manufacturer's warranty for private sewer pumps, including the alarm panel and all other accessories.
  - a) You shall involve the manufacturer in the installation and startup as needed to secure any extended warranty required.
  - b) Nothing in here is intended to limit any manufacturer's warranty which provides the City with greater warranty rights than set forth in this section or the Contract Documents.
  - c) The warranty shall include all components. The form of the warranty shall be approved by the Engineer in accordance with 3-13.3.2, "Warranty Format Requirements".
8. If, during the warranty period, any item of the Work is found to be Defective Work, you shall correct it promptly after receipt of written notice from the City to do so. The warranty period shall be extended with respect to portions of the Work corrected as part of the warranty requirements.

**3-13.3.1 Defective Work.** To the "WHITEBOOK", item 6, DELETE in its entirety and SUBSTITUTE with the following:

6. For Building Projects which require a certificate of occupancy, not including sewer and water facilities, if you fail to correct the defective Work listed on the City's Punchlist within 45 Working Days after the Contract Time, you shall reimburse the City for all costs to provide inspection services required to monitor Work beyond the 45 Working Days. The City shall bill you for the additional inspection at the City's established rates.

**3-14 FORMAL PARTNERING.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

Refer to Technical Specifications, Section 01 12 01 "Partnering" for requirements

**3-15.2 Integration of the Work with Separate Contractors.** To the "WHITEBOOK", ADD the following:

2. The list of Separate Contractors includes:
  - a) Project Title-North City Water Reclamation Plant Expansion-Early Site Work and Ozone/ BAC Relocation (Package 4), Limits of Work- Work associated with this project is within the NCWRP footprint,  
 Contractor- AECOM Energy and Construction,  
 City Lead Project Manager-Andrea Demich (858) 614-5741,  
 City Project Manager-Monika Smoczynski (858) 292-6455.

- b) Project Title-Flow Equalization Basin (Package 1), Limits of Work- Work associated with this project is within the NCWRP footprint,  
Contractor- TBD,  
City Lead Project Manager-Andrea Demich (858) 614-5741,  
City Project Manager-Monika Smoczynski (858) 292-6455.
- c) Project Title-North City Water Reclamation Plant Expansion (Package 2) and Pure Water Facility Influent Pump Station and Conveyance (Package 3), Limits of Work- Work associated with this project is within the NCWRP footprint,  
Contractor- TBD,  
City Lead Project Manager-Andrea Demich (858) 614-5741,  
City Project Manager-Monika Smoczynski (858) 292-6455.
- d) MBC Dewatering Centrifuge Replacement project – Superintendent  
Richard Pitchford (858) 614-5509

**3-15.3 Coordination.** To the “WHITEBOOK”, ADD the following:

- 2. Other adjacent City projects are scheduled for construction for the same time period in the vicinity of the MBC Improvements Project. See **Appendix F – Adjacent Projects Map** for the approximate location. Coordinate the Work with the adjacent projects as listed below:
  - a) Project Title-North City Water Reclamation Plant Expansion-Early Site Work and Ozone/ BAC Relocation (Package 4), Limits of Work- Work associated with this project is within the NCWRP footprint,  
Contractor- AECOM Energy and Construction,  
City Lead Project Manager-Andrea Demich (858) 614-5741,  
City Project Manager-Monika Smoczynski (858) 292-6455.
  - b) Project Title-Flow Equalization Basin (Package 1), Limits of Work- Work associated with this project is within the NCWRP footprint,  
Contractor- TBD,  
City Lead Project Manager-Andrea Demich (858) 614-5741,  
City Project Manager-Monika Smoczynski (858) 292-6455.
  - c) Project Title-North City Water Reclamation Plant Expansion (Package 2) and Pure Water Facility Influent Pump Station and Conveyance (Package 3), Limits of Work- Work associated with this project is within the NCWRP footprint,  
Contractor- TBD,  
City Lead Project Manager-Andrea Demich (858) 614-5741,  
City Project Manager-Monika Smoczynski (858) 292-6455.

- d) MBC Dewatering Centrifuge Replacement project- Superintendent –  
Richard Pitchford (858) 614-5509

#### **SECTION 4 - CONTROL OF MATERIALS**

**ADD:**

**4-1.1 American Iron and Steel (AIS).**

1. The Consolidated Appropriations Act, 2014, includes an "American Iron and Steel (AIS)" requirement in section 436 that requires this project, funded via the Clean Water State Revolving Loan Fund (CWSRF) and/or the Drinking Water State Revolving Loan Fund (DWSRF) to use iron and steel products that are produced in the United States for projects for the construction, alteration, maintenance, or repair of a public water system.
2. You acknowledge to and for the benefit of the City of San Diego and the State Water Resource Control Board that you understand the Work under this Contract is being funded with monies made available by the Clean Water State Revolving Fund and/or Drinking Water State Revolving Fund that have statutory requirements commonly known as "American Iron and Steel" that requires all of the iron and steel products used for construction to be produced in the United States including iron and steel products to be provided by you. You hereby warrant to and for the benefit of the City and the State that:
  - a) You have reviewed and understand the American Iron and Steel Requirement,
  - b) All of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement with required certification (for sample certification letters, refer to **Appendix G**, unless a waiver of the requirement is approved, and;
  - c) You will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the City or the State.
3. The additional information below is being provided for reference and guidance to ensure that you comply with all requirements set forth by the CWSRF and/or DWSRF Loans:
  - a) Refer to the following EPA website:  
  
<http://www.epa.gov/cwsrf/state-revolving-fund-american-iron-and-steel-ais-requirement>
  - b) The United States Environmental Protection Agency's Memorandum dated March 20, 2014 entitled, "Implementation of American Iron and Steel Provisions of P.L. 113-76, Consolidated Appropriations Act, 2014":  
  
<https://www.epa.gov/sites/production/files/2015-09/documents/ais-final-guidance-3-20-14.pdf>
4. Your failure to comply with this provision shall permit the City or State to recover damages against you for any loss, expense, or cost (including without limitation

attorney's fees) incurred by the City or State resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the City). Although you have no direct contractual privity with the State, as a lender to the City for the funding of this project, you and the City agree that the State is a third-party beneficiary and neither this provision (nor any other provision of this Contract necessary to give this provision force or effect) shall be amended or waived without the prior written consent of the State.

**4-3.4 Specialty Inspection Paid for by the Contractor.** To the "WHITEBOOK", ADD the following:

5. No special inspection shall be performed by the Contractor. The Contractor is not required to pay for special inspection due to the circumstances detailed in Technicals Section 01 45 33.

**4-3.6 Preapproved Materials.** To the "WHITEBOOK", ADD the following:

3. You shall submit in writing a list of all products to be incorporated in the Work that are on the AML.

**4-6 TRADE NAMES.** To the "WHITEBOOK", ADD the following:

11. You shall submit your list of proposed substitutions for an "equal" item **no later than 15 Working Days after the determination of the Apparent Low Bidder** and on the City's Product Submittal Form available at:

<https://www.sandiego.gov/ecp/edocref/>

## **SECTION 5 – LEGAL RELATIONS AND RESPONSIBILITIES**

**5-3.6 Project Labor Agreement (PLA).** The Contractor and all subcontractors agree to be bound by the Project Labor Agreement (which is attached as Attachment I and incorporated by this reference) by submitting a Letter of Assent to the City's Labor Coordinator. The Contractor shall submit its Letter of Assent as a condition of award and all subcontractors shall submit their Letter of Consent before commencing any Work on the Project.

**5-4 INSURANCE.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

**5-4 OWNER-CONTROLLED INSURANCE PROGRAM.**

**5-4.1 GENERAL REQUIREMENTS**

1. The City has implemented an Owner-Controlled Insurance Program (OCIP) for its Pure Water Projects. In this OCIP, the City furnishes Workers' Compensation, General, Excess, Pollution Liability and Builder's Risk insurance associated with construction of the Work. Insurance furnished under the OCIP covers the City, the Contractor, and the Contractor's subcontractors of all tiers with exceptions stated below. As detailed in Section 5-4.17 and 5-4.18, Contractor and subcontractors still provide some insurance coverage under the OCIP.



2. Bidders, as well as their subcontractors with a subcontract amount of greater than one half of one percent of the Contractors bid amount, shall exclude from bids the costs of insurance for risks covered under the OCIP.
3. Bidders, as well as their subcontractors with a subcontract amount of greater than one half of one percent, shall determine the OCIP coverage credit by utilizing the OCIP Credit Worksheets attached herein under **Section 6. Certifications and Forms.**
4. OCIP enrollment is mandatory for contractors/subcontractors with contracts valued at \$10,000 or greater or onsite labor of three days or more. For contracts under \$10,000 in value, should there be any potential for additive change orders thereby increasing the contract value to \$10,000 or greater, the contractor/subcontractor must enroll in the OCIP.
5. Bidders, as well as all of their subcontractors, with a subcontract amount of greater than one half of one percent of the Contractors bid amount, shall complete OCIP credit worksheets provided as part of the bid documents attached herein. Bidders shall submit these OCIP credit worksheets, including OCIP credit worksheets obtained from all their subcontractors, within 10 Working Days of receipt by bidder of contract forms and Notice of Intent to Award. **Failure to comply with OCIP Credit Worksheets requirements is a condition of final award.**
6. Contractor shall still maintain minimum insurance outside of OCIP as defined in Section 5-4.17
7. OCIP related manuals mentioned in Section 5-4 and 5-7 can be downloaded from the following link:

<https://drive.google.com/drive/folders/1aCNE-AWO-6Vihwex-JHZYpUNZ7aYIsLe?usp=sharing>

#### **5-4.2 OCIP DEFINITIONS**

1. The following definitions apply to the OCIP program:
  - a) Claim – A covered loss asserted under the OCIP insuring policy(s).
  - b) OCIP Deductible Assessment – The amount the Enrolled Contractor is responsible for paying as its contribution for settlement of any loss that is chargeable to the Contractor, or its subcontractors. The deductible shall be paid in a proportional amount between the Contractor and subcontractor, as determined by responsibility of the party causing the loss, by the OCIP insurance carrier.
  - c) Enrolled Contractors – The Contractor and any Subcontractor who have submitted all necessary enrollment information and have received confirmation letter, as well as certificates of insurance evidencing OCIP coverage as issued from the OCIP administrator. Enrollment date shall be established by the date on the certificate of insurance.
  - d) Excluded Parties: - The following parties shall not be enrolled in the OCIP:
    - i) Heavy or structural demolition utilizing wrecking balls or explosives.

- ii) Hazardous materials remediation, removal or transport companies and their consultants.
  - iii) Architects, surveyors, engineers, soil testing engineers and their respective consultants.
  - iv) Vendors, suppliers, fabricators, materials dealers, truckers, haulers, drivers and others who merely transport, pickup, deliver, or carry materials, personnel, parts or other equipment to and from the Job Site.
  - v) Any parties or entities not specifically designated by the City at its sole discretion, even if otherwise eligible.
  - vi) Subcontractors work with a value of less than \$10,000, unless their work extends to be greater than three days of work or more
- e) Insured Party - Contractor, the Contractor's subcontractors, officers, employees and agents, the City and the City's officers, employees, contractors and agents as enrolled in the OCIP, except any Uninsured Party.
  - f) OCIP Administrator - The person or insurance broker firm designated by the City with responsibility for administration of the OCIP, including claims.
  - g) OCIP Coverage – the insurance coverages generally described in Sections 5-4.3, through -4.10 of this Section and set forth more fully in the policies of insurance or forms of policies of insurance on file with the City's Public Utilities Department.
  - h) Uninsured Party - Any person, partnership, corporation, or other business entity performing work under the Contract that is not an Insured Party under the OCIP.

### **5-4.3 OCIP INSURANCE PROVIDED BY THE CITY**

1. Before commencement of the work, the City will obtain OCIP insurance coverage. Insured Parties will be enrolled in the OCIP according to the policies of OCIP insurance coverage.
2. The Contractor and the Contractor's subcontractors, officers, employees and agents, except for Excluded Parties as defined in Section 5-4.2 (d), will be Insured Parties with OCIP Coverage solely as to risks at the job site.
3. The City assumes no obligations to provide insurance other than OCIP Coverage.
4. The City does not warrant or represent that the OCIP Coverages constitute an insurance portfolio that adequately addresses all of the Contractor's risks under the contract documents. Nothing in this Section shall be construed to relieve the Contractor of any risk or obligation under the contract documents.
5. The OCIP Coverages are set forth in full in the respective policy forms and are on file with the City's Public Utilities Department. Nothing in this section is intended to alter or amend any provision of the OCIP Coverage policies. In the event of an actual conflict between the descriptions of coverage contained in this Section and the coverage provided under the policies, the provisions of the policies shall govern.

**5-4.4 INFORMATION TO BE PROVIDED BY SUCCESSFUL BIDDER AFTER CONTRACT AWARD**

1. Within 15 working days from the mailing date of the Notice of Intent to Award of Contract, the successful bidder shall complete and return to the OCIP Administrator the "OCIP Insurance Enrollment Form," and provide such other information as the Project Manager or OCIP insurance carriers deem necessary. Each subcontractor shall complete the OCIP Insurance Enrollment Form and return such forms to the successful bidder for submission with, and attachment to, its form.
2. Each subcontractor shall complete the OCIP Insurance Enrollment Forms and submit to the successful bidder for submission to the OCIP Administrator not less than two weeks before the date they are scheduled to begin work or within 90 working days of the City's issuance of the Limited Notice to Proceed, whichever occurs first. Failure to submit the information within the time required may delay the subcontractor's ability to commence work.
3. Contractor shall ensure that each subcontractor on the Work site for whom OCIP coverage is provided has received confirmation of such coverage from the OCIP Administrator before commencement of the subcontractor's work.
4. The City will review the OCIP documents submitted by the Contractor within 15 days of their submittal. Any deficiencies noted shall be corrected by the Contractor within five days of its receipt of the returned documents. The City will endeavor to issue a Limited Notice to Proceed within 60 working days of the mailing date of the Notice of Award however, failure to complete and return the documents identified in this paragraph within the time provided may delay the City's issuance of the Limited Notice to Proceed or result in forfeiture of the successful bidder's bid bond and award of contract to the next lowest bidder.

**5-4.5 OCIP WORKERS' COMPENSATION INSURANCE AND EMPLOYERS LIABILITY**

1. Coverage for workers' compensation insurance will comply with statutory limits of the workers' compensation laws of the State of California, with Coverage B - Employer's Liability, to limits of not less than one million dollars (\$1,000,000) each accident, one million dollars (\$1,000,000) each employee for bodily injury by disease, and one million dollars (\$1,000,000) policy limit for bodily injury by disease covering operations of the insured parties at the Work site. Coverage under the Broad Form All States extension is also included. This insurance is primary for all occurrences at the jobsite only.
  - a) Named Insured: Contractor and subcontractors of all tiers Enrolled in OCIP
  - b) Insurer: Zurich
  - c) A.M. Best Rating: AXV
  - d) Policy Term: Per Effective Date of each Enrolled Contractor, as defined above, to the earliest of each Enrolled Contractor Work completion, or at 12:01 AM, 7/21/25
  - e) Policy Form: Per CA statutory requirements

**5-4.6**

**OCIP GENERAL AND EXCESS LIABILITY INSURANCE**

1. General and Excess liability will be provided under Commercial General Liability insurance policy(s) and covering the insured parties in connection with the performance of the work at the jobsite, that includes hazards of operations (including explosion, collapse, and underground coverage), elevators, independent contractors, employees as additional insureds, completed operations with a ten (10) year extended discovery period after substantial completion of the work, contractual liability coverage (for contracts related to the work), personal injury liability coverage, and excess Employer's Liability coverage for claims arising out of the work hereunder, for personal injury, bodily injury, and property damage, in policies of insurance such that the total available limits to all insureds combined will not be less than one hundred million dollars (\$150,000,000) combined single limits for each occurrence and aggregates, as applicable.

- a) Named Insured: City, Contractor and subcontractors of tiers Enrolled in OCIP.
- b) Insurer: HDI
- c) A.M. Best Rating: AXV
- d) Policy Term: July 21, 2019 to July 21, 2025, Plus 10 years Completed Operation Coverage
- e) Policy Form: Occurrence
- f) Limits: General Liability

Coverage	Limit
Per Occurrence	\$2,000,000
Personal & Advertising Injury Limit	\$2,000,000
General Annual Aggregate*	\$4,000,000
Completed Operations Term Aggregate**	\$4,000,000

**NOTE:** \* All aggregate limits reinstate annually.  
 \*\* 10 year Completed Operations has single aggregate

**EXCESS LIABILITY**

- a) Coverage: Follow form excess liability (terms and conditions, exclusions, etc.) of the underlying Commercial General Liability and Employers Liability policy wording.
- b) Named Insured: City, Contractor and subcontractors of tiers Enrolled in OCIP.
- c) Insurer(s): See Below
- d) A.M. Best Rating: AXV
- e) Policy Term: 7/21/19 to 7/21/25
- f) Policy Form: Follow - Form
- g) Limits: Layered to \$154M.

Layer No.	Insurer	Policy Number	Shared Limit by all Enrolled Contractors	Cumulative Limits
1	AWAC		\$10M excess \$2M/\$4M	\$12M Each Occurrence \$14M Aggregate
2	CHUBB		\$15M excess \$27M/\$29M	\$27M Each Occurrence \$29M Aggregate
3	Liberty		\$25M excess \$27M/\$29M	\$52M Each Occurrence \$54M Aggregate
4	Great American		\$50M excess \$52M/\$54M	\$102M Each Occurrence \$104M Aggregate
5	Zurich		\$50M excess \$102M/\$104M	\$152M Each Occurrence \$154M Aggregate

#### 5-4.7 CONTRACTORS POLLUTION LIABILITY

Contractor's pollution liability shall include contractual liability coverage for liability arising out of cleanup, removal, storage, or handling of hazardous or toxic chemicals, materials, substances or any other pollutants resultant from the worksite.

1. Named Insured: City, Contractor and subcontractors of tiers Enrolled in OCIP.
2. Insurer: Ironshore
3. A.M. Best Rating: AXV
4. Policy Term: July 21, 2019 to July 21, 2025
5. Policy Form: Occurrence
6. Limits: \$50,000,000 per occurrence and Aggregate

#### 5-4.8 OCIP DEDUCTIBLES – GENERAL/ EXCESS AND POLLUTION LIABILITY

1. Notwithstanding the actual policy deductibles per occurrence, the Contractor shall be liable for a \$15,000 (fifteen thousand) dollar deductible for each occurrence, to the extent losses payable are attributable to the Contractor's acts or omissions or the acts or omissions of Contractor's officers, employees, subcontractors or agents, or Uninsured Parties providing equipment, materials, supplies or services for the Work. The Contractor's deductible shall encompass the costs of investigation and defense, including court costs and attorneys' fees.
2. Any deductible amount will be invoiced to the Contractor by separate billing. If not paid within 30 calendar days of notice, the amount will be withheld from the next progress payment. Any payment of a deductible amount per occurrence by the Contractor shall not be compensable to Contractor by the City.

3. Each claim, without regard to the amount claimed, shall be reported by the Contractor to the Project Manager, OCIP administrator and the insurance company. The insurance company will adjust the claim on behalf of the Insured Parties. Insurance company will determine if there is proportional responsibility for the loss between the contractor and subcontractor, and such determination will provide the basis for payment of the deductible between the contractor and subcontractor.

#### **5-4.9 OCIP BUILDER'S RISK INSURANCE**

1. OCIP Coverage for builder's risk will provide coverage on an all-risk basis, including coverage against fire, flood, lightning, wind damage, hail, explosion, collapse, offsite storage and in-transit, and installation risks of equipment to be installed as part of the work. Earthquake coverage is not included. The policies for such insurance will be secured and maintained by the City in a form and amount consistent with such coverage commonly purchased for large construction projects. The Contractor's coverage for Builder's Risk shall be contract value with no aggregate.
2. Coverage shall include materials, supplies, and equipment that are intended for specific installation in the work while such materials, supplies, and equipment are located at the jobsite, in transit, or while temporarily located away from the Work site for the purpose of repair, adjustment, or storage at the risk of one of the insured parties.
3. Except as otherwise provided in Subsection 5-4.9 (2), this insurance will not include coverage for tools or clothing of workers, or Contractor's equipment.

The Builder's Risk policy will be endorsed waiving the carrier's rights of recovery under subrogation against the other Insured Parties.

#### **5-4.10 OCIP BUILDERS RISK DEDUCTIBLES**

1. Notwithstanding the actual policy deductible, the Contractor shall be liable for the first \$25,000 (twenty-five thousand) of loss for each occurrence. Flood/Water and LEG3 deductible is \$50,000 (fifty thousand) The Contractor may insure deductible risk at the Contractor's discretion and cost.
2. Each claim without regard to the amount claimed shall be reported by the Contractor to the OCIP Administrator and the insurance company. The insurance company will adjust the claim on behalf of the Insured Parties. Insurance company will determine if there is proportional responsibility for the loss between the contractor and subcontractor, and such determination will provide the basis for payment of the deductible between the contractor and subcontractor.
3. Payments by the insurer for all losses covered under the All-Risk Builder's Risk policy will be made to the City. The City will make the proceeds from the Builder's Risk policy covered losses available to the Contractor for rebuilding work damaged by covered perils.

#### **5-4.11 NO WAIVER OF CONTRACT OBLIGATIONS**

1. Nothing contained herein or in any document referenced herein shall relieve, limit, or be construed to relieve or limit the Contractor from any liability or obligations otherwise imposed by the contract documents.

#### **5-4.12 CHANGE ORDERS**

1. Change orders shall include the removal of OCIP provided insurance costs from the Contractors costs associated with the change order. Contractor shall specifically identify the OCIP insurance costs associated with the change order.
2. Contractor is solely responsible for ensuring that its subcontractors remove the cost of OCIP insurance coverage associated with the change order.

#### **5-4.13 THE CITY'S RIGHT TO AUDIT OCIP**

The Contractor hereby warrants to the City the accuracy of the information provided on the OCIP Insurance Enrollment Form and OCIP Credit Worksheets, and agrees that the City, its officers, agents, insurance carriers, and the OCIP Administrator may audit the records of the Contractor and its subcontractors to confirm the accuracy of information provided, including the accuracy of all estimated payrolls, and to ascertain any effect on insurance resulting from changes in the work. The audit will be held during the Contractor's normal business hours at the office of the Contractor or at another mutually agreeable location. This provision is supplemental to 2015 Whitebook Section 6-11, "Right to Audit".

1. The City shall be entitled to credits in OCIP insurance premiums that may accrue as a result of the audit. The Contractor shall also be entitled to any credits as a result of the audit for any OCIP premiums paid in excess of their OCIP Credit Worksheets.
2. The Contractor shall maintain or cause to be maintained sufficient records as may be necessary to audit its compliance and its subcontractors' compliance with the requirements of the OCIP.

#### **5-4.14 ASSIGNMENT**

1. The Contractor and each of its subcontractors shall assign to the City all return premiums, premium refunds, dividends, and other monies due in connection with the insurance provided by the City. The Contractor and its subcontractors shall execute such other further documentation as may be required by the City to effect this assignment.

#### **5-4.15 OCIP CLAIMS**

1. The Contractor, its subcontractors, and uninsured parties shall assist the City, its agents, and the OCIP Administrator and shall provide the utmost cooperation in the adjustment of claims arising out of the operations conducted under, or in connection with, the work and shall cooperate with the City's insurance carriers in claims and demands that arise out of the work and that the insurance carriers are called upon to adjust or resist.
2. The Contractor and its subcontractors shall make every effort to provide modified work for injured workers who have been placed on modified duty status as a result of a Workers' Compensation injury or illness covered under this OCIP.

#### **5-4.16 LIMIT OF OCIP COVERAGES**

1. The City does not warrant or represent that the OCIP coverages constitute an insurance portfolio that adequately addresses the risk faced by the Contractor or its

subcontractors. The Contractors and its subcontractors shall satisfy themselves as to the existence, extent, and adequacy of the OCIP coverages before the commencement of work under the Contract.

2. The OCIP coverages referred to above are set forth in full in the respective policy forms, and the foregoing descriptions of such policies are not intended to be complete, or to alter or amend any provision of the actual policies. In the event of an actual conflict between the foregoing descriptions of policies with such instruments, the provisions of the insurance policies shall govern.

#### **5-4.17 CONTRACTOR PROVIDED INSURANCE THAT IS NOT COVERED BY THE OCIP INSURANCE**

1. The OCIP does not provide the insurance policies for auto liability coverage and aircraft liability coverage. In addition, the City requires that any excluded party under OCIP who is performing work to have the required insurance listed in this section. The Contractor shall procure and maintain during the period of performance of this Contract and for 12 months following completion, insurance from insurance companies authorized to do business in the State of California, as set forth in this Section. These policies shall be primary insurance as to the City so that any other coverage held by the City shall not contribute to any loss under the Contractor's insurance. Coverage may be provided by a combination of primary and excess insurance policies, provided all insurers meet the requirements of this Section.
2. The Contractor shall obtain and maintain insurance following insurance coverages in the amounts as follows:
  - a) General Commercial Liability -- \$5,000,000 for any excluded party, any subcontractor who fails or losses enrollment in the OCIP. Coverage at least as broad as ISO form CG 00 01 10 01 or its equivalent, with no exclusion endorsements.
  - b) Automobile Liability -- \$5,000,000 Coverage at least as broad as ISO form CA 00 01 10 01, for "any auto," including owned, non-owned and hired vehicles
  - c) Aircraft Liability: If aircraft is used by the Contractor, its subcontractors, or anyone else on their behalf, the Contractor or its subcontractor shall maintain or cause the operator of the aircraft to maintain aircraft public liability insurance insuring passengers and the general public against personal injury, bodily injury, or property damage arising from aircraft owned, used, operated or hired in connection with the work by the Contractor, subcontractor, or anyone else in limits of not less than ten million dollars (\$10,000,000) combined single limit for each occurrence, for each aircraft.
3. Workers' compensation and employer's liability: Coverage shall comply with the laws of the State of California, but an employer's liability limit of less than \$1,000,000 is not permitted. The Contractor may satisfy this requirement by proof of an approved self-insurance program under California law.
4. Any insurance policy utilizing a self-insured retention is subject to approval by the City. Contractor shall be solely responsible for the payment of any self-insured retention, however, any self-insured retention policy obtained by either the



contractor, or any tier of sub-contractor, shall be endorsed to provide that the self-insured retention may be satisfied by either the named, additional insured, or City covered under the policy.

5. The insurance policies shall be endorsed as follows:
  - a) For general commercial liability and automobile insurance, as well as excess or umbrella insurance covering risks within the scope of that type insurance, the City, its Council Members, officers, employees and agents are included as additional insureds with regard to liability and defense of suits or claims arising from the operations, products and activities performed by or on behalf of the Named Insured. The Contractor's insurance applies separately to each insured, including insureds added pursuant to this paragraph, against whom claim is made or suit is brought except with respect to the policy limits of liability. The inclusion of any person or entity as an insured shall not affect any right which the person or entity would have as a claimant if not so included. Any failure of the named insured to comply with reporting provisions of the policy or breaches or violations of warranties shall not affect coverage provided to the insureds added pursuant to this paragraph. The additional insured endorsement shall provide coverage at least as broad as ISO form CG 20 10 11 01 and CG 20 37 10 01
  - b) The Contractor's insurance shall be primary. Any other insurance or self-insurance available to the City or persons stated in paragraph (1) shall be in excess of and shall not contribute to the Contractor's insurance.
  - c) The Contractor's insurance shall not be canceled or materially reduced in coverage except after 30 days prior written notice has been given to the City, except 10 days' notice shall be allowed for non-payment of premium.
  - d) The workers' compensation and employer's liability insurance, and any property insurance shall be endorsed to include a waiver by the insurer all rights of subrogation against the City and other persons specified in paragraph (1) for losses paid under the terms of the insurance policy. Any of the Contractor's off-site insurance requirements shall not have the provision of naming the City as loss payee.
6. Unless otherwise specified by supplemental condition, the insurance shall be provided by an acceptable insurance provider, as determined by the City, which satisfies the following minimum requirements: An insurance carrier authorized to do business in California and maintaining an agent for process within the state. Such insurance carrier shall maintain a current A.M. Best rating classification of "A- (A minus)" or better and a financial size of \$50 million to \$100 million (Class VII) or better, or a Lloyds of London program provided by syndicates of Lloyds of London and other London insurance carriers, providing all participants are qualified to do business in California and the policy provides for an agent for process in the state and the program assures a financial capability at least equal to the required classification and size for authorized insurers. Workers' compensation and employer's liability insurance may be provided the California State Compensation Fund.
7. Certificates of insurance and endorsements shall be provided by the Contractor and approved by the City before execution of the Contract.

**5-4.18****SUBCONTRACTORS PROOF OF INSURABILITY REQUIREMENT UNDER OCIP**

1. As a requirement of the OCIP Program, all subcontractors shall demonstrate insurability to the satisfaction of the OCIP Administrator as follows:
  - a) Commercial General Liability -- \$1,000,000
  - b) Automobile Liability - \$1,000,000
  - c) Workers' Compensation and employer's liability – as required by California law with employer's liability of not less than \$1,000,000
2. The Contractor shall be responsible for obtaining proof of insurability from its subcontractors and providing the information to the OCIP Administrator, as well as for assuring that all its subcontractors comply with the requirements of the OCIP Program.

**5-4.19****NOTICES, COSTS, AND LOSSES - OCIP**

1. Before the date on which the Contractor or any subcontractor begins performance of its part of the work, the Contractor shall cause to be furnished to the OCIP Administrator certificates of insurance for insurance required to be maintained by the Contractor and its subcontractors as provided herein. The Contractor shall not be allowed and shall not allow subcontractors on the jobsite for the performance of work until appropriate certificates of insurance are issued by the OCIP Administrator.
2. The City will pay the cost of the OCIP insurance premiums for the insurance described above as being provided by the City, and the City will receive or pay, as the case may be, all adjustments in such costs, whether by way of dividends or otherwise. All enrolled Contractors, and Subcontractors, shall assign to the City all adjustments, premium discounts, dividends, costs or other monies due for the OCIP insurer(s).
3. The cost of losses sustained because of clauses that specify the Contractor deductible amounts in any of the insurance policies furnished by the City shall be paid by the Contractor. If the City-provided OCIP policies described in Sections 5-4.6., 5-4.7 and 5-4.9 have deductible amounts greater than the Contractor-deductible amounts, such excess amounts will be paid by the City provided that the Contractor shall be responsible for losses greater than OCIP policy limits.
4. Require its subcontractors to waive the rights of recovery in the same manner as waived in the employees, and Contractors rendering services at the Work site, the Contractor, other Project contractors, and their subcontractors regardless of tier.

**5-4.20****CONTRACTOR OBLIGATIONS UNDER OCIP**

1. The Contractor shall:
  - a) Provide OCIP Coverage enrollment information as required by the City. Furnish to the OCIP Administrator and the insurance carriers all information and documentation that the OCIP Administrator may require from time to time in connection with the issuance of policies under this Contract, in such form and substance as the OCIP Administrator may prescribe.

- b) Furnish to the OCIP Administrator monthly payroll reports on the form provided by OCIP Administrator, and payroll records as required. Segregate their respective reports relating to the work for which OCIP coverage is herein provided from their records relating to other work for which such coverage is not provided.
  - c) Promptly comply with the policy requirements of the OCIP insurance carriers as submitted through the Project Manager.
2. The Contractor shall not violate or knowingly permit any subcontractor to violate any conditions of the policies of insurance provided by the City under the terms of the Contract and shall at all times satisfy the requirements of the insurance companies issuing them.
  3. The Contractor shall assure that all OCIP requirements imposed upon and to be performed by the Contractor shall likewise be imposed upon, assumed, and performed by each of its subcontractors and uninsured parties with whom it or its subcontractors have a contractual relationship.
  4. The Contractor shall furnish each bidding and negotiating subcontractor, vendor, supplier, material dealer, or other person or business entity that may provide goods or services in connection with the work a copy of this Section describing the insurance requirements for the Contractor and its subcontractors shall require each to impose the same requirement in their subcontracting and procurement procedures.
  5. If the Contractor or any of its subcontractors should fail to comply with the requirements of this Section, the City may withhold payments due to the Contractor or suspend the work until such time as the Contractor and its subcontractors have performed such obligations to the reasonable satisfaction of the Project Manager.
  6. The Contractor shall include in the bid price the cost of complying with the OCIP as herein described.
  7. Failure of the Contractor to enroll any sub-contractor of any tier in the OCIP, or to allow any sub-contractor to begin work on-site without proof of enrollment, shall constitute a breach of the OCIP insurance requirements. As such, all work performed by the sub-contractor, or any accident or injury as a result of the sub-contractor's activity, shall be considered an uninsured risk under the OCIP coverage. No OCIP insurance coverage of any line of insurance described in this document, shall extend coverage to the conditions described above.

**5-4.21 OCIP INSURANCE MANUAL**

1. The OCIP Administrator will provide an OCIP Insurance Manual that will describe procedures relevant to the OCIP to the Contractor. The Contractor and its subcontractors are required to comply with the procedures therein described.

**5-4.22 ALTERNATIVE INSURANCE**

1. In the event the City is unable to furnish, or after commencement of work elects not to furnish or to continue to furnish the OCIP coverage herein described, and upon 30 days written notice from the City, the Contractor shall secure insurance as

required under the Section 5-4.17 with limits as specified below (2). The Contractor shall be allowed a change order for additional costs of insurance that were excluded from the bid as required by this Supplemental Condition.

2. The coverage limits for insurance required pursuant to paragraph (a), and also for coverage not provided by OCIP Coverage such as automobile liability, shall be as follows:
  - a) Commercial General Liability -- \$10,000,000 annual aggregate renewal
  - b) Contractors Pollution Liability - \$3,000,000 annual aggregate
  - c) Automobile Liability -- \$5,000,000
  - d) Workers' Compensation and employer's liability - as required by California law with employer's liability of not less than \$1,000,000
  - e) Builder's Risk – Contract Value
  - f) Aircraft Liability: If aircraft is used by the Contractor, its subcontractors, or anyone else on their behalf, the Contractor or its subcontractor shall maintain or cause the operator of the aircraft to maintain aircraft public liability insurance insuring passengers and the general public against personal injury, bodily injury, or property damage arising from aircraft owned, used, operated or hired in connection with the work by the Contractor, subcontractor, or anyone else in limits of not less than \$10,000,000 combined single limit for each occurrence, for each aircraft.

#### **5-4.23 ACCIDENT REPORTS AND CLAIMS**

1. Contractor shall immediately report (as soon as feasible, but not more than 24 hours after occurrence) to the City any accident or other occurrence causing injury to persons or property during the performance of this Contract. If required by the City's Risk Management Department, the report shall be made in writing and shall include, at a minimum:
  - a) the names, addresses, and telephone numbers of the persons involved,
  - b) the names, addresses and telephone numbers of any known witnesses,
  - c) the date, time and description of the accident or other occurrence.
2. All claims for damages, losses, expenses, and other costs, received by the Contractor or the City, arising out of or resulting from or in connection with the performance of the Work shall be acknowledged by the Contractor by sending written notice to the claimant within 10 days of the Contractor's receipt of the claim. The written notice shall either:
  - a) confirm the Contractor's responsibility for damages and losses, and intent to pay or settle claim directly with the claimant; or
  - b) confirm the Contractor's responsibility for prompt investigation and processing of the claim, including identifying the Contractor's insurance carrier and claims adjuster, describing the Contractor's or insurance carrier's procedure for investigating and processing of the claim, and providing a name and telephone number for contacting the representative of the Contractor. A copy of the written notice of claim shall be delivered to the Project Manager. Should the Contractor state his intent to pay or settle the claim directly with the claimant, payment or settlement shall be

made within 45 working days of receipt of the claim. Claims to be submitted to the Contractor's insurance carrier shall be forwarded to the insurance carrier within 30 calendar days of receipt of the claim. Failure by the Contractor to send the written notice of claim, or to notify the Project Manager of any claim, shall be cause for the City to withhold payments to the Contractor.

3. The City shall have full authority to compromise or otherwise settle any claim related to the Contract at any time. The City will notify the Contractor of the receipt of any third-party claim arising from or relating to the Work within 14 working days of the receipt of the claim by the City. The City shall be entitled to recover its reasonable costs incurred in providing the Contractor timely notification of third-party claims. Neither this Section nor the City's failure to give notice shall limit the City's ability to compromise or settle any claim.

#### **5-4.24 ADDITIONAL INSURANCE PROVISIONS**

1. Nothing in Section 5-4 shall be construed to limit or qualify the liabilities and obligations otherwise assumed by the Contractor pursuant to this Contract, including but not limited to the provisions relating to indemnity and warranty.
2. The City may require the Contractor to provide complete copies of all insurance policies required by Section 5-4.
3. If at any time, the Contractor fails to maintain in full force any insurance required by the Contract, the City may acquire the necessary insurance for the Contractor and deduct the cost thereof from any payment due the Contractor.

**PURE Program OCIP – Insurance Coverage by Project Segment Summary**  
 Project Name: **North City MBC Improvements**

Owner Controlled Insurance Program Insurance coverage provided for Contractor			Contractor/Sub-Contractor Insurance Requirements by type of insurance and limits still required under OCIP		
Type	Limit	Deductible	Contractor	Limit	Self-Insured Retention
General Liability	\$150M	\$15K	General Liability	\$5M	Needs Approval
Automobile Liability**	N/A	N/A	Automobile Liability	\$5M	Needs Approval
Workers Compensation	CA Statutory - \$1M employers Liability	N/A	Workers Compensation	CA Statutory - \$1M employers Liability	
Pollution Liability*	\$50M		Pollution Liability*	N/A	N/A
Builders Risk***	Contract Value	\$25K	Builders Risk*	N/A	N/A
*Indicates shared limit among all Pure projects, per project limit applies **N/A indicates not provided by OCIP coverage *** AOP deductible per occurrence with no aggregate – deductible limit for Flood/Water and LEG3 is \$50K			Sub-Contractor	Limit	Self-Insured Retention
			General Liability	\$1M	Needs Approval
			Automobile Liability	\$1M	Needs Approval
			Workers Compensation	CA Statutory - \$1M employers Liability	
			Pollution Liability*	N/A	N/A
			Builders Risk*	N/A	N/A
			* Coverage provided by OCIP		

Contractor Insurance Required if OCIP is unavailable at commencement of work or cancelled after construction has begun			General Notes – Pure Water OCIP Coverage North City MBC Improvements
Type	Limit	Self-Insured Retention	1) Contractor obligation for payment of the deductible under the OCIP coverage is triggered by insurance carrier acceptance of claim. 2) At issuance of the Notice to Proceed, the shared OCIP coverage limits remain at 100% of the values stated above.
General Liability	\$10M	Needs Approval	
Automobile Liability	\$5M		
Workers Compensation	CA Statutory - \$1M employers Liability		
Pollution Liability	\$3M		
Builders Risk	Contract Value	Needs Approval	

**Notes:** OCIP will utilize a per-occurrence deductible program. If Contractor utilizes Self-Insured retention insurance, it will require approval of the self-insurance retention amount the contractor declares.

**END OF SECTION**

**ADD:**

**5-7.2.1.1 Safety, Sanitation, Medical, and Drug and Alcohol Requirements.**

1. The Contractor shall have ultimate responsibility for the health and safety of its employees. These specifications shall not be construed to limit the Contractors liability nor to assume that the City, its employees, agents, or designates shall assume any of the Contractors liability associated with its safety performance.
2. The Contractor shall promptly and fully carry out the safety, sanitary, and medical requirements as stated in the contract documents and as may from time to time be prescribed by the Engineer, to the end that proper work shall be done, and the safety and health of the employees and of the public are preserved and safeguarded. In case such regulations and orders are not observed by the Contractor, they may be enforced by the Engineer at the Contractor's expense. The Contractor shall summarily dismiss and shall not again engage, except with the written consent of the Engineer, any employee or subcontractor who knowingly and willingly violates the safety, sanitary, or medical requirements. Such discharge shall not be the basis of any claim for compensation or damages from the Contractor against the City, its OCIP Insurance, or any of its officers, employees, consultants or agents.
3. Appropriate first aid facilities and supplies shall be kept at the site of the Work, and the Contractor shall provide and maintain all measures required by the Construction Safety Orders issued by the Division of Industrial Safety of the State of California.
4. The Contractor shall prohibit the use or possession of intoxicating liquors or controlled substance at the jobsite or in any vehicle or equipment used in performance of the Work. This prohibition shall not apply to use or possession of prescription or non-prescription medication in accordance with prescribed directions.
5. Employ a "competent person" as defined by Cal OSHA. The "competent person" shall monitor, educate, and facilitate safety related jobsite activities. This individual shall be on the jobsite during all work hours identified in Section 6.7, Paragraph (b), or as authorized in writing by the Engineer.
6. When trenching, place your name and emergency telephone number adjacent to the Work at intervals and locations approved by the Engineer. The method of marking shall be approved by the Engineer.
7. The City shall not assume any role in determining the adequacy of the Contractors Safety and Health Plan.

**ADD:**

**5-7.2.1.2 Contractor's Safety and Health Representatives.**

1. The Contractor shall provide a qualified and experienced full-time, on-site Safety Professional to serve as their Safety and Health Representative. Qualifications shall include at least 10 years of construction related safety experience as the lead site safety representative (only duty) and experience in developing and implementing accident prevention programs for construction projects. If the Contractors Safety and Health Representative has less than 10 years construction related safety experience, or equivalent level of education and experience, the Contractors Safety and Health Representative must be approved by The City of San Diego. This individual shall be assigned only to this project and whose sole duty is monitoring and supervising the Contractor's and Subcontractors' Safety, Health, and

Environmental Program, and who shall be on-site when any work is in progress. In the event the Contractor's Safety Representative gives notice of separation of employment or is transferred from the Contractor's work site, the Contractor shall ensure that the incumbent Safety Representative remains on site for a minimum of two weeks after giving notice, and that the Contractor's replacement Safety Representative receives a minimum of two weeks safety orientation on the construction site before being allowed to assume the full duties as the Contractor's Safety Representative. This requirement may be waived upon written approval by the City. The Contractor's Safety and Health Representative shall support and Implement the OCIP Safety Program, or its equivalent and shall coordinate and require the Contractor's and Subcontractor's foremen to participate in the OCIP Program and conduct and submit the required audits as described in the Safety Programs section of the OCIP Construction Safety Procedures Manual. In the event the Contractor fails to comply with the above safety professional requirements, the Engineer shall obtain the services of a Safety Professional, and charge all costs associated with the services to the Contractor.

2. The Contractor's safety and health representatives shall be responsible for, and have the authority to, direct the required safety and health programs, correct unsafe conditions and unsafe practices, and stop work in areas containing unsafe conditions or practices until such unsafe conditions or practices are correct.
3. The Contractor's safety and health representatives shall be charged with the responsibility of daily on-site safety and health coordination and inspections and shall record the results of the inspections and corrective actions, if any, on a report form provided by the City.
4. The weekly report shall be submitted to the Engineer not later than the first working day following the workweek covered by the report.
5. Contractor's Safety and Health representatives shall participate in weekly progress meetings and report out on safety conditions at the worksite.

#### **5-7.2.1.3 Submittals.**

1. Submit, within 30 days of the Notice of Award and before execution of the Contract or at a later time as directed by the Engineer a Project-specific safety and health program conforming to applicable laws and regulations that includes the following:
  - a) A Project-specific Injury and Illness Prevention Program covering work performed by or for the Contractor at the site.
  - b) The resume of qualification and experience for the Contractor's on-site safety representative responsible for safety and health.
  - c) A written Hazard Communication Program covering work performed by or for the Contractor at the site.
  - d) A written Emergency Action and Fire Protection Plan and a written Fire Prevention Plan covering work performed by or for the Contractor at the site. The Contractor shall have the Fire Protection Plan reviewed and approved by the jurisdictional fire protection agency. The Contractor's Fire Protection Plan shall include:
    - i. Dedication of an on-site 2,000 gallon or greater water truck fitted with a one and one-half inch fire hose that shall have the ability to access all on-site construction operations.



- ii. Fire watch on-site during construction operations. This role may be filled by the Contractor's safety representative.
  - iii. Contractor shall check in daily with CAL FIRE for an update on fire conditions and to determine if any fire restrictions have been ordered. This information shall be included on the Contractor's Daily Report to the Engineer.
  - iv. Contractor shall cease brush clearing, cutting, or chipping operations when a red flag fire day is declared by the jurisdictional fire agency.
  - v. Contractor shall have tailgate meetings daily to communicate fire conditions and fire prevention measures necessary for the daily work.
- e) A written hazard safety analysis of the project conditions. The Contractor shall perform a comprehensive site analysis before commencement of work to determine any existing hazards and shall abate these hazards or inform the Engineer and all affected employees of these hazards and how to protect themselves from them.
- f) In addition to the reports that the Contractor is required to file under the provisions of California Workers' Compensation law and other applicable laws, submit a report to the Engineer on or before the 10th day of each month giving:
- i. The total force employed on the contract in workdays during the previous calendar month.
  - ii. The number and character of all accidents resulting in loss of time, medical treatment and first aid treatment.
  - iii. Any other information or classification of employee injuries incurred on the Project and disabilities resulting there from that may be required by the Engineer.
- g) Obtain and keep copies of the Material Safety Data Sheets of all hazardous materials brought to and stored at the site.

#### **5-7.2.1.4 Emergency Procedures.**

1. Designate responsible personnel to make emergency calls. Should an emergency occur, the Contractor shall:
  - a) Immediately secure the area and implement the Emergency Action Plan. Preserve the site for investigation until released by OSHA, the Engineer or OCIP Insurance Provider.
  - b) Notify the Construction Management Team or another representative previously designated by the Engineer in writing.
  - c) Provide information regarding the emergency to the appropriate authorities and authorized City representatives only. Questions from others including the press and media shall be referred to the Engineer.

2. Emergency procedures shall ensure that the Contractor's Safety Representative or the most qualified senior supervisor present takes charge and directs the handling of the emergency. The Contractor shall ensure proper handling of all Subcontractor related emergencies per the Contractor's and OCIP Emergency Procedures.
3. All Incidents, whether causing injury, environmental impacts or unauthorized property damage or not, shall be investigated by the Contractor and documented on forms provided by the OCIP and as required by the OCIP Construction Procedures Safety Manual. Instruct and require supervisors that, except for rescue or other emergency measures, the Incident site shall be secured until investigation has been completed and the scene has been released by both the Contractor and the Engineer, and as appropriate, the insurance company/OSHA.
4. Injuries which require medical attention shall be reported to the Engineer or Construction Management Team immediately after summoning medical help and securing the scene to prevent further injury. Injuries which meet the Cal/OSHA, Title 8 requirement as reportable shall also be reported to Cal/OSHA immediately. The Contractor shall investigate and generate a report which identifies the root causes and corrective actions for all accidents and incidents. This report shall be on the OCIP Incident form or an equivalent form approved by the Engineer. The Construction Management Team will also investigate all accidents and incidents to identify means to prevent further occurrences
5. For incidents that caused or had the potential to cause injury or significant losses, the Engineer or Construction Management Team may request a post Incident review. In such cases, the Contractor, Subcontractor, or other entity shall send an appropriate Manager to present the facts of the incident and provide information how future similar incidents will be prevented.
6. Immediately notify the Engineer or OCIP Safety Manager of any unabated hazardous conditions and take action to guard or control access to these conditions until correction has been accomplished. Notify the Engineer of any property or equipment found at the work site that is not under the Contractor's control. However, it shall be the Contractor's responsibility to take necessary precautions to prevent injury to persons or damage to property from such hazardous conditions until corrected by the responsible party.

#### **5-7.2.1.5 Safety and Health.**

1. Have and implement a written site-specific IIPP and Code of Safe Work Practices covering site work to be performed under the contract.
  - a) If not a part of the IIPP, the following procedures shall also be implemented:
    - i. Stress the importance of and conduct a thorough hazard safety analysis at the start of the project.
    - ii. Participate to develop and ensure all key staff are aware of the project hazards and keep staff informed of existing and developing safety hazards.
    - iii. Encourage all suppliers to visit the project site to assess hazards before the delivery of materials.

- b) Foremen and superintendents shall provide written Job Task Analysis for all tasks. The JTA shall include all hazards that might be encountered while performing the task and methods for assuring that each employee will be protected from the hazard.
- c) Utilize supervisory and craft employees to conduct and document a jobsite Safety Survey each week. Each survey shall include subcontractor activities. Utilize the results of each survey to inform Contractor and Subcontractor employees and other affected jobsite individuals of hazards on the job and how to protect themselves from these identified hazards. Survey shall be submitted to the Engineer for review and comment. Identify upcoming jobs and associated hazards and notify affected employees and individuals.
- d) Before authorization or start of construction, the Contractor shall prepare a Spill Prevention and Contingency Plan for review and approval of the appropriate jurisdictional agency and all construction crew members shall be trained in the requirements of the Spill Prevention and Contingency Plan. The Plan will include information on storage of hazardous materials, emergency response procedures, employee training requirements, fire safety, first-aid procedures, hazardous materials release containment/control procedures, and release reporting requirements. The Contractor shall integrate this SP&CP into the IIPP.
- e) All persons shall be required to wear American National Standards Institute approved hard hats while at the Work site; no bump caps will be permitted. Each employee's hard hat shall identify the employee's name and employer. Steel toed shoes shall be worn when in active construction zone. Safety vest or equivalent shall be worn in addition to hard hat when in active construction zone.
- f) When sufficient time is available, notify the City in advance of safety inspections by Cal/OSHA, the fire department, or other governmental agencies. When regulatory agencies arrive on-site for unannounced inspections, the Contractor shall immediately inform the Engineer and the Construction Management Team and shall escort the inspector(s) for the entire duration of their time on-site. When the Engineer is not present during a safety inspection, immediately report to the Engineer that an inspection has taken place, and describe any violations, or citations, and the Contractor's abatement actions or salient events arising from the inspection.
- g) The Contractor shall be responsible to ensure compliance with the specific policies and procedures established in the OCIP Construction Safety Procedures Manual. To ensure Contractor and Subcontractor compliance with the IIPP's and applicable laws, contractor specifications, and the Owner Controlled Insurance Program, the Engineer or Construction Management Team Representative will use a Schedule Driven Safety Program and a Managing Safety Performance or equivalent program(s) as approved by the Engineer to gauge the Contractor's compliance and adherence to its site-specific IIPP and applicable laws and regulations. Such monitoring and audits by the Construction Management Team or the Engineer will not relieve the Contractor of any safety and health obligations.
- h) Eating and drinking shall not be permitted in areas containing hazardous materials.

- i) Equipment shall be maintained in a proper state of operation as per the manufacturer's specifications. Equipment service records will be maintained and be available for inspection to ensure compliance.
- j) Reduce harmful combustion engine emissions to the greatest extent feasible by conducting preventive maintenance on construction equipment and, whenever possible, limit equipment idling time by such means as turning engines off while vehicles are in loading and unloading queues; use clean and low sulfur fuels and use electric motors to drive conveyor belts, pumps, compressors, and other equipment.
- k) All personnel shall wear appropriate Personal Protective Equipment in accordance with the Contractor's IIPP, regulatory requirements, and the OCIP Construction Safety Procedures Manual. All personnel in active construction areas shall be required to wear approved hard hats, eye protection, safety vests with reflective stripes, steel toed work shoes, long pants, and shirts with sleeves. Gloves, hearing protection, and additional eye protection may be required as appropriate.
- l) No asbestos- or PCB-containing materials shall be used.
- m) At the beginning of the Project, the Contractor shall post at the entrance to the construction site a sign of size and wording approved by the Engineer listing the general rules, regulations, attire, and PPE requirements.

**5-7.2.1.6 Safety and Health Training.**

- 1. The Contractor's safety and health representatives shall conduct training classes before commencement of the Work and on a monthly basis, or more often if needed, on safety and health, emergency procedures, first aid, fire prevention, and other areas applicable to the Work. The Contractor may seek input from the Engineer.

**5-7.2.1.7 First Aid.**

- 1. The Contractor is responsible to provide initial emergency care and to notify Emergency Responders by calling 911 when required. The contractor is also responsible to arrange for transportation of sick or injured persons off the job site when other than emergency transport is appropriate.

**5-10.2.1 Public Notice by Contractor.** To the "WHITEBOOK", items 2 and 3, DELETE in their entirety and SUBSTITUTE with the following:

- 2. No less than 5 Working Days in advance of Project construction activities and utility service interruptions, you shall notify all critical facilities, businesses, institutions, property owners, residents, or any other impacted stakeholders within a minimum 300-foot (90 m) radius of the Project. Verbal and written notifications shall be sent to critical facilities (including but not limited to police stations, fire stations, hospitals, and schools). A copy of written notifications sent to any critical facility shall also be sent to the Resident Engineer. You shall keep records of the people contacted, along with the dates of notification, and shall provide the record to the Engineer upon request. You shall identify all other critical facilities that need to be notified.

3. Furnish and distribute public notices in the form of door hangers using the City's format to all occupants and/or property owners along streets:
  - a) Where Work is to be performed at least Working 5 Working Days before starting construction or survey activities or impacting the community as approved by the Resident Engineer.
  - b) Within 5 Working Days of the completion of your construction activities where Work was performed, you shall distribute public notices in the form of door hangers, which outlines the anticipated dates of Asphalt Resurfacing or Slurry Seal.
  - c) 72 hours in advance of the scheduled resurfacing.

**5-13 ELECTRONIC COMMUNICATION.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. PMWeb shall be used on this Contract. See Technicals Section 01 33 22 Web Based Construction Document Management.

**5-15.1 General.** To the "WHITEBOOK", item 10, DELETE in its entirety and SUBSTITUTE with the following:

10. If your construction activities have encountered flammable liquids or other hazardous substances, you shall ensure that construction staff have the required Hazardous Waste Operations and Emergency Response (HAZWOPER) certification. Construction staff shall include: City Engineers, City Laboratory Technicians, and City staff that perform onsite inspections.
  - a) If your Work encounters flammable liquids or other hazardous substances, you shall be responsible for scheduling training for all construction staff to attend and for submitting verification to the Engineer that construction staff have the required HAZWOPER certification prior to continuing that Work in that area. You shall maintain the HAZWOPER certifications annually until the construction activities triggering the requirement is complete, as approved by the Resident Engineer.

## **SECTION 6 – PROSECUTION AND PROGRESS OF THE WORK**

**6-1.1 Construction Schedule.** To the "WHITEBOOK", item 1, subsection "e" and "s", DELETE in their entirety and SUBSTITUTE with the following:

- e) Monthly progress payments are contingent upon the submittal of an updated Schedule to the Engineer. The Engineer may refuse to process the whole or part of any monthly payment if you refuse or fail to provide an acceptable schedule.
- s) Submit an updated cash flow forecast with every pay request (for each Project ID or WBS number provided in the Contract) showing periodic and cumulative construction billing amounts for the duration of the Contract Time. If there has been any Extra Work since the last update, include only the approved amounts.
  - i. Refer to the Sample City Invoice materials in **Appendix D – Sample City Invoice with Cash Flow Forecast** and use the format shown.

- ii. See also the "Cash Flow Forecast Example" at the location below:

<https://www.sandiego.gov/ecp/edocref/>

**6-1.5.2 Excusable Non-Compensable Delays.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

**6-1.5.2 Excusable Non-Compensable and Concurrent Delays.**

1. The City shall only issue an extension of time for Excusable Delays that meet the requirements of 6-4.2, "Extensions of Time" for the following circumstances:
  - a) Delays resulting from Force Majeure.
  - b) Delays caused by weather.
  - c) Delays caused by changes to County, State, or Federal law.
2. When a non-excusable delay is concurrent with an Excusable Delay, you shall not be entitled to an extension of Contract Time for the period the non-excusable delay is concurrent with the Excusable Delay.
3. When an Excusable Non-Compensable Delay is concurrent with an Excusable Compensable Delay, you shall be entitled to an extension of Contract Time but shall not be entitled to compensation for the period the Excusable Non-Compensable Delay is concurrent with the Excusable Compensable Delay.

**6-4.2 Extensions of Time.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. The Contract Time shall not be modified except by Change Order.
2. You shall notify the City in writing within **1 Working Day** after the occurrence and discovery of an event that impacts the Project Schedule.
  - a) If you believe this event requires a Change Order, you shall submit a **written Change Order request with a report to** the City that explains the request for Change Order within **5 Working Days**. The Change Order request must include supporting data, a general description of the discovery, the basis for extension, and the estimated length of extension. The City may grant an extension of time, in writing, for the Change Order request if you require more time to gather and analyze data.
3. The Engineer shall not grant an extension of Contract Time in accordance with 6-1.5, "Excusable Delays" unless you demonstrate, through an analysis of the critical path, the following:
  - a) The event causing the delay impacted the activities along the Project's critical path.
  - b) The increases in the time to perform all or part of the Project beyond the Contract Time arose from unforeseeable causes beyond your control and without your fault or negligence and that all project float has been used.

4. Any modifications to the Contract Time will be incorporated into the weekly document that the Engineer issues that stipulates the Contract Time. If you do not agree with this document, submit to the Engineer for review a written protest supporting your objections to the document within **30 Calendar Days** after receipt of the statement. Your failure to file a timely protest shall constitute your acceptance of the Engineer’s weekly document.
  - a) Your protest will be considered a claim for time extension and shall be subject to 2-10.1, “Claims”.

**6-4.4 Written Notice and Report.** To the “WHITEBOOK”, DELETE in its entirety and SUBSTITUTE with the following:

1. Your failure to notify the Resident Engineer within **1 Working Day** OR provide a Change Order request within **5 Working Days** after the event, in accordance with 6-4.2, “Extensions of Time”, will be considered grounds for refusal by the City to consider such request if your failure to notify prejudices the City in responding to the event.

**ADD:  
6-6.1.1**

**Environmental Document.**

1. The City of San Diego has prepared an **Environmental Impact Report/Environmental Impact Statement (EIR/EIS)**, Project. No. **SCH#2106081016/PS #499621** for Pure Water Phase 1, which includes the Metro Biosolids Center Improvements. This document may be obtained at the following web link:

<https://www.sandiego.gov/public-utilities/sustainability/pure-water-sd/reports>

In addition, Pure Water Phase 1 has obtained the Environmental Documents and permits listed below with corresponding links that the Contractor shall comply with.

<b>PURE WATER ENVIRONMENTAL DOCUMENTS</b>
Site Development Permit
Record of Decision
FAA Determination of No Hazard
MCAS Miramar Site Approval
Air Pollution Control District Authority to Construct Permits
Development Services Department Building Permits

These documents can be obtained at the following link:

<https://drive.google.com/drive/folders/19Kx4fEqn3-oOLYeWbEDOGpPmJ568yo81?usp=sharing>

2. Compliance with the City’s environmental documents shall be included in the Contract Price.

**6-6.2.1 Archaeological and Native American Monitoring Program.** To the “WHITEBOOK”, ADD the following:

4. The City will retain a qualified archaeologist and Native American Monitor for this Contract. You shall coordinate your activities and Schedule with the activities and schedules of the archaeologist and Native American monitor. Notify the Engineer before noon of the Working Day before monitoring is required. See 3-5, “INSPECTION” for details.

**6-6.2.2 Paleontological Monitoring Program.** To the "WHITEBOOK", ADD the following:

3. The City will retain a qualified paleontologist for this Contract. You shall coordinate your activities and Schedule with the activities and schedules of the paleontologist monitor. Notify the Engineer before noon of the Working Day before monitoring is required. See 3-5, "INSPECTION" for details.

**6-9 LIQUIDATED DAMAGES.** To the "WHITEBOOK", ADD the following:

3. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Contract Times in the Scope of Work. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), the Contractor shall pay the following amounts for each Milestone for each day that expires after the time specified herein until the Work is substantially complete. If the Work of multiple Milestones are simultaneously not completed by the times specified, the Contractor shall pay the amount for the first Milestone not completed.

Milestone No.	Milestone Description	Required Completion Date	Amount of Liquidated Damages
Milestone 1	Intermediate Substantial Completion	619 Working Days after Notice to Proceed	\$4,600/day
Milestone 2	Start of Integration Period	736 Working Days after Notice to Proceed	\$4,600/day
Milestone 3	Substantial Completion	838 Working Days after Notice to Proceed	\$4,600/day
Milestone 4	Final Acceptance and Completion	889 Working Days after Notice to Proceed	\$4,600/day

**SECTION 7 – MEASUREMENT AND PAYMENT**

**7-3.1 General.** To the "GREENBOOK" and "WHITEBOOK", paragraph (8), DELETE in its entirety and SUBSTITUTE with the following:

If, within the time fixed by law, a properly executed notice to stop payment is filed with the City, due to your failure to pay for labor or materials used in the Work, all money due for such labor or materials will be withheld from payment in accordance with applicable laws.



To the "WHITEBOOK", ADD the following:

1. Unless specified otherwise, the Contract Price includes use, consumer, and other taxes mandated by applicable legal requirements.
2. As provided in §7105 of the California Public Contract Code, if the Contract is not financed by revenue bonds, you are not responsible for the cost of repairing or restoring damage to the Project when damage was proximately caused by an act of God, in excess of 5% of the Contract Price, if the following occur:
  - a) The Project damaged was built in accordance with the Contract requirements.
  - b) There are no insurance requirements in the Contract for the damages.

**7-3.2 Partial and Final Payment.** To the "WHITEBOOK", item 1, DELETE in its entirety and SUBSTITUTE with the following:

1. The Final Payment, which is the release of Retention, shall be paid to you after you have successfully submitted the following required documents:
  - a) An affidavit that payrolls and bills for materials, equipment, and other indebtedness connected with the Work for which the City or the City's property might be responsible for or encumbered by.
  - b) A certificate evidencing that insurances required by the Contract Documents shall remain in force after Final Payment is currently in effect and shall not be canceled or allowed to expire until at least a 30 Calendar Days prior written notice has been given to the Engineer.
  - c) Consent of Surety to Final Payment.
  - d) If required by the Engineer, other data establishing payment or satisfaction of obligations such as receipts, releases and waivers of liens, claims, and security interests or encumbrances arising out of the Contract Documents. If a Subcontractor refuses to furnish a release or waiver required by the City, you may furnish a bond satisfactory to the Engineer to indemnify the City against such lien.
  - e) If required in the Contract Documents, the successful completion and submittal of the required reports such as construction demolition, waste recycling, and hydrostatic discharge reports.
  - f) Required EOCP Final Summary Report in accordance with Section 0-12, "Contract Records and Reports", record drawings, operations manuals, test reports, warranty documentation, and UL labels shall be submitted before requesting the release of retention.
  - g) Acceptance of the completed Project by the asset owning Department.

To the "WHITEBOOK", ADD the following:

2. Submit an invoice for payment after you successfully complete the required documents and the City will pay the invoice within 30 Calendar Days. The City will pay 6% annually for late retention payments.

**7-3.2.1 Application for Progress Payment.** To the "WHITEBOOK", item 3, DELETE in its entirety and SUBSTITUTE with the following:

3. The City shall not pay progress or partial payments until you submit to the Engineer an acceptable updated Schedule. It is solely your responsibility to prepare and submit the Schedule updates.

**7-3.2.2 Amount of Progress Payments.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. The City will pay 6% annually for late progress payments.
2. Progress payments will be considered "late" if the following occur:
  - a) The City does not pay the contractor within 30 Calendar Days from receipt of an undisputed and properly submitted invoice. A properly submitted payment invoice means that the City has approved for payment the entire invoice amount or if the Resident Engineer has not disputed any portion of the application within 7 Calendar Days of the date of submission.
  - b) The application for payment does not require signing of a Contract Change Order.
3. The Engineer may withhold payment for any of the following reasons:
  - a) Defective or incomplete Work.
  - b) Not providing an updated and accurate Cost Loaded Construction Schedule in accordance with 6-1.1, "Construction Schedule".
  - c) Stop notices, wage orders, or other withholdings required by Applicable Law. Your failure to comply with 5-3.3, "Payroll Records" and the Contractor Registration and Electronic Reporting System requirements of the Contract Documents.
4. The Engineer may back charge the contract for any of the following reasons:
  - a) Defective or incorrect Work not remedied.
  - b) Damage to City property or a third party's property that was caused by you.
  - c) Liquidated Damages.

**7-3.2.3 Waiver of Claims at Final Payment.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. Your acceptance of Final Payment constitutes a waiver of affirmative Claims by you, except those previously made in writing and identified as unsettled at the time of Final Payment.

**7-3.2.4 Withholding of Payment and Back Charge.** To the "WHITEBOOK", DELETE in its entirety.

**7-3.5.1**

**General.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. Unit Bid prices shall not be subject to adjustment regardless of quantity used, or if none is used, for the following Bid items:
  - a) imported backfill
  - b) shoring
  - c) water services
  - d) house connection sewers
  - e) water pollution control items

Upon discovery and prior to the Work, you shall notify the Resident Engineer if there is a change in Bid item quantity that increases the total Contract Price by 5% or \$100,000 or more, whichever is less.

**7-3.9**

**Field Orders.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. If the cumulative total of Field Order items of Work does not exceed the "Field Orders" Bid Item, the City shall pay those Field Orders as shown below:

**TABLE 7-3.9  
FIELD ORDER LIMITS**

Contract Price	Maximum Field Order Work Amount
Less than \$100,001	\$2,500
\$100,001 to \$1,000,000	\$5,000
\$1,000,001 to \$5,000,000	\$10,000
\$5,000,001 to \$15,000,000	\$20,000
\$15,000,001 to \$30,000,000	\$40,000
Greater than \$30,000,000	\$50,000

2. Field Order items of Work for contracts greater than \$15,000,000 will require additional approvals from the City prior to its approval by the Resident Engineer.
3. The City will issue a Field Order only after the City's acceptance of the cost of the field order amount.
4. Field Orders shall not be used to add scope or to include extensions of time related to changes in work.
5. If in the event there is a change related to the critical path on the project which necessitates an extension of time and the change amount is within the Field Order

limits shown on Table 7-3.9, then a Field Order can be issued to compensate you for the approved costs. Any extensions of time associated with the change shall be included in a subsequent Change Order and no additional compensation shall be granted as part of the change order for the extension of time.

6. The unused portions of Field Orders Bid item shall revert to the City upon Acceptance.

**7-3.11 Compensation Adjustments for Price Index Fluctuations.** To the "WHITEBOOK", ADD the following:

5. This Contract is not subject to the provisions of The "WHITEBOOK" for Compensation Adjustments for Price Index Fluctuations for paving asphalt.

**7-4.3 Markup.** To the "WHITEBOOK", item 4, DELETE in its entirety and SUBSTITUTE with the following:

4. When a Subcontractor is performing Extra Work, the allowance for overhead and profit shall be applied to the labor, materials, and equipment costs of the Subcontractor as follows:
  - a) Regardless of the number of a Subcontractor's tasks for Extra Work, you may only apply 10% for the first \$50,000 of the Subcontractor's portion of accumulated total cost then 5% for any remaining costs. You shall not apply 10% to any costs after the first \$50,000 of accumulated total costs from performing Extra Work.
  - b) If the accumulated costs of single or subsequent tasks exceed the \$50,000 threshold, you shall instead only apply 5% to any amounts in excess of the \$50,000.
  - c) Regardless of the number of hierarchical tiers of Subcontractors, you may only markup a Subcontractor's Work once.

## **SECTION 8 - FACILITIES FOR AGENCY PERSONNEL**

**8-2 FIELD OFFICE FACILITIES.** To the "WHITEBOOK", ADD the following.

1. Provide Field Office per Technicals Section 01 50 00.

## **SECTION 203 – BITUMINOUS MATERIALS**

**203-6.3.1 General.** To the "WHITEBOOK", ADD the following:

3. Asphalt concrete for Job Mix Formula (JMF) and Mix Designs shall be Type III and shall not exceed 15% RAP.

## SECTION 209 – PRESSURE PIPE

**209-1.1.1 General.** To the "WHITEBOOK", ADD the following:

2. PVC products specifically type C900 and C905, as manufactured or distributed by J-M Manufacturing Company or JM Eagle shall not be used on the Contract for pressurized pipe.
3. Refer to AWWA C900-16 for all references to AWWA C905.

## SECTION 301 – SUBGRADE PREPARATION, TREATED MATERIALS, AND PLACEMENT OF BASE MATERIALS

**301-1.6 Preparatory Repair Work.** To the "WHITEBOOK", item 1, DELETE in its entirety and SUBSTITUTE with the following:

1. Prior to the placement of any asphalt concrete or application of slurry, you shall complete all necessary preparation and repair Work and shall obtain approval by the Resident Engineer.

ADD the following:

13. Asphalt concrete shall be Type III and shall not exceed 15% RAP in accordance with 203-6.3.1, "General".

## SECTION 302 – ROADWAY SURFACING

**302-4.5 Scheduling, Public Convenience and Traffic Control.** To the "GREENBOOK", paragraphs (1) and (2), DELETE in their entirety and SUBSTITUTE with the following:

1. In addition to the requirements of Part 6, you shall comply with the following:
  - a) At least 5 Working Days prior to commencing the Work, you shall submit your proposed Schedule to the Engineer for approval.
  - b) Based upon the approved schedule, you shall notify residents and businesses of the Work and post temporary "No Parking" signs 72 hours in advance.
  - c) Requests for changes in the approved Schedule shall be submitted to the Engineer for approval at least 3 Working Days before the street is scheduled to be sealed.

## SECTION 303 – CONCRETE AND MASONRY CONSTRUCTION

**303-5.1.1 General.** To the "WHITEBOOK", ADD the following:

7. For the purposes of this section, the terms "walk" and "access ramp" shall be synonymous with "sidewalk" and "curb ramp and pedestrian ramp", respectively.

## SECTION 306 – OPEN TRENCH CONDUIT CONSTRUCTION

**306-7.8.2.1 General.** To the "WHITEBOOK", item 2, DELETE in its entirety and SUBSTITUTE with the following:

2. Pressure testing of pipe and fittings at the lowest elevation shall be performed at 150% of the specified test pressure and no less than 100% of the specified test pressure at the highest elevation.
  - a) Specified test pressure for Class 235 pipe shall be 150 psi and is tested at 225 psi.
  - b) Specified test pressure for Class 305 pipe shall be 200 psi and is tested at 300 psi.

**306-8.8.3 Thrust Blocks and Anchor Blocks.** To the "WHITEBOOK", item 1, DELETE in its entirety and SUBSTITUTE with the following:

1. Thrust blocks shall be installed at all bends, tees, dead-ends and reducers. The use of restrained joints requires approval from the Engineer. The thrust blocks shall be constructed as follows:
  - a) Thrust blocks shall be constructed of concrete conforming to 201-1, "PORTLAND CEMENT CONCRETE".
  - b) Unless otherwise shown on the Plans, concrete thrust blocks shall be constructed in accordance with SECTION 303 - CONCRETE AND MASONRY CONSTRUCTION and the Standard Drawings.
  - c) Concrete blocks shall be constructed between undisturbed ground and fittings to be anchored.
  - d) Unless otherwise shown on the Plans, the quantity of concrete and the bearing area of the pipe against undisturbed soil shall be as shown on the Standard Drawings.
  - e) Unless otherwise shown on the Plans, concrete shall be placed so pipe joints and fittings remain accessible to repairs.

**306-8.9.2.3 Allowable Leakage.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. For prefabricated pressure pipe testing requirements, refer to prefabricated gravity pipe pressure testing requirements in 306-7.8.2, "Pressure Testing and Leakage Inspection".

## SECTION 402 – UTILITIES

**402-2 PROTECTION.** To the "WHITEBOOK", item 2, ADD the following:

- g) Refer to **Appendix J - Advanced Metering Infrastructure (AMI) Device Protection** for more information on the protection of AMI devices.

**402-6 COOPERATION.** To the "GREENBOOK", ADD the following:

1. Notify SDG&E at least 10 Working Days prior to excavating within 10 feet of SDG&E Underground High Voltage Transmission Power Lines (69 KV and higher).

**402-7.2 Pipe Separations.** To the "WHITEBOOK", item 1, subsection "a", DELETE in its entirety and SUBSTITUTE with the following:

- a) You shall notify the Engineer immediately if:
  - i. 1 foot (0.3 m) vertical separation as measured from the outside of pipe wall to the outside of pipe wall between sewer and water mains cannot be maintained.
  - ii. 10 feet (3.0 m) horizontal separation as measured from the outside of pipe wall to the outside of pipe wall between sewer and water mains cannot be maintained.
  - iii. 6 inches (152.4 mm) vertical separation as measured from the outside of pipe wall to the outside of pipe wall between utilities other than sewer and water mains cannot be maintained.
  - iv. 3 feet (0.9 m) or more of cover over the top of the water main cannot be maintained.
  - v. 5 feet (1.5 m) or more of cover over the top of the recycled water main cannot be maintained.

#### **SECTION 601 - TEMPORARY TRAFFIC CONTROL FOR CONSTRUCTION AND MAINTENANCE WORK ZONES**

**601-2.1.4 Traffic Control for Resurfacing and Slurry Sealing.** To the "WHITEBOOK", item 3, subsection "d", DELETE in its entirety and SUBSTITUTE with the following:

- d) Place "NO PARKING - TOW-AWAY ZONE" signs 72 hours in advance of the scheduled slurry sealing. Reschedule street block segments which are not completed by the last posted Working Day. If a Work delay of 48 hours or more occurs from the originally scheduled Work date, remove the "NO PARKING - TOW-AWAY ZONE" signs for a minimum of 24 hours, then reset and re-post for the appropriate Work date.

**601-3.5.1 General.** To the "WHITEBOOK", item 3, DELETE in its entirety and SUBSTITUTE with the following:

3. Temporary "No Parking" and "No Stopping" signs shall be installed 72 hours before enforcement. Temporary "No Parking" and "No Stopping" signs shall be installed and removed as specified in the Special Provisions. Signs shall indicate specific days, dates, and times of restrictions. If violations occur, call Police Dispatch 619-531-2000 to enforce the Tow-Away notice.

**601-3.6 Channelizing Devices.** To the "WHITEBOOK", item 4, Barricades, ADD the following:

- h) You shall place "OPEN TRENCH" signs (C27(CA)) on Type 3 Barricade within the construction Work zone, ahead of any Work areas with open trenches that are greater than 3 inches in depth, in accordance with California MUTCD SECTION 6F.103 (CA). The barricades shall be placed in a continuous manner and shall prevent pedestrian, vehicular, and biker access to the open trench area.

**SECTION 1001 – CONSTRUCTION BEST MANAGEMENT PRACTICES (BMPs)**

**1001-1 GENERAL.** To the "WHITEBOOK", ADD the following:

- 7. Based on a preliminary assessment by the City, this Contract is subject to **WPCP**.
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# TECHNICALS

PURE WATER PROGRAM  
FOR  
THE CITY OF SAN DIEGO, CALIFORNIA

BIDDING REQUIREMENTS  
AND  
CONTRACT DOCUMENTS

for the construction of the

SAN DIEGO NORTH CITY METROPOLITAN  
BIOSOLIDS CENTER IMPROVEMENTS

VOLUME 1  
SPECIFICATIONS  
DIVISIONS 00 THROUGH 01

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*Issued for Construction*

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CH2M HILL

San Diego, CA

October 2020

Project No. PW\DEN001\050020\695037

Copy No. \_\_\_\_\_

CITY OF SAN DIEGO  
 METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

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44 22 23	PMS	Thickening Centrifuges.....	1- 37
44 42 56.05	PMS	Chopper Pumps and Mixing Nozzles .....	1- 9
44 42 56.09	PMS	Non-Clog Dry-Pit Centrifugal Pumps .....	1- 12
		Supplement:	
		Raw Solids Feed Pump Nos. 1, 2 and 3 Data Sheet .....	1- 4
44 42 56.10	WVM	Horizontal End Suction Centrifugal Pumps.....	1- 8
		Supplement:	
		Centrate Pump 1, 2, 3 Data Sheet .....	1- 3
44 42 56.13	PMS	Progressing Cavity Pumps .....	1- 6
		Supplements:	
		Dewatering Centrifuge Sludge Feed Pump 1, 2, 3, 4, 5, 6, 7, 8 Data Sheet .....	1- 3
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		Thickening Centrifuge Sludge Feed Pump 1, 2, 3, 4, 5 Data Sheet .....	1- 3
		Thickening Polymer Feed Pumps 1, 2, 3, 4, 5 Data Sheet.....	1- 3
		Thickened Solids Transfer Pump Data Sheet .....	1- 3
44 42 56.16	WVM	Peristaltic Hose Pump .....	1- 5
		Supplement:	
		Peristaltic Feed Pump Data Sheet.....	1- 3
44 46 20	WVM	Digester Gas Safety Equipment and Specialties.....	1- 12
44 46 22	WVM	Digester Gas Boost Compressors.....	1- 7
		Supplement:	
		Biogas Compressors No. 1, No. 2 & No. 3 Induction Motor Data Sheet .....	1- 1
44 46 23	WVM	Digester Cleaning.....	1- 23
		Supplements:	
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DIVISIONS 47 THROUGH 49—NOT USED

**VOLUME 5**

DRAWINGS (BOUND SEPARATELY)

**END OF SECTION**



**SECTION 01 12 01  
PARTNERING**

**PART 1 GENERAL**

**1.01 PARTNERING**

- A. The Owner intends to encourage the foundation of a cohesive partnership with the Contractor. This partnership will be structured to draw on the strengths of each organization to identify and achieve reciprocal goals. The general objectives are effective and efficient contract performance to achieve completion within budget, on schedule, and in accordance with the intent of the Contract Documents.
- B. Project partnering recognizes that the Owner, Contractor, Construction Manager and Design Engineer all hold in common the goal of successful completion of this Project, including the following specific goals:
  - 1. Construction of a facility that meets the Project performance standards as defined in the Specifications.
  - 2. Completion of the Project on schedule in order to correctly interface with other concurrent and related projects and provide operational success of the MBC and the Pure Water Program Projects.
  - 3. Conformance to budgetary requirements and limitations.
  - 4. Promote organizational efficiency for all parties.
- C. In addition, it is recognized that safety, liability limitation, avoidance of litigation, reputation, good will, and other factors are of significant importance to all parties involved in the Project.
- D. Through partnering, the four parties will agree among themselves regarding the primary goals for the Project and the methods that will be used to accomplish them. This will require development of a cooperative open relationship among the Contractor, Owner, Construction Manager, and Design Engineer. The parties will mutually develop a communication framework and a conflict resolution system to be used throughout the Project.
- E. Partnering will include an initial 8-hour workshop in which the basic requirements for the partnering relationship will be established. The following persons will be expected to attend the workshop, at a minimum.
  - 1. Contractor:
    - a. Project Sponsor (Principal-in-Charge).
    - b. Project Manager.
    - c. Safety Representative.

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- d. Startup Manager.
  - e. Superintendents.
  - f. Subcontractors.
  - g. Key Manufacturers.
  - 2. Owner:
    - a. Director of Utility Services (Principal).
    - b. Manager of Technical Services.
    - c. Project Manager.
    - d. Construction Manager.
  - 3. Construction Manager:
    - a. Principals.
    - b. Construction Manager.
    - c. Project Coordinator.
    - d. Startup Manager.
    - e. Resident Engineers.
    - f. Inspectors.
  - 4. Design Engineer:
    - a. Principals.
    - b. Project Manager.
    - c. Resident Design Engineer.
- F. The partnering workshop will be conducted by an independent partnering facilitator within 30 days of the limited Notice to Proceed at a time and date agreed upon by all parties and at a neutral location away from each entity's home office and/or field facilities. The facilitator will prepare the workshop agenda after conducting telephone interviews with key individuals from each party to assess their needs and concerns.
- G. Additional partnering sessions will be held quarterly and will include an 8-hour workshop, with the same attendees as the initial partnering workshop. The purpose of these follow-up sessions will be to confirm the relationship and assure the partnering effort continues to be successful throughout the Project.
- H. Selection of a partnering facilitator and payments will be as indicated in The WHITEBOOK 3-14.1.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

**SECTION 01 29 00  
PAYMENT PROCEDURES**

**PART 1 GENERAL**

**1.01 WORK REQUIRED OF THIS SECTION**

- A. Payment for the various items of the Bid Schedule, as further specified herein, shall include all compensation to be received by the Contractor for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor and services, operations, and incidentals appurtenant to the items of Work being described here and within the plans, specifications, and Contract Documents, as necessary to complete the various items of the Work all in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of permits and cost of compliance with the regulations of public agencies having jurisdiction, including Safety and Health Requirements of the California Division of Industrial Safety and the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA). No separate payment will be made for any item that is not specifically set forth in the Bid Schedule, and all costs therefore shall be included in the Contract Price.
- B. Work shall include all aspects of the Project, including civil, electrical, mechanical, HVAC, plumbing, instrumentation and control, structural, coatings, and architectural work, and the like required to support each Bid Item.

**1.02 RELATED SECTIONS**

- A. The Work of the following Section applies to Work of this Section. Other Sections of the Work not referenced below shall also apply to the extent required for proper performance of the Work.
  - 1. Bid Schedule.
  - 2. Section 01 32 00, Construction Progress Documentation.
  - 3. Section 01 33 22, Web Based Document Management.

**1.03 SUBMITTALS**

- A. Informational Submittals:
  - 1. Schedule of Values: Submit based on a roll up of the cost-loaded schedule described in Section 01 32 00, Construction Progress Documentation.

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2. Schedule of Estimated Progress Payments: Submit based on current approved Schedule of Values.
3. Record Drawing Red-lines: Update and deliver monthly as required by Section 01 77 00, Closeout Procedures.
4. Application for Payment.
5. Final Application for Payment.

1.04 ALLOWANCES

- A. Allowances will be administered in accordance with the Contract requirements.
- B. Submit, with application for payment, invoice showing the date of purchase, labor costs, expenses, and the total price for all allowance items.
- C. Allowances shall be paid based on actual work performed up to the amount listed in the Bid Schedule. The Owner shall authorize the use of the cash allowances on an as needed basis.
- D. Allowances are further described as:
  1. Dispute Resolution Board.
  2. Contingency (Field Orders).

1.05 SCHEDULE OF VALUES

- A. Prepare a separate Schedule of Values for each schedule of the Work under the Agreement, using the Cost ID activity code specified in Section 01 32 00, Construction Progress Documentation.
- B. Upon request of Construction Manager, provide documentation to support the accuracy of the Schedule of Values.
- C. Limitations:
  1. The values of the activities listed below are limited as indicated. The limit is the percent of the Total Bid Amount.

Activity	Limit
Mobilization	2.0 percent maximum
Contractor Quality Control Program	0.25 percent minimum
180-day Schedule Approval	0.25 percent
Baseline Schedule Approval	0.5 percent

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Activity	Limit
O&M Data (Manuals)	1.0 percent minimum
Functional Testing	1.5 percent minimum
Performance Testing	1.0 percent minimum
Project Record Documents	0.5 percent minimum
Demobilization	0.25 percent minimum

2. Mobilization:
  - a. Payment for mobilization will be prorated until all the following items have been completed. Mobilization includes:
    - 1) Project Manager onsite full time.
    - 2) Plant and construction equipment for activities for first month onsite.
    - 3) Field office setup with utilities.
    - 4) Fire protection established.
    - 5) Construction yard setup with storage and maintenance facilities and utilities setup.
    - 6) Safety Plan submitted and required notices posted.
    - 7) Initial Quality Control Plan submitted.
    - 8) QC Manager onsite full time.
3. Contractor Quality Control Program: Payment for Contractor Quality Control will be prorated based on progress towards Project completion.
4. 180-Day Schedule Approval: Payment will be made upon approval of the 180-day schedule as specified in the Section 01 32 00, Construction Progress Documentation.
5. Baseline Schedule Approval: Payment will be made on approval of the Baseline schedule as specified in Section 01 32 00, Construction Progress Documentation.
6. O&M Data (Manuals):
  - a. The Contractor and Construction Manager shall meet to determine the total number of O&M Data (Manuals) for the Contract. The value of the O&M Data shall be distributed equally across the total number of O&M Data for the Contract.
  - b. A Draft, Draft-Final and Final submittal is required for each O&M Data (Manual). The Draft, Draft-Final and Final submittals will be assigned 50 percent, 25 percent, and 25 percent, respectively of the calculated value for each Manual. Payment will be made upon acceptance of each submittal.
7. Functional Testing: Payment will be prorated based upon completion of the functional testing activities. See Section 01 91 14, Testing, Integration, and Startup, and equipment specifications for details on functional testing activities.

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8. Performance Testing: Payment will be pro-rated based upon completion of all performance testing activities as described in the Section 01 91 14, Testing, Integration, and Startup.
9. Project Record Documents: Progress payments for project record (as-built) documentation will be made based on the estimated percent complete of the quantity of documents submitted in accordance with weighting established as follows:

No.	Project Record Categories	Drawing Weight
1.	Electrical interconnects and referenced drawings	10
2.	Loop drawings and referenced drawings, process and instrumentation	9
3.	Control and logic drawings, schedules and PLC documents; both Design Engineer and Contractor supplied	7
4.	Electrical and instrumentation, Area Control Center connection drawings; both City and Contractor supplied	5
5.	Process and Piping Schematic, Power, single and three-line	3
6.	All other Contract Drawings	1

10. Demobilization:
  - a. Submittal of warranties.
  - b. Removal of plant and construction equipment.
  - c. Removal of field office, construction yards and related facilities, utilities, and project signs.
  - d. Cleanup and disposal of materials, supplies, equipment, and debris.
  - e. Restoration of areas, roads and other facilities damaged or altered as a result of the Work.

D. An unbalanced or front-end loaded schedule will not be acceptable. Acceptable Schedule of Values will be required prior to submittal of first Application for Payment.

E. Summation of the complete Schedule of Values representing all the Work shall equal the Contract Price.

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- F. Use Schedule of Values Form provided by Owner
- G. Schedule of Values shall correlate with cost-loaded schedule

1.06 APPLICATION FOR PAYMENT

- A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment for each schedule and include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification with inked signature by authorized officer of Contractor.
- B. Use detailed Application for Payment Form provided by Owner.
- C. Provide separate form for each schedule as applicable.
- D. Include accepted Schedule of Values for each schedule or portion of lump sum Work and the unit price breakdown for the Work to be paid on a unit priced basis.
- E. Include separate line item for each Change Order and Work Change Directive executed prior to date of submission. Provide further breakdown of such as requested by Construction Manager.
- F. Preparation:
  - 1. Round values to nearest dollar.
  - 2. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form(s) for each schedule as applicable, a listing of materials on hand for each schedule as applicable, and such supporting data as may be requested by Construction Manager.
- G. Progress payments do not constitute acceptance of the Work or a waiver of any terms or conditions of the Contract.

1.07 PAYMENT - GENERAL

- A. Payment for all Lump Sum Work shown or specified in Contract Documents is included in the Contract Price. Payment will be based on a percentage complete basis for each line item of the accepted Schedule of Values.
- B. Payment for the various items of the Bid Schedule, as further specified herein, shall include all compensation to be received by the Contractor for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor and services, operations, and incidentals appurtenant to items of Work being described here and within the plans, specifications, and Contract Documents,

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as necessary to complete the various items of the Work all in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of permits and cost of compliance with the regulations of public agencies having jurisdiction, including Safety and Health Requirements of the California Division of Industrial Safety and the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA). No separate payment will be made for any item that is not specifically set forth in the Bid Schedule, and all costs therefore shall be included in the contract price.

C. Payment for Procured Equipment:

1. Payment for procured equipment is divided into two types of equipment: Major Equipment and all other procured equipment.
2. Major Equipment will be paid according to the following milestones:
  - a. Purchase Order equals 5 percent. An executed purchase order must accompany the payment request.
  - b. Submittal Acceptance equals 5 percent. Approval of the equipment submittal is required prior to payment of this amount.
  - c. Fabrication equals 65 percent. Fabrication, including factory testing, may be paid in part provided adequate documentation is presented and accepted at the monthly Schedule Preview Meeting.
  - d. Delivery equals 10 percent. Proof of onsite delivery (or proper handling of stored materials) must accompany the payment request.
  - e. Pre-Operational Checkouts/Installation Certification equals 10 percent. Proof of Installation Certification by the Manufacturer must accompany the payment request.
  - f. Operational Checkouts/Performance Verification equals 5 percent. Documentation of successful operational checkouts/performance verification must be provided.
  - g. The sum of items listed above shall not exceed the documented quotation amount or invoice amount.
3. All other equipment (i.e., non-Major Equipment) will be paid upon submittal and acceptance of the required documents, including:
  - a. Paid invoices and proof of payment for materials on hand.
  - b. Proof of proper storage or stored materials.
  - c. Quantity verification (load tickets, etc.).
  - d. Any required certifications.

1.08 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

A. Payment will not be made for following:

1. Loading, hauling, and disposing of rejected material.



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2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.
4. Material not unloaded from transporting vehicle.
5. Defective Work not accepted by Owner.
6. Material remaining on hand after completion of Work.

1.09 RETENTION

- A. The Owner shall retain a percentage of each progress payment in accordance with Section 7-3.2 Partial and Final Payment of Part 1 Special Provisions – General of the Contract Documents. The retained amount is available for the protection and payment of the person(s), mechanics, subcontractors, or materialmen who perform labor upon the Contract or Work thereunder, and the persons who supply such person(s), or subcontractors with components and supplies for carrying on such Work.
- B. Pursuant to Section 22300 of the Public Contract Code of the State of California, the Contractor has the option, at its expense, to deposit securities with an Escrow Agent as a substitute for retention earnings required to be withheld by the City. Securities eligible for such substitution are bank or savings and loans certificates of deposit or such securities which are eligible for investment pursuant to Government Code Section 16430. As to any such security or securities so substituted for monies withheld, the Contractor shall be the beneficial owner of same and shall receive any interest thereon. Such security shall, at the request and expense of the Contractor, be deposited with the City or with a State or Federally Chartered bank as the escrow agent who shall pay such monies to the Contractor upon notification by the City that payment can be made. Such notification will be given at the expiration of 35 days from the date of acceptance of the Work, or as prescribed by law, provided however, that there will be a continued retention of the necessary securities to cover such amounts as are required by law to be withheld by properly executed and filed notices to stop payment, or as may be authorized by the Contract to be further retained.

1.10 BID ITEMS

- A. Bonds (payment and performance) - Lump Sum:
  1. No measurement shall be made for this Item.
  2. Payment is made for this item for the Bonds required under this Contract and shall be made as the lump sum price named in the Bid Schedule. Refer to Whitebook Section 1-7.2 for requirements.

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B. Mobilization - Lump Sum:

1. No measurement shall be made for this Item.
2. Payment for this item shall be made as a Lump Sum amount named in the Bid Schedule

C. Dispute Resolution Board - Allowance

1. No measurement shall be made for this Item.
2. Payment for this Bid Item is described in Section 2-10.2.3 of the SSP. Payment for this Item shall be made as an allowance amount named in the Bid Schedule.

D. SHEETING, SHORING, AND BRACING - LUMP SUM

1. No measurement shall be made for this Item.
2. Payment is made for this Item for temporary sheeting, shoring, and bracing or equivalent method and shall be made at the lump sum price named in the Bid Schedule, which price shall constitute full compensation for completion of all planning, design, engineering fees, furnishing and constructing, and removal and disposal of such temporary sheeting, shoring, and bracing as a lump sum item, complete, as required for the prosecution of the Work, required for temporary or permanent support of any structures, pipelines or utilities and required under the provisions of any permits, and in accordance with the requirements of OSHA and the Construction Safety Orders of the State of California, pursuant to the provisions of Section 6707 of the California Labor Code.

E. Site Civil Grading - Lump Sum:

1. No measurement shall be made for this Item.
2. General: All site civil grading.
3. Payment is made for this item for the following:
  - a. Civil demolition work and grading as shown on Drawings and as specified.
  - b. Payment under this Bid Item shall be made as the lump sum price named in the Bid Schedule.

F. Yard Piping - Lump Sum:

1. No measurement shall be made for this Item.
2. General: All yard piping
3. Payment is made for this item for the following:
  - a. All yard piping shown on Drawings and as specified.

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- b. Payment under this Bid Item shall be made as the lump sum price named in the Bid Schedule.
- G. Receiving Tank Complex Facility 73 - Lump Sum:
  1. No measurement shall be made for this Item.
  2. Payment is made for the replacement of the raw solids feed pumps and adjustable speed drive replacement.
- H. Centrifuge Building Facility 76 - New Grit Separator - Lump Sum:
  1. No measurement shall be made for this Item.
  2. General: New grit separator and refurbishment of two existing grit clarifiers.
  3. Payment is made for this item for all Work required to upgrade the capacity of the grit removal system. Payment for this item includes the following:
    - a. A fourth grit separator will be installed to increase capacity. The two existing grit clarifiers will be refurbished.
    - b. Payment under this Bid Item shall be made as the lump sum price named in the Bid Schedule.
- I. Centrifuge Building Facility 76 - Centrifuge Building Improvements - Lump Sum:
  1. No measurement shall be made for this Item.
  2. General: New larger thickening centrifuges with feed pumps and polymer pumps, new larger thickened sludge transfer pumps.
  3. Payment is made for this item for all Work required to upgrade the capacity of the sludge thickening system. Payment for this item includes the following:
    - a. Five new increased capacity thickening centrifuges with new feed pumps and polymer pumps, all pumps with new ASDs.
    - b. Three new thickened solids transfer pumps all pumps with new ASDs.
    - c. Two new 6-inch thickened solids pipelines.
    - d. Payment under this Bid Item shall be made as the lump sum price named in the Bid Schedule.
- J. Centrifuge Building Facility 76 - Dewatering - Lump Sum:
  1. No measurement shall be made for this Item.
  2. General: New larger dewatering centrifuge feed pumps and polymer pumps.

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3. Payment is made for this item for all Work required to upgrade dewatering centrifuges. Payment for this item includes the following:
  - a. Eight new dewatering centrifuge feed pumps and polymer pumps.
  - b. Payment under this Bid Item shall be made as the lump sum price named in the Bid Schedule.

K. Digester Complex Facility 80 - Lump Sum:

1. No measurement shall be made for this Item.
2. General: New mixing systems and new biogas collection piping for all three digesters.
3. Payment is made for this item for the following:
  - a. Replacement of the existing digester mixing pumps with new chopper pumps and ASDs for all three digesters.
  - b. Replacement of the existing digester recirculation pumps with new chopper pumps and ASDs for all three digesters.
  - c. Replacement of the existing digester axial mixing pumps with new chopper pumps and ASDs for all three digesters.
  - d. Remove the existing biogas collection pipe and replace with a larger pipe for all three digesters.
  - e. Remove the existing biogas collection pipe and replace with a larger pipe for two digested sludge storage tanks.
  - f. Addition of nozzles to digester mixing system.
  - g. Replacement of the existing digester overflow piping with larger piping.
  - h. Payment under this Bid Item shall be made as the lump sum price named in the Bid Schedule.

L. Biogas Flare Facility 10 - Lump Sum:

1. No measurement shall be made for this Item.
2. General: New biogas flare will be installed.
3. Payment is made for the installation of one new biogas flare adjacent to the two existing flares. Payment under this Bid Item shall be made as the lump sum price named in the Bid Schedule.

M. Biogas Holding Tank and Compressors Facility 11 - Lump Sum:

1. No measurement shall be made for this Item.
2. General: New biogas compressors and new compressor suction and discharge piping.
3. Payment is made for this item for the following:
  - a. Replace two existing compressors with two new larger compressors and one new compressor for a total of three compressors.

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- b. New suction and discharge piping for compressors.
- c. Payment under this Bid Item shall be made as the lump sum price named in the Bid Schedule.

N. Wastewater Pump Station and Odor Control System Facility 94 - Lump Sum:

- 1. No measurement shall be made for this Item.
- 2. Payment is made for the replacement of the centrare pumps and adjustable speed drive replacement. Payment under this Bid Item shall be made as the lump sum price named in the Bid Schedule.

O. Controls, System Integration - Lump Sum:

- 1. No measurement shall be made for this Item.
- 2. Payment is made for this item for Distributed Control System (DCS) equipment supply and systems integration, to be performed by Emerson Process Controls, Inc., with the MBC Improvements existing controls in accordance with the Contract Documents. Payment for this item shall be made as the lump sum price named in the Bid Schedule.

P. Field Orders - Allowance:

- 1. No measurement shall be made for this Item.
- 2. Payment is made for this Item as an allowance towards field orders and contingencies that may occur during the course of the Work.

Q. Integration Period Services - Lump Sum:

- a. No measurement shall be made for this Item.
- b. Payment is made for this Item for the Integration Period Services required to be performed as part of the commissioning activities of the facilities. Payment for this item shall be made as the lump sum price named in the Bid Schedule.
- c. In the event the integration period is delayed or extended beyond the 120-day specified herein due to other related Pure Water Projects not being ready, the Contractor will be compensated based on the integration period Bid item shown above.
  - 1) Example: If the Contract Integration Bid item is \$100 for the 120 days and the delay is 30 days, then the additional compensation to the contractor will be  $(30/120*100)$  equals \$25.

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1.11 SUPPLEMENT

A. The supplement listed below, following “End of Section,” is part of this Specification.

1. MBC Improvements Major Equipment.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

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<b>MAJOR EQUIPMENT</b>	
<b>Specification Section</b>	<b>Specific Product</b>
26 20 00	Low-Voltage AC Induction Motors
26 24 19	Low-Voltage Motor Control
26 29 23	Low-Voltage Variable Speed Drive System
44 22 23	Thickening Centrifuges
44 42 56.05	Chopper Pumps and Mixing Nozzles
44 42 56.09	Non-Clog Dry-pit Centrifugal Pumps
44 42 56.10	Horizontal End Suction Centrifugal Pumps
44 42 56.13	Progressing Cavity Pumps
44 42 56.16	Peristaltic Hose Pump
44 46 20	Digester Gas Safety Equipment and Specialties
44 46 22	Digester Gas Boost Compressors
46 23 00	Grit Separators
46 23 10	Grit Dewatering Unit Rehabilitation

**SECTION 01 31 13**  
**PROJECT COORDINATION**

**PART 1 GENERAL**

1.01 GENERAL

- A. Surveying will be performed by a surveyor contracted with the City or Construction Manager. The Contractor will not be responsible for performing surveying. Contractor will be responsible for identifying surveying needs and coordinating those needs with the Construction Manager. The surveying requirements indicated in the Contract Documents are intended to provide information and background for the Contractor.

1.02 SUBMITTALS

A. Informational:

1. Statement of Qualification (SOQ) for land surveyor or civil engineer.
2. Maintenance of Plant Operations Plans (MOPO Plans).
  - a. Contractor shall develop a detailed plan for each maintenance of plant operation activity by unit process or facility that includes a detailed description of the outage, temporary provisions to maintain plant operations, procedural steps, list of equipment and materials, contingency plan, detailed hourly schedule, list of labor and equipment, and scheduling constraints. Plans shall be submitted to the Construction Manager and Owner for approval 45 days prior to planned activity. Plans must be approved a minimum of 10 days prior to the planned activity. In the absence of an approved work plan, scheduled activities will be postponed to provide a minimum 10-day advance notice of the Work. The Contractor will be solely responsible for any delays associated with failure to provide timely submittals for activities that impact plant operations.
  - b. The plan shall include the following steps for MOPOs:
    - 1) Step 1: The Contractor shall identify the anticipated project MOPO (maintenance of plant operation) processes needed and provide list them on a MOPO log and in the Baseline Schedule. This list shall also identify shutdowns, diversions, or tie-ins as described in the Contract Documents. The MOPO duration and timing shall be shown in the Baseline Schedule. Date scheduled MOPOs to coincide with the appropriate construction activities.



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- 2) Step 2: The Contractor shall request a Pre-MOPO Meeting with the Owner, Construction Manager, and Design Engineer to discuss the nature of the shutdown, diversion, or tie-in, and to gather the information necessary to complete the MOPO Form. The pre-MOPO meeting may be waived by the Owner or Construction Manager if the work is deemed to be minor.
  - 3) Step 3: The Contractor completes the MOPO Form and shall submit for approval to the Construction Manager.
  - 4) Step 4: The Construction Manager will distribute the MOPO Form for review by the Owner, Construction Manager, and Design Engineer. The MOPO Form shall be reviewed for completeness, accuracy, compliance with both the construction schedule, constraints defined in contract documents, and to ensure that the requested work does not negatively impact plant operations or other concurrent project activities. Additional information may be requested to better understand the nature of and method for completing the Work.
  - 5) Step 5: Once the MOPO is agreed to by all parties, the MOPO will be finalized by signature. Copies are distributed to the Owner, Construction Manager, Design Engineer, and Contractor.
  - 6) Step 6: The Contractor shall verify with the Construction Manager that everything is ready for the work described within the MOPO.
  - 7) Step 7: The Contractor shall complete a Safety Checklist.
  - 8) Step 8: The Contractor completes the work.
  - 9) Step 9: The Contractor updates MOPO log weekly and distributes at the regularly scheduled construction progress meetings.
3. Photographs:
    - a. Digital Images: Submit one copy of DVD disc containing images within 5 days of being taken. Each image is to have a minimum file size of 1.4 Mb (1,400 Kb) so viewed resolution is high quality. The production of larger file sizes with higher resolution is encouraged.
  4. Video Recordings: Submit one copy, including updated copy of project video log, within 5 days of being taken.
  5. Time Lapse Construction Video: Submit one copy of cumulative time lapse video of construction site on the first working day of each month.

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1.03 RELATED WORK AT SITE

A. General:

1. Other work, performed by others under separate contracts, that is either directly or indirectly related to scheduled performance of the Work under these Contract Documents, is listed henceforth.
  - a. North City Water Reclamation Plant Expansion.
  - b. MBC Dewatering Centrifuge Replacement Project.
  - c. North City Renewable Energy Project.
2. Coordinate the Work of these Contract Documents with work of others as specified.
3. Include sequencing constraints specified herein as a part of Progress Schedule.

B. Power:

1. Electricity/Gas Company: San Diego Gas and Electric (SDG&E).
  - a. Emergencies: (800) 411-7343.
  - b. Mark-Out: 811 or [www.call811.com](http://www.call811.com).
  - c. Website: <https://www.sdge.com/more-information/safety/gas-safety/dial-811-you-dig>.
  - d. Work to be performed by San Diego Gas and Electric will be complete prior to award of this Contract.

- C. Applications Software Development: Application software for the Distributed Control System (DCS) will be performed by the Distributed Control System Provider (DCSP). The DCSP will provide hardware and perform programming of the DCS applications software for certain portions of Process Instrumentation and Control Subsystem (PICS). Refer to Section 40 90 07, Scope of Work, and related Sections, for detailed information pertaining to DCS hardware and application software programming. The DCSP shall be Emerson Process Controls, Inc., no substitutions.

1.04 UTILITY NOTIFICATION AND COORDINATION

- A. Coordinate the Work with various utilities within Project limits. Notify applicable utilities prior to commencing Work, if damage occurs, or if conflicts or emergencies arise during the Work.

1. Electricity Company: San Diego Gas & Electric.
  - a. Contact: Cathy Cavaletto.
  - b. Telephone: (848) 636-5786.
2. Telephone Company: Chris Porter.
  - a. Telephone: (858) 208-8375.

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3. Public Utilities Department: City of San Diego.
  - a. Contact Person: Monika Smoczynski.
  - b. Telephone: (858) 292-6455.
4. Gas Department: San Diego Gas & Electric.
  - a. Contact Person: Cathy Cavaletto.
  - b. Telephone: (848) 636-5786.
5. Building Department: City of San Diego.
  - a. Contact Person: Colette Redon.
  - b. Telephone: (619) 446-5402.

1.05 PROJECT MILESTONES

A. Project Milestones:

1. Generally described in the Contract Documents. The following is a detailed description of each:
  - a. Milestone 1: Substantial Completion – Occurs after completing the prerequisites for Substantial Completion.
  - b. Milestone 2: Final Completion – After successful completion of Substantial Completion requirements, and all aspects of the Contract Closeout have been satisfactorily completed.

1.06 WORK SEQUENCING/CONSTRAINTS

- A. The sequencing described herein is provided as guidance documentation for the Contractor. The Contractor shall comply with construction constraints which are stated in the Specifications. The Contractor shall be responsible for the detailed development of sequencing planning and scheduling to meet with the Milestone and Completion requirements of the Work.
- B. The Contractor shall supervise, direct, and cooperate fully with all subcontractors, manufacturers, fabricators, suppliers, distributors, installers, testing agencies, and all others whose services, materials or equipment are required to ensure completion of the Work within the Contract time.

1.07 FACILITY OPERATIONS

- A. Continuous operation of Owner's facilities is of critical importance. Schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified.

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- B. The Contractor shall be solely responsible for maintaining continued and uninterrupted operation of all facilities in the Project area, and shall prepare all required Maintenance of Plant Operation (MOPO) plans for all facilities affected by its work. The MOPO Plan shall detail how, but not limited to, the following elements that will allow the biosolids center to function continuously with appropriate capacity during construction:
1. Sequence of construction activities, temporary works, and bypassing.
- C. The Contractor shall provide the Privatizer power generation operations continuous access and operation of the power generation facilities. The Contractor shall coordinate through City for any Privatizer site access or impacts.
- D. Perform Work continuously during critical connections and changeovers, and as required to prevent interruption of Owner's operations.
- E. When necessary, plan, design, and provide various temporary services, utilities, connections, temporary piping and heating, access, and similar items to maintain continuous operations of Owner's facility.
- F. Do not close lines, open or close valves, or take other action which would affect the operation of existing systems. The Contractor shall provide a written request for any valve operation from the Owner so that the operations staff can operate the valves. Requests shall be made 48 hours prior to the need for the valve operation.
- G. Site Requirements:
1. Maintain chemical truck access for chemical delivery through the Site to Facility 60 at all times.
  2. Maintain solids haul truck access through the Site to Facility 76 at all times.
  3. Maintain access during construction to all facilities for City operation and maintenance staff.
  4. Provide temporary parking to replace all parking stalls removed during construction.
- H. Process or Facility Shutdown and Operating Requirements:
1. The following describes operating requirements and facilities which may be shutdown at some time during the Work:
    - a. 73 – Receiving Tank Complex: Two raw solids feed pumps must remain in service at all times.
    - b. 76 – Centrifuge Building: Two grit separators and one grit clarifier must remain in service at all times.

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- c. 76 – Centrifuge Building: Three thickening centrifuges and associated feed and polymer pumps must remain in service at all times.
  - d. 80 – Digester Complex: One digester system may be taken out of in service at a time.
  - e. 10 – Biogas Flare Facility: The digester gas system shutdown shall be limited to 8 hours maximum each. Biogas Holding Tank and Compressors must remain in service at all times during construction on the Biogas Flare Facility.
  - f. 11 – Biogas Holding Tank and Compressors: The digester gas system shutdown shall be limited to 8 hours maximum each. Biogas Flare Facility must remain in service at all times during construction of the Biogas Compressors.
  - g. 76 – Centrifuge Building: One dewatering centrifuge may be taken out of service at a time for centrifuge feed pump and polymer pump replacement.
  - h. 94 – Centrate Pump Station: Two centrate pumps must remain in service at all times.
  - i. Provide 21 days advance written request for approval of need to shut down a process or facility to Owner and Engineer.
- 2. Power outages will be considered upon 7 days written request to Owner and Engineer. Describe the reason, anticipated length of time, and areas affected by the outage. Provide temporary provisions for continuous power supply to critical facility components.
  - 3. Fire protection system shall remain in continuous service during construction.
  - 4. Plant distributed control system (DCS) work shutdowns shall be limited to one 48-hour shutdown per Facility DCS for the following facilities. During this shutdown, the priority facility I/O points will be converted from the “Q Series” type of I/O to “R Series” I/O. Coordinate with Owner for operation during shutdown.
    - a. Drop 07 – Raw Solids.
    - b. Drop 08 – Raw Solids and Biogas Flares.
    - c. Drop 10 – Thickening Centrifuges 1 and 2.
    - d. Drop 11 – Thickening Centrifuges 3 and 4.
    - e. Drop 13 – Thickening Centrifuge 5.
    - f. Drop 17 – Grit Separators 1 and 3.
    - g. Drop 18 – Grit Separators 2 and 4.
    - h. Drop 29 – Centrate Pumps 1 and 3.
    - i. Drop 30 – Centrate Pump 2.
    - j. Drop 38 – Biogas Compressors.
- I. Install and maintain bypass facilities and temporary connections required to keep Owner’s wastewater treatment operations online. Sequences other than

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those specified will be considered upon written request to Owner and Engineer, provided they afford equivalent continuity of operations.

- J. Do not proceed with Work affecting a facility's operation without obtaining Owner's and Engineer's advance written approval of the need for and duration of such Work.
- K. Relocation of Existing Facilities:
  - 1. During construction, it is expected that minor relocations of Work will be necessary.
  - 2. Provide complete relocation of existing structures and Underground Facilities, including piping, utilities, equipment, structures, electrical conduit wiring, electrical duct bank, and other necessary items.
  - 3. Use only new materials for relocated facility. Match materials of existing facility, unless otherwise shown or specified.
  - 4. Perform relocations to minimize downtime of existing facilities.
  - 5. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by Engineer.
- L. Prior to any bypass, shutdown or testing of new equipment or process, the Contractor shall coordinate and sufficiently schedule and plan the Work with the Owner to prove the readiness and operational condition of the existing facility. This may include the Owner's operation of related valves, gates, etc., to verify system readiness.

1.08 ADJACENT FACILITIES AND PROPERTIES

- A. Examination:
  - 1. After Effective Date of the Agreement and before Work at Site is started, Contractor, Engineer, and affected property owners and utility owners shall make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements in vicinity of Work, as applicable, which could be damaged by construction operations.
  - 2. Periodic reexamination shall be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions.
- B. Documentation:
  - 1. Record and submit documentation of observations made on examination inspections in accordance with Article Construction Photographs and Article Audio-Video Recordings.

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2. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of Contractor's operations, and is for the protection of adjacent property owners, Contractor, and Owner.

1.09 CONSTRUCTION PHOTOGRAPHS

A. General:

1. Photographically document all phases of the Project including preconstruction, construction progress, and post-construction.
2. Engineer shall have right to select subject matter and vantage point from which photographs are to be taken.

B. Preconstruction and Post-Construction:

1. After Effective Date of the Agreement and before Work at Site is started, and again upon issuance of Substantial Completion, take a minimum of 60 photographs of Site and property adjacent to perimeter of Site.
2. Particular emphasis shall be directed to structures both inside and outside the Site.
3. Format: Digital, minimum resolution of 20 megapixel.

C. Construction Progress Photos:

1. Photographically demonstrate progress of construction, showing every aspect of Site and adjacent properties as well as interior and exterior of new or impacted structures.
2. Weekly: Take 50 photographs using digital, minimum resolution of 20 megapixel.

D. Documentation:

1. Digital Images:
  - a. Electronic image shall have date taken embedded into image.
  - b. Archive using a commercially available photo management system that provides listing of photographs including date, keyword description, and direction of photograph.
  - c. Label file folders or database records with Project and Owner's name, and month and year images were produced.

1.10 AUDIO-VIDEO RECORDINGS

- A. Prior to beginning the Work on Site or of a particular area of the Work, videograph Site and property adjacent to Site.

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- B. In the case of preconstruction recording, no work shall begin in the area prior to Engineer's review and approval of content and quality of video for that area.
- C. Particular emphasis shall be directed to physical condition of existing vegetation, structures, and pavements within site and areas adjacent to and within the right-of-way or easement, and on Contractor storage and staging areas.
- D. Engineer shall have right to select subject matter and vantage point from which videos are to be taken.
- E. Time Lapse Construction Video
  - 1. Provide a continuous-sequence time lapse construction video of the MBC site beginning with mobilization and concluding with demobilization.
  - 2. Location:
    - a. Select a position, approved by the Owner and Construction Manager, for the time lapse video camera that will remain fixed for the entire duration of construction.
    - b. Video camera location should provide maximum view of the entire Site from a public interest perspective.
    - c. Provide a pole-mounted camera to achieve adequate height for enhanced visibility of the Site.
  - 3. Equipment:
    - a. Manufacturer: Time-Lapse Pro, iBEAM Construction Cameras, "or-equal."
    - b. Digital single-lens reflex video camera capable of 4K ultra HD time-lapse movies.
      - 1) 8.3 to 18 megapixel images.
      - 2) 4G LTE cellular communications.
      - 3) Power interruption remote alert.
- F. Video recording shall be by a professional commercial videographer, experienced in shooting exterior and interior construction videos. Video Format and Quality:
  - 1. DVD format, with sound.
  - 2. Video:
    - a. Produce bright, sharp, and clear images with accurate colors, free of distortion and other forms of picture imperfections.
    - b. Electronically and accurately display the month, day, year, and time of day of the recording.



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3. Audio:
  - a. Audio documentation shall be done clearly, precisely, and at a moderate pace.
  - b. Indicate date, project name, and a brief description of the location of recording, including:
    - 1) Facility name.
    - 2) Street names or easements.
    - 3) Addresses of private property.
    - 4) Direction of coverage, including engineering stationing, if applicable.

G. Documentation:

1. DVD Label:
  - a. DVD number (numbered sequentially, beginning with 001).
  - b. Project name.
  - c. Applicable location.
  - d. Date and time of coverage.
2. Project Video Log: Maintain an ongoing log that incorporates above noted label information for DVDs on Project.

1.11 REFERENCE POINTS AND SURVEYS

A. Location and elevation of bench marks are shown on Drawings.

B. Contractor's Responsibilities:

1. Refer to Section 3-10 of the SSP for Contractor responsibilities and survey services provided by the City.
2. Provide additional survey and layout required to layout the Work.
3. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.
4. In event of discrepancy in data or staking provided by Owner, request clarification before proceeding with Work.
5. Retain professional land surveyor or civil engineer registered in California who shall perform or supervise engineering surveying necessary for construction staking and layout.
6. Maintain complete accurate log of survey work as it progresses as a Record Document.
7. On request of Engineer, submit documentation.
8. Provide competent employee(s), tools, stakes, and other equipment and materials as Engineer may require to:
  - a. Establish control points, lines, and easement boundaries.
  - b. Check layout, survey, and measurement work performed by others.

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- c. Measure quantities for payment purposes.

1.12 OWNER PERFORMED TESTING

A. General:

1. Owner performed tests does not:
  - a. Relieve Contractor of responsibility for providing adequate quality control measures.
  - b. Relieve Contractor of responsibility for damage to or loss of material before acceptance.
2. Contractor is responsible for additional costs associated with tests when Work is not ready for testing in accordance with the schedule previously identified and coordinated between Contractor and Construction Manager. Contractor and Construction Manager to coordinate schedule for all tests beforehand as directed by Construction Manager.
3. Contractor is responsible for associated costs for additional tests because of rejection of materials or Work that cannot be completed in the absence of acceptable test results as required by the Contract Documents.
4. Contractor shall provide access for all testing performed by Owner or Construction Manager.
5. Contractor shall notify the Construction Manager and Owner in advance of required tests no later than 48 hours prior to test.
6. Contractor shall provide access of construction documents at all times to personnel performing testing.
7. Contractor shall cooperate with Construction Manager and testing personnel and provide safe access to the Work in order to perform and complete the tests.
8. Contractor shall provide reasonable auxiliary services as requested by the Construction Manager and testing personnel. Auxiliary services include, but is not limited to:
  - a. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate tests and assist the testing personnel in performing tests.
  - b. Providing storage space for the exclusive use of testing personnel, such as area for storing test samples, curing concrete samples, and delivery of samples to testing laboratories if required by Construction Manager and testing personnel.
  - c. Providing security and protection of samples and test equipment at the Project Site if required by the Construction Manager or testing personnel.
  - d. Provide samples of materials to be tested in required quantities.
9. Owner performed test reports will be submitted to the Construction Manager, Contractor, Design Engineer, and Owner within 1 week of the

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test completion. Delays that may occur due to delays in Owner performed tests shall be negotiated between the Owner and Contractor.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

**3.01 SALVAGE OF MATERIALS**

- A. Salvage materials for Owner’s use where shown:
  - 1. Remove material with extreme care so as not to damage for future use.
  - 2. Promptly remove salvaged materials from Work area.
  - 3. Store materials where instructed by Owner onsite.
- B. Meet with Construction Manager prior to starting to dismantle equipment or piping designated to be salvaged.
- C. Meet with Construction Manager and Owner prior to salvaging of equipment to ascertain the condition of the equipment being salvaged. Provide new or repair damaged equipment or material specified or indicated to be salvaged should condition vary from the condition prior to salvage. Clean and protect equipment from dust, dirt, natural elements, and store as directed.

**3.02 SUPPLEMENT**

- A. The supplement listed below, following “End of Section,” is part of this Specification.
  - 1. MBC Operations During Construction Criteria. This is a guideline and does not serve as final sequencing or a final construction schedule. Contractor is responsible for developing a detailed sequencing plan and schedule for review and approval by the Construction Manager prior to the start of the construction.

**END OF SECTION**

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MBC Operations During Construction Criteria

Description	Criteria	MOPO Considerations
<i>Process Facilities</i>		
Grit Building	The existing grit removal equipment and raw solids pumping needs to remain in service during installation of the new equipment, except for brief shutdowns to tie in new equipment and facilities. The number and duration of shutdowns should be limited and scheduled to occur during low-flow periods of the year and low diurnal flow conditions. Grit separator (TeaCup) installation can occur to allow two existing grit separators and one existing clarifier in service at all times. Two raw solids feed pumps must remain in service.	Existing system has the necessary capacity to accommodate flows from NCWRP during construction.
Solids Thickening	Three solids thickening centrifuges and one thickened sludge pump need to remain in service at all times, except for a short duration tie-in for MBC to maintain solids handling.	Modifications to the thickened sludge pump suction and discharge piping may remove multiple pumps out of service.
Digester Mixing	One digester may be taken out of service at a time for MBC to maintain solids handling.	The digester improvement should rotate through the three digesters one-by-one. Short shutdowns will be required when combining common headers between digesters.
Biogas System	Larger biogas piping will be installed adjacent to the existing piping to maintain operations during construction.	Short shutdowns and depressurization will be required during tie-ins of new piping and equipment. Special precautions will be necessary when handling digester gas.
Sludge Dewatering	Not Applicable	Tie-ins to the larger centrifuges will take place one at a time and will require a shutdown of the associated centrifuge.
Centrate Pump Station	Two centrate pumps need to remain in service at all times for MBC to maintain solids handling.	Tie-ins for the new pumps will require short shutdowns.

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Chemical Handling	Not Applicable	Not Applicable
<b>Site</b>		
	Maintain site access around existing facilities for maintenance and operations staff.	
Site Roadways	Maintain site access for Privatizer Cogeneration operations and maintenance. Chemical delivery truck routes, sludge hauling truck routes, and headworks grit and screening truck hauling routes need to remain in operation.	
Stormwater Handling	A temporary stormwater drainage plan will need to be developed to convey stormwater.	
<b>Electrical</b>		
Medium-voltage Distribution	Maintain supply to operating facilities. Develop a plan to stage system modifications to mesh with process system shutdowns.	
Low-voltage Systems	Maintain supply to operating facilities. Develop a plan to stage system modifications to mesh with process system shutdowns.	

**SECTION 01 31 19**  
**PROJECT MEETINGS**

**PART 1 GENERAL**

1.01 GENERAL

- A. The Construction Manager shall schedule physical arrangements for meetings throughout progress of the Work, prepare meeting agenda with regular participant input and distribute with written notice of each meeting, preside at meetings, record minutes to include significant proceedings and decisions, and reproduce and distribute copies of minutes within 5 days after each meeting to participants and parties affected by meeting decisions.

1.02 PRECONSTRUCTION CONFERENCE

- A. Contractor shall be prepared to discuss the following subjects, as a minimum:

1. Required schedules.
2. Status of Bonds and insurance.
3. Sequencing of critical path work items.
4. Progress payment procedures.
5. Project changes and clarification procedures.
6. Use of Site, access, office and storage areas, security and temporary facilities.
7. Major product delivery and priorities.
8. Contractor's safety plan and representative.

- B. Attendees will include:

1. Owner's representatives.
2. Construction Manager's representatives.
3. Contractor's office representative.
4. Contractor's resident superintendent.
5. Contractor's quality control representative.
6. Subcontractors' representatives whom Contractor may desire or Construction Manager may request to attend.
7. Design Engineer's representatives.
8. Others as appropriate.

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1.03 ENVIRONMENTAL MITIGATION MONITORING AND REPORTING  
PROGRAM PRECONSTRUCTION CONFERENCE

- A. The Contractor shall be required to discuss the following:
  - 1. Discuss the Environmental Mitigation Monitoring and Reporting Program.
- B. Attendees will include:
  - 1. City's Mitigation Monitoring Coordination Section Construction Manager.
  - 2. Owner's representatives.
  - 3. Construction Manager's representatives.
  - 4. Contractor's representatives.
  - 5. Contractor's quality control representative.
  - 6. Others as appropriate.

1.04 PRELIMINARY SCHEDULES REVIEW MEETING

- A. As set forth in Section 01 32 00, Construction Progress Documentation.
- B. Provide weekly look-ahead schedules for Progress Meetings (show 1 week past, current week, and 4 weeks in advance).

1.05 PROGRESS MEETINGS

- A. Construction Manager will schedule regular progress meetings at Site, conducted weekly to review the Work progress, Progress Schedule, Schedule of Submittals, Application for Payment, contract modifications, and other matters needing discussion and resolution.
- B. Attendees will include:
  - 1. Owner's representative(s), as appropriate.
  - 2. Construction Manager's representative (s), as appropriate.
  - 3. Contractor, Subcontractors, and Suppliers, as appropriate.
  - 4. Design Engineer's representative(s).
  - 5. Others as appropriate.

1.06 QUALITY CONTROL MEETINGS

- A. In accordance with Section 01 45 16.13, Contractor Quality Control.

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- B. Scheduled by Construction Manager on regular basis and as necessary to review test and inspection reports, and other matters relating to quality control of the Work and work of other Contractors.
- C. Attendees will include:
  - 1. Contractor.
  - 2. Contractor's designated quality control representative.
  - 3. Subcontractors and Suppliers, as necessary.
  - 4. Construction Manager's representatives.
  - 5. Design Engineer's representatives, as necessary.

1.07 PROCESS INSTRUMENTATION AND CONTROL SYSTEMS (PICS)  
COORDINATION MEETINGS

- A. Construction Manager will schedule as needed meetings at Site to review specific requirements of PICS work.
- B. Attendees will include:
  - 1. Contractor.
  - 2. Owner.
  - 3. Construction Manager.
  - 4. PICS Subcontractor/Installer.
  - 5. Distributed Control System Provider.
  - 6. Design Engineer's representatives, as required.

1.08 PREINSTALLATION MEETINGS

- A. Contractor shall schedule as needed meetings at Site to review specific requirements of the installation of the Work specified.
- B. When required in individual Specification sections, convene at Site prior to commencing the Work of that section.
- C. Require attendance of entities directly affecting, or affected by, the Work of that section.
- D. Notify Construction Manager 5 days in advance of meeting date.
- E. Provide suggested agenda to Construction Manager to include reviewing conditions of installation, preparation and installation or application procedures, and coordination with related Work and work of others.



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1.09 FACILITY STARTUP MEETINGS

- A. Contractor shall schedule and attend a minimum of twenty facility startup meetings. The first of such meetings shall be held prior to submitting Facility Startup Plan, as specified in Section 01 91 14, Testing, Integration, and Startup, and shall include preliminary discussions regarding such plan.
- B. Agenda items shall include, but not be limited to, content of Facility Startup Plan, coordination needed between various parties in attendance, and potential problems associated with startup.
- C. Attendees will include:
  - 1. Contractor.
  - 2. Contractor's designated quality control representative.
  - 3. Subcontractors and equipment manufacturer's representatives whom Contractor deems to be directly involved in facility startup.
  - 4. Construction Manager.
  - 5. Design Engineer's representatives.
  - 6. Owner's operations personnel.
  - 7. Others as required by Contract Documents or as deemed necessary by Contractor or City.

1.10 OTHER MEETINGS

- A. In accordance with Contract Documents and as may be required by Owner and Engineer.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

**SECTION 01 32 00**  
**CONSTRUCTION PROGRESS DOCUMENTATION**

**PART 1 GENERAL**

1.01 GENERAL REQUIREMENTS

- A. The rate of progress and the time of completion of the Work are of the essence for this Contract. The Work shall be executed with such progress as required to prevent any delay to this Contract and to other projects or contractors working at the Site. Compliance includes, but is not limited to, meeting Contract Milestone dates, compliance to scheduling submittals, working within any constraints and completion of all contract work within the allotted time.
- B. The Work specified in this section includes the preparation, submittal, and acceptance of a Baseline Schedule, construction progress schedules, schedule updates, recovery schedules, Time Impact Analysis (TIA) and revisions to the construction progress schedule. The construction schedule shall conform to the time provisions specified in the special provisions of the Contract Documents and the requirements of all other specified work sequence constraints set forth in the Contract Documents.
- C. The Contractor shall prepare and submit a Baseline Construction Schedule in accordance with the requirements of this section. By preparing and submitting the Baseline Construction Schedule and monthly schedule updates, the Contractor represents that it can and intends to safely execute the contracted Work and all portions thereof including all activities of subcontractors, equipment vendors, and suppliers including submittals and re-submittals within the specified times and constraints. The Contractor also represents that the bid price covers all costs associated with the execution of the Work in accordance with the construction schedule and Contract Documents.
- D. This Specification includes the cost loaded schedule requirements, consistent with Section 01 29 00, Payment Procedures, which shall form the basis for the pay application report and all monthly payment requests. These referenced sections shall be correlated and linked when preparing the monthly progress payment. The Schedule of Values shall be generated from the Oracle Primavera P6 current accepted schedule.
- E. The City will review the schedule, and any updates or revisions, and any other schedule data for conformance to the Contract. Review and acceptance of the Baseline Construction Schedule and associated documents does not relieve the Contractor of responsibility for the feasibility of the schedule, performance of any

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omitted work and completion of the Work and Milestones within the Contract Time.

1.02 DEFINITIONS

- A. Activity: A discrete work element of a project that can be identified for planning, scheduling, and controlling the construction project. Activities included in a construction schedule consume time and resources.
- B. Predecessor Activity: An activity that precedes another activity in the network.
- C. Successor Activity: An activity that follows another activity in the network.
- D. Code of Accounts: A unique lettering or numbering system in which letters or numbers are assigned to each unique component of the work breakdown structure.
- E. Hard Logic: Relationships with mandatory dependencies where the nature of the work itself dictates the order in which the activities should be performed. Construction of the walls before starting painting work is an example of mandatory dependency.
- F. Soft Logic: Also known as Discretionary Dependencies or Preferential Logic. Preferential logic that controls the critical path using constraints and lags will not be allowed.
- G. Hard Constraints: Override logical relationships and thereby prevent activities from being scheduled according to the logic. Hard Constraints include Mandatory Start, Mandatory Finish, Start On and Finish On.
- H. Critical Path Method (CPM): A method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the Project.
- I. Critical Activities: Activities on the critical path. To avoid project delays, work must start and finish on the planned early start and finish dates.
- J. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the maximum overall project duration or completion. There can only be one critical path for a project duration or a project milestone.
- K. Near Critical Path: The Near Critical Path shall be defined as the “longest path” plus 15 working days total float.

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- L. Float:
1. The measure of leeway in starting and completing an activity. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
  2. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned project completion date or contract milestone.
- M. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- N. Work Area: An area of construction, a separate facility, or a similar significant construction element.
- O. Contract Milestone: An activity or event that must be completed by a specific date and to which liquidated damages may apply. Contract start and completion dates are considered Contract Milestones.
- P. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
- Q. Schedule Of Values: A realistic statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment. The Schedule of Values should be produced from P6 and match the Cost Loading in the Schedule.
- R. Cost-Loading: The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total contract amount, unless otherwise approved by the City.
- S. Resource Loading: The allocation of manpower necessary for the completion of an activity as scheduled.
- T. Work Breakdown Structure (WBS): The WBS is a hierarchical structure of the Work to be performed under the Contract.
- U. Calendar Day: All days in a calendar year including weekends and holidays. Contract duration is measured in calendar days against contract milestones.
- V. Pacing: An intentional slowing of work activities during a delay, or alleged delay, to Project Completion.

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- W. Installed Major Equipment: All major equipment installed as part of the final constructed facility. See Section 01 29 00, Payment Procedures for definition of Major Equipment.
- X. Construction Equipment: All equipment utilized by the contractor to construct the facility but is not a part of the final constructed facility.
- Y. Blackout Calendar: An activity calendar that applies the non-work option in Primavera P6 Activity Calendars to create non-working days, weeks, and/or months when work is restricted from occurring. The City requires the use of blackout calendars for restricted activities rather than adjusted logic and durations.

1.03 SCHEDULER QUALIFICATIONS

- A. The Contractor shall employ or retain the services of a full-time, onsite Senior Project Scheduler who shall have experience in construction work sequencing, productivity, and scheduling as well as preparing and maintaining detailed construction schedules using the most current version of Oracle Primavera P6 software. Experience on projects similar in size and total construction cost is desirable. Within 7 calendar days after Notice to Proceed, the Contractor shall submit to the City Representative for review and acceptance, in accordance with Section 01 33 00. Submittal Procedures and Section 01 33 22, Web Based Construction Document Management, the Project Scheduler's resume, including personal references from at least two owner- representatives familiar with the Project Scheduler's work on previous water or wastewater treatment projects. The City reserves the right to reject the proposed scheduler based on the lack of qualifications as defined in this section. The Contractor's scheduler shall attend all schedule related meetings, including progress meetings, job walks when necessary to verify schedule progress, schedule review meetings and special meetings pertaining to scheduling of the Work. This person, along with the Contractor's management team, is expected to work closely with the City Representative to deliver acceptable products outlined in this section and comply with the Reports requirements of this section.
- B. If the Senior Construction Scheduler leaves the employment or retainage of the Contractor, the Contractor will be required to notify the City Representative in advance of the intended departure and fulfill the requirements of this subsection within 30 calendar days of the departure of the Contractor's Senior Construction Scheduler. The City reserves the right to disapprove any candidate proposed for the Project. The City reserves the right to remove any member of the Contractor scheduling staff that is, in the City's opinion, not performing scheduling work in accordance with the scheduling requirements.

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1.04 SCHEDULING CONFERENCES

- A. Pre-Construction Scheduling Conference: Within 30 calendar days after Notice to Proceed, the City Representative shall schedule and conduct a pre-construction scheduling conference to commence development of the required construction schedule. Attendance by the Contractor's Senior Construction Scheduler is mandatory. At the meeting, the requirements of this section will be reviewed with the Contractor; the Contractor shall present their proposed methodology for the Baseline Construction Schedule, sequence of operations, and resource and cost/quantity loading methodology. The Contractor shall submit to the City Representative a written copy of its proposed WBS structure at this meeting. The City shall review the WBS structure within 10 calendar days after submission by the Contractor. The Contractor shall make all modifications to the proposed WBS structure that are requested by the City. The WBS shall be correlated with the Contractor's Schedule of Values and the cost loaded schedule. The Senior Scheduler shall develop other activity codes and values needed to comply with the reporting requirements listed herewith, subject to acceptance by the City. The Contractor shall bring to the Pre-Construction Scheduling Conference the Network Logic Diagram used in bid preparation. This will be used as a basis of discussion for the construction plan.

1.05 FLOAT

- A. Pursuant to the float sharing requirements of the Contract, use of float suppression techniques such as preferential sequencing, special lead/lag logic restraints, hard constraints, Start on or After and Start on or Before constraints, adding and/or removing working or non-working days from an accepted activity calendar, extended activity durations, or imposed dates, shall be cause for rejection of the Baseline Construction Schedule and any revisions or updates. The use of float time disclosed or implied using alternative float suppression techniques shall be shared as directed by the City.
- B. Float time is not for the exclusive use or benefit of either the City or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and the contract completion date. Contractor's use of float shall be pre-approved by the City prior to use.
- C. No time extensions will be granted nor delay damages paid unless a City-caused delay occurs which impacts the Project's critical path and the Contractor has complied with all related contract requirements. Other delays will be evaluated by the Contractor for concurrency to issues and be included as part of the Contractor's analysis.

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- D. Submittal of an early completion schedule shall not provide a basis for the Contractor to claim an excusable delay for any time earlier than the Contract completion date. Any early completion schedule shall be approved by a Contract Change Order.

1.06 LOGIC AND LEVEL OF DETAIL

- A. The Project Schedule shall include activities of sufficient detail to accurately represent and clearly convey the Contractor’s feasible plan for the timely completion of the full scope of the work. Activities performed on site shall have maximum durations of 20 days and a value of \$50,000. The Contractor shall be responsible for developing the logic of the Baseline Schedule and for updating the logic each month to accurately reflect the progress of the work to date and the Contractor’s current plan for the timely completion of the Work. The schedule logic for each activity shall be constructed by determining which activities must be completed before any subsequent activity can start, which activities can occur simultaneously with the predecessor activity, which activities cannot start until another activity is complete, and the impact of all resource limitations on activity sequencing, activity durations, and activity dates. Every activity, except the Project start and finish Milestones, shall have a minimum of one predecessor and one successor. All paths through the Project Schedule shall proceed in the direction representing the progression of time; start to finish logic is disallowed. Activity lags shall not have a negative value. The use of lags shall be kept to a minimum and shall be subject to acceptance by the City. Redundant ties to preceding activities in a sequential series of activities will not be permitted.
- B. The activity descriptions shall be specific and discrete such that it cannot be confused with any other activity description. For example, “Form Concrete Wall” is too broad; there must be a description of the unique location of the wall. Similarly, activities that are discrete should not be combined.
- C. Finish to start logical relationships shall be predominantly used for schedule activities. The use of logical relationships with negative lags will not be allowed in the baseline schedule, in proposed revised schedules, or in the monthly updates.
- D. Milestones. Separately identify each Project milestone, conforming to the scheduling requirements as set forth in the Contract Documents, and assign a “finish no later than” constraint date. For Completion Deadlines, the activity description shall reference the appropriate Contract clause.
- E. No unspecified milestone constraints, other constraints, float suppression techniques, or use of Project activity durations, logic ties, and/or sequences deemed unreasonable by the City, will be used in the Project Schedule.

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- F. Any schedule showing an early completion date must show the time between the scheduled completion date(s) and the applicable Completion Deadline(s) as Float.

1.07 SCHEDULE SOFTWARE SETTINGS AND RESTRICTIONS

- A. Contractor shall use the most current version of Oracle Primavera P6 software to produce the contract schedules and reports as specified herein. In accordance with Section 01 33 00, Submittal Procedures, the Contractor shall submit all schedules and associated documentation directly into the City-furnished, web-based, document control system in accordance with Section 01 33 22, Web Based Construction Document Management. The schedule files shall be submitted in Primavera's Proprietary Exchange (XER) format until such time as Primavera recommends transferring to their Extensible Markup Language (XML) format. Reports shall be in Adobe Portable Document Format (PDF).
- B. Activity Constraints: Date/time constraint(s), other than those required by the Contract, will not be allowed unless accepted by the City. Identify any constraints proposed and provide an explanation of the purpose of the constraint in the Narrative Report. Any finish constraints for City required milestones must use a 'Finish on or Before' type designation and have logic ties. Start on or After and Start on or Before constraints are discouraged. All Start on or After and Start on or Before constraints are subject to approval by the City representative. No hard constraints, which include Start on, Finish on, Mandatory Start, and Mandatory Finish, are allowed. The Contractor shall not use any manual date entries that override schedule driven dates based on duration and network logic.
- C. Lags: Lags will not be used when the creation of an activity will perform the same function (e.g., concrete cure time), instead an activity representing the gap between the completion of one activity and the start of another will describe the time gap.
- D. Default Progress Data Disallowed: Actual Start and Actual Finish dates on the CPM schedule shall match the dates provided from Contractor Quality Control Production Reports, Contractor daily reports and other contemporaneous Project documentation.
- E. Software Settings:
  - 1. Schedule calculations and Out-of-Sequence progress (if applicable) shall be handled through Retained Logic, not Progress Override. All activity durations and float values will be shown in days. Activity progress will be shown using Remaining Duration. Default activity type set to "Task Dependent." User preference settings shall be set to hours with the show unit label box checked and zero decimal places. The "Durations Format"



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- shall be set to days with the show durations label box checked, and zero decimal places.
2. The critical path shall be calculated by selecting the Longest Path as opposed to Total Float.
- F. Activities unless otherwise approved will be “physical percent complete” type. Duration percent complete will only be used on City-related activities such as submittal reviews.
- G. Duration Type shall be set to Fixed Duration and Units.
- H. The “Automatically Level resources when scheduling” box shall not be checked. All schedule submittals, and schedule related data of any kind, shall not be resource leveled and shall be the basis for rejection if submitted with resource leveling.
- I. The Project critical path shall be displayed using both the ‘Critical’ and ‘Longest Path’ filters in P6.

1.08 COST LOADING

- A. The activities contained within the schedules shall be cost loaded, and they shall equal the Contract Total Price with Sub-Totals that match the Schedule of Values within Section 01 29 00, Payment Procedures. Contractor is required to cost load the construction schedule using price per unit. Equipment shall include installed and construction equipment specified as price of equipment that is worth over \$100,000. For example, the labor unit would be \$ per hour; the material unit would be material cost per unit installed. The non-labor resources shall be used exclusively on activities containing equipment. Equipment shall include installed and construction equipment specified as price of equipment. The resource coding and name shall distinguish between installed and construction equipment. An example of price per unit cost loading is shown below:
1. One (1) labor unit = \$1 of labor.
  2. Material unit of \$1 for 1 unit.
  3. Equipment unit of \$1 for 1 unit.
- B. Procured items, including installed equipment, should be budgeted as part of separate procurement activities such that the installation activity is not stated as started when the procured material is onsite and installation has not begun. Refer to Section 01 29 00, Payment Procedures for more details. O&M and Training activities shall be their own cost-loaded schedule activities. Project record documentation (as-builts) shall also be a separate cost-loaded schedule activity.

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- C. Overhead and profit shall be prorated evenly on all cost loaded activities. Alternatively, overhead may be treated as a Level of Effort activity or activities. The Contractor shall not unbalance the activity cost loading, nor shall the Contractor utilize Resource Leveling as a technique for extending activity durations. The approved Schedule of Values, as generated from the Cost Loading becomes the basis for the Payment Application.
- D. Every construction activity that contains labor shall be cost loaded.
- E. Fabricate and Deliver activities shall be cost loaded to cover the material or equipment costs. The Fabrication activities shall utilize a material or equipment resource.
- F. Commissioning activities shall be cost loaded using a labor resource.
- G. The cost loading and progress payments for long lead procurement items will be discussed at the pre-construction scheduling conference.
- H. Once the Schedule of Values is accepted with the Baseline Construction Schedule, requests for changes to the Baseline Schedule of Values will not be approved unless approved in writing by the City Representative.
- I. The Contractor shall submit with the Baseline Schedule the detailed budget documents reflecting the costs used as the basis of the cost loading contained therein.
- J. In Oracle Primavera P6, for actual monthly costs to store correctly, the Contractor must setup the financial period to equal the first and last date of the calendar month, regardless of the actual monthly cutoff date. Financial periods cannot bridge 2 months and must equal the full month. Financial dates table will be provided at the Preliminary Schedule meeting.
- K. Work Restrictions in Section 01 31 13, Project Coordination indicating activities that cannot be performed during specific periods of time due to operational or other City requirements shall be accommodated in the Baseline and Progress Schedules using blackout calendars. These Blackout Calendars must be developed incorporating the specific durations when work cannot be performed, according to the terms of each work restriction, and applied to the applicable activities. These Blackout Calendars will prevent work from extending into these restricted periods by shifting it until after the completion of the restriction.

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- L. Cost shall be broken down by the funding sources and coded under cost ID's. The following are the breakdown requirements:
1. B-17006 NC MBC Improvements:
    - a. 76 - Centrifuge Building: One new grit separator.
    - b. 10 – Biogas Flare: One new biogas flare adjacent to existing flares.
  2. S-17013 MBC Equipment Upgrades:
    - a. 73 – Receiving Tank Complex: Three new raw solids feed pumps with ASDs.
    - b. 76 – Centrifuge Building: Refurbish two existing grit clarifiers.
    - c. 76 – Centrifuge Building: Five new thickening centrifuges to replace existing. Five new centrifuge sludge feed pumps and new centrifuge polymer feed pumps to replace existing. Three new thickened sludge transfer pumps to replace existing. New fully redundant 6-inch thickened sludge supply pipe.
    - d. 76 – Centrifuge Building: Eight dewatering centrifuge sludge feed pumps and eight dewatering centrifuge polymer feed pumps to replace existing.
    - e. 80 – Digester Complex: Six recirculation pumps, nine mixing pumps and nine axial mixing pumps to replace existing. Replace nozzles inside digesters.
    - f. 11 – Biogas Holding Tank and Compressors: Three new biogas compressors to replace two existing. Replace biogas laterals with larger pipes for three digesters and two sludge storage tanks. Replace existing biogas supply pipe to cogeneration facility with larger pipe.
    - g. 94 – Centrate Pump Station: Three centrate pumps with ASDs to replace existing.
    - h. Provide shelf spare ferric chloride feed pump.

1.09 RESOURCE LOADING

- A. Schedules shall include resource loading, also known as manpower loading, showing at a minimum, the composite crew, the classification (e.g., foreman, journeyman, etc.) of the individual craftsman comprising the crew, materials or equipment associated with each construction and commissioning activity shown on the schedule, plus any other information required by the City. Manpower shall be expressed as manhours.
- B. Manpower resources shall be listed in the Resource Library of the Primavera Software and the Contractor shall assign manpower resource loading by trade for each work activity of the schedule.

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- C. The Contractor warrants that it will allocate resources and costs based upon Early Date curves and Late Date curves as well as all area between these two curves. The Contractor also warrants that the cost of performing the Work, based upon both curves, is included within its bid price.
- D. The Contractor shall submit with the Baseline Schedule the detailed budget documents reflecting labor hours used as the basis of the resource loading contained therein. The budget documents used to resource load the Baseline Construction Schedule shall be based upon the escrowed bid documents and reconcile thereto.
- E. Work performed by the prime contractor and all subcontractors with a contract value greater than or equal to 2 percent of the Prime Contract Value shall use the following resources:
  - 1. Labor.
  - 2. Materials.
  - 3. Installed Major Equipment (refer to Article Definitions).
  - 4. Construction Equipment (refer to Article Definitions).
  - 5. Manhours.
- F. The Prime Contractor, and each of the subcontractors with a contract value greater than or equal to 2 percent of the Prime Contract Value, shall create separate Labor, Material, and Nonlabor (Equipment) resources for the Prime Contractor and each subcontractor. The resources shall be titled with the name and/or trade of the Prime Contractor and subcontractors and shall match the responsibility activity code assigned to each activity.

1.10 ACTIVITY CALENDARS

- A. All calendars shall be given specific project names and defined clearly in Oracle Primavera P6. For example, “MBC Standard 5-day with Holidays,” “MBC 6-day with Holidays,” Calendars for different trades if used, should be specified. All calendars and activity coding within the schedule shall be “Global” rather than “Project” level and shall have a unique prefix of the City contract number.
- B. The Contractor shall utilize Blackout Calendars and apply the calendars to activities that may be impacted by the work restrictions stated in Section 01 31 13, Project Coordination.

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**PART 2     PRODUCTS**

2.01     180-DAY SCHEDULE

- A.     Within 30 calendar days after Notice to Proceed, the Contractor shall submit to the City the Preliminary Construction Schedule for all work in the first 180 calendar days following NTP, as well as a general approach for the remainder of the Work.
  
- B.     Within 60 days after Notice to Proceed, the Contractor shall submit to the Preliminary Construction Schedule cost and resource loaded. The remaining portion of the Work may be summary activities assigned to the Contractor's planned baseline WBS structure and shall be cost-loaded to equal the full Contract amount.
  
- C.     The City Representative, Contractor, and its Senior Project Scheduler shall meet within 14 calendar days of the submittal of the 180 calendar day Construction Schedule to review and make any necessary adjustments or revisions. The Contractor shall submit the revised 180 calendar day Construction Schedule within 14 calendar days after receiving comments. Such resubmittal shall be reviewed by the City Representative within 7 calendar days of receiving such resubmittal. The 180 calendar day Construction Schedule, when revised, will represent the Contractor's planned means, methods, and sequences for performance of the Work required in the 180 calendar days following NTP and is to be incorporated as the first 180 days of the Contractor's Baseline Construction Schedule. The 180 day schedule will include, but not be limited to, work tasks that will or may be critical to performance within the Contract Time including, but not limited to, the following:
  - 1.     Planning.
  - 2.     Mobilization.
  - 3.     Key shop drawing and sample submittals.
  - 4.     Fabrication and delivery of key and long-lead procurement elements.
  - 5.     Contractor and Subcontractor Activities.
  - 6.     Activities for the City, other contractors, utility providers, tenants, or other third parties.
  - 7.     Specific phasing as required by Contract.
  - 8.     Summary activities for the remaining duration of the Contract.
  
- D.     The 180-day schedule shall be cost loaded as described in the Cost Loading Section of this Specification.
  
- E.     The Contractor shall include a Schedule Narrative with the 180-Day Schedule submittal.

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2.02 BASELINE CONSTRUCTION SCHEDULE

- A. The Baseline Construction Schedule shall be constructed to show sequence and duration of the activities the Contractor proposes to carry out the Work. The schedule shall be resource (manpower) and cost loaded and should indicate any restrictions on the availability of work areas. The Contractor shall utilize the Baseline Construction Schedule in planning, scheduling, coordinating, and performing the Work under the Contract (including all activities of Subcontractors, equipment vendors, and Suppliers). The Baseline Construction Schedule is the basis of the Schedule of Values and 4-week look-ahead schedules. The approved 180-Day Schedule shall be incorporated into the Baseline Schedule without any changes or progress. The Baseline Schedule shall demonstrate the feasibility of the Contractor's Civil and Concrete plans. Among other elements, this plan shall demonstrate the ability to meet concrete pour, cure and strip requirements including restrictions on adjacent pours, the ability of the crane and concrete pumping equipment to reach all areas of the concrete work, and a logical plan for completing and exiting the work. The plan shall demonstrate all work including Mechanical and Electrical work and Commissioning phases.
- B. Within 180 days after Notice to Proceed, the Contractor shall submit the Baseline Construction Schedule to the City, including a written narrative to further explain the plan as set forth in its CPM logic network and schedule. The Contractor shall schedule a workshop prior to submittal of the Baseline Construction Schedule to present the schedule plan. Within 5 working days from Baseline Schedule submittal, the Contractor shall conduct a Baseline Schedule presentation describing the schedule in detail and the Contractor's means and methods for construction. The City Representative shall accept or reject, in writing, the Contractor's Baseline Schedule within 30 calendar days after receipt of all required information. If rejected, the Contractor shall make necessary modification to the Baseline Schedule and resubmit to the City within 14 calendar days. The City Representative shall accept or reject, in writing, the revised Baseline Construction Schedule within 14 calendar days of resubmittal. Once accepted, the Baseline Construction Schedule shall be used for monitoring and evaluating Contract performance, including, but not limited to progress, progress payments, changes, and delays.
- C. The Baseline Construction Schedule will be the Performance Measurement Baseline (PMB) for the Project. This requires that the PMB will be maintained with any structural schedule changes in the current schedule. This includes expansion and contraction in WBS and/or activities, detailing out summary cost items, and anything else that makes the PMB non-measurable.

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- D. There shall be at least one continuous Critical Path in the Baseline Schedule, using the longest path definition that starts at the earliest occurring schedule activity in the network (i.e., NTP1) and ends at the latest occurring schedule activity in the network. No more than 20 percent of the activities may be critical or near critical. The near critical path shall be defined as within 15 working days of the critical path. If 20 percent of the activities become critical, present a plan to reduce the number of near-critical path activities to the client.
- E. The Baseline Construction Schedule shall demonstrate the final level of detail for each activity and shall contain the required relationships completely identified and the durations of each activity correctly depicted. The Baseline Construction Schedule shall be developed as follows:
1. The Baseline Construction Schedule shall contain no contract changes or delays which may have been incurred during the interim schedule development period. These changes will be entered at the first update after the baseline schedule has been accepted and a change to the Contract Time or duration was made via an approved change order.
  2. The Baseline Construction Schedule submitted for review and acceptance by the City shall contain no status and the data date shall be the contract notice to proceed date.
  3. The Baseline Construction Schedule shall clearly indicate the longest critical path of activities from Notice To Proceed to the Contract completion date or Contract Milestone.
  4. The Baseline Construction Schedule will contain all cost information assigned to each of the specific activities at the final level of detail. Every construction activity that contains labor, construction equipment or permanent equipment shall be cost and resource loaded to permit initial generation of a cash flow curve and resource curve.
- F. The Baseline Schedule shall include summary activities and milestones for startup as defined in Article Submittals of Section 01 91 14, Testing, Integration, and Startup. The detailed Startup Schedule will be submitted and updated separately as described in Section 01 91 14, Testing, Integration, and Startup, with links to the accepted Baseline Schedule summary activities and milestones for startup. 100 working days prior to the start of Pre-Commissioning, the Contractor shall submit detailed Startup Schedule which will link to the accepted Baseline Schedule summary activities and milestones for startup.
- G. The comments made by the City Representative on the Baseline Construction Schedule, during review, will not relieve the Contractor from compliance with requirements of the Contract Documents. To the extent that there are any conflicts between the accepted schedule and the requirements of the Contract Documents, the Contract Documents shall govern. The Baseline Schedule shall show the

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sequence and interdependence of activities required for complete performance of the Work, beginning with the date of the Contractor's Notice to Proceed date and concluding with the Contract Completion.

- H. Please refer to the Section 01 33 13, Project Coordination for specific requirements regarding Facility Operations. Maintenance of Plant Operations (MOPO) requests must be submitted prior to starting work in any area, and additional specific MOPO Requests must be submitted for each shutdown and cutover. MOPO requests shall be submitted a minimum of 10 working days prior to the need date. Activities for the MOPO Request Submittal, City Review Period, and MOPO Request Approval shall be included in the baseline schedule.
- I. The Baseline Construction Schedule shall reflect the Contractor's true plans for progressing and performing the Work. The Contractor shall be responsible for the means, methods, and duration and certifies that the schedule duration and Contract period is achievable and Contractor's estimate/bid, and/or budgets, are based upon sequences shown in the schedule.
- J. The Baseline Schedule shall provide the Contractor and the City with a tool to monitor and follow the progress of all phases of the Work. The Baseline Schedule submitted to the City shall comply with all limits imposed by the Scope of Work, with all contractually specified intermediate milestone and completion dates, and with all constraints, restraints or sequences included in the Contract. The Contractor shall obtain subcontractor written concurrence with its Baseline Construction Schedule for all subcontracts with a contract value of 2 percent or greater of the prime contract value.
- K. The Baseline Construction Schedule shall incorporate and include:
  - 1. Appropriate administrative activities and contract specified review periods (including the City and third parties) for all and phases and components of Work.
  - 2. Required cost, resource, and activity codes.
  - 3. Project milestones dates and overall construction activities and Project completion dates.
  - 4. Project budget, schedule of values, and the cost basis for progress payments.
  - 5. Commissioning activities.
  - 6. Punch list and final completion activities.
- L. Failure to include in the schedule any element of Work required for performance of Contract shall not excuse Contractor from completing all Work required within applicable time constraints, notwithstanding the City's acceptance of Contractor's Baseline Construction Schedule.



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- M. Nothing in these requirements shall be deemed to negate or diminish Contractor's authority and responsibility to plan and schedule Work as required, subject to requirements of Contract Documents.
- N. No construction activity shall be more than 20 working days duration. Exceptions may be approved by the City.
- O. Submittal Review Time: Include in the schedule the review times indicated in Section 01 33 00, Submittal Procedures. Coordinate submittal review times in contractor's baseline construction schedule with submittal schedule. The schedule shall include a schedule activity for all submittals required by these Specifications. Rejected submissions will require the contractor to add activities that start a second submission and review process.

2.03 SCHEDULE NAMING REQUIREMENTS

- A. To assist the City in consolidating the schedules from all the projects, a standard naming convention has been adopted. The Project name in P6 and the schedule file name should be the same as the following example:

MBC Baseline 01 Dec18 DD123118

Where:

MBC = the code for the project, in this case Metropolitan Biosolids Center  
Baseline = the type of schedule submittal, which can also be Update, Recovery or Time Impact Analysis  
01 = the submittal number or version  
Dec18 = the month and year of the schedule submittal  
DD = the Data Date, in this example Dec 31, 2018  
The exported P6 data (XER) file shall use the same name as the Schedule ID

2.04 ACTIVITY CODES

- A. The Project Schedule shall utilize the following activity codes and code values. Unless otherwise specified, a value for each code shall be assigned to each activity. In the event it is unclear which code value assignment should be made for an activity, the City Representative will make the final decision. The Project ID (City Contract Number) shall be the prefix for all Activity Codes. All District-

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required Activity Codes should be global. Final configuration will be presented at the Pre-Construction scheduling meeting.

Activity Code	Description
(Project ID) Phase	Phase of Work, Examples include Submit, Review & Approve, Fabrication, Deliver, Mobilization, Construction, Commissioning, etc.
(Project ID) Work Area	Assign Area code to activities based upon the work area in which the activity occurs. Define work areas based on resource constraints or space constraints that would preclude a resource, such as a particular trade or craft work crew, from working in more than one work area at a time due to restraints on resources of space. Examples of Area code include different areas within a floor of a building, different floors within a building, and different buildings within a complex of buildings. Activities shall not have more than one Area code. Not all activities are required to be work area coded.
(Project ID) Responsibility	Assign a Responsibility code to all activities indicating who is responsible for performing the activity. Examples include Electrical, Mechanical, Plumbing, Fire Protection, the City, General Contractor Etc. Responsibility code may be named to the company performing the work.
(Project ID) System	Assign System code to the group of activities that comprise a system that will be Commissioned during the commissioning phase. Examples of a System are: Chemical Treatment System, Sprinkler System, HRSG System, SCADA System, Switchgear, etc.
(Project ID) CSI	All procurement and submittal activities shall be assigned a 6 digit CSI code identifying Submittals, Purchase Orders, Fabrication and Delivery activities. The City uses CSI's Master Format 50 numbering system.
(Project ID) Cost ID	All cost loaded activities shall be assigned a cost code for the purpose of categorizing costs into accounts.
(Project ID) Change Orders	The Contractor shall use a City-provided change order code structure containing the change order number and a description of the change order.

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Activity Code	Description
CITY Project Code	The Contractor shall add the City’s Project code to all activities. For MBC, for example, use the Code Value of “MBC” with a Description of “Metropolitan Biosolids Center (MBC)”
(Project ID) 180-Day Schedule	Assign an activity code to all activities to be reviewed and approved as part of the 180-Day Schedule, which includes all activities within the 180-day window
(Project ID) Major Equipment	Assign an activity code to all activities related to procurement of Major Equipment as defined in the Definitions and Terms found in Section 01 29 00, Payment Procedures
CITY Access Requests	Assign an AR Code to all access request activities
(Project ID) Milestones	The Contractor shall add a Milestones code to all milestones in the schedule
(Project ID) Weather Sensitivity	Code (WS or NWS). Assign Category of Work Code to all Activities based upon Weather Sensitive Installation or Non-Weather Sensitive Installation

2.05 ACTIVITY ID

- A. Every Activity ID in the baseline and updated schedules shall be preceded by a 3 letter or 4 letter prefix code followed by a dash. All suffix coding to the right of the dash is at the discretion of the Contractor. The prefix code for the MBC Project is ‘MBC-’.
- B. If for any reason an Activity ID is deleted or removed from the schedule, it may not be reused for another activity. Similarly, once the baseline construction schedule is accepted, activity descriptions may not be changed without the permission of the City Representative.

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2.06 SCHEDULE SUBMITTALS

- A. In accordance with Section 01 33 00, Submittal Procedures and the Section 01 33 22, Web Based Construction Document Management, submit all required schedule submittals in the following format:
1. One electronic copy of the Oracle Primavera P6 XER file including all project layouts.
  2. One PDF copy of all reports, bar-charts, time-scaled diagrams, histograms, s- curves and narrative.
- B. Variance Report: With each updated schedule submission, provide a computer-generated Log Report listing all changes made between the previous schedule and current updated schedule. Identify the name of the previous schedule and name of the current schedule being compared showing all changes to the Schedule. This report will as a minimum show changes for: Added and Deleted Activities, Original Durations, Calendars, Descriptions, Constraints (added, deleted or changed), Added/Deleted Resources, Costs, Added/Deleted Relationships, Changed Relationship Lags, a Critical Path Analysis, Float Analysis, Open Ended Activity Analysis. A narrative shall be included in the variance report stating the reason for the changes listed above.
- C. CPM Reports: Concurrent with the CPM schedule, submit in PDF format the reports listed below. The specific format of the required reports will be discussed at the Preconstruction Scheduling Conference.
1. Critical Path Gantt Chart as further described in Article Baseline Construction Schedule.
  2. Critical and Near Critical Path Gantt Chart as further described in Article Baseline Construction Schedule.
  3. Activity ID Report: List of all activities sorted by activity number.
  4. Activity Schedule Bar-chart: Sorted by phase, area, start and finish.
  5. Logic Report: List of preceding and succeeding activities for all activities, sorted by phase, area, start and finish.
  6. Total Float Report: List of all activities sorted by phase in descending order of total float, then descending finish.
  7. Schedule of Values Report generated from the Oracle Primavera P6 schedule grouped by the Cost ID activity code and filtered by “budgeted total cost is not equal to \$0.” Sort by Activity ID with the following columns:
    - a. Activity ID.
    - b. Activity Name.
    - c. Remaining Duration.
    - d. Start.

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- e. Finish.
  - f. Cost Percent Complete.
  - g. Physical Percent Complete.
  - h. Previous Physical Percent Complete.
  - i. Budgeted Total Cost.
  - j. Actual Total Cost.
  - k. Actual This Period Total Cost.
  - l. Previous Applications Total Cost.
  - m. Remaining Total Cost.
  - n. At Completion Total Cost.
- D. Project Cash Flow S-Curve: Show the monthly budgeted costs, actual costs and estimate at completion. Include cash curves for early and late start and finish dates.
- E. Manpower Histograms: Showing Project overall labor hours per month and trade labor hours per month (carpenters, masons, electricians, laborers, foremen, etc.).
- F. Material and Equipment Status Report: Showing the status of materials and equipment stored onsite and materials and equipment stored in bonded warehouse(s).

2.07 BASELINE NARRATIVE

- A. The Contractor shall provide a written narrative accompanying the electronic version of the Contractor's Baseline Schedule submission. This narrative shall explain the Contractor's approach for meeting all milestones and project completion dates. It shall also include a clear description of the critical path activities from beginning to end and describe anticipated crew sizes, production rate and anticipated problems of major activities along the critical path.
- B. In the written narrative, the Contractor shall include the basis and assumptions used to develop the Contractor's Baseline Schedule. The Contractor shall include crew sizes, equipment requirements, and anticipated delivery dates; restraints; critical path activities; activities requiring overtime or additional shifts; activities that contain time contingencies for impacts to be expected from normal rainfall; holidays and other non-work days; potential problem areas; permits; coordination required with the City and third party agencies; and long lead delivery items requiring more than 60 calendar days from order to delivery. The narrative shall also include a description of winterization activities necessary for work to continue through normally inclement weather periods.

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2.08 PAYMENTS DURING THE 180 DAY AND BASELINE SCHEDULE PROCESSING

- A. The City will only process the Contractor's payment applications for Mobilization, Bonds and Insurance prior to the acceptance of the 180-Day Schedule. The accepted 180- Day Schedule shall be the basis for progress payment request until the duration of the 180-Day Schedule is exceeded, at which time the Contractor shall have an accepted Baseline Schedule in effect. Should the Contractor not have an accepted Baseline Schedule at the end of the 180-Day Schedule duration, the City will be unable to process payments until a Baseline schedule is accepted and stasured. This paragraph remains in effect in addition to any payment deductions or withholds determined per Article Compliance and Failure to Submit Timely Schedules.
- B. The City places a high value on the timely acceptance of the 180-Day and Baseline Schedules, and their usefulness to the City diminishes with late acceptance of these schedules. Accordingly, for every month that acceptance of the 180-Day Schedule is delayed beyond 95 calendar days after NTP, the payment amount for the 180-Day Schedule, as specified in the Section 01 29 00, Payments Procedures, will be reduced by 10 percent of the specified amount. For every month beyond 180 calendar days after NTP that an accepted Baseline Schedule is delayed, the payment amount for the Baseline Schedule, as specified in the Section 01 29 00, Payments Procedures, will be reduced by 10 percent of the specified amount.

2.09 SCHEDULE UPDATE PROCESS AND PAYMENTS

- A. Contractor to monthly update the approved Baseline Schedule to reflect the current status of the Project. The update shall include all information available and status of the Project as of the cut-off date established in the Preliminary Schedule Meeting. All Monthly Progress Schedules shall incorporate all schedule Revisions and changes previously approved by the City.
- B. Each Monthly Progress Schedule shall reflect all as-built activities performed as of the effective data date of the update schedule. The Monthly Progress Schedule shall include the period from the last update to the effective data date and for the remainder of the Project. The current period's activities shall be reported as they actually took place. In the updated schedule, Contractor shall indicate the actual dates that activities were started, completed, or split. Ongoing activities shall have an indication of the percent complete based on the amount of actual work performed, and the estimated remaining duration to complete such activities.
- C. Contractor shall certify that the progress shown on the schedule update accurately represents Work completed through the cutoff date of the Submittal.

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- D. If Work was performed out of sequence, implement changes to the schedule so that it correctly reflects the actual sequence of Work. In the case of repairing logic for Work performed out of sequence, the City may consider the use of negative lags. Any such schedule corrections for out of sequence work shall be considered a revision, and Contractor shall obtain written approval from the City prior to implementing those revisions to the Monthly Progress Schedule or any other type of schedule.
- E. The physical percentage completion status (and remaining duration) of activities shall be statused in the schedule Updates and the Monthly Progress Schedule independently from the status of the dollar amount assigned to the activity for cost (price) and progress payment purposes. For example, the status of an activity can be 50 percent complete (based on time of performance) and may have a remaining duration of 5 days of the original 10-day duration, but the cost assigned to that activity may have a different completion status, and the earned dollars could be more or less than 50 percent of the at-completion dollars assigned to that activity. Contractor shall set up the scheduling software to calculate the physical completion status of each activity related to time separately from the statusing of the value of dollars earned for progress payment purposes.
- F. The earned-to-date dollar amount must reflect the value of the Work completed (which may not be directly proportional to the activity remaining duration or physical completion status), and consideration must be given to:
1. Materials stored at the site or offsite, but not incorporated into the Work when payment prerequisites are met by Contractor,
  2. Reductions for non-compliant work,
  3. Reductions for failure to provide material testing or required certifications,
  4. Reductions for other reasons described by the Contract Documents,
  5. when the value of the Work remaining is naturally disproportionate to the performance time remaining. When the physical percentage complete of an activity is disproportionate to the earned-to-date dollar amount, the reasons for the variance shall be described in a Log field as part of the Monthly Progress Schedule data, and those Log field notations shall be displayed as a column in the “Application For Payment Detail”.
- G. In addition to what is required for a schedule Update of Work progress, the submission shall include a separate tabular report of all schedule activities that are cost loaded, and shall include the at-completion Total Cost, the proposed earned-this-period Cost amount, and the proposed earned-to-date Cost. The format and group subtotaling of the cost and payment accounting tabular report shall be submitted for review and acceptance by the City prior to the first Monthly Progress Schedule submission, and the City can request and Contractor shall implement revisions to the formatting and data displayed in the tabular report at

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any time thereafter to better serve the City's cost accounting system. The tabular report shall serve as the line item detail of the earned-to-date dollars assigned to each activity through the schedule's data date, will be referred to as the "Application For Payment Detail" document, and once approved by the City, will be an attachment to the Contractor "Summary Of Tasks" submitted by Contractor as part of the monthly "Invoice And Invoice Certificate" package.

- H. Two days prior to the Monthly Progress Schedule data date, submit draft Monthly Progress Schedule for review by the City. Review will be done during a meeting to go over the claimed amounts. During the meeting the City Representative will respond to Contractor's estimated earned-to-date dollar amounts, and any variances between Contractor's proposed earned-to-date dollars and the City's estimate will be discussed and resolved. A marked up copy of the tabular report of the resolution of any variances will be copied for each party. Those changes to the draft Monthly Progress Schedule earned-to-date dollars will be made to the schedule before the Monthly Progress Schedule is formally submitted. If follow-up is required to further a discussion or to present proof in order to resolve the earned-to-date dollar amount for an activity, it shall occur within 2 working days after the Meeting, and a resolution shall be reached before formal submission of the Monthly Progress Schedule. If there is a disagreement between City's and Contractor's estimated earned-to-date dollar amounts, Contractor shall use the City's earned-to-date figure.
- I. If at any time, Contractor or the City discovers an at-completion dollar amount (budget) assigned to an activity that is unreasonable or incorrect, either party can request that an adjustment be made. Such proposed adjustment shall be presented at the next Weekly Progress Meeting and discussed and treated like any other proposed schedule revision. Adjustments to the at-completion dollar amount for any activity will naturally require an equal adjustment to another activity such that the total Contract value does not change. Any proposed Revision to the at-completion dollar amount for any activity must be accepted by the City in writing prior to the change being made to the Monthly Progress Schedule. Contractor will maintain and make available to the City a record of all approved revisions to at-completion dollar amounts that displays each approved revision, and the adjustments to all activities affected by a revision.
- J. Contractor's monthly payment applications shall not be accepted and processed for payment by the City Representative without Baseline Schedule progress updates submitted in the time and manner required by this Specification which accurately reflect the allowable costs due under the Contract Documents and are accepted by the City. Should the Baseline Schedule progress updates not be accepted due to the Contractor's failure to address all City provided comments, payment withholds and deducts will be applied as specified in Article Compliance and Failure to Submit Timely Schedules of this section.



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- K. Please see the Section 01 29 00, Payment Procedures for the Schedule of Values approval process and coordination with invoice payment.
- L. The Schedule Update Submittal shall include:
1. A detailed Gantt chart showing all activities organized by Work Breakdown Structure. The activity columns shall include Activity ID, Activity Name, Original Duration, Remaining Duration, Duration Percent Complete, Physical Percent Complete, Start, Finish, and Total Float. The critical path shall be clearly shown.
  2. A Critical Path Gantt chart showing Longest Path grouped by WBS to Level 1 only. The activity columns shall include Activity ID, Activity Name, Remaining Duration, Start, Finish, and Total Float. The critical path and relationship lines (logic) shall be clearly shown and based upon the critical and longest path.
  3. A Critical and Near Critical Path Gantt using the “calculate multiple float paths” option in P6 with the “display multiple float paths ending with activity” set to each of the contract milestones. Set the number of float paths to thirty. Group the report by “Float Path” and filter for float value 15 days from the float value showing on each Contract Milestone. The activity columns on the tabular data portion of the schedule shall include Activity ID, Activity Name, Remaining Duration, Start, Finish, and Total Float. The critical path and relationship lines (logic) shall be clearly shown.
  4. A Schedule Variance Report shall be submitted comparing the current schedule submittal with the previously accepted schedule. Display the baseline project bars and Milestones in the Gantt Chart. Include the following categories:
    - a. Activity ID.
    - b. Activity Name.
    - c. Original Duration.
    - d. BL Project Duration.
    - e. Variance – BL Project Duration.
    - f. Start.
    - g. Finish.
    - h. BL Project Start.
    - i. BL Project Finish.
    - j. Variance – BL Project Finish Date.
  5. Schedule of Values Report generated from the Oracle Primavera P6 schedule grouped by the Cost ID activity code and filtered by “budgeted total cost is not equal to \$0.” Sort by Activity ID with the following columns:
    - a. Activity ID.
    - b. Activity Name.
    - c. Remaining Duration.

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- d. Start.
  - e. Finish.
  - f. Cost Percent Complete.
  - g. Physical Percent Complete.
  - h. Previous Physical Percent Complete.
  - i. Budgeted Total Cost.
  - j. Actual Total Cost.
  - k. Actual This Period Total Cost.
  - l. Previous Applications Total Cost.
  - m. Remaining Total Cost.
  - n. At Completion Total Cost.
6. A Cashflow curve plotting actual invoicing against Baseline forecast cashflow and the update forecast to project completion. The cashflow shall include Show the monthly budgeted costs, actual costs and estimate at completion. Include cash curves for early and late start and finish dates.
7. A manpower histogram plotting actual labor hours against Baseline forecast labor hours over the entire Project.
8. Material and Equipment Histograms: Showing the status of materials and equipment stored onsite and materials and equipment stored in bonded warehouse(s).
9. Construction Equipment Histograms: Show Project overall equipment count per month by major equipment category count per month (cranes, excavators, etc.).
- M. All changes to Schedule Updates must be accepted by the City Representative. If the Contractor desires to make a change to the current accepted Progress Update Schedule, the Contractor shall request permission from the City in writing, stating the reasons for the change as well as the specifics, such as revisions to activities, logic, durations, calendars, etc. Pending changes will be discussed at the Monthly Schedule Review (2 days prior to last Friday) where the City may authorize their inclusion in the schedule without any determination of merit or responsibility.
- N. Out of sequence logic must be corrected before the Progress Update Schedule is submitted.
- O. Pending Changes shall have a City assigned Potential Change (PC) number. The Contractor shall incorporate PC activities into the schedule as Level of Effort (LOE) activities, with a zero-dollar value cost, in the update period in which the Contractor knew, or should have known of the change. The LOE shall be linked to the impacted base contract schedule activities. The change activity shall not be cost loaded until an agreement is reached between the Contractor and City as to cost. Should the PC impact the critical path, the Contractor shall submit a Time Impact Analysis (TIA) per the TIA provisions of these Specifications. Upon acceptance of a TIA by the City Representative, the Contractor shall

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incorporate the detailed TIA schedule activities into the next Schedule Update retaining the original LOE activity. All Potential Change Activities shall be assigned a WBS and coding structure to distinguish said activities from base contract schedule activities. Upon PCs being incorporated into a Contract Change Order (CCO), the Contractor shall assign a WBS and Activity Code for each CCO, with its subset of PC numbers, with the sum cost loading of said PC activities equal to the value of the CCO. The sum of the base contract activities shall total the original contract value. The sum of the change activities shall total CCOs issued to date, plus remaining PCs pending CCO. In the case of deductive change, the base contract activity shall be broken into two activities with the same logic ties consisting of the original activity with the remaining base contract amount and second activity with the amount to be deducted, the sum of the two totaling the originally scheduled value. Add an offsetting deduct (negative cost) as a PC change activity. The deduct amount activity on the base contract section shall have the successor logic removed, with a “deduct” note in parenthesis added to the end of the activity description. The deduct activity shall remain open until the actual deduct activity in the change section is statused as complete upon the CCO being issued. Upon the CCO being issued, both activities shall be statused with the CCO issue date.

- P. Failure to include in the schedule any element of Work required for performance of Contract shall not excuse Contractor from completing all Work required within applicable time constraints, notwithstanding the City’s acceptance of Contractor’s Construction Schedule.
- Q. Contractor shall address City review comments and resubmit within 7 Calendar Days from receipt of review comments. Should the Contractor fail to timely incorporate the City schedule review comments prior to the due date for the next month’s update, the Contractor shall proceed with the update and the outstanding schedule review comments from the prior month will be included in the current schedule update’s review comments. The Contractor is responsible for including the City schedule review comments into all affected schedules.
- R. Schedule updates forecasting contract milestones 30 or more days late are subject to rejection.

## 2.10 NARRATIVE PROGRESS REPORTS

- A. A Cost Activity Report shall be prepared and submitted with each progress payment. The cost information shall be updated by activity and summarized for each month. The sum of all monthly costs shall be equal to the contract amount plus approved change orders.

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- B. The Narrative Report shall be submitted with the monthly progress update and include:
1. The Contractor's transmittal letter.
  2. Schedule report indicating each activity on the CPM Schedule that has been:
    - a. Completed during this reporting period.
    - b. In progress during this reporting period.
  3. Scheduled for the next reporting period.
  4. Analysis, by critical path. (Note: critical path is longest path as described above.):
    - a. A listing of the current critical path.
    - b. Progress made on critical path activities in current CPM schedule.
    - c. Explanations for any lack of Work on critical path activities planned to be performed during the last month.
    - d. Impact on other activities, milestones, and completion dates.
  5. Current and anticipated delays:
    - a. Cause of the delay.
    - b. Corrective action and schedule adjustments taken or to be taken to correct the delay.
    - c. Impact of the delay on other activities, milestones, and completion dates.
    - d. Recommendations for recovery of the delays.
  6. Any change in construction sequence, logic changes, relationship changes, or duration changes and the rationale associated with each change for City review and acceptance.
  7. Any corrective actions taken by the Contractor to address delays or potential delays.
  8. Value of materials and equipment properly stored at the site but not yet incorporated in the Work.
  9. Identify interface items of work with another contract or with existing facilities or where third-party action or coordination is required.
  10. Pending issues and status of other items such as:
    - a. Permits.
    - b. Contract modifications.
    - c. Time extension requests.
    - d. Long-lead procurement items.
  11. Contract complete date status.
  12. Ahead of schedule and number of days.
  13. Behind schedule and number of days.
  14. Summary of Project status including cumulative information to date, variance, and forecast at completion.
  15. Other Project or scheduling concerns.

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2.11 WEEKLY 4-WEEK LOOK-AHEAD SCHEDULE

- A. The weekly bar chart “Four Week Look-Ahead Schedule” submittal shall comply with the following requirements:
1. Be produced using the latest version of Oracle Primavera P6 software and generated from the latest Monthly Schedule Update.
  2. Updated weekly with a Monday Data Date.
  3. The filter for the bar chart will be all activities that have started but not finished, plus all activities with a start or finish within minus 1 week and plus 4 weeks. Total float and the critical path shall clearly be shown.
  4. Submit as a printed bar chart on 11-inch by 17-inch paper 24 hours prior to the weekly Project meeting.
  5. Identify any shutdowns/cutovers that may potentially impact stakeholders.
  6. Be prepared to discuss the status of activities on the Four Week Look Ahead Schedule, including any key issues or delays at the weekly Project meetings. The Contractor’s Superintendent in charge of the work areas in the schedule shall review and sign off on the Four Week Look Ahead Schedule. The Superintendent shall be prepared to review the activities in the Four Week Look Ahead Schedule and discuss any foreseeable issues.
  7. The Contractor may provide supplemental detail to elaborate on any schedule activity and must clearly represent this supplement detail as supplemental task information separate from the Oracle Primavera P6 generated schedule. The Contractor shall not in any way change the Activity ID and description in the schedule. For each activity on the Four Week Rolling Schedule, the Contractor shall list the corresponding schedule activity identification number from the current Monthly Progress Schedule Update.

2.12 RECOVERY SCHEDULE

- A. When a periodic update indicates the project completion, or any intermediate contract milestone, is 1 day to 15 days behind the current accepted schedule, the City reserves the right to request a recovery schedule. If the Work falls more than 15 days behind the current accepted schedule, the Contractor is required to submit a Recovery Schedule taking steps necessary to improve progress at no additional cost to the City.
- B. Recovery schedules may be submitted independently or included in the next Monthly Progress Update. Indicate changes to working hours per shift, labor per shift, shifts per working day, working days per week, or amount of construction equipment, or any combination of foregoing, sufficiently to achieve the contractual milestones in accordance with the current Contract requirements. If the Contractor chooses to include the recovery schedule with the next Monthly

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Progress Update, the City Representative may reject the Monthly Progress Update or require revisions to be made to the recovery schedule before the Monthly Progress Schedule is accepted. Recovery Schedules shall be prepared by the Contractor regardless of the underlying cause for the delay and responsibility for the time.

- C. The Recovery Schedule shall have the same data date as the submitted Monthly Progress Schedule, and the data prior to the data date shall be the same in both.
- D. Concurrent with the submittal of the Monthly Progress Schedule for review by the City, Contractor shall submit the proposed Recovery Schedule. The Submittal shall also include a written, narrative format document detailing proposed changes to the Project Schedule and including reasons for the changes. This narrative document shall include at a minimum, the following:
  - 1. Detailed description of the changes in the means and methods that Contractor intends to implement to recover from schedule delay; such as additional design staff, additional construction crews, additional equipment, extended working hours, additional shifts per day, or other means;
  - 2. Detailed description of proposed changes in work activity sequences that will permit previously scheduled sequential work to be performed concurrently, or other scheduling changes, which will result in recovery of the schedule delay;
  - 3. Identification of changes to specific activity original durations;
  - 4. Identification of changes to activity relationships and/or schedule logic;
  - 5. Identification of activities that have been added, deleted, or modified; and/or
  - 6. Identification of changes to the Project Schedule's Critical Path.

2.13 TIME IMPACT ANALYSIS (TIA)

- A. When the Contractor asserts it has been or will be delayed, and as a result is requesting a time extension, the Contractor shall notify the City Representative of a potential delay and prepare and submit a TIA within 14 calendar days after the impact is known or should have been known.
- B. The TIA shall be submitted separately and based upon the current accepted schedule with a data date closest to and prior to the date when the Contractor knew, or should have known, of the impact. The current accepted schedule can be the Initial 180 Day Schedule, Baseline Schedule, or Monthly Schedule Update.
- C. If the Contractor is submitting time related costs of any kind and/or is requesting time due to a schedule delay, the submittal of a TIA is required.

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- D. The Contractor shall submit to the City a written TIA illustrating the influence of each change or delay on any specified intermediate milestone date and the current projected completion date. Each TIA shall include a CPM schedule network (fragnet) indicating all necessary added activities, logic, duration and demonstrating how the Contractor proposes to incorporate the change or delay into the Schedule and any additional supporting evidence that the City deems necessary.
- E. The TIA submittal shall include a PDF fragnet comparing the current accepted schedule against the Contractor's claimed delay, showing the impact on the critical path. The fragnet must show all impacts leading up and including the contract milestones.
- F. The TIA shall include a narrative addressing entitlement including a description of the scope of the change as well as addressing compliance with all contract requirements for requesting a time extension. The schedule narrative at a minimum shall address the chronology of events (impact activities), compliance with notice requirements, schedule update used as the basis of analysis (or baseline schedule if applicable), critical path, identification of CPM schedule activities impacted, logic ties between impact activities and CPM schedule activities, fragnet, concurrency, and compensability if applicable.
- G. The Contractor shall submit one electronic copy of the Oracle Primavera P6 schedule files in XER format, PDF copies of the fragments, and the narrative. Each TIA should be identified with a discrete ID number and description.
- H. Should the Contractor fail to request time and submit a contract compliant TIA per these Specifications, the Contractor will have irrevocably waived its contract right to a time extension and time-related costs and will be responsible for all costs associated with mitigating said delay to complete the work within the Contract Time.
- I. It is expressly agreed and understood that the Contractor shall not be entitled to any time or compensation for potential delays, or delays, which:
1. Can be avoided by re-sequencing work activities;
  2. Applying additional resources;
  3. Do not delay the project completion date or a project milestone; or
  4. Result from any method used to sequester float.
- J. Pacing is defined as an intentional slowing of work activities during a delay, or alleged delay, to Project Completion. Absent contemporaneous notice of intent to pace, including the Contractor's rationale to pace and the City's concurrence, pacing of work activities will be construed as a concurrent delay for the purposes of assessing time extensions and delay costs."

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- K. The Contractor shall incorporate City review comments and resubmit the TIA within 7 calendar days of receiving them.
- L. Upon acceptance of the TIA by the City Representative, the Contractor shall incorporate the TIA fragnet into the next monthly progress schedule update.

**PART 3 WEATHER**

**3.01 ANTICIPATED WEATHER DAYS**

- A. Time Allowance For Inclement Weather: Time allowance for inclement weather: “Inclement weather” is a lost workday, caused by inclement weather conditions, and is defined as a day in which the Contractor’s workforce cannot work 50 percent or more of the day thereby resulting in a delay to the critical path. The number of inclement weather days will be reflected in a schedule activity titled “Inclement Weather”. The Contractor shall allow 13 working days per year within the Baseline Construction Schedule for inclement weather, the unused portion shall be considered as Float to be used by either party. The inclement weather activity’s successor shall be the Substantial Completion milestone. The predecessor activities shall be the last Project activities that occur before Substantial Completion. The Contractor shall notify the Resident Project Representative in writing when a lost workday has occurred due to inclement weather in accordance with the Baseline Construction Schedule update requirements. Any delays beyond the 13 working days per year shall not entitle the Contractor to any additional compensation. The sole remedy of the Contractor shall be to seek a non-compensable extension of time.

**3.02 WEATHER CALENDAR AND ACCOUNTING OF DAYS**

- A. The accounting of weather days shall occur once monthly corresponding to the Monthly Schedule Update. The City granted non-working days affecting the critical path attributable to weather shall be accounted for in the Weekly Statement of Contract Time, as prepared by the City, independent of the weather allowance. City granted weather days shall be added to the schedule monthly as a one work day Non-work days in the calendars with an actual date equal to the non-working day as reflected in the Weekly Statement of Contract Time. A monthly reconciliation will occur between the inclement weather allowance and actual weather impact, as reflected in the Weekly Statement of Contract Time. Should the Contractor meet all contract requirements for demonstrating unavoidable delay, the Contractor shall be granted a time extension for weather impact days, beyond the weather allowance days for the same time period, for activities on the critical path.



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- B. No contract time adjustment shall be made if actual non-working days attributable to weather affecting the critical path DOES NOT exceed the allowance. Unused weather allowance shall become project float.

3.03 COMPLIANCE AND FAILURE TO SUBMIT TIMELY SCHEDULES

- A. Because the City places a high value on the importance and use of Project scheduling information as a management tool in achieving the completion of Work as planned, the City will deduct 10 percent of the monthly Progress Payment, but not more than 3 percent of the Contract value, for failure by the Contractor to submit accepted Baseline Schedules or the monthly Progress Update Schedules as required by these Specifications. These deductions shall apply should the Contractor fail to address within the specified time frame schedule review comments, TIA review comments, recovery schedule requirements, and address any other requirements of these Specifications and/or the City. These deductions are cumulative and will be made for each and every month that the Contractor fails to provide the required information. The Progress Update Schedules and narratives shall be accurate, reflect actual events on the Project, and meet all requirements of these Specifications. If the Contractor does not correct the deficiency by providing an acceptable schedule within the specified time frame from receiving the City's review comments, the deduction will become permanent via a deductive change order.

3.04 FINAL PROGRESS SCHEDULE

- A. The last monthly update of the Project Schedule shall be the project record (as-built) schedule. The project record schedule shall accurately show the completion of all Work required by the Contract and shall have a data date equivalent to the day after the actual date of the Contract Completion milestone. All Project Schedule activities shall be stated at 100 percent complete and have actual start and actual finish dates. The Project budgeted cost reflected in the project record schedule shall be the Contract price, inclusive of all adjustments due to executed change orders. The project record schedule submittal shall meet all monthly update requirements and include an actual cost statement. The City's acceptance of the project record schedule shall be a condition precedent to acceptance of the contract by the City's Board of Directors and to the release of final payment and bonds by the City.
- B. This schedule submission shall be accompanied by a certification, signed by an officer of the company and the Contractor's Project Manager and Project Scheduler, stating "To the best of our knowledge, the enclosed final update of the Construction Progress Schedule accurately reflects the actual start and completion

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dates and logical relationships of all activities contained herein and represents an accurate depiction of the way in which the Project was constructed.”

**END OF SECTION**

**SECTION 01 33 00**  
**SUBMITTAL PROCEDURES**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Action Submittal: Written and graphic information submitted by Contractor that requires Design Engineer's approval.
- B. Deferred Submittal: Information submitted by Contractor for portions of design that are to be submitted to permitting agency for approval prior to installation of that portion of the Work, along with Design Engineer's review documentation that submittal has been found to be in general conformance with Project's design.
- C. Informational Submittal: Information submitted by Contractor that requires Design Engineer's review and determination that submitted information is in accordance with the Conditions of the Contract.

1.02 PROCEDURES

- A. Direct submittals as described in Section 01 33 22, Web Based Construction Document Management, unless specified otherwise.
  - 1. Via Construction Manager.
- B. Electronic Submittals: Submittals shall, unless specifically accepted, be made in electronic format.
  - 1. Each submittal shall be an electronic file in Adobe Acrobat Portable Document Format (PDF). Use the latest version available at time of execution of the Agreement.
  - 2. Electronic files that contain more than 10 pages in PDF format shall contain internal bookmarking from an index page to major sections of the document.
  - 3. PDF files shall be set to open "Bookmarks and Page" view. Magnification shall be set to "fit page".
  - 4. Add general information to each PDF file, including title, subject, author, and keywords.
  - 5. PDF files shall be set up to print legibly at 8.5-inch by 11-inch, 11-inch by 17-inch, or 22-inch by 34-inch. No other paper sizes will be accepted.
  - 6. Submit new electronic files for each resubmittal.

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7. Include a copy of the Transmittal of Contractor's Submittal form, located at end of section, with each electronic file.
8. Owner will reject submittal that is not electronically submitted, unless specifically accepted.
9. Provide Construction Manager with authorization to reproduce and distribute each file as many times as necessary for Project documentation. Provide file password if security settings are used.
10. Detailed procedures for handling electronic submittals will be discussed at the preconstruction conference and shall be as required by Section 01 33 22, Web Based Construction Document Management.

C. Transmittal of Submittal:

1. Contractor shall:
  - a. Review each submittal and check for compliance with Contract Documents.
  - b. Stamp each submittal with uniform approval stamp before submitting to Construction Manager.
    - 1) Stamp to include Project name, submittal number, Specification number, Contractor's reviewer name and inked signature, date of Contractor's approval, and statement certifying submittal has been reviewed, checked, and approved for compliance with Contract Documents.
    - 2) Construction Manager will not review submittals that do not bear Contractor's approval stamp and will return them without action.
2. Complete, sign, and transmit with each submittal package, one Transmittal of Contractor's Submittal form in format approved by Construction Manager.
3. Identify each submittal with the following:
  - a. Numbering and Tracking System:
    - 1) Sequentially number each submittal.
    - 2) Resubmission of submittal shall have original number with sequential alphabetic suffix.
  - b. Specification section and paragraph to which submittal applies.
  - c. Project title and Owner's project number.
  - d. Date of transmittal.
  - e. Names of Contractor, Subcontractor or Supplier, and manufacturer as appropriate.
4. Identify and describe each deviation or variation from Contract Documents.
5. All submittals shall be in the English language.

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D. Format:

1. Do not base Shop Drawings on reproductions of Contract Documents.
2. Package submittal information by individual specification section. Do not combine different specification sections together in submittal package, unless otherwise directed in specification.
3. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials, and devices, and compliance with Contract Documents.
4. Index with labeled tab dividers in orderly manner.
5. Submit all text in the English language.

E. Timeliness: Schedule and submit in accordance Schedule of Submittals, and requirements of individual specification sections.

F. Processing Time:

1. Time for review shall commence on Engineer's receipt of submittal.
2. Construction Manager will act upon Contractor's submittal and transmit response to Contractor not later than 20 working days after receipt, unless otherwise specified.
3. Allow 30 working days for the review of deferred submittals by the AHJ after approval by the Design Engineer.
4. Resubmittals will be subject to same review time.
5. No adjustment of Contract Times or Price will be allowed as a result of delays in progress of Work caused by rejection and subsequent resubmittals.

G. Resubmittals: Clearly identify each correction or change made.

H. Incomplete Submittals:

1. Construction Manager will return entire submittal for Contractor's revision if preliminary review deems it incomplete.
2. When any of the following are missing, submittal will be deemed incomplete:
  - a. Contractor's review stamp; completed and signed.
  - b. Transmittal of Contractor's Submittal; completed and signed.
  - c. Insufficient number of copies.
3. The Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain the required approval within one submittal and one resubmittal. The Construction Manager will record time for reviewing subsequent submittals and the Contractor shall reimburse the Owner for Design Engineer's such charges based on actual billing rates for the Design Engineer.

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- I. Submittals not required by Contract Documents:
  - 1. Will not be reviewed and will be returned stamped “Not Subject to Review.”
  - 2. Construction Manager will keep one copy and return submittal to Contractor.
  
- J. Approved Materials List (AML): See Section 4-1.3.6, “Preapproved Material” in The Whitebook and as amended in the SSP for submittal requirements of materials in the City’s AML.
  
- K. Working Drawings: Submit Working Drawings listed in Table 3-8.2 of The Whitebook in accordance with the requirements of The Whitebook and The Greenbook.

1.03 ACTION SUBMITTALS

- A. Prepare and submit Action Submittals required by individual specification sections.
  
- B. Shop Drawings:
  - 1. Copies: Five copies of closed submittals as required under Section 01 33 22, Web Based Construction Document Management.
  - 2. Identify and Indicate:
    - a. Applicable Contract Drawing and Detail number, products, units and assemblies, and system or equipment identification or tag numbers.
    - b. Equipment and Component Title: Identical to title shown on Drawings.
    - c. Critical field dimensions and relationships to other critical features of Work. Note dimensions established by field measurement.
    - d. Project-specific information drawn accurately to scale.
  - 3. Manufacturer’s standard schematic drawings and diagrams as follows:
    - a. Modify to delete information that is not applicable to the Work.
    - b. Supplement standard information to provide information specifically applicable to the Work.
  - 4. Product Data: Provide as specified in individual specifications.
  - 5. Deferred Submittal: See Drawings for list of deferred submittals.
    - a. Contractor-design drawings and product data related to permanent construction.
      - 1) Written and graphic information.
      - 2) Drawings.
      - 3) Cut sheets.
      - 4) Data sheets.

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- 5) Action item submittals requested in individual specification section.
  - b. Prior to installation of indicated structural or nonstructural element, equipment, distribution system, or component or its anchorage, submit required supporting data and drawings for review and acceptance by Design Engineer. Documentation of review and approval provided on Design Engineer's comment form, along with completed submittal, shall be filed with permitting agency by Contractor and approved by permitting agency prior to installation.
  6. Foreign Manufacturers: When proposed, include names and addresses of at least two companies that maintain technical service representatives close to Project.
- C. Samples:
1. Copies: Two, unless otherwise specified in individual specifications.
  2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of quality. Attach label on unexposed side that includes the following:
    - a. Manufacturer name.
    - b. Model number.
    - c. Material.
    - d. Sample source.
  3. Manufacturer's Color Chart: Units or sections of units showing full range of colors, textures, and patterns available.
  4. Full-size Samples:
    - a. Size as indicated in individual specification section.
    - b. Prepared from same materials to be used for the Work.
    - c. Cured and finished in manner specified.
    - d. Physically identical with product proposed for use.
- D. Action Submittal Dispositions:
1. Design Engineer will review, comment, stamp, and distribute as noted:
    - a. Approved:
      - 1) Contractor may incorporate product(s) or implement Work covered by submittal.
      - 2) Distribution: Electronic.
        - a) One copy of closed submittal furnished to the Construction Manager.
    - b. Approved as Noted:
      - 1) Contractor may incorporate product(s) or implement Work covered by submittal, in accordance with Design Engineer's notations.

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- 2) Distribution: Electronic.
- c. Partial Approval, Resubmit as Noted:
  - 1) Make corrections or obtain missing portions, and resubmit.
  - 2) Except for portions indicated, Contractor may begin to incorporate product(s) or implement Work covered by submittal, in accordance with Design Engineer's notations.
  - 3) Distribution: Electronic.
- d. Revise and Resubmit:
  - 1) Contractor may not incorporate product(s) or implement Work covered by submittal.
  - 2) Distribution: Electronic.

1.04 INFORMATIONAL SUBMITTALS

A. General:

- 1. Copies: Electronic.
- 2. Refer to individual specification sections for specific submittal requirements.
- 3. Construction Manager will review each submittal. If submittal meets conditions of the Contract, Construction Manager will forward copy to appropriate parties. If Construction Manager determines submittal does not meet conditions of the Contract and is therefore considered unacceptable, Construction Manager will provide review comments to Contractor, and require that submittal be corrected and resubmitted.
- 4. Construction Manager and Design Engineer's review of the submittals will be only for compliance with the information given in the Contract Documents and shall not extend to means, methods, sequences, techniques, or procedures of construction or to safety precautions or programs. Compliance confirmation shall not relieve the Contractor of responsibility for the accuracy of Drawings, nor for the proper fitting and construction of work, or for the furnishing of materials or work required by the Contract and not identified on Drawings.

- B. Equipment Procured Overseas: Within 60 calendar days of Notice to Proceed, submit a list of equipment that will require overseas shipping for project delivery. List shall include the value of shipped items.

C. Certificates:

- 1. General:
  - a. Provide notarized statement that includes signature of entity responsible for preparing certification.
  - b. Signed by officer or other individual authorized to sign documents on behalf of that entity.



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2. Welding: In accordance with individual specification sections.
  3. Installer: Prepare written statements on manufacturer's letterhead certifying installer complies with requirements as specified in individual specification section.
  4. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
  5. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in individual specification sections.
  6. Manufacturer's Certificate of Compliance: In accordance with Section 01 61 00, Common Product Requirements.
  7. Manufacturer's Certificate of Proper Installation: In accordance with Section 01 43 33, Manufacturers' Field Services.
- D. Construction Photographs and Video: In accordance with Section 01 31 13, Project Coordination, and as may otherwise be required in Contract Documents.
- E. Closeout Submittals: In accordance with Section 01 77 00, Closeout Procedures.
- F. Contractor-design Data (related to temporary construction):
1. Written and graphic information.
  2. List of assumptions.
  3. List of performance and design criteria.
  4. Summary of loads or load diagram, if applicable.
  5. Calculations.
  6. List of applicable codes and regulations.
  7. Name and version of software.
  8. Information requested in individual specification section.
- G. Deferred Submittals: See Drawings for list of deferred submittals.
1. Contractor-design data related to permanent construction:
    - a. List of assumptions.
    - b. List of performance and design criteria.
    - c. Summary of loads or load diagram, if applicable.
    - d. Calculations.
    - e. List of applicable codes and regulations.
    - f. Name and version of design software.
    - g. Factory test results.
    - h. Informational submittals requested in individual specification section.

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2. Prior to installation of indicated structural or nonstructural element, equipment, distribution system, or component or its anchorage, submit calculations and test results of Contractor-designed components for review by Design Engineer. Documentation of review and indication of compliance with general design intent and Project criteria provided on Design Engineer's comment form as meets conditions of the Contract, along with completed submittal, shall be filed with permitting agency by Contractor, and approved by permitting agency prior to installation.
  
- H. Manufacturer's Instructions: Written or published information that documents manufacturer's recommendations, guidelines, and procedures in accordance with individual specification section.
  
- I. Operation and Maintenance Data: As required in Section 01 78 23, Operation and Maintenance Data.
  
- J. Payment:
  1. Application for Payment: In accordance with Section 01 29 00, Payment Procedures.
  2. Schedule of Values: In accordance with Section 01 29 00, Payment Procedures.
  3. Schedule of Estimated Progress Payments: In accordance with Section 01 29 00, Payment Procedures.
  
- K. Quality Control Documentation: As required in Section 01 45 16.13, Contractor Quality Control.
  
- L. Schedules:
  1. Schedule of Submittals: The Schedule of Submittals shall be an integral part of the Project's Critical Path Method Schedule as specified in Section 01 32 00, Construction Progress Documentation.
    - a. Show for each, at a minimum, the following:
      - 1) Specification section number.
      - 2) Identification by numbering and tracking system as specified under Paragraph Transmittal of Submittal.
      - 3) Estimated date of submission to Engineer, including reviewing and processing time.
    - b. On a monthly basis, submit updated Schedule of Submittals to Construction Manager if changes have occurred or resubmittals are required.
  2. Progress Schedules: In accordance with Section 01 32 00, Construction Progress Documentation.

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- M. Special Guarantee: Supplier's written guarantee as required in individual specification sections.
- N. Statement of Qualification:
1. Evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty Subcontractor, trade, Specialist, consultant, installer, and other professionals.  
Submittals Required by Laws, Regulations, and Governing Agencies:
    - a. Promptly submit notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
    - b. Transmit to Construction Manager for Owner's records one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.
- O. Submittals Required by Laws, Regulations, and Governing Agencies:
1. Promptly submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
  2. Transmit to Construction Manager for Owner's records one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.
- P. Test, Evaluation, and Inspection Reports:
1. General: Shall contain signature of person responsible for test or report.
  2. Factory:
    - a. Identification of product and specification section, type of inspection or test with referenced standard or code.
    - b. Date of test, Project title and number, and name and signature of authorized person.
    - c. Test results.
    - d. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
    - e. Provide interpretation of test results, when requested by Construction Manager.
    - f. Other items as identified in individual specification sections.
  3. Field:
    - a. As a minimum, include the following:
      - 1) Project title and number.
      - 2) Date and time.

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- 3) Record of temperature and weather conditions.
- 4) Identification of product and specification section.
- 5) Type and location of test, Sample, or inspection, including referenced standard or code.
- 6) Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
- 7) If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
- 8) Provide interpretation of test results, when requested by Construction Manager.
- 9) Other items as identified in individual specification sections.

Q. Testing and Startup Data: In accordance with Section 01 91 14, Testing, Integration, and Startup.

R. Training Data: In accordance with Section 01 43 33, Manufacturers' Field Services.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

**SECTION 01 33 22**  
**WEB BASED CONSTRUCTION DOCUMENT MANAGEMENT**

**PART 1 GENERAL**

1.01 SUMMARY

- A. The Owner, Construction Manager, Design Engineer, and Contractor shall utilize PMWeb (PMWeb is a registered trademark of PMWeb, Inc.) for submission of all data and documents (unless specified otherwise herein) throughout the duration of the Contract.
1. PMWeb is a web-based electronic media site.
  2. PMWeb is paid for by the Owner.
  3. PMWeb will be made available to all Contractor's personnel, subcontractor personnel, suppliers, consultants, Construction Manager, and Design Engineer or as approved by Owner.
  4. The joint use of this system is to facilitate electronic exchange of information, automation of key processes, and overall management of Construction Phase Documentation.
  5. PMWeb shall be the primary official means of project information submission and management.
- B. User Access Limitations: The Owner will initially manage the Contractor's access to PM Web by allowing access and assigning user profiles to accepted Contractor personnel. User profiles will define levels of access into the system; determine assigned function-based authorizations and user privileges. Entry of information exchanged and transferred between the Contractor and its subcontractors and suppliers on PMWeb shall be the responsibility of the Contractor.
- C. Ownership of Data: Data entered in a collaborative mode (entered with the intent to share as determined by permissions and workflows within the PMWeb system) by the Owner, Construction Manager, Design Engineer, and Contractor will be owned by the City.
- D. Automated System Notification and Audit Log Tracking: Review comments made (or lack thereof) by the Owner on Contractor submitted documentation shall not relieve the Contractor from compliance with requirements of the Contract Documents. The Contractor is responsible for managing, tracking, and documenting the Work to comply with the requirements of the Contract Documents. Owner's acceptance via automated system notifications or audit logs extends only to the face value of the submitted documentation and does not constitute validation of the Contractor's submitted information.

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E. Submittals:

1. See Section 01 33 00, Submittal Procedures.
2. Preconstruction Submittals List of Contractor's key PMWeb personnel. Include descriptions of key personnel's roles and responsibilities for this Project. Contractor should also identify their organizations administrator on the list.

F. Computer Requirements:

1. The Contractor shall use computer hardware and software that meets the requirements of the PMWeb system as required to access and utilize PMWeb. As recommendations are modified by PMWeb, the Contractor will upgrade their system(s) to meet or exceed the recommendations. Upgrading of the Contractor's computer systems will not be justification for a cost or time modification to the Contract.
2. The Contractor shall ensure that connectivity to the PMWeb system is accomplished through DSL, cable, T-1 or wireless communications systems. The minimum bandwidth requirements for using the system is 1 Mb/s. It is recommended a faster connection be used when uploading pictures and files into the system.
3. PMWeb currently supports Mozilla's Firefox v3.0-3.5, Apple's Safari v3.0-3.5, Google Chrome v65.03325.181 and Microsoft's Internet Explorer v7.0 web browsers for accessing the application.

G. Contractor Responsibility:

1. The Contractor shall be responsible for the validity of their information placed in PMWeb and coordinate with the City System administrator for access for the ability of their personnel accessing and using the PM Web system.
2. Accepted users shall be knowledgeable in the use of computers, including Internet Browsers, email programs, cad drawing applications, and Adobe Portable Document Format (PDF) document distribution program.
3. The Contractor shall utilize the existing forms in PMWeb to the maximum extent possible. If a form does not exist in PMWeb the Contractor must include a form of their own, or provided by the Construction Manager, as an attachment to a submittal.

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4. Adobe PDF documents will be created through electronic conversion rather than optically scanned whenever possible. The Contractor is responsible for the training of their personnel in the use of PM Web (outside what is provided by the Owner) and the other programs indicated above as needed.
- H. Connectivity Problems: Provide a list of Contractor's key PMWeb personnel for the Construction Manager's acceptance. The Owner reserves the right to perform a security check on all potential users. The Contractor will be allowed to add additional personnel and subcontractors to PMWeb.
- I. Training:
1. The Owner will provide training to the Contractor.
  2. Training may consist of web-based seminars in conjunction with conference calls and/or in-person training.
  3. Contractor shall arrange and pay for the facilities and hardware/software required to facilitate their own training not provided by Owner.

**PART 2 PRODUCTS**

2.01 DESCRIPTION

- A. PMWeb project management application (no equal).

**PART 3 EXECUTION**

3.01 PMWEB UTILIZATION

- A. PMWeb shall be utilized in connection with all document and information management required by these Contract Documents.

3.02 SUBMITTALS

- A. Shop Drawings:
1. Shop Drawing and design data documents shall be submitted PDF attachments to the PMWeb submittal work flow process and form. Examples of Shop Drawings include, but are not limited to:
    - a. Standard manufacturer installation drawings.
    - b. Drawings prepared to illustrate portions of the work designed or developed by the Contractor.
    - c. Steel fabrication, piece, and erection drawings.
- B. See Section 01 33 00, Submittal Procedures.

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3.03 PRODUCT DATA

- A. Product catalog data and manufacturer's instructions shall be submitted as PDF attachments to the PMWeb submittal work flow process and form. Examples of product data include, but are not limited to:
1. Manufacturer's printed literature.
  2. Preprinted product specification data and installation instructions.

3.04 ADMINISTRATIVE OR INFORMATIONAL SUBMITTALS

- A. All correspondence and preconstruction submittals shall be submitted using PMWeb. Examples of administrative submittals include, but are not limited to:
1. Permits.
  2. Requests for substitutions (RFS).
  3. List of contact personnel.
  4. Requests for Information (RFI).
- B. Network Analysis Schedules and associated reports and updates. Each schedule submittal specified in these Contract Documents shall be submitted as a native backed-up file (.PRX or .STX) of the scheduling program being used. The schedule shall also be posted to PM Web as a PDF file in the format specified in these Contract Documents.
- C. Meeting minutes for quality control meetings, progress meetings, pre-installation meetings, etc., shall be posted to PM Web as a PDF file in format specified in these Contract Documents.
- D. Any general correspondence submitted.
- E. Project Photos: Project photos shall be posted monthly to PMWeb.

3.05 COMPLIANCE SUBMITTALS

- A. Test reports, certificates, and manufacture field report submittals shall be submitted on PMWeb as PDF attachments. Examples of compliance submittals include, but are not limited to:
1. Field test reports.
  2. Quality Control certifications.
  3. Manufacturer's documentation and certifications for quality of products and materials provided.



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3.06 RECORD AND CLOSEOUT SUBMITTALS

- A. Operation and maintenance data and closeout submittals shall be submitted on PMWeb as PDF documents during the approval and review stage as specified, with actual set of documents submitted for final. Examples of record submittals include, but are not limited to:
1. Operation and Maintenance Manuals: final documents shall be submitted as specified.
  2. Extra materials, spare stock, etc., submittal forms shall indicate when actual materials are submitted.

3.07 FINANCIAL SUBMITTALS

- A. Schedule of Value, Pay Estimates, and Change Request Proposals shall be submitted via PMWeb. Supporting material for Pay Estimates and Change Requests shall be submitted on PMWeb as PDF attachments. Examples of compliance submittals include, but are not limited to:
1. Contractor's Schedule of Values.
  2. Contractor's Monthly Progress Payment Requests.
  3. Contract Change proposals requested by the Owner.

3.08 SUBMITTAL PAPER COPIES

- A. Contractor shall deliver bound and tabbed paper copies of every closed submittal to the Construction Manager within 1 week of the Construction Manager closing a submittal with any disposition as follows:
1. Each copy shall have the closed PMWeb cover page including the disposition and any comments.
  2. Final copies of submittals returned with comments, but not requiring resubmittal shall incorporate revisions per the Design Engineer's comments.
  3. Number of paper copies:
    - a. Final O&M Manuals: Three copies as specified in the Section 01 78 23, Operation and Maintenance Data.
    - b. All Other Submittals: Five copies as specified in Section 01 33 00, Submittal Procedures.
    - c. For submittals with attachments over 30 megabytes in size, provide one CD of the submittal for each required paper copy.

**END OF SECTION**

**SECTION 01 42 13**  
**ABBREVIATIONS AND ACRONYMS**

**PART 1 GENERAL**

1.01 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES

- A. Reference to standards and specifications of technical societies and reporting and resolving discrepancies associated therewith shall be as provided in Article 3 of the General Conditions, and as may otherwise be required herein and in the individual Specification sections.
- B. Work specified by reference to published standard or specification of government agency, technical association, trade association, professional society or institute, testing agency, or other organization shall meet requirements or surpass minimum standards of quality for materials and workmanship established by designated standard or specification.
- C. Where so specified, products or workmanship shall also meet or exceed additional prescriptive or performance requirements included within Contract Documents to establish a higher or more stringent standard of quality than required by referenced standard.
- D. Follow the order of precedence per Section 3-7.2 of The Greenbook
- E. The design is based on the first listed supplier shown within the Contract Documents. Any modifications or adjustments shall made by the Contractor for other listed suppliers.
- F. Copies of standards and specifications of technical societies:
  - 1. Copies of applicable referenced standards have not been bound in these Contract Documents.
  - 2. Where copies of standards are needed by Contractor, obtain a copy or copies directly from publication source and maintain in an orderly manner at the Site as Work Site records, available to Contractor's personnel, Subcontractors, Owner, and Construction Manager.

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1.02 ABBREVIATIONS

A. Abbreviations for trade organizations and government agencies: Following is a list of construction industry organizations and government agencies to which references may be made in the Contract Documents, with abbreviations used.

1.	AA	Aluminum Association
2.	AABC	Associated Air Balance Council
3.	AAMA	American Architectural Manufacturers Association
4.	AASHTO	American Association of State Highway and Transportation Officials
5.	ABMA	American Bearing Manufacturers' Association
6.	ACI	American Concrete Institute
7.	AEIC	Association of Edison Illuminating Companies
8.	AGA	American Gas Association
9.	AGMA	American Gear Manufacturers' Association
10.	AI	Asphalt Institute
11.	AISC	American Institute of Steel Construction
12.	AISI	American Iron and Steel Institute
13.	AITC	American Institute of Timber Construction
14.	ALS	American Lumber Standards
15.	AMCA	Air Movement and Control Association
16.	ANSI	American National Standards Institute
17.	APA	APA – The Engineered Wood Association
18.	API	American Petroleum Institute
19.	APWA	American Public Works Association
20.	AHRI	Air-Conditioning, Heating, and Refrigeration Institute
21.	ASA	Acoustical Society of America
22.	ASABE	American Society of Agricultural and Biological Engineers
23.	ASCE	American Society of Civil Engineers
24.	ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
25.	ASME	American Society of Mechanical Engineers
26.	ASNT	American Society for Nondestructive Testing
27.	ASSE	American Society of Sanitary Engineering
28.	ASTM	ASTM International
29.	AWI	Architectural Woodwork Institute
30.	AWPA	American Wood Preservers' Association
31.	AWPI	American Wood Preservers' Institute
32.	AWS	American Welding Society
33.	AWWA	American Water Works Association
34.	BHMA	Builders Hardware Manufacturers' Association

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35.	CBM	Certified Ballast Manufacturer
36.	CDA	Copper Development Association
37.	CGA	Compressed Gas Association
38.	CISPI	Cast Iron Soil Pipe Institute
39.	CMAA	Crane Manufacturers' Association of America
40.	CRSI	Concrete Reinforcing Steel Institute
41.	CS	Commercial Standard
42.	CSA	Canadian Standards Association
43.	CSI	Construction Specifications Institute
44.	DIN	Deutsches Institut für Normung e.V.
45.	DIPRA	Ductile Iron Pipe Research Association
46.	EIA	Electronic Industries Alliance
47.	EJCDC	Engineers Joint Contract Documents' Committee
48.	ETL	Electrical Test Laboratories
49.	FAA	Federal Aviation Administration
50.	FCC	Federal Communications Commission
51.	FDA	Food and Drug Administration
52.	FEMA	Federal Emergency Management Agency
53.	FIPS	Federal Information Processing Standards
54.	FM	FM Global
55.	Fed. Spec.	Federal Specifications (FAA Specifications)
56.	FS	Federal Specifications and Standards (Technical Specifications)
57.	GA	Gypsum Association
58.	GANA	Glass Association of North America
59.	HI	Hydraulic Institute
60.	HMI	Hoist Manufacturers' Institute
61.	IBC	International Building Code
62.	ICBO	International Conference of Building Officials
63.	ICC	International Code Council
64.	ICEA	Insulated Cable Engineers' Association
65.	IFC	International Fire Code
66.	IEEE	Institute of Electrical and Electronics Engineers, Inc.
67.	IESNA	Illuminating Engineering Society of North America
68.	IFI	Industrial Fasteners Institute
69.	IGMA	Insulating Glass Manufacturer's Alliance
70.	IMC	International Mechanical Code
71.	INDA	Association of the Nonwoven Fabrics Industry
72.	IPC	International Plumbing Code
73.	ISA	International Society of Automation
74.	ISO	International Organization for Standardization
75.	ITL	Independent Testing Laboratory

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76.	JIC	Joint Industry Conferences of Hydraulic Manufacturers
77.	MIA	Marble Institute of America
78.	MIL	Military Specifications
79.	MMA	Monorail Manufacturers' Association
80.	MSS	Manufacturer's Standardization Society
81.	NAAMM	National Association of Architectural Metal Manufacturers
82.	NACE	NACE International
83.	NBGQA	National Building Granite Quarries Association
84.	NEBB	National Environmental Balancing Bureau
85.	NEC	National Electrical Code
86.	NECA	National Electrical Contractor's Association
87.	NEMA	National Electrical Manufacturers' Association
88.	NESC	National Electrical Safety Code
89.	NETA	InterNational Electrical Testing Association
90.	NFPA	National Fire Protection Association
91.	NHLA	National Hardwood Lumber Association
92.	NICET	National Institute for Certification in Engineering Technologies
93.	NIST	National Institute of Standards and Technology
94.	NRCA	National Roofing Contractors Association
95.	NRTL	Nationally Recognized Testing Laboratories
96.	NSF	NSF International
97.	NSPE	National Society of Professional Engineers
98.	NTMA	National Terrazzo and Mosaic Association
99.	NWWDA	National Wood Window and Door Association
100.	OSHA	Occupational Safety and Health Act (both Federal and State)
101.	PCI	Precast/Prestressed Concrete Institute
102.	PEI	Porcelain Enamel Institute
103.	PPI	Plastic Pipe Institute
104.	PS	Product Standards Section-U.S. Department of Commerce
105.	RMA	Rubber Manufacturers' Association
106.	RUS	Rural Utilities Service
107.	SAE	SAE International
108.	SDI	Steel Deck Institute
109.	SDI	Steel Door Institute
110.	SJI	Steel Joist Institute
111.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association
112.	SPI	Society of the Plastics Industry
113.	SSPC	The Society for Protective Coatings

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114. STI/SPFA	Steel Tank Institute/Steel Plate Fabricators Association
115. SWI	Steel Window Institute
116. TEMA	Tubular Exchanger Manufacturers' Association
117. TCA	Tile Council of North America
118. TIA	Telecommunications Industry Association
119. UBC	Uniform Building Code
120. UFC	Uniform Fire Code
121. UL	Underwriters Laboratories Inc.
122. UMC	Uniform Mechanical Code
123. USBR	U.S. Bureau of Reclamation
124. WCLIB	West Coast Lumber Inspection Bureau
125. WI	Wood Institute
126. WWPA	Western Wood Products Association

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

**SECTION 01 43 33**  
**MANUFACTURERS' FIELD SERVICES**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Person-Day: One person for 8 hours within regular Contractor working hours.

1.02 SUBMITTALS

- A. Informational Submittals:

1. Training Schedule: Submit, in accordance with requirements of this Specification, not more than, nor not less than 21 days prior to start of equipment installation and revise as necessary for acceptance.
2. Lesson Plan: Submit, in accordance with requirements of this Specification, proposed lesson plan not less than 21 days prior to scheduled training and revise as necessary for acceptance.
3. Training Session Recordings: Furnish Owner with two complete sets of recordings fully indexed and cataloged with printed label stating session and date recorded.

1.03 QUALIFICATION OF MANUFACTURER'S REPRESENTATIVE

- A. Authorized representative of the manufacturer, factory trained, and experienced in the technical applications, installation, operation, and maintenance of respective equipment, subsystem, or system, with full authority by the equipment manufacturer to issue the certifications required of the manufacturer. Additional qualifications may be specified in the individual specification section.
- B. Representative subject to acceptance by Owner, Construction Manager, and Design Engineer. No substitute representatives will be allowed unless prior written approval by such has been given.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 FULFILLMENT OF SPECIFIED MINIMUM SERVICES

- A. Furnish manufacturers' services, when required by an individual specification section, to meet the requirements of this section.

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- B. Where time is necessary in excess of that stated in the Specifications for manufacturers' services, or when a minimum time is not specified, time required to perform specified services shall be considered incidental.
- C. Schedule manufacturer' services to avoid conflict with other onsite testing or other manufacturers' onsite services.
- D. Determine, before scheduling services, that conditions necessary to allow successful testing have been met.
- E. Only those days of service approved by Construction Manager will be credited to fulfill specified minimum services.
- F. When specified in individual specification sections, manufacturer's onsite services shall include:
  - 1. Assistance during product (system, subsystem, or component) installation to include observation, guidance, instruction of Contractor's assembly, erection, installation or application procedures.
  - 2. Inspection, checking, and adjustment as required for product (system, subsystem, or component) to function as warranted by manufacturer and necessary to furnish Manufacturer's Certificate of Proper Installation.
  - 3. Providing, on a daily basis, copies of manufacturers' representatives field notes and data to Design Engineer and Construction Manager.
  - 4. Revisiting the Site as required to correct problems and until installation and operation are acceptable to Construction Manager.
  - 5. Resolution of assembly or installation problems attributable to or associated with respective manufacturer's products and systems.
  - 6. Assistance during functional and performance testing, and facility startup and evaluation.
  - 7. Training of Owner's personnel in the operation and maintenance of respective product as required.

3.02 MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

- A. A Manufacturer's Certificate of Proper Installation form, a copy of which is attached to this section, shall be completed and signed by equipment manufacturer's representative.
- B. Such form shall certify signing party is a duly authorized representative of manufacturer, is empowered by manufacturer to inspect, approve, and operate their equipment and is authorized to make recommendations required to ensure equipment is complete and operational.



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3.03 TRAINING

A. General:

1. Furnish manufacturers' representatives for detailed classroom and hands-on training to Owner's personnel on operation and maintenance of specified product (system, subsystem, component) and as may be required in applicable Specifications.
2. Furnish trained, articulate personnel to coordinate and expedite training, to be present during training coordination meetings with Owner, and familiar with operation and maintenance manual information specified in Section 01 78 23, Operation and Maintenance Data.
3. Manufacturer's representative shall be familiar with facility operation and maintenance requirements as well as with specified equipment.
4. Furnish complete training materials, to include operation and maintenance data, to be retained by each trainee.

B. Training Schedule:

1. List specified equipment and systems that require training services and show:
  - a. Respective manufacturer.
  - b. Estimated dates for installation completion.
  - c. Estimated training dates.
2. Allow for multiple sessions when several shifts are involved.
3. Adjust schedule to ensure training of appropriate personnel as deemed necessary by Owner, and to allow full participation by manufacturers' representatives. Adjust schedule for interruptions in operability of equipment.
4. Coordinate with Section 01 32 00, Construction Progress Documentation, and Section 01 91 14, Testing, Integration, and Startup.

C. Lesson Plan:

1. When manufacturer or vendor training of Owner personnel is specified, prepare a lesson plan for each required course containing the following minimum information:
  - a. Title and objectives.
  - b. Recommended attendees (such as, managers, engineers, operators, maintenance).
  - c. Course description, outline of course content, and estimated class duration.
  - d. Format (such as, lecture, self-study, demonstration, hands-on).
  - e. Instruction materials and equipment requirements.
  - f. Resumes of instructors providing training.

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- D. Prestartup Training:
1. Coordinate training sessions with Owner’s operating personnel and manufacturers’ representatives and with submission of operation and maintenance manuals in accordance with Section 01 78 23, Operation and Maintenance Data.
  2. Complete at least 14 days prior to beginning of facility startup.
- E. Post-startup Training: Furnish and coordinate training of Owner’s operating personnel by respective manufacturer’s representatives.
- F. Recording of Training Sessions:
1. Furnish video recording of prestartup and post-startup instruction sessions, including manufacturers’ representatives’ hands-on equipment instruction and classroom sessions.
  2. Video training materials shall be produced by a qualified, professional video production company.
  3. Use DVD format suitable for playback on standard equipment available commercially in the United States. Blu-ray® DVD format is not acceptable without Construction Manager’s prior approval.
  4. DVD may contain multiple training sessions. If multiple training sessions included on a DVD, provide with on-screen menu for playback selection.

3.04 SUPPLEMENT

- A. The supplement listed below, following “End of Section,” is part of this Specification.
1. Manufacturer’s Certificate of Proper Installation.

**END OF SECTION**

**MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION**

OWNER \_\_\_\_\_ EQPT SERIAL NO: \_\_\_\_\_  
EQPT TAG NO: \_\_\_\_\_ EQPT/SYSTEM: \_\_\_\_\_  
PROJECT NO: \_\_\_\_\_ SPEC. SECTION: \_\_\_\_\_

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- Installed in accordance with Manufacturer's recommendations.
- Inspected, checked, and adjusted.
- Serviced with proper initial lubricants.
- Electrical and mechanical connections meet quality and safety standards.
- All applicable safety equipment has been properly installed.
- Functional tests.
- System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: \_\_\_\_\_, 20\_\_

Manufacturer: \_\_\_\_\_

By Manufacturer's Authorized Representative: \_\_\_\_\_  
(Authorized Signature)

**SECTION 01 45 16.13**  
**CONTRACTOR QUALITY CONTROL**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. ASTM International (ASTM):
    - a. D3740, Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
    - b. E329, Use in the Evaluation of Testing and Inspection Agencies as Used in Construction.

1.02 DEFINITIONS

- A. Contractor Quality Control (CQC): The means by which Contractor ensures that the construction, to include that performed by subcontractors and suppliers, complies with the requirements of the Contract.

1.03 SUBMITTALS

- A. Informational Submittals:
1. CQC Plan: Submit, not later than 30 days after receipt of Notice to Proceed.
  2. CQC Report: Submit, weekly, an original and one copy in report form.

1.04 OWNER'S QUALITY ASSURANCE

- A. All Work is subject to Owner's quality assurance inspection and testing at all locations and at all reasonable times before acceptance to ensure strict compliance with the terms of the Contract Documents.
- B. Owner's quality assurance inspections and tests are for the sole benefit of Owner and do not:
1. Relieve Contractor of responsibility for providing adequate quality control measures.
  2. Relieve Contractor of responsibility for damage to or loss of the material before acceptance.
  3. Constitute or imply acceptance.
  4. Affect the continuing rights of Owner after acceptance of the completed Work.

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- C. The presence or absence of a quality assurance inspector does not relieve Contractor from any Contract requirement.
- D. Promptly furnish all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by Construction Manager.
- E. Owner may charge Contractor for any additional cost of inspection or test when Work is not ready at the time specified by Contractor for inspection or test, or when prior rejection makes re-inspection or retest necessary. Quality assurance inspections and tests will be performed in a manner that will not unnecessarily delay the Work.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 GENERAL

- A. Maintain an adequate inspection system and perform such inspections as will ensure that the Work conforms to the Contract Documents.
- B. Maintain complete inspection records and make them available at all times to Owner and Construction Manager.
- C. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product that complies with the Contract Documents. The system shall cover all construction and demolition operations, both onsite and offsite, including Work by subcontractors, fabricators, suppliers and purchasing agents, and shall be keyed to the proposed construction sequence.

3.02 COORDINATION MEETING

- A. After the Preconstruction Conference, but before start of construction, and prior to acceptance of the CQC Plan, schedule a meeting with Construction Manager and Owner to discuss the quality control system.
- B. Develop a mutual understanding of the system details, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite Work, and the interrelationship of Contractor's management and control with the Owner's Quality Assurance.
- C. There may be occasions when subsequent conferences may be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures that may require corrective action by Contractor.

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3.03 QUALITY CONTROL ORGANIZATION

A. CQC System Manager:

1. Designate an individual within Contractor's organization who will be responsible for overall management of CQC and have the authority to act in CQC matters for the Contractor.
2. CQC System Manager may not perform other duties on the Project.
3. CQC System Manager shall be an experienced construction person, with construction experience on similar type Work.
4. CQC System Manager shall report to the Contractor's project manager or someone higher in the organization. Project manager in this context shall mean the individual with responsibility for the overall quality and production management of the Project.
5. CQC System Manager shall be onsite during construction; periods of absence may not exceed 2 weeks at any one time.
6. Identify an alternate for CQC System Manager to serve with full authority during the System Manager's absence. The requirements for the alternate will be the same as for designated CQC System Manager.

B. CQC Staff:

1. Designate a CQC staff, available at the Site at all times during progress, with complete authority to take any action necessary to ensure compliance with the Contract. CQC staff members shall be subject to acceptance by Construction Manager.
2. CQC staff shall take direction from CQC System Manager in matters pertaining to QC.
3. CQC staff must be of sufficient size to ensure adequate QC coverage of Work phases, work shifts, and work crews involved in the construction. These personnel may perform other duties, but must be fully qualified by experience and technical training to perform their assigned QC responsibilities and must be allowed sufficient time to carry out these responsibilities.
4. The actual strength of the CQC staff may vary during any specific Work period to cover the needs of the Project. If the Owner's Quality Assurance staff believe the Contractor's Quality Control staff is insufficient in number or qualifications, the Owner will require the Contractor to increase and/or otherwise modify the CQC staff at no additional cost to the Owner.

- C. Organizational Changes: Obtain Construction Manager's acceptance before replacing any member of the CQC staff. Requests for changes shall include name, qualifications, duties, and responsibilities of the proposed replacement.

3.04 QUALITY CONTROL PHASING

- A. CQC shall include at least three phases of control to be conducted by CQC System Manager for all definable features of Work, as follows:
1. Preparatory Phase:
    - a. Notify Owner at least 48 hours in advance of beginning any of the required action of the preparatory phase.
    - b. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The CQC System Manager shall instruct applicable CQC staff as to the acceptable level of workmanship required in order to meet Contract requirements.
    - c. Document the results of the preparatory phase meeting by separate minutes prepared by the CQC System Manager and attached to the QC report.
    - d. Perform prior to beginning Work on each definable feature of Work:
      - 1) Review applicable Contract Specifications.
      - 2) Review applicable Contract Drawings.
      - 3) Verify that all materials and/or equipment have been tested, submitted, and approved.
      - 4) Verify that provisions have been made to provide required control inspection and testing.
      - 5) Examine the Work area to verify that all required preliminary Work has been completed and is in compliance with the Contract.
      - 6) Perform a physical examination of required materials, equipment, and sample Work to verify that they are on hand, conform to approved Shop Drawing or submitted data, and are properly stored.
      - 7) Review the appropriate activity hazard analysis to verify safety requirements are met.
      - 8) Review procedures for constructing the Work, including repetitive deficiencies.
      - 9) Document construction tolerances and workmanship standards for that phase of the Work.
      - 10) Check to verify that the plan for the Work to be performed, if so required, has been accepted by Construction Manager.
  2. Initial Phase:
    - a. Accomplish at the beginning of a definable feature of Work:
      - 1) Notify Owner at least 48 hours in advance of beginning the initial phase.

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- 2) Perform prior to beginning Work on each definable feature of Work:
    - a) Review minutes of the preparatory meeting.
    - b) Check preliminary Work to verify compliance with Contract requirements.
    - c) Verify required control inspection and testing.
    - d) Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Comparison with sample panels is appropriate.
    - e) Resolve all differences.
    - f) Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
  - 3) Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the QC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
  - 4) The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.
3. Follow-up Phase:
- a. Perform daily checks to verify continuing compliance with Contract requirements, including control testing, until completion of the particular feature of Work.
  - b. Daily checks shall be made a matter of record in the CQC documentation and shall document specific results of inspections for all features of Work for the day or shift.
  - c. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of Work that will be affected by the deficient Work. Constructing upon or concealing nonconforming Work will not be allowed.
4. Additional Preparatory and Initial Phases: Additional preparatory and initial phases may be conducted on the same definable features of Work as determined by Owner if the quality of ongoing Work is unacceptable; or if there are changes in the applicable QC staff or in the onsite production supervision or work crew; or if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.



3.05 CONTRACTOR QUALITY CONTROL PLAN

A. General:

1. Plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used.
2. An interim plan for the first 30 days of operation will be considered.
3. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of Work to be started.
4. Work outside of the features of Work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of Work to be started.

B. Content:

1. Plan shall cover the intended CQC organization for the entire Contract and shall include the following, as a minimum:
  - a. Organization: Description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff will implement the three-phase control system (see Article QC Phasing) for all aspects of the Work specified.
  - b. CQC Staff: The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a QC function.
  - c. Letters of Authority: A copy of a letter to the CQC System Manager signed by an authorized official of the firm, describing the responsibilities and delegating sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop Work which is not in compliance with the Contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities and responsibilities. Copies of these letters will also be furnished to Owner.
  - d. Submittals: Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers and purchasing agents.
  - e. Testing: Control, verification and acceptance testing procedures for each specific test to include the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required.

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- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests, including documentation.
  - g. Procedures for tracking deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.
  - h. Reporting procedures, including proposed reporting formats; include a copy of the CQC report form.
- C. Acceptance of Plans: Acceptance of the Contractor's basic and addendum CQC plans is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. Owner reserves the right to require Contractor to make changes in the CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.
- D. Notification of Changes: After acceptance of the CQC plan, Contractor shall notify Construction Manager, in writing, a minimum of 7 calendar days prior to any proposed change. Proposed changes are subject to acceptance by Construction Manager.

3.06 CONTRACTOR QUALITY CONTROL REPORT

- A. As a minimum, prepare a CQC report for every 7 calendar days. Account for all days throughout the life of the Contract. Reports shall be signed and dated by CQC System Manager. Include copies of test reports and copies of reports prepared by QC staff.
- B. Maintain current records of quality control operations, activities, and tests performed, including the Work of subcontractors and suppliers.
- C. Records shall be on an acceptable form and shall be a complete description of inspections, the results of inspections, daily activities, tests, and other items, including but not limited to the following:
- 1. Status of Noncompliances issued by the Construction Manager.
  - 2. Contractor/subcontractor and their areas of responsibility.
  - 3. Operating plant/equipment with hours worked, idle, or down for repair.
  - 4. Work performed today, giving location, description, and by whom. When a network schedule is used, identify each phase of Work performed each day by activity number.
  - 5. Test and/or control activities performed with results and references to specifications/plan requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
  - 6. Material received with statement as to its acceptability and storage.

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7. Identify submittals reviewed, with Contract reference, by whom, and action taken.
8. Offsite surveillance activities, including actions taken.
9. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
10. List instructions given/received and conflicts in Drawings and/or Specifications.
11. Contractor's verification statement.
12. Indicate a description of trades working on the Project; the number of personnel working; weather conditions encountered; and any delays encountered.
13. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in file work and workmanship comply with the Contract.

3.07 SUBMITTAL QUALITY CONTROL

- A. Submittals shall be as specified in Section 01 33 00, Submittal Procedures. The CQC organization shall be responsible for certifying that all submittals are in compliance with the Contract requirements. Owner will furnish copies of test report forms upon request by Contractor. Contractor may use other forms as approved.

3.08 TESTING QUALITY CONTROL

- A. Testing Procedure:
  1. Perform tests specified or required to verify that control measures are adequate to provide a product which conforms to Contract requirements. Perform the following activities and record the following data:
    - a. Verify testing procedures comply with contract requirements.
    - b. Verify facilities and testing equipment are available and comply with testing standards.
    - c. Check test instrument calibration data against certified standards.
    - d. Verify recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
    - e. Documentation:
      - 1) Record results of all tests taken, both passing and failing, on the CQC report for the date taken.
      - 2) Include specification paragraph reference, location where tests were taken, and the sequential control number identifying the test.

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- 3) Actual test reports may be submitted later, if approved by Construction Manager, with a reference to the test number and date taken.
- 4) Provide directly to Construction Manager an information copy of tests performed by an offsite or commercial test facility. Test results shall be signed by an engineer registered in the state where the tests are performed.
- 5) Failure to submit timely test reports, as stated, may result in nonpayment for related Work performed and disapproval of the test facility for this Contract.

B. Testing Laboratories: Laboratory facilities, including personnel and equipment, utilized for testing soils, concrete, asphalt and steel shall meet criteria detailed in ASTM D3740 and ASTM E329, and be accredited by the American Association of Laboratory Accreditation (AALA), National Institute of Standards and Technology (NIST), National Voluntary Laboratory Accreditation Program (NVLAP), the American Association of State Highway and Transportation Officials (AASHTO), or other approved national accreditation authority. Personnel performing concrete testing shall be certified by the American Concrete Institute (ACI).

### 3.09 COMPLETION INSPECTION

- A. CQC System Manager shall conduct an inspection of the Work at the completion of all Work or any milestone established by a completion time stated in the Contract.
- B. Punchlist:
  1. CQC System Manager shall develop a punchlist of items which do not conform to the Contract requirements.
  2. Include punchlist in the CQC report, indicating the estimated date by which the deficiencies will be corrected.
  3. CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Owner.
  4. These inspections and any deficiency corrections required will be accomplished within the time stated for completion of the entire Work or any particular increment thereof if the Project is divided into increments by separate completion dates.

**END OF SECTION**

**SECTION 01 45 33**  
**SPECIAL INSPECTION, OBSERVATION, AND TESTING**

**PART 1 GENERAL**

1.01 SUMMARY

- A. This section covers requirements for Special Inspection, Observation, and Testing required in accordance with Chapter 17 of the 2016 CBC and is in addition to General Notes, Statement of Special Inspections, and Tables of Required Special Inspections shown on Drawings.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Society of Civil Engineers (ASCE): 7, Minimum Design Loads for Buildings and Other Structures.
  2. 2016 California Building Code (CBC) by California Building Standards Commission.
  3. International Code Council (ICC):
    - a. International Building Code (IBC).
    - b. Evaluation Service (ICC-ES) Reports and Legacy Reports.

1.03 DEFINITIONS

- A. Agencies and Personnel:
1. Agency Having Jurisdiction (AHJ): Permitting building agency; may be a federal, state, local, or other regional department, or individual including building official, fire chief, fire marshal, chief of a fire prevention bureau, labor department, or health department, electrical inspector; or others having statutory authority. AHJ may be Owner when authorized to be self-permitting by governmental permitting agency or when no governmental agency has authority.
  2. Approved Agency: An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved.
  3. Registered Design Professional in Responsible Charge: An individual who is registered or licensed to practice their respective design profession as defined by statutory requirements of professional registration laws of state or jurisdiction in which Project is to be constructed.

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4. Special Inspector: Qualified person employed by Owner who will demonstrate competence to the satisfaction of AHJ for inspection of a particular type of construction or operation requiring Special Inspection.
- B. Statement of Special Inspections: Detailed written procedure contained on Drawings establishing systems and components subject to Special Inspection, Observation, and Testing during construction, type and frequency of testing, extent and duration of Special Inspection, and reports to be completed and distributed by Special Inspector.
- C. Special Inspection:
1. Special Inspection: Inspection required of materials, installation, fabrication, erection, or placement of components and connections requiring special expertise to ensure compliance with approved Contract Documents and referenced standards.
  2. Special Inspection, Continuous: Full-time observation of work requiring Special Inspection by an approved Special Inspector who is present in area where the Work is being performed.
  3. Special Inspection, Periodic: Part-time or intermittent observation of the Work requiring Special Inspection by an approved Special Inspector who is present in area where the Work has been or is being performed, and at completion of the Work.
- D. Nonstructural Components:
1. Electrical Component Supports: Structural members or assemblies which transmit loads and forces from electrical equipment to structure, including braces, frames, legs, pedestals, and tethers, as well as elements forged or cast as part of component for anchorage.
  2. Mechanical and Plumbing Component Supports: Structural members or assemblies which transmit loads and forces from mechanical or plumbing equipment to structure, including braces, frames, skirts, legs, saddles, pedestals, snubbers, and tethers, as well as elements forged or cast as part of component for anchorage.
- E. Professional Observation:
1. Does not include or waive responsibility for required Special Inspection or inspections by building official.
  2. Requirements are indicated on Statement of Special Inspections provided on Drawings.
  3. Geotechnical Observation: Visual observation of formational materials exposed during grading and overexcavation of selected subgrade bearing surfaces and installation of deep foundation elements by a

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- registered design professional for general conformance to Contract Documents.
4. Structural Observation: Visual observation of structural system(s) by a registered design professional for general conformance to Contract Documents.
  5. Observation: Visual observation of selected by registered design professional for general conformance to Contract Documents.

1.04 STATEMENT OF SPECIAL INSPECTIONS REQUIREMENTS

- A. Designated Systems for Inspection: Architectural, plumbing, mechanical, and electrical Components subject to Special Inspection under CBC Section 1705.12.5 and 1705.12.6 for Seismic Resistance.
- B. Statement of Special Inspections:
  1. As included and in support of building permit application, Project-specific requirements were prepared by Registered Design Professional in Responsible Charge. The following identifies elements of inspection, observation, and testing program to be followed in construction of the Work:
    - a. Components that are subject to Special Inspection and Structural Observation for lateral load resistance.
    - b. Special Inspection and testing required by CBC Section 1705 and other applicable sections and referenced standards therein.
    - c. Type and frequency of Special Inspection required.
    - d. Type and frequency of testing required.
    - e. Required frequency and distribution of testing and Special Inspection reports to be distributed by Special Inspector to Construction Manager, Contractor, building official, and Owner.
- C. Code required Special Inspection with associated testing as provided in Statement of Special Inspections and further provided in this section, is for benefit of Owner and does not:
  1. Relieve Contractor of responsibility for providing adequate quality control measures.
  2. Relieve Contractor of responsibility for damage to or loss of material before acceptance.
  3. Constitute or imply acceptance.
  4. Affect continuing rights of Owner after acceptance of completed Work.
- D. The presence or absence of code required Special Inspector and Professional Observer does not relieve Contractor from Contract requirements.

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- E. Contractor is responsible for additional costs associated with Special Inspection and Testing when Work is not ready at time identified by Contractor and Special Inspectors and Professional Observer are onsite, but not able to provide contracted services.
- F. Contractor is responsible for associated costs for additional Special Inspection and Testing by Special Inspectors and Professional Observers required because of rejection of materials of in place Work that cannot be made compliant to Contract Document without additional inspections and observation and testing.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 GENERAL

- A. Requirements of the Statement of Special Inspections are provided by the Owner. All other testing and inspections, unless noted otherwise, are provided by Contractor.
- B. Provide access to shop or Site for Special Inspection and Testing and Professional Observation requirements.
- C. Notify Construction Manager and Design Engineer in advance of required Special Inspection and Professional Observation no later than 48 hours prior to date of Special Inspection.
- D. Provide access for Special Inspector to construction documents.
- E. Retain special inspection records onsite to be readily available for review.
- F. Cooperate with Special Inspector and provide safe access to the Work to be inspected.
- G. Provide reasonable auxiliary services as requested by the Special Inspector. Auxiliary services required include, but not limited to:
  - 1. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests to assist the Special Inspector in performing test/inspections.
  - 2. Providing storage space for the Special Inspector's exclusive use, such as for storing and curing concrete test samples and delivery of samples to testing laboratories.
  - 3. Providing the Special Inspector with access to all approved submittals.



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4. Providing security and protection of samples and test equipment at the Project Site.
  5. Provide samples of materials to be tested in required quantities.
- H. When required by Registered Design Professional in Responsible Charge, provide access for plumbing, mechanical and electrical component inspections for those items requiring certification.
- I. Materials and systems shall be inspected during placement where Continuous Special Inspection is required.
- J. Where Periodic Special Inspection is indicated in the Statement of Special Inspections:
1. Schedule inspections for either during or at completion of their placement or a combination of both.
  2. Schedule periodically inspected Work (either inspected during or after its placement) so that corrections can be completed and re-inspected before Work is inaccessible.
  3. Sampling a portion of the Work is not allowed. Schedules shall provide for inspection of all Work requiring periodic inspection.

**END OF SECTION**

**SECTION 01 50 00**  
**TEMPORARY FACILITIES AND CONTROLS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Association of Nurserymen (AAN): American Standards for Nursery Stock.
  2. Federal Emergency Management Agency (FEMA).
  3. National Fire Prevention Association (NFPA): 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations.
  4. Telecommunications Industry Association (TIA); Electronic Industries Alliance (EIA): 568B, Commercial Building Telecommunications Cabling Standard.
  5. U.S. Department of Agriculture (USDA): Urban Hydrology for Small Watersheds.
  6. U.S. Weather Bureau: Rainfall-Frequency Atlas of the U.S. for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years.

1.02 SUBMITTALS

- A. Informational Submittals:
1. Copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.
  2. Temporary Construction Submittals:
    - a. Access Roads: Routes, cross-sections, and drainage facilities.
    - b. Contractor's field office, storage yard, and storage building plans, including gravel surfaced area.
    - c. Fencing and protective barrier locations and details.
    - d. Construction Manager, Owner, and Engineer's field office plans.
    - e. Staging area location plan.
    - f. Traffic and Pedestrian Control and Routing Plans: As specified herein, and proposed revisions thereto.
    - g. Plan for maintenance of existing plant operations.
  3. Temporary Control Submittals:
    - a. Noise control plan.
    - b. Dust control plan.

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- c. Submittals required as part of the Environmental Mitigation Monitoring and Reporting Program in Supplement Mitigation Monitoring and Reporting Program.
  - d. WPCP submittals required under Section 01 57 13, Temporary Erosion and Sediment Control.
  - e. Plan for disposal of waste materials and intended haul routes.
  - f. Preconstruction and post construction condition assessment report, including video information and any recommendations, for the 60-inch storm drain crossing the site.
4. Temporary Utility Submittals:
- a. Electric power supply and distribution plans.
  - b. Water supply and distribution plans.
  - c. Sanitary.

1.03 MOBILIZATION

- A. Mobilization includes, but is not limited to, these principal items:
- 1. Obtaining required permits.
  - 2. Moving Contractor's field office and equipment required for first month operations onto Site.
  - 3. Installing temporary construction power, wiring, and lighting facilities.
  - 4. Providing onsite Internet service and telephones.
  - 5. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.
  - 6. Arranging for and erection of Contractor's work and storage yard.
  - 7. Posting OSHA required notices and establishing safety programs and procedures.
  - 8. Having Contractor's superintendent at Site full time.
- B. Use area designated for Contractor's temporary facilities as shown on Drawings.

1.04 PROTECTION OF WORK AND PROPERTY

- A. Comply with Owner's safety rules while on Owner's property.
- B. Keep Owner informed of serious onsite accidents and related claims.
- C. Use of Explosives: No blasting or use of explosives will be allowed onsite.

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**PART 2 PRODUCTS**

2.01 CONSTRUCTION MANAGER FIELD OFFICES

- A. Furnish equipment specified for exclusive use of Construction Manager and their representatives.
- B. A general arrangement of the temporary construction facilities as shown for reference in Supplement Temporary Construction Facilities General Arrangement. The Contractor shall be responsible for providing facilities in an arrangement determined by the Contractor meeting the requirements for all Contractor and Subcontractor personnel as well as the Construction Manager, and Owner.
- C. Ownership of equipment furnished under this article will remain, unless otherwise specified, that of Contractor.
- D. Equipment furnished shall be new or like new in appearance and function.
- E. Minimum Features:
  - 1. 110-volt lighting and wall plugs.
  - 2. Fluorescent ceiling lights.
  - 3. Electric heating and self-contained air conditioning unit, properly sized for Project locale and conditions. Provide ample electric power to operate installed systems.
  - 4. Provide railed stairways and landings, and exterior lighting at entrances.
  - 5. Sign on entrance door reading Construction Manager, letter height 4 inches minimum.
  - 6. Exterior Door(s):
    - a. Number: Four.
    - b. Type: Solid core.
    - c. Lock(s): Cylindrical; keyed alike.
  - 7. Number of Windows: Fourteen.
  - 8. Minimum Interior Height: 8 feet.
- F. Trailer Type Mobile Structure: Two (28 by 60 feet).
- G. Floor Space: Minimum 1,680 square feet.
- H. All-metal frame; all-metal exterior, sides, and roof; and insulated double walls, floor, and roof.
- I. Security guard screens on windows.

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- J. Toilet and wash basin in separate compartment with hot and cold water and drains.
- K. Number of Private Offices: Four, 12 feet by 12 feet.
- L. Storage Room: One, 6 feet by 8 feet, with door with cylinder lock, keyed differently than exterior door locks. Provide two sets of keys.
- M. Shelving in Storage Room: 72 linear feet, 18 inches deep.
- N. Blinds or drapes on windows.
- O. Work Surface: One, 30 inches by 10 feet at desk height of 29 inches from floor.
- P. Office Equipment—General:
  - 1. Bottled Water Service: One, with cooler capable of producing hot water and cold water.
  - 2. Paper Cup Dispenser with Cups: One.
  - 3. Paper Towel Dispenser with Towels: One.
  - 4. Desk Chair:
    - a. Six, with the following characteristics:
      - 1) Five castor base.
      - 2) Adjustable height.
      - 3) Swivels.
      - 4) Locking back.
      - 5) Adjustable seat back for height and angle.
      - 6) Adjustable arms.
  - 5. Folding Table: Two, 36 inches by 72 inches.
  - 6. Steel Folding Chairs: Ten.
  - 7. Four-Drawer Steel File with Lock: Two, legal width.
  - 8. Drawing Rack with Drawing Hangers: Four.
  - 9. Bookcase: Four, 36 inches wide by 48 inches high.
  - 10. Wastepaper Basket: Four.
  - 11. Blue Recycling Basket: Four.
  - 12. Clothes Rack: Two.
  - 13. First-Aid Kit: One.
  - 14. Tri-Class (ABC), Dry Chemical Fire Extinguisher, 10-Pound: Two.
  - 15. Telephone: Four, with one intercom line and two incoming/outgoing lines, Touch-Tone, with conference speaker, and 12-foot coiled handset cord.
  - 16. Digital Answering Machine: Model as approved by Engineer. Must have capability to retrieve messages remotely.

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Q. Computer Hardware:

1. Accessories:
  - a. Free Standing Document Holder: 11 inches by 17 inches.
  - b. Adjustable keyboard tray, large enough to accommodate standard keyboard and mouse.
  - c. Wrist rest for keyboard.
  - d. Wrist rest and pad for mouse.
  - e. Foot rest, slanted and small enough to fit under desk.
  - f. Monitor arm.
  - g. Monitor risers.
  - h. Laptop Accessories:
    - 1) External Mouse: Three-button.
    - 2) External keyboard.
    - 3) Riser.
2. Power Supply Surge Protector: One each per computer; rated at 15 amps minimum.
3. Uninterruptible Power Supply (UPS): APC Smart, sized for minimum 15-minute run time for computers.
4. Printer: One each; HP LaserJet or approved equal.
5. Printer Accessories: Manufacturer's standard network-attached storage device. Black and color toner cartridges.
6. Maintenance service agreements for all hardware for duration of Contract.
7. Scheduling (most current version): Primavera Project Planner P6.

2.02 PROJECT SIGN

- A. Refer to Whitebook Section 3-11.2 for requirements for City-furnished Project signs and the Funding Agency provisions for required signage.

**PART 3 EXECUTION**

3.01 CONSTRUCTION MANAGER'S AND ENGINEER'S FIELD OFFICE

- A. Make available for Construction Manager's use prior to start of the Work at Site and to remain on Site for minimum of 60 days after final acceptance of the Work.
- B. Locate where directed by Construction Manager; level, block, tie down, skirt, provide stairways, and relocate when necessary and approved. Construct on proper foundations, and provide proper surface drainage and connections for utility services.

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- C. Provide minimum 100 square feet of gravel or crushed rock base, minimum depth of 4 inches, at each entrance.
- D. Raise grade under field office, as necessary, to elevation adequate to avoid flooding.
- E. Provide sanitary facilities in compliance with state and local health authorities.
- F. Exterior Door Keys: Furnish two set(s) of keys.
- G. Telephone:
  - 1. Provide number of incoming lines equal to that specified for telephone type.
  - 2. Provide appropriate jacks; locate as directed by Construction Manager.
  - 3. Provide wiring necessary for complete telephone system.
- H. Computer: Provide required connecting cables and plugs.
- I. Local Area Network (LAN):
  - 1. Provide Ethernet network prewired in compliance with EIA/TIA 568B.
  - 2. Ethernet wireless hub shall be capable of a minimum of four connections.
  - 3. LAN shall be designed and installed by personnel experienced in similar LAN systems.
- J. Telecommunications:
  - 1. Provide cable Internet connection with minimum of five live portable computer (PC) ports.
  - 2. Provide appropriate jacks, wiring, and equipment required for a complete telecommunications system.
  - 3. Arrange and provide for telecommunication service for use during construction. Pay costs of installation, maintenance, and monthly service of internet connection.
- K. Maintain in good repair and appearance, and provide weekly cleaning service and replenishment, as required, of paper towels, paper cups, hand soap, toilet paper, first-aid kit supplies, and bottled water.
- L. Replenish, as needed, copy paper and toner.

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3.02 TEMPORARY UTILITIES

A. Power:

1. Electric power will be available at or near Site. Determine type and amount available and make arrangements for obtaining temporary electric power service, metering equipment, and pay costs for electric power used during Contract period, except for portions of the Work designated in writing by Engineer as substantially complete.
2. Where grid power is unavailable or impractical, provide diesel fueled standby generators and temporary distribution circuit breaker equipment to maintain continuous power to process facilities as required.

B. Lighting: Provide temporary lighting to meet applicable safety requirements to allow erection, application, or installation of materials and equipment, and observation or inspection of the Work.

C. Heating, Cooling, and Ventilating:

1. Provide as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for installation of materials, and to protect materials, equipment, and finishes from damage because of temperature or humidity. Provide adequate forced air ventilation of enclosed areas to cure installed materials, to dispense humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases.
2. Pay costs of installation, maintenance, operation, removal, and fuel consumed.
3. Provide portable unit heaters, complete with controls, oil- or gas-fired, and suitably vented to outside as required for protection of health and property.
4. If permanent natural gas piping is used for temporary heating units, do not modify or reroute gas piping without approval of utility company. Provide separate gas metering as required by utility.

D. Water:

1. Hydrant Water:
  - a. Is available from nearby hydrants. Secure written permission for connection and use from water department and meet requirements for use. Notify fire department before obtaining water from fire hydrants.



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- b. Use only special hydrant-operating wrenches to open hydrants. Make certain hydrant valve is open full, since cracking valve causes damage to hydrant. Repair damaged hydrants and notify appropriate agency as quickly as possible. Hydrants shall be completely accessible to fire department at all times.
    - c. Include costs to connect and transport water to construction areas in Contract Price.
  2. Owner will provide a place of temporary connection for construction and drinking water at Site. Contractor to provide temporary facilities and piping required to bring water to point of use and remove when no longer needed. Install an acceptable metering device and pay for water used at Owner's current rate.
  3. Provide and bear costs of necessary water in excess of 100 gpm required for testing equipment, tanks or basins, and piping prior to Substantial Completion, unless otherwise specifically stated in Specifications for equipment, systems, or facilities to be tested.
  4. Provide means to prevent water used for testing from flowing back into source pipeline.
- E. Sanitary and Personnel Facilities:
  1. Provide and maintain facilities for Contractor's employees, Subcontractors, and other onsite employers' employees. Service, clean, and maintain facilities and enclosures.
  2. Use of Owner's existing sanitary facilities by construction personnel will not be allowed.
- F. Telephone Service:
  1. Contractor: Arrange and provide onsite telephone service for use during construction. Pay costs of installation and monthly bills.
- G. Fire Protection: Furnish and maintain on Site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of NFPA 241.

3.03 PROTECTION OF WORK AND PROPERTY

- A. General:
  1. Perform Work within right-of-way and easements in a systematic manner that minimizes inconvenience to property owners and the public.

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2. No business shall be cut off from vehicular traffic. Contractor shall phase work to allow ingress/egress at all times, unless special arrangements have been made.
3. Maintain in continuous service existing oil and gas pipelines, underground power, telephone or communication cable, water mains, irrigation lines, sewers, poles and overhead power, and other utilities encountered along line of the Work, unless other arrangements satisfactory to owners of said utilities have been made.
4. Where completion of the Work requires temporary or permanent removal or relocation of existing utility, coordinate activities with owner of said utility and perform work to their satisfaction.
5. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.
6. Keep fire hydrants and water control valves free from obstruction and available for use at all times.
7. In areas where Contractor's operations are adjacent to or near a utility, such as gas, telephone, television, electric power, water, sewer, or irrigation system, and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection have been made by Contractor.
8. Notify property owners and utility offices that may be affected by construction operation at least 2 days in advance. Before exposing a utility, obtain utility owner's permission. Should service of utility be interrupted due to Contractor's operation, notify proper authority immediately. Cooperate with said authority in restoring service as promptly as possible and bear costs incurred.
9. Do not impair operation of existing sewer system. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering sewers, pump stations, or other sewer structures.
10. Maintain original Site drainage wherever possible.
11. Maintain existing lights, guard rails, covers, and barricades.
12. Protect and maintain existing floors and roofs.
13. Brace and secure all parts of work against storm and accident.
14. Enclose excavations with barricades.
15. Provide a preconstruction and post-construction video condition assessment and report for the existing 60-inch storm drain located onsite for its entire length. The report shall include all condition issues for the existing pipeline and recommendations for repairs. The post-construction video shall be used to ensure that no damage has been caused to the storm drain during the construction process.

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- B. Site Security: Provide and maintain temporary security fences as necessary to protect the Work and Contractor-furnished products not yet installed.
- C. Barricades and Lights:
1. Provide as required by the CalTrans, OSHA Title 8, California Manual on Uniform Traffic Control Devices (CAMUTCD), or other required Vehicle Code and in sufficient quantity to safeguard public and the Work.
  2. Provide as necessary to prevent unauthorized entry to construction areas and affected roads, streets, and alleyways, inside and outside of fenced area, and as required to ensure public safety and the safety of Contractor's employees, other employer's employees, and others who may be affected by the Work.
  3. Provide to protect existing facilities and adjacent properties from potential damage.
  4. Locate to enable access by facility operators and property owners.
  5. Illuminate barricades and obstructions with warning lights from sunset to sunrise.
- D. Trees and Plantings:
1. Protect from damage and preserve trees, shrubs, and other plants outside limits of the Work and within limits of the Work, which are designated on Drawings to remain undisturbed.
    - a. Where practical, tunnel beneath trees when on or near line of trench.
    - b. Employ hand excavation as necessary to prevent tree injury.
    - c. Do not stockpile materials or permit traffic within drip lines of trees.
    - d. Provide and maintain temporary barricades around trees.
    - e. Water vegetation as necessary to maintain health.
    - f. Cover temporarily exposed roots with wet burlap, and keep burlap moist until soil is replaced around roots.
    - g. No trees, except those specifically shown on Drawings to be removed, shall be removed without written approval of Engineer.
    - h. Dispose of removed trees in a legal manner off the Site.
  2. Balling and burlapping of trees indicated for replacement shall conform to recommended specifications set forth in the American Standards for Nursery Stock, published by American Association of Nurserymen. Balls shall be firm and intact and made-balls will not be accepted. Handle ball and burlap trees by ball and not by top.
  3. In event of damage to bark, trunks, limbs, or roots of plants that are not designated for removal, treat damage by corrective pruning, bark

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tracing, application of a heavy coating of tree paint, and other accepted horticultural and tree surgery practices.

4. Replace each plant that dies as a result of construction activities.

E. Existing Structures:

1. Where Contractor contemplates removal of small structures such as signposts, and culverts that interfere with Contractor's operations, obtain approval of property owner and Engineer.
2. Replace items removed in their original location and a condition equal to or better than original.

F. Finished Construction: Protect finished floors and concrete floors exposed as well as those covered with composition tile or other applied surfacing.

G. Waterways: Keep ditches, culverts, and natural drainages continuously free of construction materials and debris.

3.04 TEMPORARY CONTROLS

A. Air Pollution Control:

1. Minimize air pollution from construction operations.
2. Burning: Of waste materials, rubbish, or other debris will not be permitted on or adjacent to Site.
3. Conduct operations of dumping rock and of carrying rock away in trucks to cause a minimum of dust. Give unpaved streets, roads, detours, or haul roads used in construction area a dust-preventive treatment or periodically water to prevent dust. Strictly adhere to applicable environmental regulations for dust prevention.
4. Provide and maintain temporary dust-tight partitions, bulkheads, or other protective devices during construction to permit normal operation of existing facilities. Construct partitions of plywood, insulating board, plastic sheets, or similar material. Construct partitions in such a manner that dust and dirt from demolition and cutting will not enter other parts of existing building or facilities. Remove temporary partitions as soon as need no longer exists.

B. Noise Control:

1. Provide acoustical barriers so noise emanating from tools or equipment will not exceed legal noise levels.
2. Noise Control Ordinance: San Diego Municipal Code, Section 59.5.01.

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3. Noise Control Plan: Propose plan to mitigate construction noise and to comply with noise control ordinances, including method of construction, equipment to be used, and acoustical treatments.
- C. Requirements for the Federal Aviation Administration and Marine Corps Air Station.
1. The Contractor shall comply with all requirements provided in the Environment Impact Report (EIR).
  2. Cranes shall have a maximum height limit as required by the ALUC Air Space Obstruction Criteria defined in the EIR. The limit is 200 feet above ground level.
  3. All Work shall be provided in accordance with the Compatibility Plan provided within the EIR.

3.05 STORAGE YARDS AND BUILDINGS

- A. Coordinate requirements with Section 01 61 00, Common Product Requirements.
- B. Temporary Storage Yards: Construct temporary storage yards for storage of products that are not subject to damage by weather conditions.
- C. Temporary Storage Buildings:
1. Provide environmental control systems that meet recommendations of manufacturers of equipment and materials stored.
  2. Arrange or partition to provide security of contents and ready access for inspection and inventory.
  3. Store combustible materials (paints, solvents, fuels) in a well-ventilated and remote building meeting safety standards.

3.06 ACCESS ROADS AND DETOURS

- A. Alignments for alternative routes to that provided on Drawings shall be approved by the Construction Manager.
- B. Maintain drainage ways. Install and maintain culverts to allow water to flow beneath access roads. Provide corrosion-resistant culvert pipe of adequate strength to resist construction loads.
- C. Provide gravel, crushed rock, or other stabilization material to permit access by all motor vehicles at all times.

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- D. Maintain road grade and crown to eliminate potholes, rutting, and other irregularities that restrict access.
- E. Upon completion of construction, restore ground surface disturbed by access road construction to original grade. Replace damaged or broken culverts with new culvert pipe of same diameter and material.
- F. Coordinate with Construction Manager detours and other operations affecting traffic and access with the Construction Manager. Provide at least 72 hours' notice to Construction Manager of operations that will alter access to Site.
- G. Construct access roads as shown and within easements, rights-of-way, or Project limits.

3.07 PARKING AREAS

- A. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner's operations, or construction operations.
- B. If equipment staging and parking facilities are not identified in the Contract Documents, the Contractor's proposed locations for these purposes is subject to City approval.
- C. Provide parking facilities for personnel working on Project. No employee or equipment parking will be permitted on Owner's existing paved areas.
- D. Use area designated on Drawings for parking of Contractor's and Contractor's employees' vehicles.

3.08 CLEANING DURING CONSTRUCTION

- A. In accordance with General Conditions, as may be specified in other Specification sections, and as required herein.
- B. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris. At least weekly, sweep floors (basins, tunnels, platforms, walkways, roof surfaces), and pick up and dispose of debris.
- C. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least weekly, dispose of such waste materials, debris, and rubbish offsite.

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- D. At least weekly, brush sweep entry drive, roadways, and other streets and walkways affected by the Work and where adjacent to the Work.

**END OF SECTION**

**SECTION 01 56 39  
TREE PROTECTION**

**PART 1 GENERAL**

1.01 SUMMARY

- A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.
- B. Related Sections:
  - 1. Section 01 50 00, Temporary Facilities and Controls, for temporary site fencing.
  - 2. Section 31 10 00, Site Clearing, for removing existing trees and shrubs.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract apply to this Section.

1.03 DEFINITIONS

- A. Tree Caliper: Diameter of a trunk measured by the average of the smallest and largest diameters at 6 inches above the ground for trees up to, and including, 4-inch size; and 12 inches above the ground for trees larger than 4-inch size.
- B. Tree and Shrub Protection Critical Root Zone (CRZ): Area surrounding existing trees, tree groupings, or shrub groupings to be protected during construction, as indicated on Drawings.
- C. DBH (Diameter Breast Height): Every inch of DBH of each existing tree to be protected represents one required radial foot of tree protection.
- D. Arborist must be a Board Certified Master Arborist, Registered Consulting Arborist, and must be Certified by the International Society of Arboriculture (ISA).
- E. Appraised Value: Removal of any tree without prior approval will be subject to replacement equal to the Appraised Value of the tree that is lost. Value will be determined by Consulting Arborist.

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated.



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- B. Samples for Verification:
  - 1. For each type of the following:
    - a. Organic Mulch: 1 pint volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
    - b. Protection-Zone Fencing: Assembled Samples of full-size components.
    - c. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.
- C. Pruning and Maintenance Schedule: Verify locations of trees and shrubs to remain that are affected by construction, and submit written schedule detailing scope and extent of protective fencing, pruning, root pruning, and scope of on-going maintenance during all phases of construction.
- D. Qualification Data: Submit Certificates for qualified Consulting Arborist and tree service firm.
- E. Maintenance Recommendations: Submit list of instructions for care and protection of trees and shrubs affected by construction during and after completing the Work. Instructions shall be prepared by Consulting Arborist with clear definition of standards, and shall include instructions for prompt and proper treatment and repair of any trees or shrubs that are damaged.
- F. Tree and Shrub Protection Certification: Submit letter from Consulting Arborist, certifying that trees and shrubs indicated to remain have been protected during initial and on-going phases of construction.
- G. Existing Conditions: Submit Tree and Shrub Evaluation and Protection Report from Certified Consulting Arborist including detailed Site Map and Photo Documentation of each existing tree, shrub or plant grouping indicated to be protected, which establishes a record of preconstruction conditions, for use in documenting consequential damage caused by construction activities. Report shall include plans and notations indicating specific wounds and damage conditions.

## 1.05 QUALITY ASSURANCE

- A. Contractor shall take extreme care to protect the root systems of the existing trees. No grading shall occur within the CRZ. Bulk material, equipment, scaffold footings, or vehicles shall not be stockpiled or parked within the critical root zone (CRZ) of any tree or shrub, or within 10 feet of the trunk (whichever is greater). This is done to minimize surface and subsurface root and soil compaction. Any damage to existing trees or shrubs during construction shall be the Contractor's responsibility.

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- B. Preparatory work shall be performed under direction of Consulting Arborist. Pruning work shall be performed in accordance with ANSI A300 standards and by a qualified, licensed and insured arborist or tree service company.
- C. Tree Service Firm Qualifications: A tree service firm that has experience with work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.
- D. Preconstruction Conference:
  - 1. Conduct 'Plant Protection' conference at Project site prior to any site demolition or construction.
  - 2. 'Plant Protection' conference to include General Contractor, Earthwork Contractor, Site Utility Contractor, Landscape Contractor, Consulting Arborist, Tree Service Firm, Landscape Architect and City Project Manager.
  - 3. Purpose of the conference is to review methods and procedures related to tree and plant protection, including the following:
    - a. Construction Schedule: Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
    - b. Enforcing requirements for protection zones.
    - c. Arborist's responsibilities.
    - d. Field quality control.

1.06 PROJECT CONDITIONS

- A. The following practices are prohibited within the plant protection zones:
  - 1. Storage of construction materials, debris, or excavated material.
  - 2. Parking or operation of vehicles or equipment.
  - 3. Erection of sheds or structures.
  - 4. Impoundment or runoff of water or chemicals.
  - 5. Grading, excavation, or digging unless otherwise indicated.
  - 6. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch in diameter; and free of weeds, roots, and toxic and other nonsoil materials.
1. Obtain topsoil only from well-drained sites where topsoil is 4 inches deep or more; do not obtain from bogs or marshes.
  2. Imported or manufactured topsoil shall comply with ASTM D5268.
- B. Organic Mulch:
1. Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
    - a. Type: Bark chips, natural color (not dyed).
    - b. Particle Size Range: 3-inch maximum, 1/2 inch minimum.
- C. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements. Previously used materials may be used when approved by City Project Manager.
1. Chain-Link Fencing for Trees and Tree/Shrub Groupings: Fence to be 6-foot high galvanized-steel fencing fabricated from minimum 2-inch opening, 0.148-inch diameter wire chain-link fabric; with steel pipe posts, minimum 2-3/8-inch OD line posts, and 2-7/8-inch OD corner and pull posts; with 1-5/8-inch OD top rails and 0.177-inch diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
  2. Gates: Single swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; minimum width 36 inches.
- D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading letters.

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**PART 3 EXECUTION**

3.01 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. Submit written report, endorsed by Consulting Arborist, listing all conditions that are or may become detrimental to tree and plant protection.

3.02 COORDINATION

- A. Coordinate relocation of any irrigation lines to serve protected plant materials as necessary.
- B. Coordinate relocation of other utility lines or structures that are in conflict with protection zones. Notify the Owner's Representative of any conflicts encountered.

3.03 PREPARATION

- A. Prior to site demolition or construction operations, install Plant Protection Fencing in all areas and obtain approval from Construction Manager for fence alignment and any anticipated root pruning.
- B. Locate and clearly identify trees, shrubs, and other vegetation to remain. Tie a 1-inch blue-vinyl tape around each tree trunk at 54 inches above the ground.
- C. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting.

3.04 TREE- AND PLANT-PROTECTION ZONES

- A. Protection-Zone Fencing: Prior to any construction activities on this site, install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.

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- B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations spaced approximately every 35 feet on protection-zone fencing, but no fewer than four signs with each facing a different direction.
- C. Contractor shall not engage in any construction activity within the Tree and Plant Protection Area without the approval of the Owner's Representative including: operating, moving or storing equipment; storing supplies or materials; locating temporary facilities including trailers or portable toilets and shall not permit employees to traverse the area to access adjacent areas of the project or use the area for lunch or any other work breaks. Permitted activity, if any, within the Tree and Plant Protection Area maybe indicated on the drawings along with any required remedial activity as listed below.
- D. Contractor shall be fully responsible to ensure that adequate water is provided to all plants to be preserved during the entire construction period. Adequate water is defined to be maintaining soil moisture above the permanent wilt point to a depth of 8 inches or greater. Contractor shall adjust irrigation system or apply additional water, using hoses or water tanks as required. If hand watering, ensure that the watering basin is of sufficient diameter to capture all roots. Do not allow water to pond against the tree trunk.
- E. Contractor shall be fully responsible to ensure that plants remain free of disease and insect infestations during the entire construction period. Provide all disease and insect control required to keep the plants in a healthy state using the principles of Integrated Plant Management (IPM). All pesticides shall be applied by a certified pesticide applicator.
- F. Contractor shall maintain plant protection zones free of weeds and trash.
- G. Contractor shall maintain protection-zone fencing and signage in good condition through all phases of construction. Remove when construction operations are complete and equipment has been removed from the site.
  - 1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
  - 2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.05 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 31 23 16, Excavation.

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- B. Trenching Near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.
- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.
- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.06 ROOT AND BRANCH PRUNING

- A. Prune roots that are affected by temporary and permanent construction. Prune roots under the direction of Consulting Arborist and with pre-approval by City Project Manager.

3.07 REGRADING

- A. Maintain existing grade within tree protection zone at all times during and after construction.

3.08 FIELD QUALITY CONTROL

- A. Inspections: Engage a Consulting Arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.09 REPAIR AND REPLACEMENT

- A. In the event that construction activity is unavoidable within the Tree and Plant Protection Area, Contractor shall submit a detailed written plan of action (prepared by Consulting Arborist) for pre-approval by City Project Manager. Plan shall include a description of proposed activity; the time period for the activity, and a list of remedial actions that will reduce the impact on the Tree and Plant Protection Area from the activity.
- B. Contractor is responsible for replacement of trees and shrubs that have been damaged by construction operations.

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- C. Trees shall be replaced with a tree of similar species and of equal size, or 6-inch caliper (whichever is less). Shrubs and groundcovers shall be replaced with plants of similar species and equal size, or the largest size plants reasonably available. Plant quantities shall match quantities of all plants removed or damaged.
- D. Remedial work for damaged plants shall be completed by the Contractor at no cost to the Owner, and may extend for a period beyond the Maintenance Period. Remedial work shall include but is not limited to plant replacement, irrigation repair, soil compaction remediation, pruning, staking or cabling, insect and disease control, fertilizing, watering, and mulching.
- E. Remedial work shall be done at the direction of a Consulting Arborist and shall be reviewed and approved by the City Project Manager upon completion of all remedial efforts.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove excess excavated material, cuttings, roots, trash, and debris, and legally dispose of them off Project site.

**END OF SECTION**

**SECTION 01 57 13**  
**TEMPORARY EROSION AND SEDIMENT CONTROL**

**PART 1 GENERAL**

1.01 SUMMARY

- A. This section covers Work to implement structural and nonstructural Best Management Practices (BMP) to control soil erosion by wind or water and keep eroded sediments and other construction-generated pollutants from moving off project sites. Requirements described in this Specification are part of the project Water Pollution Control Plan (WPCP) and are the minimum for all project construction sites and conditions. This Specification covers all Project activities, including material sources, disposal sites, and offsite mitigation areas unless specific Project activities are excluded elsewhere in this Specification or in other Contract Documents controlling the Work.
- B. National Pollutant Discharge Elimination System: Comply with Federal, state, and local laws, rules and regulations, and the National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer System (MS4) Permit Draining the Watersheds of the San Diego Region, Order No. R9-2013-0001, as amended by R9-2015-0001 and R9-2015-0100 or Permits applicable to the Project. A copy of the Project's General Construction Permit, if applicable to the Project, is available from Owner.
- C. Other Regulations: A local government erosion and sediment control permit may apply and some local agency requirements may be more stringent than this specification. Adequate erosion and sediment control is essential for complying with the federal Endangered Species Act where construction runoff enters waters inhabited by protected species.

1.02 REFERENCES

- A. Activities shall conform to the Municipal Storm Water Permit No. R9-2013-0001, as amended by R9-2015-0001 and R9-2015-0100, the 2018 City of San Diego Storm Water Standards Manual, the Storm Water Pollution Prevention Plan, the 2018 "Whitebook" the City of San Diego Standard Specifications for Public Works Construction, the 2018 "Greenbook" Standard Specifications for Public Works Construction and Drawings. In the event of a conflict, follow the precedence of the Contract Documents per Greenbook 3-7.2.



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- B. The following is a list of standards that may be referenced in this section:
1. California Stormwater Quality Association (CASQA) Stormwater Best Management Practice Handbook for Construction.
  2. Storm Water Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.
  3. National Oceanic and Atmospheric Administration (NOAA) National Weather Service:
    - a. Precipitation-Frequency of the United States by State/Territory, 2012.
    - b. Precipitation Frequency Data Server, 2012.

1.03 SYSTEM DESCRIPTION

- A. Erosion and Sediment Control: Provide, maintain, and operate temporary facilities to control erosion and sediment releases during construction period.
- B. Personnel Training:
1. Prior to commencement of construction, applicable personnel must have an understanding of the Municipal Storm Water Permit requirements and their specific responsibilities under the permit. At a minimum, personnel must be trained to understand the following as it relates to the scope of their job duties:
    - a. The location of all stormwater controls and how to maintain them.
    - b. Procedures for complying with the pollution prevention requirements.
    - c. Procedures for conducting inspections, recording findings, and taking corrective action.
- C. Temporary Erosion and Sediment Control Plan (Water Pollution Control Plan):
1. A WPCP shall be prepared by the Contractor for approval.

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2. For each phase of the scheduled work, indicate on the WPCP all the BMPs proposed and installed for erosion and sediment control to minimize clearing, stabilize exposed soil, divert or temporarily store flows, limit runoff from exposed areas, and filter transported sediment. Include all temporary slopes, constructed for staging or other reasons, which may not have been identified in the original Contract plans. Refer to the City of San Diego 2016 Storm Water Standards Manual as well as the California Construction General Permit, Municipal Storm Water Permit.
    - a. The required BMPs and Procedures for Erosion Prevention, Runoff Control, and Sediment Control.
  3. Keep a copy of the approved WPCP with updated changes onsite during all construction activities.
- D. Water Management: Manage site water in accordance with the conditions of the Municipal Storm Water permit from a local permitting authority.
- E. Pollution Control: Waste Management and Materials Pollution Control BMPs are source control BMPs that prevent pollution by limiting or reducing potential pollutants at their source before they come in contact with storm water. These BMPs also involve day to day operations of the construction site and include material delivery and storage as well as various liquid and solid waste management. The Project-specific waste management BMPs to be implemented on the Project will be identified by the Contractor in their WPCP. Certain authorized non-stormwater discharges may be necessary for the completion of a construction project. Non-stormwater Management BMPs are source control BMPs that prevent pollution by limiting or reducing potential pollutants at their source or eliminating offsite discharge.
- F. If California State Water Resources Control Board or City of San Diego orders the Work suspended or permit violated, continue to control erosion, pollution, and runoff during the shutdown.
- G. Nothing in this section shall relieve Contractor from complying with other Contract requirements.

1.04 SUBMITTALS

- A. Informational Submittals:
1. Prepare a WPCP for approval that includes the following:
    - a. The WPCP shall cover all areas that may be affected inside and outside the limits of the Project (including all Owner-provided sources, disposal sites, and haul roads, and all nearby land, streams, and other bodies of water).

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- b. BMP plan including the type of BMP, installation details, and location for each BMP.
- c. BMP Inspection and maintenance plan for each proposed BMP.

**PART 2 PRODUCTS**

**2.01 SILT (SEDIMENT) FENCE**

- A. Geotextile: As specified in Article Geotextile.
- B. Support Posts: As recommended by manufacturer of geotextile.
- C. Fasteners: Heavy-duty wire staples at least 1-inch long, tie wires, or hog rings, as recommended by manufacturer of geotextile.

**2.02 STABILIZED CONSTRUCTION ENTRANCE**

- A. Construct a pad from stone 3 inches to 6 inches in size, placed at least 8 inches deep and not less than 50 feet long.
- B. Provide aggregate free of extraneous materials that may cause or contribute to track out.
- C. Place separation geotextile under the rock to prevent fine sediment from pumping up into the rock pad. See Article Geotextile for required geotextile properties.
- D. Use of constructed or constructed/manufactured steel plates with ribs (such as, shaker/rumble plates or corrugated steel plates) for entrance/exit access is allowable.

**2.03 WATTLES**

- A. Cylinders of biodegradable plant material such as weed-free straw, coir, compost, wood chips, excelsior, or wood fiber or shavings encased within biodegradable netting.
- B. Diameter: 5 inches minimum.
- C. Netting Material: Clean, evenly woven, and free of encrusted concrete or other contaminating materials such as preservatives. Also free from cuts, tears, or weak places with a minimum lifespan of 6 months.
- D. Compost Filler: Coarse compost, wood chips, or wood shavings.

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- E. Wood Stakes: Untreated softwood species, 2-inch by 2-inch nominal dimension and 36 inches in length.

2.04 GEOTEXTILE

- A. Geotextiles shall consist only of long chain polymeric fibers or yarns formed into a stable network such that the fibers or yarns retain their position relative to each other during handling, placement, and design service life. At least 95 percent by weight of the material shall be polyolefins or polyesters. The material shall be free from defects or tears. Geotextile shall also be free of any treatment or coating which might adversely alter its hydraulic or physical properties after installation. Geotextile properties shall be as described in Table 1.

<b>Table 1 Geotextile for Temporary Silt Fence</b>			
Geotextile Property	ASTM Test Method	Geotextile Property Requirements	
		Unsupported Between Posts	Supported Between Posts with Wire or Polymeric Mesh
AOS	D4751	U.S. No. 30 max. for silt wovens, U.S. No. 50 for all other geotextile types, U.S. No. 100 min.	
Water Permittivity	D4491	0.2 sec <sup>-1</sup> min.	
Grab Tensile Strength, in machine and x-machine direction	D4632/D4632M	180 lb min. in machine direction, 100 lb min. in x-machine direction	100 lb min.
Grab Failure Strain, in machine and x-machine direction	D4632/D4632M	30% max. at 180 lb or more	
Ultraviolet (UV) Radiation Stability	D4355	70% strength retained min., after 500 hours in xenon arc device	

**PART 3 EXECUTION**

3.01 PREPARATION

- A. Construction General Permit Coverage is required prior to starting earth disturbing activities.

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- B. The WPCP shall include proposed stockpile areas and installation of temporary erosion control devices, ditches, or other facilities in Work phasing plans.
- C. Areas designated for Contractor's use during Project may be temporarily developed as specified to provide working, staging, and administrative areas. Include control of sediment from these areas in the WPCP.
- D. Implementation of erosion and sediment control BMPs are delineated in the WPCP.

3.02 MAINTENANCE

- A. The erosion and sediment control measures described in the WPCP are minimum requirements for anticipated Site conditions. During the construction period, upgrade these measures as needed to comply with all applicable local, state, and federal erosion and sediment control regulations.
- B. BMP Inspection and maintenance is depicted in the WPCP.

3.03 REMOVAL

- A. When the Engineer determines that an erosion control BMP is no longer required, remove BMP and all associated hardware from the Project limits. When materials are biodegradable, Engineer may approve leaving temporary BMP in place.
- B. Permanently stabilize all bare and disturbed soil after removal of erosion and sediment control BMPs. Dress sediment deposits remaining after BMPs have been removed to conform to existing grade. Prepare and seed graded area. If installation and use of erosion control BMPs have compacted or otherwise rendered soil inhospitable to plant growth, such as construction entrances, take measures to rehabilitate soil to facilitate plant growth. This may include, but is not limited to, ripping the soil, incorporating soil amendments, or seeding with specified seed.

**END OF SECTION**

**SECTION 01 61 00  
COMMON PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

1.01 DEFINITIONS

A. Products:

1. New items for incorporation in the Work, whether purchased by Contractor or Owner for the Project, or taken from previously purchased stock, and may also include existing materials or components required for reuse.
2. Includes the terms material, equipment, machinery, components, subsystem, system, hardware, software, and terms of similar intent and is not intended to change meaning of such other terms used in Contract Documents, as those terms are self-explanatory and have well recognized meanings in construction industry.
3. Items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature, that is current as of the date of the Contract Documents.

1.02 DESIGN REQUIREMENTS

A. Where Contractor design is specified, design of installation, systems, equipment, and components, including supports and anchorage, shall be in accordance with provisions of the 2016 California Building Code (CBC) by California Building Standards Commission.

1. Wind: Basic wind speed, V: 115 mph (3-second gust), with exposure Category C, and Risk Category III.
2. Seismic: Risk Category III, importance factor, I, of 1.25, Site Class Definition D, mapped maximum considered earthquake, 5 percent damped, spectral response at short periods, S<sub>s</sub> 1.06G, mapped maximum considered earthquake, 5 percent damped, spectral response at a period of 1 second, S<sub>1</sub> 0.41G, unless specified otherwise.

1.03 ENVIRONMENTAL REQUIREMENTS

- A. Altitude: Provide materials and equipment suitable for installation and operation under rated conditions at 400 feet above sea level.
- B. Provide equipment and devices installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of 36 degrees F to 91 degrees F.

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1.04 PREPARATION FOR SHIPMENT

- A. When practical, factory assemble products. Mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with strippable protective coating.
- B. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project and Contractor, equipment number, and approximate weight. Include complete packing list and bill of materials with each shipment.
- C. Extra Materials, Special Tools, Test Equipment, and Expendables:
  - 1. Furnish as required by individual Specifications.
  - 2. Schedule:
    - a. Ensure that shipment and delivery occurs concurrent with shipment of associated equipment.
    - b. Transfer to Owner shall occur immediately subsequent to Contractor's acceptance of equipment from Supplier.
  - 3. Packaging and Shipment:
    - a. Package and ship extra materials and special tools to avoid damage during long term storage in original cartons insofar as possible, or in appropriately sized, hinged-cover, wood, plastic, or metal box.
    - b. Prominently displayed on each package, the following:
      - 1) Manufacturer's part nomenclature and number, consistent with Operation and Maintenance Manual identification system.
      - 2) Applicable equipment description.
      - 3) Quantity of parts in package.
      - 4) Equipment manufacturer.
  - 4. Deliver materials to Site.
  - 5. Notify Construction Manager upon arrival for transfer of materials.
  - 6. Replace extra materials and special tools found to be damaged or otherwise inoperable at time of transfer to Owner.
- D. Request a minimum 7-day advance notice of shipment from manufacturer. Upon receipt of manufacturer's advance notice of shipment, promptly notify Construction Manager of anticipated date of equipment arrival.
- E. Factory Test Results: Reviewed and accepted by Design Engineer before product shipment as required in individual Specification sections.

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1.05 DELIVERY AND INSPECTION

- A. Deliver products in accordance with accepted current Progress Schedule and coordinate to avoid conflict with the Work and conditions at Site. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete.
- B. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible. Include on label, date of manufacture and shelf life, where applicable.
- C. Unload products in accordance with manufacturer's instructions for unloading or as specified. Record receipt of products at Site. Promptly inspect for completeness and evidence of damage during shipment.
- D. Remove damaged products from Site and expedite delivery of identical new undamaged products, and remedy incomplete or lost products to provide that specified, so as not to delay progress of the Work.

1.06 HANDLING, STORAGE, AND PROTECTION

- A. Handle and store products in accordance with manufacturer's written instructions and in a manner to prevent damage. Store in approved storage yards or sheds provided in accordance with Section 01 50 00, Temporary Facilities and Controls. Provide manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by Owner.
- B. Manufacturer's instructions for material requiring special handling, storage, or protection shall be provided prior to delivery of material.
- C. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to ensure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the Work.
- D. Store electrical, instrumentation, and control products, and equipment with bearings in weather-tight structures maintained above 60 degrees F. Protect electrical, instrumentation, and control products, and insulate against moisture, water, and dust damage. Connect and operate continuously space heaters furnished in electrical equipment.
- E. Store fabricated products aboveground on blocking or skids, and prevent soiling or staining. Store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter. Cover products that are subject



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to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.

- F. Store finished products that are ready for installation in dry and well-ventilated areas. Do not subject to extreme changes in temperature or humidity.
- G. After installation, provide coverings to protect products from damage due to traffic and construction operations. Remove coverings when no longer needed.
- H. Hazardous Materials: Prevent contamination of personnel, storage area, and Site. Meet requirements of product specification, codes, and manufacturer's instructions.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. Provide manufacturer's standard materials suitable for service conditions, unless otherwise specified in the individual Specifications.
- B. Where product specifications include a named manufacturer, with or without model number, and also include performance requirements, named manufacturer's products must meet the performance specifications.
- C. Like items of products furnished and installed in the Work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, manufacturer's services, and implement same or similar process instrumentation and control functions in same or similar manner.
- D. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.
- E. Provide interchangeable components of the same manufacturer, for similar components, unless otherwise specified.
- F. Equipment, Components, Systems, and Subsystems: Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable OSHA, state, and local health and safety regulations.

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- G. Regulatory Requirement: Coating materials shall meet federal, state, and local requirements limiting the emission of volatile organic compounds and for worker exposure.
- H. Safety Guards: Provide for all belt or chain drives, fan blades, couplings, or other moving or rotary parts. Cover rotating part on all sides. Design for easy installation and removal. Use 16-gauge or heavier; galvanized steel, aluminum coated steel, or galvanized or aluminum coated 1/2-inch mesh expanded steel. Provide galvanized steel accessories and supports, including bolts. For outdoors application, prevent entrance of rain and dripping water.
- I. Authority Having Jurisdiction (AHJ):
  - 1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
  - 2. Materials and equipment manufactured within the scope of standards published by UL shall conform to those standards and shall have an applied UL listing mark.
- J. Equipment Finish:
  - 1. Provide manufacturer's standard finish and color, except where specific color is indicated.
  - 2. If manufacturer has no standard color, provide equipment with finish as approved by Construction Manager.
- K. Special Tools and Accessories: Furnish to Owner, upon acceptance of equipment, all accessories required to place each item of equipment in full operation. These accessory items include, but are not limited to, adequate oil and grease (as required for first lubrication of equipment after field testing), light bulbs, fuses, hydrant wrenches, valve keys, handwheels, chain operators, special tools, and other spare parts as required for maintenance.
- L. Lubricant: Provide initial lubricant recommended by equipment manufacturer in sufficient quantity to fill lubricant reservoirs and to replace consumption during testing, startup, and operation until final acceptance by Owner.
- M. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the

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maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.

1. Use or reuse of components and materials without a traceable certification is prohibited.

## 2.02 FABRICATION AND MANUFACTURE

### A. General:

1. Manufacture parts to U.S.A. standard sizes and gauges.
2. Two or more items of the same type shall be identical, by the same manufacturer, and interchangeable.
3. Design structural members for anticipated shock and vibratory loads.
4. Use 1/4-inch minimum thickness for steel that will be submerged, wholly or partially, during normal operation.
5. Modify standard products as necessary to meet performance Specifications.

### B. Lubrication System:

1. Require no more than weekly attention during continuous operation.
2. Convenient and accessible; oil drains with bronze or stainless steel valves and fill-plugs easily accessible from the normal operating area or platform. Locate drains to allow convenient collection of oil during oil changes without removing equipment from its installed position.
3. Provide constant-level oilers or oil level indicators for oil lubrication systems.
4. For grease type bearings, which are not easily accessible, provide and install stainless steel tubing; protect and extend tubing to convenient location with suitable grease fitting.

## 2.03 SOURCE QUALITY CONTROL

- A. Where Specifications call for factory testing to be witnessed by Design Engineer, Owner, or Construction Manager, notify Construction Manager not less than 30 days prior to scheduled test date, unless otherwise specified.
- B. Calibration Instruments: Bear the seal of a reputable laboratory certifying instrument has been calibrated within the previous 12 months to a standard endorsed by the National Institute of Standards and Technology (NIST).
- C. Factory Tests: Perform in accordance with accepted test procedures and document successful completion.

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**PART 3 EXECUTION**

3.01 INSPECTION

- A. Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install material or equipment showing such effects. Remove damaged material or equipment from the Site and expedite delivery of identical new material or equipment. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within Contractor's control.

3.02 MANUFACTURER'S CERTIFICATE OF COMPLIANCE

- A. When so specified, a Manufacturer's Certificate of Compliance, a copy of which is attached to this section, shall be completed in full, signed by entity supplying the product, material, or service, and submitted prior to shipment of product or material or execution of the services.
- B. Construction Manager may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.
- C. Such form shall certify proposed product, material, or service complies with that specified. Attach supporting reference data, affidavits, and certifications as appropriate.
- D. May reflect recent or previous test results on material or product, if acceptable to Design Engineer.

3.03 INSTALLATION

- A. Equipment Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.
- B. No shimming between machined surfaces is allowed.
- C. Install the Work in accordance with NECA Standard of Installation, unless otherwise specified.
- D. Install the Equipment per Section 01 88 15, Anchorage and Bracing.
- E. Repaint painted surfaces that are damaged prior to equipment acceptance.
- F. Do not cut or notch any structural member or building surface without specific approval of Design Engineer.

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- G. Handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's instructions, and as may be specified. Retain a copy of manufacturers' instruction at Site, available for review at all times.
- H. For material and equipment specifically indicated or specified to be reused in the Work:
  - 1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed Work.
  - 2. Arrange for transportation, storage, and handling of products that require offsite storage, restoration, or renovation. Include costs for such Work in the Contract Price.

3.04 FIELD FINISHING

- A. In accordance with Section 09 90 00, Painting and Coating, and individual Specification sections.

3.05 ADJUSTMENT AND CLEANING

- A. Perform required adjustments, tests, operation checks, and other startup activities.

3.06 LUBRICANTS

- A. Fill lubricant reservoirs and replace consumption during testing, startup, and operation prior to acceptance of equipment by Owner.

3.07 ANCHOR BOLTS

- A. Provide anchor bolts as specified in the specification sections and in accordance with Section 05 50 00, Metal Fabrications.

3.08 SUPPLEMENT

- A. The supplement listed below, following "End of Section," is part of this Specification.
  - 1. Manufacturer's Certificate of Compliance.

**END OF SECTION**

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**MANUFACTURER'S CERTIFICATE OF COMPLIANCE**

OWNER: \_\_\_\_\_ PRODUCT, MATERIAL, OR SERVICE  
PROJECT NAME: \_\_\_\_\_ SUBMITTED: \_\_\_\_\_  
PROJECT NO: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I hereby certify that the above-referenced product, material, or service called for by the Contract for the named Project will be furnished in accordance with all applicable requirements. I further certify that the product, material, or service are of the quality specified and conform in all respects with the Contract requirements, and are in the quantity shown.

Date of Execution: \_\_\_\_\_, 20\_\_

Manufacturer: \_\_\_\_\_

Manufacturer's Authorized Representative (*print*): \_\_\_\_\_

\_\_\_\_\_  
(Authorized Signature)

**SECTION 01 74 19**  
**CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

**PART 1 GENERAL**

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
  - 1. Salvaging nonhazardous construction waste.
  - 2. Recycling nonhazardous construction waste.
  - 3. Disposing of nonhazardous construction waste.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. The Section shall be used in conjunction with Section 02 41 00, Demolition.

1.03 DEFINITIONS

- A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.
- C. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- D. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- E. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.04 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.

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- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
  - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.05 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 7 days of date established for the Notice to Proceed.

1.06 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit monthly report. Use the City of San Diego's and the California Green Building Code forms for construction waste. Include the following information:
  - 1. Material category.
  - 2. Generation point of waste.
  - 3. Total quantity of waste in tons.
  - 4. Quantity of waste salvaged, both estimated and actual in tons.
  - 5. Quantity of waste recycled, both estimated and actual in tons.
  - 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
  - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.



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- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. Qualification Data: For waste management coordinator.

1.07 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with experience of successful waste management coordination of projects with similar requirements. Superintendent may serve as Waste Management Coordinator.
- B. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.
- C. Waste Management Conference(s):
  - 1. Conduct conference(s) at Project site to review methods and procedures related to waste management including, but not limited to, the following:
    - a. Review and discuss waste management plan including responsibilities of each contractor and waste management coordinator.
    - b. Review requirements for documenting quantities of each type of waste and its disposition.
    - c. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
    - d. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
    - e. Review waste management requirements for each trade.

1.08 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to the requirements in this Section and in accordance with the City of San Diego's New Construction and Demolition Debris Diversion Requirement, and the California Green Building Code. Plan shall consist of waste identification, waste reduction work plan, including identification of five material streams. Indicate quantities by weight or volume but use same units of measure throughout waste management plan.

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- B. Waste Identification: Indicate anticipated types and quantities of site-clearing and construction waste generated by the Work. Use the City of San Diego's and the California Green Building Code forms for construction waste. Include estimated quantities and assumptions for estimates.
  
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Use the City of San Diego's and the California Green Building Code forms for construction waste. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
  - 1. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
  - 2. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
  - 3. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
  - 4. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

**PART 2 PRODUCTS**

**2.01 RECYCLING RECEIVERS AND PROCESSORS**

- A. Subject to compliance with requirements, available recycling receivers and processors include, but are not limited to, the following:
  - 1. The City of San Diego's published Certified Construction and Demolition Recycling Facilities.

**2.02 PERFORMANCE REQUIREMENTS**

- A. General: Achieve end-of-Project rates for salvage/recycling of 75 percent by weight of total nonhazardous solid waste generated by the Work and separation of four waste streams excluding landfill. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills

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and incinerators. Facilitate recycling and salvage of materials, including the following:

1. Construction Waste:
  - a. Masonry and CMU.
  - b. Lumber.
  - c. Wood sheet materials.
  - d. Wood trim.
  - e. Metals.
  - f. Roofing.
  - g. Insulation.
  - h. Carpet and pad.
  - i. Gypsum board.
  - j. Piping.
  - k. Electrical conduit.
  - l. Packaging:
    - 1) Regardless of salvage/recycle goal indicated in Article Performance Requirements, Paragraph General above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
      - a) Paper.
      - b) Cardboard.
      - c) Boxes.
      - d) Plastic sheet and film.
      - e) Polystyrene packaging.
      - f) Wood crates.
      - g) Wood pallets.
      - h) Plastic pails.
  - m. Construction Office Waste:
    - 1) Regardless of salvage/recycle goal indicated in Article Performance Requirements, Paragraph General above, salvage or recycle 100 percent of the following construction office waste materials:
      - a) Paper.
      - b) Aluminum cans.
      - c) Glass containers.
  - n. Electrical wiring.

**PART 3 EXECUTION**

3.01 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
  - 1. Distribute waste management plan to everyone concerned within 3 days of submittal return.
  - 2. Distribute waste management plan to entities when they first begin work onsite. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
  - 2. Comply with Section 01 50 00, Temporary Facilities and Controls, for controlling dust and dirt, environmental protection, and noise control.

3.02 RECYCLING CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by onsite workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

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- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type (minimum allowable is 4 streams) at Project site to the maximum extent practical according to approved construction waste management plan.
  - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - a. Inspect containers and bins for contamination and remove contaminated materials if found.
  - 2. Stockpile processed materials onsite without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
  - 4. Store components off the ground and protect from the weather.
  - 5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.03 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
  - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
  - 2. Polystyrene Packaging: Separate and bag materials.
  - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain onsite, break down pallets into component wood pieces and comply with requirements for recycling wood.
  - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
- C. Paint: Seal containers and store by type.

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3.04 DISPOSAL OF WASTE

A. General:

1. Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
  - a. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate onsite.
  - b. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
2. Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner's property.

B. Burning:

1. Do not burn waste materials.
2. Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

3.05 FINAL STATUS REPORT

- A. A Final Status Report demonstrating final disposition, either diverted or disposed, of materials generated by the Project is required before final payment.

**END OF SECTION**

**SECTION 01 77 00  
CLOSEOUT PROCEDURES**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

**A. Informational Submittals:**

1. Submit prior to application for final payment.
  - a. Record Documents: As described in Section 01 33 00, Submittal Procedures and as required in General Conditions.
  - b. Approved Shop Drawings and Samples: As described in Section 01 33 00, Submittal Procedures. Special bonds, Special Guarantees, and Service Agreements and as required in General Conditions.
  - c. Consent of Surety to Final Payment: As required in General Conditions.
  - d. Releases or Waivers of Liens and Claims: As required in General Conditions.
  - e. Releases from Agreements.
  - f. All documentation as required by all Funding Agencies.
  - g. Final Application for Payment: Submit in accordance with procedures, requirements stated in Section 01 29 00, Payment Procedures , and requirements stated in the General Conditions.
  - h. Extra Materials: As required by individual Specification sections.

**1.02 RECORD DOCUMENTS**

**A. Quality Assurance:**

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents and to ensure compliance with the requirements of the Contract Documents and Funding Agencies.
2. Accuracy of Records:
  - a. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
  - b. Purpose of Project record documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive Site measurement, investigation, and examination.

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3. Make entries within 24 hours after receipt of information that a change in the Work has occurred.
4. Prior to submitting each request for progress payment, request Construction Manager's review and approval of current status of record documents. Failure to properly maintain, update, and submit record documents may result in a deferral by Construction Manager to recommend whole or any part of Contractor's Application for Payment, either partial or final.

1.03 RELEASES FROM AGREEMENTS

- A. Furnish Owner written releases from property owners or public agencies where side agreements or special easements have been made, or where Contractor's operations have not been kept within the Owner's construction right-of-way.
- B. In the event Contractor is unable to secure written releases:
  1. Inform Owner of the reasons.
  2. Owner or its representatives will examine the Site, and Owner will direct Contractor to complete the Work that may be necessary to satisfy terms of the side agreement or special easement.
  3. Should Contractor refuse to perform this Work, Owner reserves right to have it done by separate contract and deduct cost of same from Contract Price, or require Contractor to furnish a satisfactory bond in a sum to cover legal Claims for damages.
  4. When Owner is satisfied that the Work has been completed in agreement with Contract Documents and terms of side agreement or special easement, right is reserved to waive requirement for written release if: (i) Contractor's failure to obtain such statement is due to grantor's refusal to sign, and this refusal is not based upon any legitimate Claims that Contractor has failed to fulfill terms of side agreement or special easement, or (ii) Contractor is unable to contact or has had undue hardship in contacting grantor.



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**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 MAINTENANCE OF RECORD DOCUMENTS

A. General:

1. Promptly following commencement of Contract Times, secure from Construction Manager at no cost to Contractor, one complete set of Contract Documents. Drawings will be full size.
2. Label or stamp each record document with title, "RECORD DOCUMENTS," in neat large printed letters.
3. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.

B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
2. Make documents and Samples available at all times for observation by Construction Manager.

C. Making Entries on Drawings:

1. Clearly describe change by graphic line and note as required. Entries shall be adequately clear to accurately locate and indicate changes on Drawings. Entries shall be dark enough to allow scanned copies.
  - a. Color Coding:
    - 1) Green when showing information deleted from Drawings.
    - 2) Red when showing information added to Drawings.
    - 3) Blue and circled in blue to show notes.
  2. Date entries.
  3. Call attention to entry by "cloud" drawn around area or areas affected.
  4. Legibly mark to record actual changes made during construction, including, but not limited to:
    - a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
    - b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Horizontal and vertical locations of utilities placed at locations different than the coordinates shown on Drawings shall be surveyed, with revised coordinates to two

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- decimal places, marked on Record Documents. Reference to at least two measurements to permanent surface improvements.
- c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
  - d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
  - e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, and Construction Manager's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number. Changes shall also be physically annotated on Drawings, in addition to noting the associated change.
5. Dimensions on Schematic Layouts: Show on Record Drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
- a. Clearly identify the item by accurate note such as "cast iron drain," "galv. water," and the like.
  - b. Show, by symbol or note, vertical location of item ("under slab," "in ceiling plenum," "exposed," and the like).
  - c. Make identification so descriptive that it may be related reliably to Specifications.

### 3.02 FINAL CLEANING

- A. At completion of the Work or of a part thereof and immediately prior to Contractor's request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to Contractor's notice of completion, clean entire Site or parts thereof, as applicable.
1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to Owner and Construction Manager.
  2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.
  3. Repair, patch, and touch up marred surfaces to specified finish and match adjacent surfaces.
  4. Clean all windows.
  5. Clean and wax wood, vinyl, or painted floors.
  6. Broom clean exterior paved driveways and parking areas.
  7. Hose clean sidewalks, loading areas, and others contiguous with principal structures.
  8. Rake clean all other surfaces.
  9. Remove snow and ice from access to buildings.

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10. Replace air-handling filters and clean ducts, blowers, and coils of ventilation units operated during construction.
  11. Leave water courses, gutters, and ditches open and clean.
- B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

3.03 SUBSTANTIAL COMPLETION

- A. When Contractor considers the entire Work ready for its intended use, Contractor shall notify Owner and Construction Manager in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete), and request that Construction Manager issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Construction Manager shall make an inspection of the Work to determine the status of completion. If Construction Manager does not consider the Work substantially complete, Construction Manager will notify Contractor in writing giving the reasons therefor.
- C. If Construction Manager considers the Work substantially complete, Construction Manager will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the tentative certificate during which to make written objection to Construction Manager as to any provisions of the certificate or attached list. If, after considering such objections, Construction Manager concludes that the Work is not substantially complete, Construction Manager will within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Construction Manager considers the Work substantially complete, Construction Manager will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Construction Manager believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Construction Manager will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and

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so inform Construction Manager in writing prior to Construction Manager's issuing the definitive certificate of Substantial Completion, Construction Manager's aforesaid recommendation will be binding on Owner and Contractor until final payment.

3.04 FINAL INSPECTION

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Construction Manager will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

**END OF SECTION**

**SECTION 01 78 23**  
**OPERATION AND MAINTENANCE DATA**

**PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Detailed information for the preparation, submission, and Design Engineer's review of Operations and Maintenance (O&M) Data, as required by individual Specification sections.

1.02 DEFINITIONS

- A. Preliminary Data: Initial and subsequent submissions for Design Engineer's review.
- B. Final Data: Design Engineer-accepted data, submitted as specified herein.
- C. Maintenance Operation: As used on Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

1.03 SEQUENCING AND SCHEDULING

- A. Equipment and System Data:
  - 1. Preliminary Data:
    - a. Do not submit until Shop Drawing for equipment or system has been reviewed and approved by Design Engineer.
    - b. Submit prior to shipment date.
  - 2. Final Data: Submit Instructional Manual Formatted data not less than 30 days prior to equipment or system field functional testing.
  - 3. Record Data: Submit final Compilation Formatted and Electronic Media Formatted data prior to Substantial Completion of Project.
- B. Materials and Finishes Data:
  - 1. Preliminary Data: Submit at least 15 days prior to request for final inspection.
  - 2. Final Data: Submit within 10 days after final inspection.

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1.04 DATA FORMAT

- A. Prepare preliminary data in the form of an instructional manual. Prepare final data in data compilation format and on electronic media.
- B. Instructional Manual Format:
1. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
  2. Size: 8-1/2 inches by 11 inches, minimum.
  3. Cover: Identify manual with typed or printed title “OPERATION AND MAINTENANCE DATA” and list:
    - a. Project title.
    - b. Include name of piece of equipment and equipment tag number.
    - c. Designate applicable system, equipment, material, or finish.
    - d. Identity of separate structure as applicable.
    - e. Identify volume number if more than one volume.
    - f. Identity of general subject matter covered in manual. Identity of equipment number and Specification section.
  4. Spine:
    - a. Project title.
    - b. Identify volume number if more than one volume.
  5. Title Page:
    - a. Contractor name, address, and telephone number.
    - b. Subcontractor, Supplier, installer, or maintenance contractor’s name, address, email address, and telephone number, as appropriate.
      - 1) Identify area of responsibility of each.
      - 2) Provide name and telephone number of local source of supply for parts and replacement.
  6. Table of Contents:
    - a. Neatly typewritten and arranged in systematic order with consecutive page numbers.
    - b. Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.
  7. Paper: 20-pound minimum, white for typed pages.
  8. Text: Manufacturer’s printed data, or neatly typewritten.
  9. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
  10. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs. FAX and thermal copies are not acceptable.

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C. Data Compilation Format:

1. Compile all Design Engineer-accepted preliminary O&M data into a hard-copy, hard-bound set.
2. Each set shall consist of the following:
  - a. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
  - b. Cover: Identify each volume with typed or printed title "OPERATION AND MAINTENANCE DATA, VOLUME NO. \_\_\_ OF \_\_\_", and list:
    - 1) Project title.
    - 2) Contractor's name, address, and telephone number.
    - 3) If entire volume covers equipment or system provided by one Supplier include the following:
      - a) Identity of general subject matter covered in manual.
      - b) Identity of equipment number and Specification section.
  - c. Provide each volume with title page and typed table of contents with consecutive page numbers. Place contents of entire set, identified by volume number, in each binder.
  - d. Table of contents neatly typewritten, arranged in a systematic order:
    - 1) Include list of each product, indexed to content of each volume.
    - 2) Designate system or equipment for which it is intended.
    - 3) Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.
  - e. Section Dividers:
    - 1) Heavy, 80-pound cover weight, tabbed with numbered plastic index tabs.
    - 2) Divider Page:
      - a) For each separate product, or each piece of operating equipment, with typed description of product and major component parts of equipment.
      - b) List with Each Product:
        - (1) Name, address, and telephone number of Subcontractor, Supplier, installer, and maintenance contractor, as appropriate.
        - (2) Identify area of responsibility of each.
        - (3) Provide local source of supply for parts and replacement.
      - c) Identity of separate structure as applicable.
  - f. Assemble and bind material, as much as possible, in same order as specified in the Contract Documents.

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D. Electronic Media Format:

1. Portable Document Format (PDF):
  - a. After all preliminary data has been found to be acceptable to Design Engineer, submit Operation and Maintenance Data in PDF format on CD. Minimize the number of files in each manual. Files should not be broken up unless the size is greater than 1 GB.
  - b. Files to be exact duplicates of Design Engineer-accepted preliminary data. Arrange by specification number and name.
  - c. Files to be processed for optical character recognition, bookmarked, and viewable in most recent version of Adobe Acrobat.
  - d. Document properties requirements of each file shall be set as follows:
    - 1) Title: Name of the system.
    - 2) Author: Manufacturer's name.
    - 3) Subject: Equipment Service Manual.
    - 4) Keywords: Equipment Tag Number, equipment type.
    - 5) Initial View – Navigation Tab: Bookmarks Panel and Page.
    - 6) Layout: Single Page.
    - 7) Magnification: Fit Page.
    - 8) Window Option: Show document title.
    - 9) Security: No security.

1.05 SUBMITTALS

A. Informational:

1. Data Outline: Submit two copies and electronic copies of a detailed outline of proposed organization and contents of Final Data prior to preparation of Preliminary Data.
2. Preliminary Data:
  - a. Submit two copies and electronic copies for Design Engineer's review.
  - b. If data meets conditions of the Contract:
    - 1) One copy will be returned to Contractor.
    - 2) One copy will be forwarded to Resident Project Representative.
    - 3) One copy will be retained in Engineer's file.
  - c. If data does not meet conditions of the Contract:
    - 1) All copies will be returned to Contractor with Engineer's comments (on separate document) for revision.
    - 2) Engineer's comments will be retained in Engineer's file.
    - 3) Resubmit two copies revised in accordance with Engineer's comments.



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3. Final Data: Submit two printed copies and an electronic copy in format specified herein.
4. Record Data: Submit two printed copies and an electronic copy in format specified herein, incorporating all modifications made during testing and commissioning.

1.06 DATA FOR EQUIPMENT AND SYSTEMS

A. Content for Each Unit (or Common Units) and System:

1. Product Data:
  - a. Include only those sheets that are pertinent to specific product.
  - b. Clearly annotate each sheet to:
    - 1) Identify specific product or part installed.
    - 2) Identify data applicable to installation.
    - 3) Delete references to inapplicable information.
  - c. Function, normal operating characteristics, and limiting conditions.
  - d. Performance curves, engineering data, nameplate data, and tests.
  - e. Complete nomenclature and commercial number of replaceable parts.
  - f. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
  - g. Spare parts ordering instructions.
  - h. Where applicable, identify installed spares and other provisions for future work (e.g., reserved panel space, unused components, wiring, terminals).
2. As-installed, color-coded piping diagrams.
3. Charts of valve tag numbers, with the location and function of each valve.
4. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:
  - a. Format:
    - 1) Provide reinforced, punched, binder tab; bind in with text.
    - 2) Reduced to 8-1/2 inches by 11 inches, or 11 inches by 17 inches folded to 8-1/2 inches by 11 inches.
    - 3) Where reduction is impractical, fold and place in 8-1/2-inch by 11-inch envelopes bound in text.
    - 4) Identify Specification section and product on Drawings and envelopes.
  - b. Relations of component parts of equipment and systems.
  - c. As-built control and flow diagrams.
  - d. Coordinate drawings with Project record documents to assure correct illustration of completed installation.

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5. Instructions and Procedures: Within text, as required to supplement product data.
  - a. Format:
    - 1) Organize in consistent format under separate heading for each different procedure.
    - 2) Provide logical sequence of instructions for each procedure.
    - 3) Provide information sheet for Owner's personnel, including:
      - a) Proper procedures in event of failure.
      - b) Instances that might affect validity of guarantee or Bond.
  - b. Installation Instructions: Including alignment, adjusting, calibrating, and checking.
  - c. Operating Procedures:
    - 1) Startup, break-in, routine, and normal operating instructions.
    - 2) Test procedures and results of factory tests where required.
    - 3) Regulation, control, stopping, and emergency instructions.
    - 4) Description of operation sequence by control manufacturer.
    - 5) Shutdown instructions for both short and extended duration.
    - 6) Summer and winter operating instructions, as applicable.
    - 7) Safety precautions.
    - 8) Special operating instructions.
  - d. Maintenance and Overhaul Procedures:
    - 1) Routine maintenance.
    - 2) Guide to troubleshooting.
    - 3) Disassembly, removal, repair, reinstallation, and re-assembly.
6. Guarantee, Bond, and Service Agreement: In accordance with Section 01 77 00, Closeout Procedures.

B. Content for Each Electric or Electronic Item or System:

1. Description of Unit and Component Parts:
  - a. Function, normal operating characteristics, and limiting conditions.
  - b. Performance curves, engineering data, nameplate data, and tests.
  - c. Complete nomenclature and commercial number of replaceable parts.
  - d. Interconnection wiring diagrams, including control and lighting systems.
2. Circuit directories of panelboards.
3. Electrical service.
4. Control requirements and interfaces.
5. Communication requirements and interfaces.
6. List of electrical relay settings, and control and alarm contact settings.

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7. Electrical interconnection wiring diagram, including as applicable, single-line, three-line, schematic and internal wiring, and external interconnection wiring.
8. As-installed control diagrams by control manufacturer.
9. Operating Procedures:
  - a. Routine and normal operating instructions.
  - b. Startup and shutdown sequences, normal and emergency.
  - c. Safety precautions.
  - d. Special operating instructions.
10. Maintenance Procedures:
  - a. Routine maintenance.
  - b. Guide to troubleshooting.
  - c. Adjustment and checking.
  - d. List of relay settings, control and alarm contact settings.
11. Manufacturer's printed operating and maintenance instructions.
12. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

C. Maintenance Summary:

1. Compile individual Maintenance Summary for each applicable equipment item, respective unit or system, and for components or sub-units.
2. Format:
  - a. Use Maintenance Summary Form bound with this section or electronic facsimile of such.
  - b. Each Maintenance Summary may take as many pages as required.
  - c. Use only 8-1/2-inch by 11-inch size paper.
  - d. Complete using typewriter or electronic printing.
  - e. Provide in electronic media format.
3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommend type, grade, and temperature range of lubricants and frequency of lubrication.
4. Recommended Spare Parts:
  - a. Data to be consistent with manufacturer's Bill of Materials/Parts List furnished in O&M manuals.
  - b. "Unit" is the unit of measure for ordering the part.
  - c. "Quantity" is the number of units recommended.
  - d. "Unit Cost" is the current purchase price.

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1.07 DATA FOR MATERIALS AND FINISHES

- A. Content for Architectural Products, Applied Materials, and Finishes:
  - 1. Manufacturer's data, giving full information on products:
    - a. Catalog number, size, and composition.
    - b. Color and texture designations.
    - c. Information required for reordering special-manufactured products.
  - 2. Instructions for Care and Maintenance:
    - a. Manufacturer's recommendation for types of cleaning agents and methods.
    - b. Cautions against cleaning agents and methods that are detrimental to product.
    - c. Recommended schedule for cleaning and maintenance.
  
- B. Content for Moisture Protection and Weather Exposed Products:
  - 1. Manufacturer's data, giving full information on products:
    - a. Applicable standards.
    - b. Chemical composition.
    - c. Details of installation.
  - 2. Instructions for inspection, maintenance, and repair.

1.08 SUPPLEMENT

- A. The supplement listed below, following "End of Section," is part of this Specification.
  - 1. Maintenance Summary Form.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

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**MAINTENANCE SUMMARY FORM**

PROJECT: \_\_\_\_\_ CONTRACT NO.: \_\_\_\_\_

1. EQUIPMENT ITEM \_\_\_\_\_

2. MANUFACTURER \_\_\_\_\_

3. WEBSITE \_\_\_\_\_

3. EQUIPMENT/TAG NUMBER(S) \_\_\_\_\_

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) \_\_\_\_\_

5. NAMEPLATE DATA (hp, voltage, speed, etc.) \_\_\_\_\_

6. MANUFACTURER'S LOCAL REPRESENTATIVE \_\_\_\_\_

a. Name \_\_\_\_\_ Telephone No. \_\_\_\_\_

b. Address \_\_\_\_\_

c. Email \_\_\_\_\_

7. MAINTENANCE REQUIREMENTS

<b>Maintenance Operation Comments</b>	<b>Frequency</b>	<b>Lubricant (If Applicable)</b>
List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable. (Reference to manufacturer's catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

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8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

**SECTION 01 88 15**  
**ANCHORAGE AND BRACING**

**PART 1 GENERAL**

1.01 SUMMARY

- A. This section covers requirements for anchorage and bracing of equipment, distribution systems, and other nonstructural components required in accordance with the 2016 California Building Code (CBC), for seismic, wind, gravity, soil, and operational loads.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Institute of Steel Construction (AISC) 360, Specification for Structural Steel Buildings.
  2. American Society of Civil Engineers (ASCE): ASCE 7, Minimum Design Loads for Buildings and Other Structures.
  3. American Society of Civil Engineers (ASCE): ASCE 41-17, Seismic Evaluation and Retrofit of Existing Buildings.
  4. California Building Commission: 2016 CBC.
  5. International Code Council (ICC): International Building Code (IBC).

1.03 DEFINITIONS

- A. Authority Having Jurisdiction (AHJ): Permitting building agency; may be a federal, state, local, or other regional department, or individual including building official, fire chief, fire marshal, chief of a fire prevention bureau, labor department, or health department, electrical inspector; or others having statutory authority. AHJ may be Owner when authorized to be self-permitting by governmental permitting agency or when no governmental agency has authority.
- B. Designated Seismic System: Architectural, electrical, and mechanical system or their components for which component importance factor is greater than 1.0.

1.04 DESIGN AND PERFORMANCE REQUIREMENTS

- A. General:
1. Anchorage and bracing systems shall be designed by a qualified professional engineer registered in the State of California.

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2. Design anchorage and bracing of architectural, mechanical, and electrical components and systems in accordance with this section, unless a design is specifically provided within Contract Documents or where exempted hereinafter.
3. Design attachments, braces, and anchors for equipment, components, and distribution systems to structure for gravity, seismic, wind, and operational loading.
4. Design seismic anchorage and bracing for modified existing architectural, mechanical, or electrical systems where code requirements would dictate design for similar new components.
5. Anchor and brace piping and ductwork, whether exempt or not exempt for this section, so that lateral or vertical displacement does not result in damage or failure to essential architectural, mechanical, or electrical equipment.
6. Architectural Components: Includes, but are not limited to, nonstructural walls and elements, partitions, cladding and veneer, access flooring, signs, cabinets, suspended ceilings, and glass in glazed curtain walls and partitions.
7. Provide supplementary framing where required to transfer anchorage and bracing loads to structure.
8. Adjust equipment pad sizes or provide additional anchorage confinement reinforcing to provide required anchorage capacities.
9. Anchor existing equipment as noted on Drawings.
10. Design anchorage and bracing for:
  - a. Equipment and components that weigh more than 400 pounds and have center of mass located 4 feet or less above adjacent finished floor.
  - b. Equipment weighing more than 20 pounds that has center of mass located more than 4 feet above adjacent finished floor.
  - c. Mechanical and electrical components that are not provided with flexible connections between components and associated ductwork, piping, or conduit.
  - d. Distribution systems that weigh more than 5 pounds per foot that have center of mass located more than 4 feet above adjacent finished floor.
11. Design seismic anchorage and bracing for Designated Seismic Systems regardless of weight or mounting height.
  - a. Component Important Factor:
    - 1)  $I_p$  equals 1.0, unless noted otherwise.
    - 2)  $I_p$  shall be taken as 1.5 if any of the following conditions apply:
      - a) Component is required to function for life-safety purposes after an earthquake, including fire protection sprinkler systems and egress stairways.
      - b) Component contains hazardous materials.



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- c) Component is in or attached to Risk Category IV structure and is needed for continued operation of facility or its failure could impair continued operation of facility.
  - 3) Per Section 01 61 00, Common Product Requirements.
12. For components exempted from design requirements of this section, provide bolted, welded, or otherwise positively fastened attachments to supporting structure.

B. Design Loads:

1. Gravity: Design anchorage and bracing for self-weight and superimposed loads on components and equipment.
2. Wind: Design anchorage and bracing for wind criteria provided in Section 01 61 00, Common Product Requirements and on General Structural Notes on Drawings for exposed architectural components and exterior and wind-exposed mechanical and electrical equipment. Alternately, manufacturer certification may be provided for components such as roofing and flashing to verify attachments meet Project-specific design criteria.
3. Operational:
  - a. For loading supplied by equipment manufacturer for CBC required load cases.
  - b. Loads may include equipment vibration, torque, thermal effects, effects of internal contents (weight and sloshing), water hammer, and other load-inducing conditions.
  - c. Locate braces to minimize vibration to or movement of structure.
  - d. For vibrating loads, use anchors meeting requirements of Section 05 50 00, Metal Fabrications, for anchors with designated capacities for vibratory loading per manufacturer's ICC-ES report.
4. Hydraulic: Design of anchorage for submerged gates and other mechanical equipment shall include hydrostatic and hydrodynamic loads determined in accordance with Section 15.7 of ASCE 7-10.
5. Seismic:
  - a. In accordance with 2016 CBC, Section 1613, and Chapter 13 of ASCE 7.
  - b. Design anchorage and bracing for design criteria listed on General Structural Notes on Drawings.
  - c. Design forces for anchors in concrete or masonry shall be in accordance with ASCE 7, Section 13.4.2 or CBC Section 1905.1.9 as applicable for Project Seismic Design Category.

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C. Seismic Design Requirements:

1. Nonstructural Components: Design as nonbuilding structures for components with weights greater than or equal to 25 percent of effective seismic weight of overall structure.
2. Analyze local region of body of nonstructural component for load transfer of anchorage attachment if component  $I_p$  equals 1.5.
3. The following are exempt from requirements for provision of seismic anchorages and bracing, in addition to those items specifically exempted in ASCE 7, Part 13.5 for architectural components and Part 13.6 for electrical and mechanical equipment:
  - a. Furniture, except storage cabinets and bookshelves over 6 feet tall.
  - b. Temporary or movable equipment.
4. Fire protection sprinkler systems designed and constructed in accordance with NFPA 13 shall be considered to meet requirements of Chapter 13 of ASCE 7.
5. Provide support drawings and calculations for electrical distribution components if any of the following conditions apply:
  - a. Conduit diameter is greater than 2.5-inch trade size.
  - b. Total weight of bus duct, cable tray, or conduit supported by trapeze assemblies exceeds 10 pounds per foot.
6. Existing components, systems, and equipment in their final condition that are modified by Project requirements and are not exempted by above paragraph require the same anchorage and bracing drawing and calculation submittals as new equipment. Field verify existing conditions.
7. Other seismic design and detailing information identified in ASCE 7, Chapter 13, is required to be provided for new and modified or noted architectural, mechanical and electrical components, systems, or equipment.

1.05 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
  - a. List of architectural, mechanical, and electrical equipment requiring Contractor-designed anchorage and bracing, unless specifically exempted.
  - b. Manufacturers' engineered seismic and nonseismic hardware product data sealed by a civil or structural engineer registered in the State of California.
  - c. Attachment assemblies' drawings including seismic attachments; include connection hardware, braces, and anchors or anchor bolts for nonexempt components, equipment, and systems.

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- d. List of existing architectural, mechanical, and electrical equipment or components to be modified in Project requiring Contractor-designed anchorage and bracing in final retrofitted condition.
- e. Drawings for seismic attachment assemblies include connection hardware, braces, and anchors (or anchor bolts) for modified, nonexempt existing components, equipment, and systems where a combination of new and existing systems or components' final condition would require anchorage or bracing under this specification for new equipment.
- f. Submittal will be rejected if proposed anchorage method would create excessive stress to supporting member. Revise anchorages and strengthen structural support to eliminate overstressed condition.

B. Informational Submittals:

- 1. Anchorage and Bracing Calculations: For attachments, braces, and anchorages, include IBC and Project-specific criteria as noted on General Structural Notes on Drawings, in addition to manufacturer's specific criteria used for design; sealed by a civil or structural engineer registered in the State of California.
- 2. Manufacturer's hardware installation requirements.

C. Deferred Submittals:

- 1. Submitted seismic anchorage drawings and calculations for Designated Seismic Systems are identified as CBC deferred submittals and will be submitted to and must be accepted by AHJ prior to installation of component, equipment, or distribution system.
- 2. Submit deferred Action Submittals such as Shop Drawings with supporting deferred informational submittals such as calculations no less than 8 weeks in advance of installation of component, equipment or distribution system to be anchored to structure.

1.06 SOURCE QUALITY CONTROL

- A. Contractor and supplier responsibilities to accommodate Owner-furnished shop fabrication related special inspections and testing are provided in Project's Statement of Special Inspections on Drawings, and Section 01 45 33, Special Inspection, Observation, and Testing.
- B. Provide all other specified, regulatory required, or required repair verification inspection and testing that is not listed in Statement of Special Inspections Provide Source Quality Control for welding and hot-dip galvanizing of anchors in accordance with Section 05 50 00, Metal Fabrications.

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- C. Contractor and supplier responsibilities to accommodate Owner-furnished shop fabrication related special inspections and testing are provided in Project's Statement of Special Inspections on Drawings, and Section 01 45 33, Special Inspection, Observation, and Testing.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. Design and construct attachments and supports transferring seismic and nonseismic loads to structure of materials and products suitable for application and in accordance with design criteria shown on Drawings and nationally recognized standards.
- B. Provide anchor bolts for anchorage of equipment to concrete or masonry in accordance with Section 05 50 00, Metal Fabrications. Provide anchor bolts of the size, minimum embedment, and spacing designated in calculations submitted by Contractor and accepted by Design Engineer.
- C. Provide post-installed concrete and masonry anchors for anchorage of equipment to concrete or masonry in accordance with Section 05 05 19, Post-Installed Anchors. Provide post-installed anchors of the size, minimum embedment, and spacing designated in calculations submitted by Contractor and accepted by Design Engineer.
- D. Do not use powder-actuated fasteners or sleeve anchors for seismic attachments and anchorage where resistance to tension loads is required. Do not use expansion anchors, other than undercut anchors, for nonvibration isolated mechanical equipment rated over 10 hp.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Make attachments, bracing, and anchorage in such a manner that component lateral force is transferred to lateral force resisting system of structure through a complete load path.
- B. Design, provide, and install overall seismic anchorage system to provide restraint in all directions, including vertical, for each component or system so anchored.
- C. Provide snubbers in each horizontal direction and vertical restraints for components mounted on vibration isolation systems where required to resist overturning.

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- D. Provide piping anchorage that maintains design flexibility and expansion capabilities at flexible connections and expansion joints.
  - 1. Piping and ductwork suspended more than 12 inches below supporting structure shall be braced for seismic effects to avoid significant bending of hangers and their attachments unless high or limited deformability piping is used per ASCE 7, Section 13.6.8 or HVAC ducts have a cross-sectional area of less than 6 square feet or weigh 17 pounds per foot or less.
- E. Anchor tall and narrow equipment such as motor control centers and telemetry equipment at base and within 12 inches from top of equipment, unless approved otherwise by Design Engineer.
- F. Do not attach architectural, mechanical, or electrical components to more than one element of a building structure at a single restraint location where such elements may respond differently during a seismic event. Do not make such attachments across building expansion and contraction joints.

3.02 INSTALLATION

- A. Do not install components or their anchorages or restraints prior to review and acceptance by Design Engineer and AHJ.
- B. Notify Construction Manager upon completion of installation of seismic restraints in accordance with Section 01 45 33, Special Inspection, Observation, and Testing.

3.03 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

- A. In accordance with Section 05 50 00, Metal Fabrications, and Section 05 05 19, Post-Installed Anchors.
- B. Owner-Furnished Quality Assurance, in accordance with IBC Chapter 17 requirements, is provided in Statement of Special Inspections Plan on Drawings. Contractor responsibilities and related information are included in Section 01 45 33, Special Inspection, Observation, and Testing.
- C. Provide any other specified, regulatory required, or required repair verification inspection and testing that is not listed in Statement of Special Inspections.

**END OF SECTION**

**SECTION 01 91 14**  
**TESTING, INTEGRATION, AND STARTUP**

**PART 1 GENERAL**

1.01 STARTUP

- A. The goal of startup is to verify proper performance and operation of the Facility.
- B. Testing, integration, and startup are complex portions of the Work required for satisfactory completion and require thorough planning and proper execution.
- C. See Supplement 1, Phase 1 Commissioning Model for the MBC startup in the context of the overall Program Integration and Acceptance Plan.
- D. See Supplement 2, MBC Testing, Integration and Startup Flowchart, for a graphical representation of the startup processes.

1.02 DEFINITIONS

- A. Acceptance Testing: A contractually required, specific and measurable test, often with liquidated damages attached, to demonstrate a system or facility performs to its intended function (e.g. flow amounts, duration and quality criteria are met). A successor activity to Performance Testing all major defects are resolved at this point.
- B. Distributed Control System Provider (DCSP): Entity who is responsible for the development and programming of the Facility DCS.
- C. Auxiliary Systems: Subsystems and systems selected by the Owner as critical to the operation and function of the Work. Auxiliary systems are more specifically identified in the Contract Documents.
- D. Beneficial Use: Utilization of a system, unit process, or facility by the Owner. Refer to Supplemental Special Provisions for further definition and extended warranty requirements for equipment placed into Beneficial Use.
- E. Facility Commissioning:
  - 1. The disciplined and systematic process of assuring that all components, subsystems and systems of a constructed unit are designed, installed, tested and operated in conformance with the design intent, and functional intent and operational requirements of the Owner.

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2. This includes:
  - a. Proof testing of design intent using static check sheets, dynamic check sheets and defined procedures to ensure compliance with design drawings, data sheets, and specifications.
  - b. Achieving a smooth and safe transition from an inert state to a completely tested, clean, leak tight, operable and safe unit ready for start-up and performance testing.
  - c. All testing shown in Supplement 1, Commissioning Model.
  
- F. Components: Individual items of equipment or portions of the Work that when combined with other components make up subsystems or systems. Components may be minor items such as pressure gauges, or they may be significant items such as pump motors.
  
- G. Contract Documents: Construction Contract, Specifications and Drawings.
  
- H. Facility: The combined equipment and systems collocated to perform a specified function e.g. Metropolitan Biosolids Center (MBC).
  
- I. Factory Acceptance Testing (FAT): All testing required to be conducted at the fabricator's/manufacturer's/vendor's off-site locations, witnessed or unwitnessed. Includes all such testing, regardless of the specific descriptive title used for said testing in the Contract Documents.
  
- J. Final Completion: Refer to the Contract requirements and Supplementary Provisions.
  
- K. Functional Testing: A test of a given component, subsystem or system to confirm its operation meets specifications and Contract requirements. Functional testing is a prerequisite of Facility Commissioning.
  
- L. Integration Period: This is the period occurring after Intermediate Substantial Completion and before substantial completion during which the MBC Improvements project will be tested and operated as part of the overall PureWater Program system, including the Morena Force Main and Pump Station, the NCPWF Influent Pump Station and Conveyance, the NCPWF, the North City Water Reclamation Facility Expansion, the NCPWF Pump Station and the North City Pure Water Pipeline, and Dechlorination Facilities.
  
- M. Intermediate Substantial Completion: The time at which the Project's operating facilities or systems are sufficiently complete to send tertiary flow to the MBC to perform an integrated startup with other facilities within the Program. Refer to Supplement 1 for commissioning model planned. The Contractor shall support all activities within the Integration period as described in Section 01 91 14, Testing, Integration, and Startup. Refer to Contract requirements and Supplementary Provisions.

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- N. Refer to Contract requirements and Supplementary Provisions.
- O. Digester Stress Testing Phase: This is a phase in which the Owner will perform testing of the digesters. This phase runs concurrent with the Integration Period of other projects. These other projects include the Morena Force Main and Pump Station, the NCPWF Influent Pump Station and Conveyance, the NCPWF, the Metropolitan Biosolids Center Improvements, the NCPWF Pump Station and the North City Pure Water Pipeline, and Dechlorination Facilities.
- P. Joint Test Group (JTG): Workgroup consisting of personnel from the Design Engineer, Construction Manager, Owner, Contractor, and Subcontractors whose goal is to facilitate pre-startup and startup of the Facility. This work group shall also support the Integration Period testing as part of a larger work group from other Facilities.
- Q. Major Equipment Systems: Systems, subsystems, or major equipment components selected by the Owner as critical to the operation and function of the Work. Major equipment systems are more specifically identified in the Contract Documents.
- R. Manufacturer's Installation Inspection: Preliminary inspection conducted by Manufacturer or Manufacturer's accepted representative to confirm proper installation of components, systems, and subsystems.
- S. Mechanical/Electrical Functional Testing: Testing performed to confirm general performance of mechanical and electrical systems. Hydrostatic leak testing of pipes is an example. Electrical testing specified in Division 26, Electrical, shall be considered Mechanical/Electrical Functional Testing.
- T. Performance Test: A defined test of a system, systems or facility over a specified period of time to demonstrate the system or facility is fully operational and meets all specifications, performance objectives and Contract requirements. Performance testing will be done with clean water and wastewater, as defined with these Contract Documents.
- U. Operational Readiness Test, See Section 40 90 00, Instrumentation and Control.
- V. Instrumentation and Control (I&C): Computer-based system whose purpose is to control and supervise the overall Facility operation. See Section 40 90 00, Instrumentation and Control.
- W. Staging Site Demonstration: Startup phase during which the DCSP performs an FAT to test the proper communication and action of the DCSP-developed software system. This testing will be conducted offsite.



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- X. Startup: The act of starting or operating a component, subsystem or system and testing its functionality and performance against defined metrics.
- Y. Subsystems: A group of related equipment that performs a defined function and is an element of a larger system.
- Z. Substantial Completion: Upon satisfactory completion of the 30-Day Systemwide Facility Acceptance Test, See Supplement 1 Phase 1 Commissioning Model. Refer to Contract requirements and Supplementary Provisions.
- AA. Systems: A group of related components, equipment or subsystems that perform a defined function or set of functions within a facility.
- BB. Training: Classroom and equipment area instruction by Manufacturer or Manufacturer accepted representative intended to educate the Owner on the proper operation and maintenance of components, systems, and subsystems.
- CC. Unit Process: Portion of the facility that performs a specific process function, such as influent pumping, screening and grit removal, chemical feed, blowers, membrane system, and plant water.

1.03 SUBMITTALS

A. Action Submittals:

- 1. Startup Personnel Qualifications: Startup Manager and Project Integrator shall be experienced providing similar services for projects of the size and type as this Project.
- 2. Startup Management Plan: Submitted within 60 days after Notice to Proceed.
- 3. Overall Facility Startup Plan.
- 4. Factory Acceptance Test Plans.
- 5. Acceptance Test Plans.
- 6. Startup Schedule:
  - a. Schedule shall be a detailed Oracle Primavera P6 schedule linked to the milestones and key startup activities contained in the Construction Schedule as specified in Section 01 32 00, Construction Progress Documentation.
  - b. The Startup Schedule shall include each phase of testing of for the systems defined herein.
  - c. Schedule shall be submitted in both XER and PDF format and updated monthly.
  - d. The detailed Startup Schedule shall be submitted no later than 6 months prior to the start of ORT in the accepted Baseline

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Schedule, as specified in Section 01 32 00. Construction Progress Documentation.

7. Startup Results Submittal:
  - a. Include the following:
    - 1) Final minutes from all JTG meetings.
    - 2) Results documentation from all Factory Acceptance Testing.
    - 3) Completed test plans (endorsed by Construction Manager and Contractor).
    - 4) Record of all Training:
      - a) Training requests.
      - b) Agendas.
      - c) Sign in sheets.
      - d) Handouts.
      - e) Electronic copy of all training presentations.
    - 5) Record of all Manufacturer Services/Inspections.
    - 6) Record of all testing not covered above.

1.04 JOINT TEST GROUP (JTG)

A. Purpose:

1. The purpose of the JTG is to facilitate communication and collaboration between all parties required to successfully complete startup including but not limited to the following:
  - a. Prepare test plans.
  - b. Conduct testing.
  - c. Oversee testing.
  - d. Assign individual or multiple JTG personnel tasks associated with startup to be completed outside of the JTG workshops.

B. Personnel:

1. The following Owner personnel will participate in the JTG:
  - a. Design Engineer.
  - b. DCSP.
  - c. Owner's Representatives:
    - 1) Construction representative.
    - 2) Operations representative.
  - d. Construction Manager.
  - e. Owner's Startup Manager.
  - f. Others as required.
2. The Contractor shall assign the following personnel to the JTG:
  - a. Contractor's Startup Manager.
  - b. Project Integrator.
  - c. Electrical Subcontractor Management Representative.

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- d. Centrifuge Supplier Management Representative.
- C. The JTG will participate in the following meetings:
- 1. Startup Preparation Workshops:
    - a. Status of equipment submittals and startup plan for overall facility.
    - b. Development of team.
    - c. Frequency: Every 2 weeks.
    - d. Duration: 4 hours minimum.
    - e. Start Date: 4 weeks after Notice to Proceed.
  - 2. Startup Planning Workshops:
    - a. Preparation of test plans.
    - b. Review of equipment shop drawings.
    - c. Frequency: Every week.
    - d. Duration: 8 hours minimum.
    - e. Start Date: 6 months before anticipated commencement of functional testing.
  - 3. Factory Acceptance Test Prep Workshops:
    - a. Preparation of factory test plans.
    - b. Address scheduling.
    - c. Frequency: Once per required FAT.
    - d. Duration: 8 hours minimum.
    - e. Start Date: 2 months prior to anticipated FAT date.
  - 4. Prestartup Execution Workshops:
    - a. Finalize planning for startup activities.
    - b. Finalize test plans.
    - c. Address any supplier/manufacturer issues.
    - d. Frequency: Every week.
    - e. Duration: 8 hours minimum.
    - f. Start Date: 1 month before anticipated commencement of functional testing.
  - 5. Startup Execution Workshops:
    - a. Current status of testing.
    - b. Identification of specific needs.
    - c. Identification and resolution of issues.
    - d. Frequency: Daily.
    - e. Duration: 4 hours minimum.
    - f. Start Date: Commencement of functional testing through completion of 30-Day Facility Acceptance Testing.
- D. Authority:
- 1. The Construction Manager will be the final authority on all disputes. Construction Manager's authority is not intended to compromise or

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change the Contractor’s rights and responsibilities as described elsewhere in these Contract Documents.

2. The JTG may not independently amend or change the Contract Documents. However, the Contract Documents may be amended or changed according to the Contract Documents, based on JTG recommendations approved by the Construction Manager.

E. Contractor Participation:

1. The Contractor is required to participate in all JTG meetings and shall dedicate the required time and personnel to complete tasks assigned by the JTG. This shall include, but not be limited to the development of all startup and testing plans identified as being required to be led by the Contractor.
2. The Contractor shall include, in his lump sum bid, all costs associated with onsite and offsite testing described in these Specifications including travel, subsistence, lodging, etc.

1.05 ORGANIZATION OF STARTUP PHASES

A. The following table summarizes the various phases of startup:

<b>Description</b>	<b>Duration</b>	<b>Preceding Constraints</b>	<b>Comments</b>
Submittals	As required to meet testing schedule		
Factory Acceptance Testing	As required to meet testing schedule	Approved submittals required prior to testing	
Staging Site Demonstration	180 days	Delivery of DCS components to DCSP staging site Completion of all FATs	Done by DCSP
Mechanical/Electrical Functional Testing and Equipment Testing	As required to meet testing schedule for individual unit process	Complete all FATs Complete equipment and piping installation Approved submittals required prior to testing (including O&Ms)	Includes hydrostatic testing

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Description	Duration	Preceding Constraints	Comments
PIC Operational Readiness Test	As required to meet testing schedule	Manufacturer's installation assistance and inspection  Approved submittals required prior to testing (including O&Ms)  Completion of PICS Operational Readiness Test  Completion of staging site demonstration test and loading of application software  Approved submittals required prior to testing (including O&Ms)	
Functional Testing on Unit Processes and Auxiliary Systems	As required to meet testing schedule	Completion of PIC Operational Readiness Test  Approved submittals required prior to testing (including O&Ms)	
Training	As specified	Completion of all functional and performance testing	
Facility Commissioning	As required	Completion of Functional Testing of Unit Processes and Auxiliary Systems	
Integration Period Testing and Commissioning	120 days	Intermediate Substantial Completion Facility and Unit Process Commissioning as required  Interfacing Facilities Ready to Test	Integrating the NCPWF, MPS, and NCWRP facilities

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Description	Duration	Preceding Constraints	Comments
Facility Acceptance Test	30 days	Completion of commissioning of the unit processes and facilities. Manufacturer's Certificate of Proper Installation. Training. Approved submittals required prior to testing (including O&Ms).	

1.06 WORK RELATED TO THE FACILITY

- A. During the period between Intermediate Substantial Completion and Substantial Completion, the Owner will conduct integration procedures associated with the Facility and its coordinated operation with NCPWF, Morena Pump Station, and North City Water Reclamation Plant, and systems being constructed by others, such as the communications and control interface and COMNET upgrade. This integration will generally consist of communications system verification and a verification that the facilities can operate as one overall system.

1.07 CONTRACTOR STARTUP PERSONNEL

- A. Contractor shall provide personnel, both supervisory and from the applicable trades, who are experienced in startup, testing, and commissioning for the execution of the work described in these Contract Documents.
- B. Startup Manager: Only assigned duties are those specifically related to planning and execution of startup activities in support of the Work. The Startup Manager shall have the necessary experience to fully understand all startup requirements and the authority to dedicate Contractor's resources as required to execute the Work.
  - 1. The Startup Manager shall have the following minimum qualifications:
    - a. Has provided startup services for wastewater facilities similar to those included in the Work.
  - 2. The Contractor shall allocate the costs for the Startup Manager as a monthly allocation starting at the project limited NTP and terminating at Final Completion.

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3. Once the Owner and Construction Manager accept the Startup Manager, the Contractor shall not change the Startup Manager throughout the full period of performance of the Work, beginning after the limited NTP, without the express written permission of Construction Manager and Owner.
4. The minimum scope of services to be managed and/or executed by the Startup Manager shall include the following tasks:
  - a. Formation of an onsite startup team of supervisory staff, including the Contractor's Project Integrator, qualified in each and every element of the startup process required as part of the Work. This staff shall prepare all Contractor-performed startup and testing documentation and direct the associated startup activities, including all required Contractor and Subcontractor personnel required for testing. This requirement is also applicable to all factory testing, whether witnessed by Construction Manager or not.
  - b. Complete planning, development, and where required, the preparation of all Startup and Test Plans, testing procedures, schedules, and related prerequisite, and final documentation for startup activities required by the Contract Documents. This requirement is applicable to all required startup and/or testing plans, reports, and procedures, regardless of the specific portion of the Contract Documents where they may be specified or otherwise required.
  - c. Overall coordination and scheduling of all startup and testing activities. This shall include the development of detailed startup and testing schedules, integrated with Contractor's CPM schedule. It shall also include all coordination with the Owner and Construction Manager for operation of the system to accommodate test flows and joint testing activities.
  - d. Coordination of all manufacturers' startup activities and certification of proper installation and/or function as required by the Contract Documents.
  - e. Coordination, direction, and management of the actual day-to-day testing.
  - f. Review and certify all test results. Prepare and/or compile all versions of all test reports and related submittals. Prior to being submitted to the Construction Manager, all test reports shall be certified by the Startup Manager that the reports and associated test results comply with the Contract Documents.
  - g. Coordinate all testing and startup with the Design Engineer, Construction Manager, and Owner.
  - h. Integration with the vendor packaged control systems.

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- C. Project Integrator: Only assigned duties are those specifically required to plan and execute the installation, interconnection, integration, and startup of the various PICS devices, panels, components, systems, and subsystems required for the Work. The Project Integrator shall have the necessary experience to fully understand all PICS and related devices, panels, components, systems, and subsystems installation, integration, and startup requirements and the authority to dedicate Contractor's resources as required to execute the Work.
1. The Project Integrator shall have the following minimum qualifications:
    - a. Has provided PICS integration services for wastewater facilities similar to those included in the Work.
    - b. The Project Integrator shall not be the same person as the System Integrator for the Instrumentation and Control system.
  2. The Contractor shall allocate the costs for the Project Integrator as a monthly allocation starting at the project limited NTP and terminating at Final Completion.
  3. Once the Owner and Construction Manager accept the Project Integrator, the Contractor shall not change the Project Integrator throughout the full period of performance of the Work without the express written permission of Construction Manager and Owner.
  4. The minimum scope of services to be managed and/or executed by the Project Integrator shall include the following tasks:
    - a. Integration of all Process Instrumentation and Control System (PICS) components and related devices, panels, components, systems, and subsystems required to be provided as part of the Work, regardless of the actual supplier or prepackage nature of the supply.
    - b. Integration and coordination of the Process Instrumentation and Control System with all components provided as packaged systems or supplied with individual equipment suppliers.
- D. The Startup Manager and the Project Integrator may not be the same person.

1.08 THE STARTUP MANAGEMENT PLAN

- A. The Contractor's Startup Manager shall conduct a startup coordination workshop and prepare and submit a Startup Management Plan that describes how Contractor will accomplish the minimum scope of services and manage the daily startup activities. The coordination workshop shall, at a minimum, include the Contractor's Startup Manager, Project Integrator, and Project Superintendent. The requirements for Startup requirements for the Work will be reviewed at the workshop. The Startup Management Plan shall be prepared immediately following the workshop and shall include a detailed description, including procedures and examples of how the Startup Team will manage the interface between Contractor's trades, Contractor's management, Contractor's



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subcontractors, Contractor's PLC programmers, Construction Manager's field team, Owner, and the DCSP programming team. The workshop shall be conducted within 4 weeks of Notice to Proceed. The draft Startup Management Plan shall be completed and submitted within 4 weeks of the startup coordination workshop. The plan will be reviewed and processed for acceptance in accordance with Section 01 33 00, Submittal Procedures.

1.09 THE STARTUP AND TEST PLANS

- A. The Contractor under the guidance of the JTG will develop specific plans for the testing of all elements of the Facility. These plans shall outline the detailed sequence of activities necessary to confirm the proper operation of every component, system, and subsystem.
- B. Test plans will be prepared for each phase of startup where testing is required including, but not limited to the following:
  - 1. Factory acceptance testing.
  - 2. Staging site demonstration.
  - 3. Manufacturer's installation inspection.
  - 4. Mechanical/electrical functional testing.
  - 5. Operational Readiness Test.
  - 6. Functional testing on unit processes and auxiliary systems.
  - 7. Equipment performance testing.
  - 8. Facility commissioning.
  - 9. Facility acceptance test.
  - 10. Systemwide 120-Day Integration Period.
- C. Test plans will be developed as described below:
  - 1. The Overall Startup Plan shall include five main sections arranged as follows:
    - a. Overall Startup Plan Summary.
    - b. Factory Acceptance Testing.
    - c. Operational Readiness Testing.
    - d. Functional and Performance Testing.
    - e. Systemwide 120-Day Integration Period.
    - f. Startup Schedule.
  - 2. The contents and requirements pertaining to each section are described below. It is expected that each section could require multiple volumes, depending on the size and complexity of the Work.
  - 3. Overall Startup Plan Summary:
    - a. The Overall Startup Plan Summary is the master startup plan document. It includes a brief summary of all testing and startup activities and provides the basic organization of the startup and

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testing program. It shall be submitted in advance of any other test plans except for Factory Acceptance Test Plans as described herein.

- b. The Overall Startup Plan Summary shall include the following:
  - 1) Introduction with a narrative description of the overall testing and startup program planned for implementation by the Contractor. Tables and flowcharts in addition to those described below should be included to clearly illustrate the Contractor's intent for the testing and startup program.
  - 2) List of major Acceptance Test Plan categories. Factory Acceptance Testing shall be a specific subset for each category. At a minimum, a separate acceptance test plan shall be prepared for the following four categories:
    - a) All PIC and DCS testing specified in Division 40, Process Integration, of the specifications and including all related testing referring to Division 40 from other specification sections and divisions.
    - b) All electrical testing specified in Division 26, Electrical, of the specifications and including all related testing referring to Division 26, Electrical, from other specification sections and divisions.
    - c) All hydrostatic testing of piping and appurtenances, pipelines, aqueducts, valves, water holding structures, pressure vessels, tanks, and any other component, subsystem, or system specified to be hydrostatic or pressure tested.
    - d) Unless otherwise indicated in the Contract Documents, all other testing.
- c. In addition to the breakdown listed above, the Contractor may propose to further divide, or group, the testing into categories assigned by process area or physical site delineation. However, said division or grouping must be agreed to, in writing, by the Construction Manager prior to the initial submittal of the Overall Startup Plan Summary. The Construction Manager will be the sole judge as to the acceptability of the additional division or grouping of testing proposed by the Contractor.
  - 1) Complete listing of component, subsystem, and system tests within each Test Plan category. Special focus should be placed on a complete listing of tests for all major equipment items and all auxiliary systems identified in the Contract Document. In any case, all components, sub-systems, and systems and their associated testing shall be included in the listing.
  - 2) Complete listing of Factory Acceptance Testing (witnessed and unwitnessed). All specified Factory Acceptance Testing

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- will be required to be successfully completed to achieve Substantial Completion. It may be to the Contractor's benefit to obtain concurrence on the listing of Factory Acceptance Testing early in the project. In that case, this section would simply be a copy of the material already agreed to, with any updates.
- 3) Flowchart the full testing program from Factory Acceptance Testing and initial shakedown through Acceptance Testing, and ending at Substantial Completion. The flowchart shall demonstrate the precedence, or order, by which the testing will take place. The order of testing shall be such that it is consistent with the requirements of the Contract Documents.
  - 4) Provide a preliminary schedule illustrating the timeline associated with the flowchart described above. This schedule does not need to be CPM based as it will be replaced with schedules developed according to requirements stated below for the Startup Schedule.
4. Factory Acceptance Test Plan:
- a. The Factory Test Plan shall be a comprehensive description of the complete test setup, procedures, analyses, and reporting program for each factory test required for the Work. Detailed step by step procedures describing all activities in the test process shall be included for all factory tests, witnessed or unwitnessed. Unwitnessed readiness tests prior to witnessed PIC Factory Acceptance Test are exempt from this requirement. However, all other shop or factory tests, witnessed, or unwitnessed, that require testing to demonstrate compliance with the Contract Documents and require submittal of test results, must have a Factory Acceptance Test Plan accepted by the Design Engineer and Construction Manager at least 4 weeks prior to the test.
  - b. At a minimum, the following shall be included for each Factory Acceptance Test Plan:
    - 1) Identification information for the component, subsystem, or system being tested. All applicable tag numbers shall be included.
    - 2) A narrative description of the purpose and goals of the test.
    - 3) Pass/Fail criteria.
    - 4) A listing and copy of all pertinent reference documents (Contract Documents and industry standards or specifications applicable to the testing).
    - 5) Complete description, including drawings, for all test stands and/or test apparatuses.
    - 6) Credentials of test personnel.
    - 7) Descriptions of all test equipment.

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- 8) Descriptions and product information, including calibration certificates, for all test instruments.
  - 9) Step-by-step detailed procedures of how the test will be conducted. The level of detail shall be sufficient for any witness with a rudimentary technical aptitude to be able to follow the steps and develop confidence that the tests were being performed as planned. All steps are significant and all steps shall be included in the procedures.
  - 10) Copies of the actual data logs and/or data recording forms that will be used for the test.
  - 11) A complete disclosure of all calculation methodologies.
  - 12) Sample computations or analyses with results in the same format as the final report. This item is intended to demonstrate how data collected will be used to generate final results. A sample shall be included for each type of computation required for the test and analysis of results.
  - 13) A detailed outline of the final factory testing report.
- c. Each factory test shall be described separately. Factory Acceptance Test Plans are the only portion of the Startup and Test Plans that will be accepted prior to acceptance of the Overall Startup Plan Summary. Also, Factory Acceptance Test Plans will be allowed to be submitted and reviewed individually. However, the Overall Startup Plan Summary is required to summarize the factory testing program and all submittal numbers for individually submitted Factory Acceptance Test Plans shall be accurately accounted for in that document.
- d. This section is not intended to supersede the specific requirements for PIC/DCS Factory Acceptance Tests (FATs) described for the Work. However, Factory Acceptance Test Plans shall be provided for the PIC/DCS FATs in accordance with these requirements. In the case of conflict, the specific testing requirements of the FATs in the PIC/DCS specification sections shall prevail. All other Factory Acceptance Testing Plans shall strictly comply with this section unless otherwise approved by the Construction Manager.
- D. Contractor shall execute these test plans with the witnessing of the Construction Manager and/or Design Engineer and/or Owner.
- E. For startup and testing purposes, the following designations are made:
1. MBC Improvements:
    - a. Main Unit Processes:
      - 1) 10 – Biogas Flare Facility: Biogas flare.
      - 2) 11 – Biogas Holding Tank and Compressors:
        - a) Biogas piping.

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- b) Biogas compressors.
- 3) 73 – Receiving Tank Complex: Raw solids pumps.
- 4) 76 – Grit Removal:
  - a) Grit separators.
  - b) Grit clarifiers.
- 5) 76 – Sludge Thickening:
  - a) Thickening centrifuges.
  - b) Thickening centrifuge feed pumps.
  - c) Thickening centrifuge polymer pumps.
  - d) Thickened sludge transfer pumps.
- 6) 76 – Dewatering Centrifuges:
  - a) Dewatering centrifuge feed pumps.
  - b) Dewatering centrifuge polymer pumps.
- 7) 80 – Digester Complex:
  - a) Digester mixing pumps.
  - b) Digester axial mixing pumps.
  - c) Digester recirculation pumps.
  - d) Digester gas collection piping.
  - e) Digester and storage tank overflow and emergency overflow piping.
- 8) 94 – Centrate Pump Station: Centrate pumps.
- b. Auxiliary Systems:
  - 1) Main Piping:
    - a) Yard piping.
    - b) Appurtenant instruments, devices, valves, and piping.
  - 2) Corrosion Control: Coating materials.
  - 3) Water Quality Instrumentation.
  - 4) Fiber Optic Network.

- F. Contractor shall submit the completed test reports as part of the Startup Results Submittal.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

**3.01 GENERAL STARTUP AND TESTING REQUIREMENTS**

- A. Contractor is responsible for the complete testing, check out, startup, and commissioning of all elements of the Facility. Verify these activities through daily inspection reports, test records/reports, onsite vendor certifications, specified testing, and by other appropriate means. Startup and Testing Plans and Test Reports shall include specific language to demonstrate that the requirements stated herein are planned, executed, and accomplished. The

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requirements below are complementary to those indicated elsewhere in the Contract Documents.

- B. Design Engineer and Construction Manager shall be solely responsible for determining the party responsible for conducting any and all corrective actions and for determining the party responsible for any and all delays.
- C. Facility Startup Meetings: Schedule, in accordance with requirements of Section 01 31 19, Project Meetings, to discuss test schedule, test methods, materials, chemicals and liquids required, facilities operations interface, and Owner involvement.
- D. Provide temporary valves, gauges, piping, test equipment and other materials and equipment required for testing and startup.
- E. Owner will:
  - 1. Provide water, power, chemicals, and other items as required for startup, unless otherwise indicated.
  - 2. Operate process units and facility with support of Contractor.
  - 3. Provide labor and materials as required for laboratory analyses.

3.02 FACTORY ACCEPTANCE TESTING

- A. Contractor shall coordinate the timing and location of all Factory Acceptance Testing (FAT) including, but not limited to the following items:
  - 1. Grit separator.
  - 2. Thickening centrifuge.
  - 3. Any other systems containing PLC's or complex control panels as identified by the Construction Manager.
- B. The JTG will prepare the test plans for each FAT or review manufacturer standard test plans in accordance with these Contract Documents. The Contractor's Startup Manager shall be the lead representative for the development of these test plans.
- C. The following Contractor personnel are required to attend all FATs:
  - 1. Startup Manager.
  - 2. Project Integrator.
  - 3. Manufacturer Representative(s).

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3.03 STAGING SITE DEMONSTRATION

- A. The DCSP shall provide the required items for the development of the application software programming.

3.04 MANUFACTURER'S INSTALLATION INSPECTION

- A. When Contractor has completed installation of components, systems, or subsystems, they shall schedule a manufacturer inspection. This manufacturer or approved manufacturer's representative shall certify that the component, system, or subsystem is properly installed and that testing of the component, system, or subsystem may commence.

B. Preparation:

1. Complete installation before testing.
2. Furnish qualified manufacturers' representatives, when required by individual Specification sections.
3. Obtain and submit from equipment manufacturer's representative Manufacturer's Certificate of Proper Installation Form, in accordance with Section 01 43 33, Manufacturers' Field Services, when required by individual Specification sections.
4. Cleaning and Checking:
  - a. Prior to beginning functional testing:
    - 1) Calibrate testing equipment in accordance with manufacturer's instructions.
    - 2) Inspect and clean equipment, devices, connected piping, and structures to ensure they are free of foreign material.
    - 3) Lubricate equipment in accordance with manufacturer's instructions.
    - 4) Turn rotating equipment by hand when possible to confirm that equipment is not bound.
    - 5) Open and close valves by hand and operate other devices to check for binding, interference, or improper functioning.
    - 6) Check power supply to electric-powered equipment for correct voltage.
    - 7) Adjust clearances and torque.
    - 8) Test piping for leaks.
5. Ready-to-test determination will be by Design Engineer and Construction Manager based at least on the following:
  - a. Acceptable Operation and Maintenance Data.
  - b. Notification by Contractor of equipment readiness for testing.
  - c. Receipt of Manufacturer's Certificate of Proper Installation, if so specified.

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- d. Adequate completion of work adjacent to, or interfacing with, equipment to be tested, including Membrane Equipment System.
- e. Availability and acceptability of manufacturer's representative, when specified, to assist in testing of respective equipment.
- f. Satisfactory fulfillment of other specified manufacturer's responsibilities.
- g. Equipment and electrical tagging complete.
- h. Delivery of all spare parts and special tools.

3.05 MECHANICAL/ELECTRICAL FUNCTIONAL TESTING

- A. After each mechanical system is completely installed, the Contractor shall confirm proper installation according to these Contract Documents. Mechanical system testing shall include, but not be limited to the following system types:
  - 1. Piping (buried and exposed).
  - 2. Pumps, motors, and drives.
- B. After the complete installation of electrical systems (or portions thereof), the Contractor shall conduct all testing, including the independent electrical testing, as specified in Division 26, Electrical.

3.06 OPERATIONAL READINESS TEST

- A. This work shall consist of manual verification of controls, verification of instrument calibration, and the completion of all loop checks.
- B. The Operational Readiness Test shall be a coordinated effort between the Contractor, PIC System Integrator, and DCSP to confirm the PIC, including the applications software is ready for operation. This testing is described in Division 40, Process Interconnections.

3.07 FUNCTIONAL TESTING ON UNIT PROCESSES

- A. Functional Testing shall include successful completion of all specified testing and related work required by the Contract Documents. Successful Functional Testing will demonstrate that all portions of the unit processes or auxiliary systems are functional, operational, installed as specified, and perform their intended function.
- B. Demonstration of the ability of all portions of the facilities to successfully operate, as specified, over their full range of capacity or capability is required as part of Functional Testing. Functional Testing shall include all balancing, adjustments, specified tests (both factory and field), tuning, and startup activities not included in Performance Testing.



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- C. Functional testing shall be performed using the process flow stream intended to be used for the given unit process.
- D. Functional Testing shall include testing of all specified shutdown conditions, failure conditions, pumping station power fail and restart, bypass conditions, and failure resets. Functional Testing shall include all equipment testing for operating parameters. Functional Testing shall not be considered complete until all testing produces successful results and all documentation of tests and all manufacturer's certifications required by the Contract Documents are submitted and accepted by the Construction Manager. Functional Testing shall be successfully completed prior to conducting and Performance Testing or Facility Commissioning.
- E. Equipment Testing shall be conducted as part of Functional Testing:
  - 1. Furnish the services of an experienced and authorized representative of the manufacturer or supplier of each item of equipment indicated in the equipment schedules (excluding manually-operated valves smaller than 24 inches in size, injectors, tanks, batch-type disc meters, rotameters, and other minor items of equipment specifically exempted by the Design Engineer or Construction Manager in writing), who shall visit the Site of the Work and inspect, check, adjust if necessary, and approve the equipment installation. In each case, arrange to have the supplier or manufacturer's representative revisit the Site as often as necessary until any and all trouble is corrected and the equipment installation and operation are satisfactory to the Construction Manager.
  - 2. Contractor shall require that each manufacturer's representative furnish to the Construction Manager a written report addressed to the City certifying that the equipment has been properly installed and lubricated, is in accurate alignment, is free from any undue stress imposed by connecting piping or anchor bolts, and has been operated satisfactorily over its full range of capability and under full-load conditions.
  - 3. Contractor shall require that the electrical and/or instrumentation subcontractor and the adjustable speed drive supplier furnish a written and signed report to the Construction Manager certifying that the motor control logic for the equipment items that reside in motor control centers, control panels, control boards, microprocessors, computers, and the like furnished by the electrical and/or instrumentation Subcontractor have been properly tested and calibrated. The report shall certify that the control logic for equipment startup, shutdown, sequencing, resets, interlocks, and emergency shutdown has been tested and is properly operating. The Contractor shall also sign said certification.

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3.08 EQUIPMENT PERFORMANCE TESTING

- A. Testing specified within specific equipment specifications to verify performance requirements of a piece of equipment.
- B. This testing shall be performed by the equipment supplier with support from the Contractor.
- C. The method for testing to validate the performance requirements shall be provided in submitted and approved test plan submittals.

3.09 FACILITY COMMISSIONING

- A. Facility Commissioning Testing:
  - 1. The disciplined and systematic process of assuring that all components, subsystems and systems of a constructed unit are designed, installed, tested and operated in conformance with the design intent, and functional intent and operational requirements of the Owner.
  - 2. Notify Construction Manager, Design Engineer, and Owner in writing at least 10 days prior to scheduled date of test.
  - 3. Commissioning shall not commence until equipment has been accepted by Construction Manager and Design Engineer as having satisfied performance test requirements specified.
  - 4. Type of fluid, gas, or solid for testing shall be as specified.
  - 5. Unless otherwise indicated, furnish labor, materials, and supplies for conducting the test and taking samples and performance measurements.
  - 6. Prepare Test Reports summarizing test method and results.
  - 7. When, in Construction Manager's and Design Engineer's opinion, the integrated facility operates as specified and is accepted as to conforming to Contract requirements. Such acceptance will be evidenced by Construction Manager's and Design Engineer's signature on Facility Commissioning Report.

3.10 TRAINING

- A. All components, systems, or subsystems require separate training by the manufacturer.
- B. Training for each component, system, or subsystem shall be a minimum of 4 hours if no specific requirements are described in the individual specification sections.
- C. All training shall be requested at least 14 days in advance of proposed training date.

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1. Proposed training shall be requested by the Contractor in an acceptable format including the following information as a minimum:
  - a. Description of training.
  - b. Name and contact information of trainer.
  - c. Location of training.
  - d. Proposed date.
  - e. Alternative dates (if applicable).
  - f. Proposed start time.
  - g. Proposed duration.
  - h. Proposed detailed agenda including topics, times, breaks, etc.
- D. All training shall be scheduled through the Construction Manager.
- E. If suitable training facilities are not available at the Facility, Contractor shall arrange and pay for training offsite.

3.11 INTEGRATION PERIOD TESTING

- A. Pure Water Phase 1 shall be fully tested, started up, commissioned, and integrated during the Integration Period. Pure Water Phase 1 includes the following projects:
  1. North City Pure Water Facility (NCPWF).
  2. North City Pure Water Pump Station (NCPWPS).
  3. North City Pure Water Pipeline (NCPWPL) and Dechlorination Facility.
  4. Morena Pump Station and Conveyance.
  5. North City Water Reclamation Plant (NCWRP) Expansion.
  6. Metropolitan Biosolids Center (MBC) Improvements.
  7. Miramar Reservoir Pump Station.
  8. Miramar Subaqueous Pipeline.
- B. The Integration Period includes the 120-Day Integration Period and subsequent 30-Day Facility Acceptance Tests. The Contractor is advised that the entire duration between Intermediate Substantial Completion and Substantial Completion is the Integration Period.
- C. The 120-Day Integration Period consists of the 120-day period starting with NCPWF Intermediate Substantial Completion.
- D. The Project shall be tested and operated concurrently with Pure Water Phase 1 during the Integration Period until Pure Water Phase 1 is fully tested, started up, commissioned, and integrated. The Contractor shall provide System Support for the integration of the Project into Pure Water Phase 1 as described herein.

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- E. Substantial Completion shall not be achieved until the Integration Period Testing is successfully completed.
- F. Contractor shall keep resources on 24-hour standby and provide all crews, materials, and equipment required to repair, replace adjust, balance, and provide other services as may be required to immediately correct all failures or malfunctions of any kind. Contractor shall provide the services of authorized representatives of equipment suppliers or manufacturers during the Integration Period as necessary to certify that all corrective actions for all defects, malfunctions, faulty equipment operation, calibration, adjustment, or related flaws are complete and acceptable.
- G. System Support testing, startup, integration, and commissioning during the Integration Period shall be coordinated by the Construction Manager (CM). The project Joint Test Group (JTG) shall support the CM in the development of these Integration Period test plans. In addition to the project JTG, the CM will coordinate and manage a Pure Water Phase 1 JTG to oversee System Support testing.

3.12 DIGESTER STRESS TESTING

- A. The MBC Improvements shall be fully tested, started up, and commissioned during the digester testing phase.
- B. The digester testing phase shall last 120 days.
- C. The digester testing phase will run concurrent with the Integration Period.
- D. Substantial Completion shall not be achieved until the Digester Stress Testing is successfully completed.
- E. Contractor shall keep resources on 24-hour standby and provide all crews, materials, and equipment required to repair, replace adjust, balance, and provide other services as may be required to immediately correct all failures or malfunctions of any kind. Contractor shall provide the services of authorized representatives of equipment suppliers or manufacturers during the Integration Period as necessary to certify that all corrective actions for all defects, malfunctions, faulty equipment operation, calibration, adjustment, or related flaws are complete and acceptable.
- F. Contractor shall provide maintenance records to the Owner at Substantial Completion.

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3.13 FACILITY ACCEPTANCE TEST

- A. The Facility Acceptance Test shall be a 30-day operational run of the completed systems demonstrating that all portions of the facility operate continuously as intended.
- B. All aspects of the Work and all Project facilities must be functional and operate in automatic mode 24 hours per day, 7 days per week during the acceptance test at varying flow rates established by the Construction Manager.
- C. Unless indicated otherwise, if any item fails or malfunctions during the test, the item shall be repaired and the test restarted at time zero with no credit given for the operating time before the aforementioned failure or malfunction. Malfunctions meeting all of the following conditions, in the opinion of the Owner/Construction Manager, will not be considered grounds for restarting the test at time zero:
  - 1. Malfunctions that do not cause any interruption of the continuous operation of any other components, subsystems, systems, and equipment during the acceptance test.
  - 2. Malfunctions that are corrected without causing or requiring any components, subsystems, systems, and equipment to cease operations during the acceptance.
  - 3. Malfunctions that are corrected properly and permanently, in the opinion of the Owner and Construction Manager, within 4 hours of the time the malfunction is detected (the 4-hour period includes the time required to locate the cause of the malfunction and shall begin upon Contractor's notification from the Construction Manager that a malfunction exists and shall end when the item is corrected and the system is successfully placed back into operation).
- D. Time lost during the test for equipment repairs, wiring corrections, control point settings, or other reasons that are not determined by the Construction Manager to be grounds to restart the test shall be justifiable cause for extending the test duration by an amount of time equal to the time required to repair the problems.
- E. Operation of the system for the acceptance test shall be conducted on a schedule or plan of operations developed by the JTG and supported by Contractor as specified. The Contractor shall provide personnel to operate the Work and support said testing activities to be performed jointly with the Construction Manager in accordance with a test plan prepared by the JTG.
- F. During the test, furnish the services of authorized representatives of the manufacturers, in addition to those services required in support of other

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testing, as necessary, to correct faulty equipment operation, calibration, adjustment, or related flaws.

- G. Contractor's acceptance test personnel shall include qualified representatives for the electrical and instrumentation crews as indicated for Acceptance Testing.
- H. The Contractor's warrantee period.

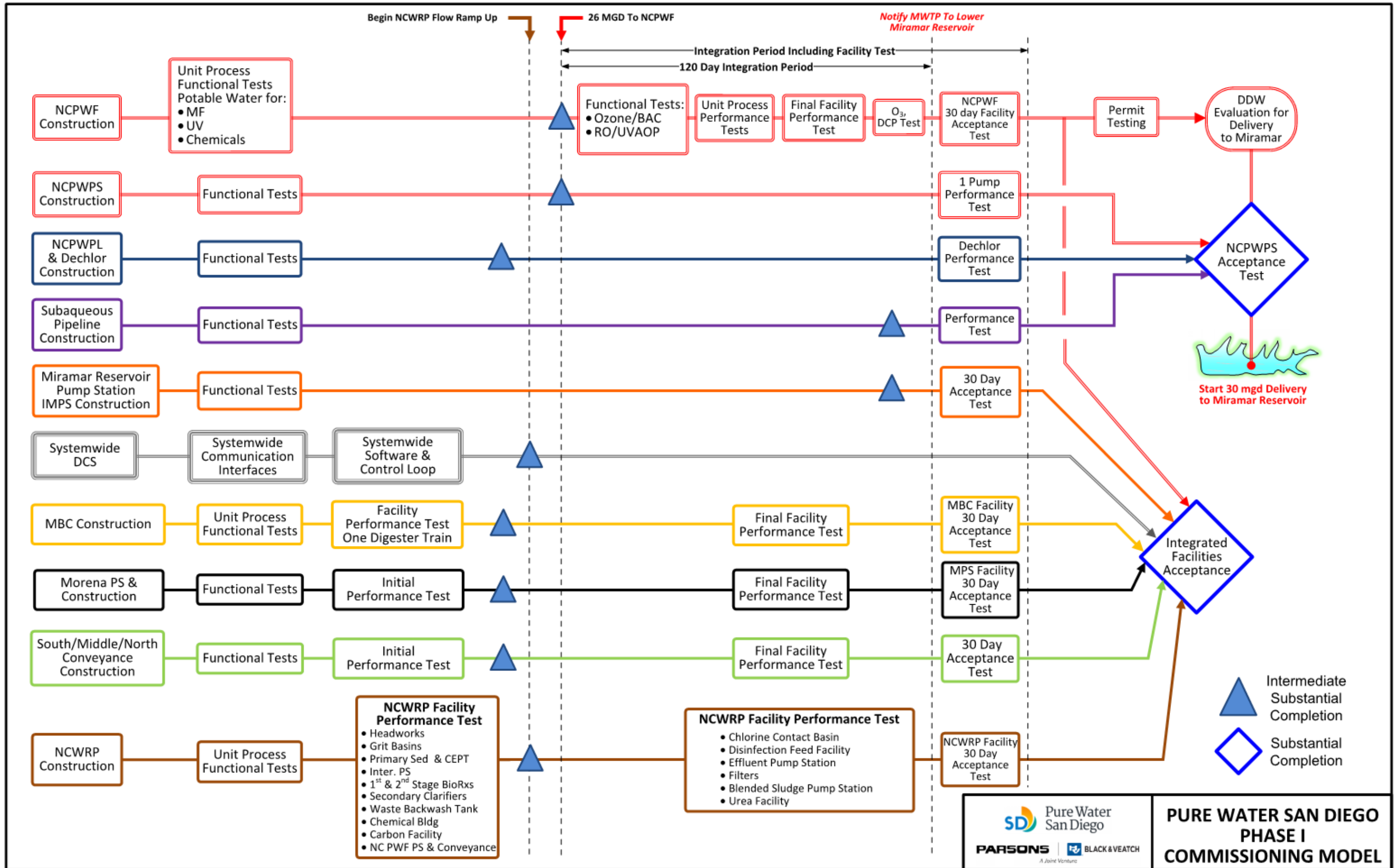
3.14 WITNESSING AND SUPERINTENDENCE

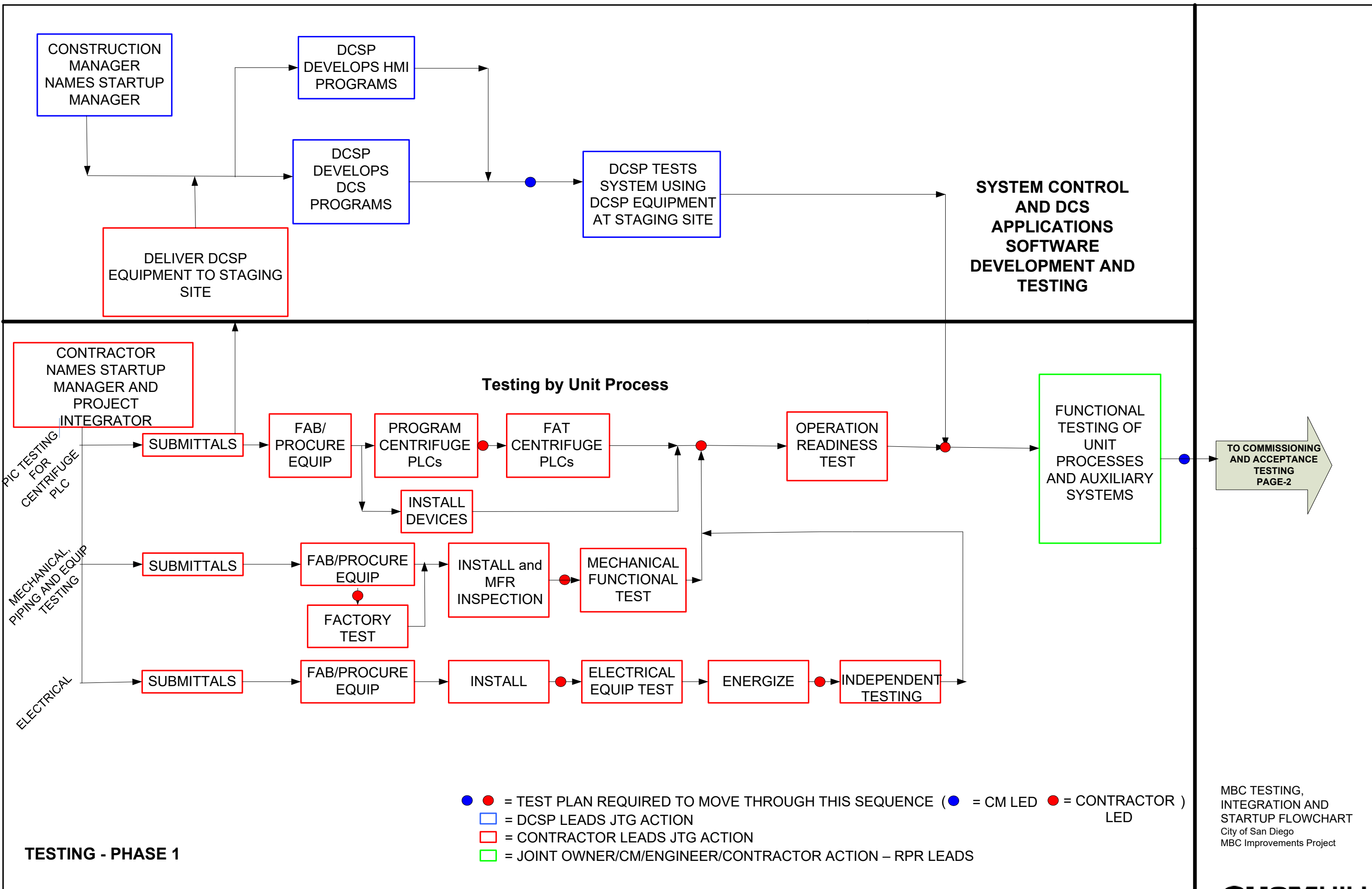
- A. The Design Engineer, Owner, Construction Manager, and others as necessary shall be allowed to witness all testing conducted during any phase of startup.
- B. The Contractor shall maintain overall superintendence of the Work during all phases of startup.
- C. The Contractor shall promptly and permanently repair damage to any portion of the Work during startup and testing.
  - 1. All repair work shall be performed by the manufacturer or with manufacturer's approved published methods.
- D. The Contractor shall perform all scheduled maintenance in strict compliance with manufacturers' published procedures and with products acceptable to manufacturers.
- E. Authorized representatives of equipment suppliers or manufacturers shall certify that all corrective actions for all defects, malfunctions, faulty equipment operation, calibration, adjustment, or related flaws are complete and acceptable.
- F. The Contractor shall keep on 24-hour local standby and provide all crews, materials, and equipment required to repair, replace adjust, balance, modify and provide other services as may be required to immediately correct all failures or malfunctions of any kind.

3.15 SUPPLEMENT

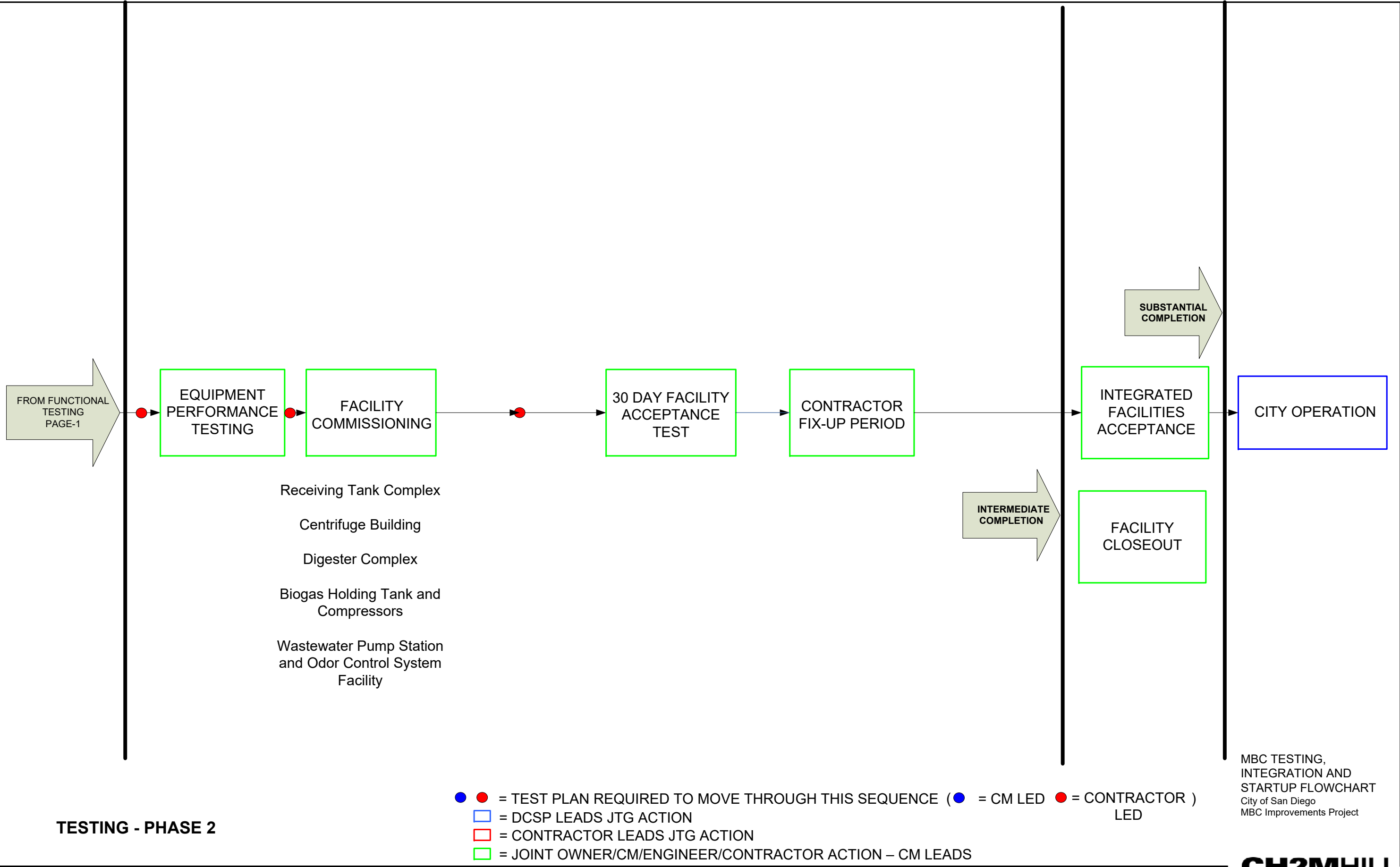
- A. The supplements listed below, following "End of Section," are part of this Specification.
  - 1. Phase 1 Commissioning Model.
  - 2. MBC Testing, Integration and Startup Flowchart.

**END OF SECTION**









PURE WATER PROGRAM  
FOR  
THE CITY OF SAN DIEGO, CALIFORNIA

BIDDING REQUIREMENTS  
AND  
CONTRACT DOCUMENTS

for the construction of the

SAN DIEGO NORTH CITY METROPOLITAN  
BIOSOLIDS CENTER IMPROVEMENTS

VOLUME 2  
SPECIFICATIONS  
DIVISIONS 02 THROUGH SECTION 40 80 01

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*Issued for Construction*

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October 2020

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METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

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SPECIFICATIONS



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CITY OF SAN DIEGO  
METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

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July 26, 2019

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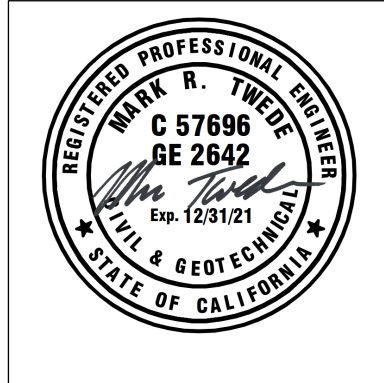
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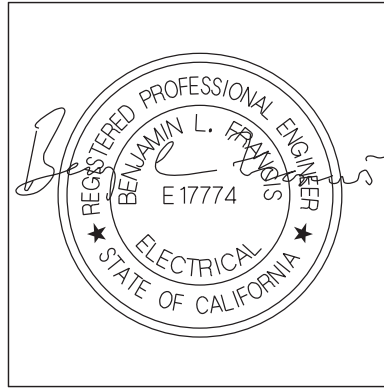
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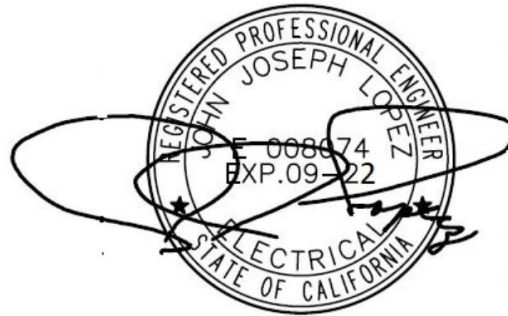
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**END OF SECTION**

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**DEMOLITION**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this Section:
1. Air-Conditioning, Heating, and Refrigeration Institute (AHRI): Guideline K, Containers for Recovered Non-flammable Fluorocarbon Refrigerants.
  2. American National Standards Institute (ANSI): A10.6, Safety Requirements for Demolition Operations.
  3. Occupational Safety and Health Administration (OSHA), U.S. Code of Federal Regulations (CFR) Title 29 Part 1926—Occupational Safety and Health Regulations for Construction.
  4. Environmental Protection Agency (EPA), U.S. Code of Federal Regulations (CFR), Title 40:
    - a. Part 61—National Emission Standards for Hazardous Air Pollutants.
    - b. Part 82—Protection of Stratospheric Ozone.
    - c. Part 273—Standards for Universal Waste Management.

1.02 DEFINITIONS

- A. ACM: Asbestos-containing material.
- B. Demolition: Dismantling, razing, destroying, or wrecking of any fixed building or structure or any part thereof. Demolition also includes removal of equipment, pipes, conduit, and other underground facilities, whether as a separate activity or in conjunction with construction of new facilities.
- C. Modify: Provide all necessary material and labor to modify an existing item to the condition indicated or specified.
- D. Relocate: Remove, protect, clean and reinstall equipment, including electrical, instrumentation, and all ancillary components required to make the equipment fully functional, to the new location identified on the Drawings.
- E. Renovation: Altering a facility or one or more facility components in any way.

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- F. Salvage/Salvageable: Remove and deliver, to the specified location(s), the equipment, building materials, or other items so identified to be saved from destruction, damage, or waste; such property to remain that of Owner. Unless otherwise specified, title to items identified for demolition shall revert to Contractor.
- G. Universal Waste Lamp: In accordance with 40 CFR 273, the bulb or tube portion of an electric lighting device, examples of which include, but are not limited to, fluorescent, high-intensity discharge, neon, mercury vapor, high-pressure sodium, and metal halide lamps.
- H. Universal Waste Thermostat: A temperature control device that contains metallic mercury in an ampule attached to a bimetal sensing element, and mercury-containing ampules that have been removed from these temperature control devices in compliance with the requirements of 40 CFR 273.

1.03 SUBMITTALS

- A. Informational Submittals:
  - 1. Submit proposed Demolition Plan, in accordance with requirements specified herein, for approval before such Work is started.
  - 2. Submit copies of any notifications, authorizations and permits required to perform the Work.
  - 3. Copies of reports and other documentation required for abandoning wells.
  - 4. Submit a shipping receipt or bill of lading for all containers of ozone depleting substance (ODS) shipped.
  - 5. Submit a shipping receipt or bill of lading for all containers of ACM shipped.
  - 6. Submit a shipping receipt or bill of lading for all universal waste shipped.

1.04 REGULATORY AND SAFETY REQUIREMENTS

- A. When applicable, demolition Work shall be accomplished in strict accordance with 29 CFR 1926-Subpart T.
- B. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the General Conditions, Contractor's safety requirements shall conform to ANSI A10.6.
- C. Furnish timely notification of this demolition project to applicable federal, state, regional, and local authorities in accordance with 40 CFR 61-Subpart M.

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1.05 DEMOLITION PLAN

- A. Demolition Plan shall provide for safe conduct of the Work and shall include:
1. Detailed description of methods and equipment to be used for each operation;
  2. The Contractor's planned sequence of operations, including coordination with other work in progress;
  3. Procedures for removal and disposition of materials specified to be salvaged.
- B. Removal and disposal of equipment to be demolished. Include statements affirming Contractor inspection of the existing roof deck, floors, walls, and framing members, and their suitability to perform as a safe working platform or, if inspection reveals a safety hazard to workers, state provisions for securing the safety of the workers throughout the performance of the Work.
- C. Contractor shall submit proposed methods, equipment and operating sequences for demolition or tie-ins to existing facilities, including coordination requirements with Owner for shut-offs, temporary services, continuation of utility services, and other applicable items to ensure continuous and safe operation of existing facilities affected by Contractor's work.

1.06 SEQUENCING AND SCHEDULING

- A. The Work of this Specification shall not commence until Contractor's Demolition Plan has been approved by Engineer.
- B. Include the Work of this Specification in the progress schedule, as specified in Section 01 32 00, Construction Progress Documentation.
- C. Areas in which the Work is to be accomplished will be available in accordance with schedule coordinated with the Owner.

1.07 ENVIRONMENTAL PROTECTION

- A. Demolition work and material disposal shall be planned and performed to comply with environmental protection requirements. Contractor to submit a plan for removal and disposal prior to demolition.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

**3.01 EXISTING FACILITIES TO BE DEMOLISHED**

- A. Facilities: Portions of buildings and other areas scheduled for selective demolition, partial demolition, and renovation Work are as shown on Drawings.
- B. Utilities and Related Equipment:
  - 1. Notify Engineer and Owner or appropriate utilities to turn off affected services at least 48 hours before starting demolition or renovation activities.
  - 2. Remove existing utilities as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by Engineer.
  - 3. When utility lines are encountered that are not indicated on Drawings, notify Engineer prior to further work in that area.
  - 4. Remove meters and related equipment and deliver to a location as determined by the Engineer.
- C. Paving and Slabs:
  - 1. Sawcut concrete and asphaltic concrete paving and slabs as indicated.
  - 2. Provide neat sawcuts at limits of pavement removal as indicated.
- D. Concrete:
  - 1. Laser scan concrete walls prior to cutting for remodel to identify any embedded electrical conduits.
  - 2. Core drill corners of new opening to avoid overcutting adjacent reinforcing in existing concrete to remain. Saw concrete along straight lines to a depth of not less than 2 inches. Make each cut in walls perpendicular to the face and in alignment with the cut in the opposite face. Break out the remainder of the concrete provided that the broken area is concealed in the finished Work, and the remaining concrete is sound.
  - 3. At locations where the broken face cannot be concealed, grind smooth or saw cut entirely through the concrete. Repair exposed rebar ends and embeds as shown on Drawings.
  - 4. Where new concrete adjoins existing concrete, thoroughly clean and mechanically roughen existing concrete surfaces to roughness profile of 3/16 inch. Rebar and small embeds at existing concrete may be required to be left to engage new concrete. Saturate surface with water for 24 hours prior to placing new concrete. The new Work shall tie into the existing construction as shown on Drawings.

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E. Patching:

1. Where removals leave holes and damaged surfaces exposed in the finished Work, patch and repair to match adjacent finished surfaces as to texture and finish.
2. Where new Work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new Work.
3. Patching shall be as specified and indicated, and shall include:
  - a. Fill holes and depressions left as a result of removals in existing concrete surfaces with an approved patching material, applied in accordance with the manufacturer's printed instructions.

F. Electrical:

1. Cut off concealed or embedded conduit, boxes, or other materials a minimum of 3/4 inch below final finished surface.
2. When removing designated equipment, conduit and wiring may require rework to maintain service to other equipment.
3. Rework existing circuits, or provide temporary circuits as necessary during renovation to maintain service to existing lighting and equipment not scheduled to be renovated. Existing equipment and circuiting shown are based upon limited field surveys. Verify existing conditions, make all necessary adjustments, and record the Work on the Record Drawings. This shall include, but is not limited to, swapping and other adjustments to branch circuits and relocation of branch circuit breakers within panelboards as required to accomplish the finished work.
4. Reuse of existing luminaires, devices, conduits, boxes, or equipment will be permitted only where specifically indicated.
5. Raceways and cabling will be permitted only where specifically indicated.
6. Inaccessibly Concealed: Cut off and abandon in place.
7. Exposed or Concealed Above Accessible Ceilings: Remove.
8. Raceways and Cabling Scheduled for Future Use: Cap/seal and tag.
9. Relocating Equipment: Extend existing wiring or run new wiring from the source.
10. Where the existing raceway is concealed, the outlet box shall be cleaned, and a blank cover plate installed.
11. Where the concealed raceway is uncovered remove raceway (or extended to new location if appropriate).
12. Provide new typewritten panelboard circuit directory cards.

G. Universal Waste Lamps and Thermostats: Manage, contain, package, and label in strict accordance with 40 CFR 273.

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- H. The Drawings show the location of known existing structures, utilities, and facilities. The information on exposed and buried objects has been obtained from field investigations, observations and available Record Drawings and shown as a screened background. The information is not guaranteed to be either complete or accurate and must be verified by the Contractor via potholing and hand excavation, and field measurements as required prior to starting demolition work. The Contractor shall utilize ground penetrating radar to survey the entirety of the new biogas pipeline alignments followed up by potholing of any potential interferences not already identified. The Contractor shall include field verified measurements and as-built documentation with the required submittals defined under Article Demolition Plan.
- I. Prior to performing any demolition work on the existing utilities or facilities, the Contractor shall coordinate all efforts with Owner to define details and schedules of temporary shutdowns of existing utilities or facilities, or maintaining of continuous plant operation.

3.02 PROTECTION

- A. Dust and Debris Control:
  - 1. Prevent the spread of dust and debris to occupied and operated portions of the building and site facilities and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution.
  - 2. Vacuum and dust the Work area daily.
  - 3. Sweep pavements as often as necessary to control the spread of debris that may result in foreign object damage potential to vehicular traffic.
- B. Traffic Control Signs: Where pedestrian and driver safety is endangered in the area of removal Work, use traffic barricades with flashing lights.
- C. Existing Work:
  - 1. Survey the site and examine the Drawings and Specifications to determine the extent of the Work before beginning any demolition.
  - 2. Take necessary precautions to avoid damage to existing items scheduled to remain in place, to be reused, or to remain the property of Owner; any Contractor-damaged items shall be repaired or replaced as directed by Engineer.
  - 3. Provide temporary weather protection during interval between removal of existing exterior surfaces and installation of new to ensure that no water leakage or damage occurs to structure or interior areas of existing building.



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4. Ensure that structural elements are not overloaded as a result of or during performance of the Work. Responsibility for additional structural elements or increasing the strength of existing structural elements as may be required as a result of any Work performed under this Contract shall be that of the Contractor. Repairs, reinforcement, or structural replacement must have Engineer approval.
  5. Do not overload pavements to remain.
- D. Trees: Protect trees within the Site that might be damaged during demolition and are indicated to be left in place, by a 6-foot-high fence. The fence shall be securely erected a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Any tree designated to remain that is damaged during the Work shall be replaced in kind, as approved by the Engineer.
- E. Facilities:
1. Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities.
  2. Floors, roofs, walls, columns, pilasters, and other structural elements that are designed and constructed to stand without lateral support or shoring, and are determined by Contractor to be in stable condition, shall remain standing without additional bracing, shoring, or lateral support until demolished, unless directed otherwise by the Engineer.
  3. Protect all facility elements not scheduled for demolition.
  4. Provide interior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities.
- F. Protection of Personnel:
1. During demolition, continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site.
  2. Provide temporary barricades and other forms of protection to protect Owner's personnel and the general public from injury due to demolition Work.
  3. Provide protective measures as required to provide free and safe passage of Owner's personnel and the general public to occupied portions of the structure.

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3.03 BURNING

- A. The use of burning at the Site for the disposal of refuse and debris will not be permitted.

3.04 RELOCATIONS

- A. Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Clean all items to be relocated prior to reinstallation, to the satisfaction of Engineer. Repair items to be relocated which are damaged or replace damaged items with new undamaged items as approved by Engineer.

3.05 BACKFILL

- A. Do not use demolition debris as backfill material.

3.06 TITLE TO MATERIALS

- A. All salvaged equipment and materials will remain the property of the Owner.
- B. With the exception of the following listed salvaged equipment and materials, all items designated to be removed shall become the property of Contractor:
  - 1. Four of the six motorized valves from the grit separator work labelled as 76MV1101, 76MV1102, 76MV1106, 76MV1107, 76MV1111, and 76MV1112. Two of the six valves to be re-installed and re-named as indicated in these construction documents.
  - 2. Additional items as identified by the Owner,
- C. Title to equipment and materials resulting from demolition is vested in the Contractor upon approval by Engineer of Contractor's Demolition Plan, and the resulting authorization by Engineer to begin demolition.

3.07 DISPOSITION OF MATERIAL

- A. Do not remove equipment and materials without approval of Contractor's Demolition Plan by Engineer.
- B. Salvage equipment and material to the maximum extent possible.
- C. Repair or replace, at the discretion of Engineer, items damaged during removal or storage.

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3.08 REUSE OF MATERIALS AND EQUIPMENT

- A. Remove and store materials and equipment shown on Drawings to be salvaged, reused or relocated to prevent damage, and reinstall as the Work progresses.
- B. Properly store and maintain equipment and materials in same condition as when removed.
- C. Store equipment and material designated to be reused in a location designated by Engineer.
- D. Equipment and material designated to be reused shall be cleaned, serviced and checked for proper operability before being put back into service.
- E. Engineer will determine condition of equipment and materials prior to removal.

3.09 SPECIALIZED SALVAGE

- A. Combustible material shall be disposed of off the Site.
- B. Universal Waste Lamps and Thermostats: Dispose of in strict accordance with 40 CFR 273.

3.10 CLEANUP

- A. Debris and rubbish shall be removed from basement and similar excavations. Debris and rubbish shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

**END OF SECTION**

**SECTION 03 30 01  
REINFORCED CONCRETE**

**PART 1 GENERAL**

1.01 SUBMITTALS

A. Action Submittals:

1. Reinforcing steel bending lists and placing drawings in accordance with CRSI Manual of Standard Practice.
2. Curing compound and evaporation retardant data.
3. Complete data on the concrete mix design, including aggregate gradations and admixtures, in accordance with ASTM C94.
4. Repair mortar data.

B. Informational Submittals:

1. Manufacturer's application instructions for curing compound.
2. Ready-mix delivery tickets for each truck in accordance with ASTM C94.

1.02 QUALITY ASSURANCE

- A. Formwork: Unless otherwise specified, follow the recommendations of ACI 347.
- B. Proportioning Concrete Mixtures: Conform to ACI 211.1.
- C. Concrete and Reinforcement: Unless otherwise specified, meet the requirements of ACI 301 and ACI 318/318R.
- D. Concrete Mixing, Transporting and Placing Concrete: Conform to ACI 304.
- E. Curing Concrete: Conform to ACI 308.
- F. Consolidating Concrete: ACI 309.
- G. Hot Weather Concreting: Conform to ACI 305R.
- H. Cold Weather Concreting: Conform to ACI 306R.
- I. Detailing Reinforced Concrete: Conform to ACI 315.

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1.03 ENVIRONMENTAL REQUIREMENTS

- A. Do not place Concrete when the ambient temperature is below 40 degrees F or approaching 40 degrees F and air temperature less than 40 degrees F for the first 7 days, without special protection to keep Concrete above 40 degrees F.

**PART 2 PRODUCTS**

2.01 CONCRETE

- A. Ready-mixed meeting ASTM C94, Option A and C.
- B. Portland Cement: ASTM C150, Type V.
- C. Admixtures:
  - 1. Air-Entraining: ASTM C260.
  - 2. Water-Reducing: ASTM C494, Type A or Type D.
  - 3. Fly Ash: ASTM C618, Class C or Class F.
- D. Mix Design:
  - 1. Minimum Allowable 28-day Compressive Field Strength: 4,000 psi when cured and tested in accordance with ASTM C31 and ASTM C39 except 3,000 psi is permitted for curbs, sidewalks, concrete fill, and pipe conduit encasements.
  - 2. Water-cement Ratio: 0.45, maximum for 4,000 psi concrete, 0.50 for 3,000 psi concrete.
  - 3. Coarse Aggregate Size: 1 inch.
  - 4. Air Entrainment: 4 percent by volume, plus or minus 1-1/2 percent.
  - 5. Water Reducers: Use in all concrete.
  - 6. Super Plasticizers: Use in all wall concrete.
- E. Mixing: Minimum 70 and maximum 270 revolutions of mixing drum. Non-agitating equipment is not allowed.

2.02 REINFORCING STEEL

- A. Deformed Bars: ASTM A615, Grade 60.

2.03 ANCILLARY MATERIALS

- A. Nonshrink Grout: In accordance with Section 03 62 00, Grouting.

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B. Repair Mortar:

1. Contain only trace amounts of chlorides and other chemicals that can potentially cause steel to oxidize.
2. Where repairs of exposed concrete are required, match color and texture of adjacent concrete.
3. Repair mortar shall be site mixed.
4. Prepare concrete substrate and mix, place, and cure repair material in accordance with manufacturer's written recommendations.
5. Manufacturers and Products:
  - a. BASF Building Systems Inc., Shakopee, MN; EMACO S-Series products.
  - b. Sika Chemical Corp., Lyndhurst, NJ; SikaTop-Series.
  - c. Or approved equal.

C. Curing Compound:

1. Water-based, high solids content nonyellowing curing compound meeting requirements of ASTM C309 and ASTM C1315.
  - a. Moisture Loss: 0.40 kg/square meter/72 hours maximum.
  - b. Capable of meeting moisture retention at manufacturer's specified application rate.
2. Manufacturers and Products:
  - a. Chemrex, Inc., Shakopee, MN; Masterkure.
  - b. Euclid Chemical Co., Cleveland, OH; Super Diamond Clear VOX.
  - c. WR Meadows, Inc., Hampshire, IL; VOCOMP-30.
  - d. Vexcon Chemical, Inc.; Philadelphia, PA; Starseal 1315.
  - e. Dayton Superior; Safe Cure and Seal 30 percent.
  - f. Or approved equal.

D. Form Ties:

1. Material: Steel.
2. Spreader Inserts:
  - a. Conical or spherical type.
  - b. Design to maintain positive contact with forming material.
  - c. Furnish units that will leave no metal closer than 1.5 inches to concrete surface when forms, inserts, and tie ends are removed.
3. Wire ties not permitted.
4. Flat bar ties for panel forms; furnish plastic or rubber inserts with minimum 1.5-inch depth and sufficient dimensions to permit patching of tie hole.

## **PART 3 EXECUTION**

### **3.01 FORMWORK**

#### **A. Form Materials:**

1. Use hard plastic finished plywood for exposed areas, and new shiplap or plywood for unexposed areas.
2. Earth cuts may be used for forming footings, where they will not be exposed.

#### **B. Construction:**

1. In accordance with ACI 347.
2. Make joints tight to prevent escape of mortar and to avoid formation of fins.
3. Brace as required to prevent distortion during concrete placement.
4. On exposed surfaces locate form ties in uniform pattern.
5. Construct so ties remain embedded in the wall with no metal within 1 inch of concrete surface when forms, inserts, and tie ends are removed.

#### **C. Beveled Edges (Chamfer):**

1. Form 3/4-inch bevels at exposed concrete edges, unless otherwise noted on Drawings.
2. Where beveled edges on existing adjacent structures are other than 3/4 inch, obtain Engineer's approval of size prior to placement of beveled edge.

#### **D. Form Removal:**

1. Remove form as shown below:
  - a. Side Form of Walls and Beams: After 48 hours.
  - b. Load Supporting Forms and Shoring: After concrete has attained its full compressive strength, but not before 14 days.
2. Remove forms with care to prevent scarring and damaging the surface.
3. Prior to form removal provide thermal protection for concrete being placed under the requirements of cold weather concreting.

### **3.02 PLACING REINFORCING STEEL**

- #### **A.**
- Unless otherwise specified on drawings, place reinforcing steel in accordance with CRSI Recommended Practice for Placing Reinforcing Bars. In case of discrepancy between the Drawings and CRSI publication, the Drawing shall

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govern. Reinforcement shall be placed within the tolerances provided in ACI 117.

- B. Splices and Laps: As shown on Drawing, “General Structural Notes.”

3.03 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301.
- B. Prior to placing concrete, remove water from all trenches and foundations and debris and foreign material from forms. Check reinforcing steel for proper placement and tolerances.
- C. Before depositing new concrete on old concrete, clean surface using sandblast or bush hammer or other mechanical means to obtain a 1/4-inch rough profile. Mechanical means shall be approved by Engineer. Pour a cement-sand grout to minimum depth of 1/2 inch over surface. Proportion 1 part cement to 2.5 parts sand by weight. The new concrete shall be placed before the grout has attained its initial set.
- D. Place concrete as soon as possible after leaving mixer, without segregation or loss of ingredients, without splashing forms or steel above, and in layers not over 2 feet deep, except for pile concrete fill which may be placed continuously. Placing shall be carried on at such a rate the concrete which is being integrated with fresh concrete is still plastic. Place within 1-1/2 hours after adding cement to mix.
- E. Three feet maximum vertical drop to final placement, when not guided with chutes or other devices to prevent segregation due to impact with reinforcing.

3.04 COMPACTION

- A. Vibrate concrete as follows:
  - 1. Approved vibrator shall be inserted and withdrawn at many points approximately 18 inches apart. At each insertion, the duration shall be sufficient to consolidate the concrete but not to cause segregation, generally 5 to 15 second duration.
  - 2. Apply close enough to forms to vibrate surface effectively but not damage form surfaces.
  - 3. Vibrator must penetrate fresh placed concrete and into previous layer of fresh concrete below.
  - 4. Follow the detailed recommendations given in “Consolidation of Concrete” (ACI 309R) where applicable.



3.05 FINISHING

A. Slabs:

1. After proper and adequate vibration and tamping, top surface shall be brought to a uniform surface.
2. After sufficient leveling, screed surfaces to true level planes.
3. After initial water has been absorbed, float with wood float and trowel with steel trowel to smooth finish free from trowel marks.
4. Do not absorb wet spots with neat cement.

B. Tolerances: Slabs shall not vary from level or true plane more than 1/4 inch in 10 feet when measured with a 10-foot straightedge.

C. New Slab at Waste Gas Burner.

1. Screed surfaces to true level planes.
2. After initial water has been absorbed, float with wood float and trowel with steel trowel to smooth finish free from trowel marks.
3. Follow with light broom finish.
4. Do not absorb wet spots with neat cement.
5. Finish exposed edges with steel edging tool.

3.06 PROTECTION AND CURING

A. Protect fresh concrete from direct rays of sunlight, drying winds, and wash by rain.

B. Keep concrete slabs continuously wet for a 7-day period. Intermittent wetting is not acceptable.

C. Use curing compound only where approved by Engineer. Cure formed surfaces with curing compound applied in accordance with approved manufacturer's directions as soon as forms are removed and finishing is completed. Water cure walls that are to receive coatings.

3.07 FIELD TESTS

A. Evaluation of Concrete Field Strength: In accordance with ACI 318/318R.

**END OF SECTION**

**SECTION 03 62 00**  
**GROUTING**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. ASTM International (ASTM):
    - a. C230, Standard Specification for Flow Table for Use in Tests of Hydraulic Cement.
    - b. C307, Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing.
    - c. C531, Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
    - d. C579, Standard Test Methods for Compressive Grout Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
    - e. C882, Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.
    - f. C939, Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).
    - g. C940, Standard Test Method for Expansion and Bleeding of Freshly Mixed Grouts for Preplaced-Aggregate Concrete in the Laboratory.
    - h. C1107/C1107M, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
    - i. C1181, Standard Test Methods for Compressive Creep of Chemical-Resistant Polymer Machinery Grouts.
    - j. D4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.

1.02 SUBMITTALS

- A. Action Submittals:
1. Product data of grouts.
  2. Proposed method for keeping existing concrete surfaces wet prior to placing nonshrink grout.
  3. Forming method for fluid grout placements.
  4. Curing method for grout.

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B. Informational Submittals:

1. Manufacturer's Written Instructions:
  - a. Mixing of grout.
  - b. Epoxy grout installation and curing.

**PART 2 PRODUCTS**

2.01 NONSHRINK GROUT AND EPOXY GROUT SCHEDULE

- A. Furnish nonshrink grout (Category I, II, and III) and epoxy grout for applications as indicated in the following schedule:

Application	Temperature Range	Max. Placing Time	
	40 deg F to 100 deg F	20 Min.	Greater Than 20 Min.
Machine bases 25 hp or less	II	II	II
Machine bases 26 hp and up	III or Epoxy Grout	III or Epoxy Grout	III or Epoxy Grout
Baseplates and/or soleplates with vibration, thermal movement, etc.	III or Epoxy Grout	III or Epoxy Grout	III or Epoxy Grout

2.02 NONSHRINK GROUT

- A. Category I:

1. Nonmetallic and nongas-liberating.
2. Prepackaged natural aggregate grout requiring only the addition of water.
3. Test in accordance with ASTM C1107/C1107M:
  - a. Grout shall have flowable consistency.
  - b. Flowable for 15 minutes.
4. Grout shall not bleed at maximum allowed water.
5. Minimum strength of flowable grout, 3,000 psi at 3 days, 5,000 psi at 7 days, and 7,000 psi at 28 days.
6. Manufacturers and Products:
  - a. BASF Building System, Inc., Shakopee, MN; MasterFlow 100.
  - b. Euclid Chemical Co., Cleveland, OH; NS Grout.
  - c. Dayton Superior Corp., Miamisburg, OH; 1107 Advantage Grout.

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- d. US MIX Co., Denver, CO; US SPEC GP Grout.
- e. Five Star Products Inc., Fairfield, CT; Five Star Grout.
- a. Or approved equal.

B. Category II:

- 1. Nonmetallic, nongas-liberating.
- 2. Prepackaged natural aggregate grout requiring only the addition of water.
- 3. Aggregate shall show no segregation or settlement at fluid consistency at specified times or temperatures.
- 4. Test in accordance with ASTM C1107/C1107M:
  - a. Fluid consistency 20 seconds to 30 seconds in accordance with ASTM C939.
  - b. Temperatures of 40 degrees F, 80 degrees F, and 90 degrees F.
- 5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
- 6. Minimum strength of fluid grout, 3,500 psi at 1 day, 4,500 psi at 3 days, and 7,500 psi at 28 days.
- 7. Maintain fluid consistency when mixed in 1-yard to 9-yard loads in ready-mix truck.
- 8. Manufacturers and Products:
  - a. BASF Building Systems, Inc., Shakopee, MN; MasterFlow 928.
  - b. Five Star Products Inc., Fairfield, CT; Five Star Fluid Grout 100.
  - c. Euclid Chemical Co., Cleveland, OH; Hi Flow Grout.
  - d. Dayton Superior Corp., Miamisburg, OH; Sure Grip High Performance Grout.
  - e. US MIX Co., Denver, CO; US SPEC MP Grout.
  - f. Or approved equal.

C. Category III:

- 1. Metallic and nongas-liberating.
- 2. Prepackaged aggregate grout requiring only the addition of water.
- 3. Aggregate shall show no segregation or settlement at fluid consistency at specified times or temperatures.
- 4. Test in accordance with ASTM C1107/C1107M:
  - a. Fluid consistency 20 seconds to 30 seconds in accordance with ASTM C939.
  - b. Temperatures of 40 degrees F and 100 degrees F.
- 5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
- 6. Minimum strength of fluid grout, 4,000 psi at 1 day, 5,000 psi at 3 days, and 9,000 psi at 28 days.

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7. Maintain fluid consistency when mixed in 1-yard to 9-yard loads in ready-mix truck.
8. Manufacturer and Product:
  - a. BASF Building Systems, Inc., Shakopee, MN; MasterFlow 885.
  - b. Euclid Chemical Co, Cleveland, OH; Hi-Flow Metallic Grout.
  - c. Or approved equal.

2.03 EPOXY GROUT

- A. High-strength, nonshrink, high-temperature epoxy grouting material developed for the support of heavy equipment with vibratory loads.
- B. Three-component mixture of a two-component epoxy resin system (100 percent solids) with a graded, precision aggregate blend.
- C. Premeasured, prepackaged system.
- D. Flowable.
- E. Minimum compressive strength in accordance with ASTM C579 Method B, 9,500 psi at 75 degrees F at 7 days, 11,000 psi at post cure.
- F. Maximum creep resistance in accordance with ASTM C1181 at 600 psi, 140 degrees F; 6.0 by  $10^{-3}$  in/in.
- G. Minimum bond strength in accordance with ASTM C882, 2,000 psi.
- H. Minimum tensile strength in accordance with ASTM C307, 2,000 psi.
- I. Maximum coefficient of thermal expansion in accordance with ASTM C531 at 73 degrees F to 210 degrees F, 23.0 by  $10^{-6}$  in/in/degrees F.
- J. Working Time: Minimum 2 hours at 50 degrees F; 1.5 hours at 70 degrees F; 50 minutes at 90 degrees F.
- K. Good chemical resistance.
- L. Good effective bearing area.
- M. Noncorrosive.
- N. Moisture insensitive.
- O. Modify resin and aggregate content where recommended by epoxy grout manufacturer to provide desired epoxy grout flow properties.

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P. Manufacturer and Product:

1. BASF Building System, Inc., Shakopee MN; MasterFlow 648.
2. Euclid Chemical Co., Cleveland, OH; E<sup>3</sup>-G.
3. Dayton Superior Corp., Miamisburg, OH; Pro-Poxy 2000 Normal Set.
4. Five Star Products Inc., Fairfield, CT; DP Epoxy Grout.
5. Or approved equal.

**PART 3 EXECUTION**

3.01 GROUT

- A. General: Mix, place, and cure grout in accordance with grout manufacturer's representative's training instructions.
- B. Epoxy Grout: Concrete slab shall be fully cured for 28 days to ensure excess water has evaporated. Test concrete surface for moisture in accordance with ASTM D4263 before epoxy grout is placed.

3.02 GROUTING MACHINERY FOUNDATIONS

- A. Block out original concrete or finish off at distance shown below bottom of machinery base with grout. Prepare concrete surface by sandblasting, chipping, or by mechanical means to remove any soft material. Surface roughness in accordance with manufacturer's written instructions.
- B. Clean metal surfaces of all paint, oil, grease, loose rust, and other foreign material that will be in contact with grout.
- C. Sandblast to bright metal all metal surfaces in contact with epoxy grout in accordance with manufacturer's written instructions.
- D. Set machinery in position and wedge to elevation with steel wedges, or use cast-in leveling bolts. Remove wedges after grout is set and pack void with grout.
- E. Form with watertight forms at least 2 inches higher than bottom of plate.
- F. Fill space between bottom of machinery base and original concrete in accordance with manufacturer's representative's training instructions.
- G. If grout cannot be placed from one edge and flowed to the opposite edge, air vents shall be provided through the plate to prevent air entrapment.
- H. Radius all corners of grout pad.

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- I. Install expansion joints for epoxy grout placement in accordance with manufacturer's written instructions.

3.03 FIELD QUALITY CONTROL

A. General:

1. Performed by Project representative's inspection staff.
2. Perform the following quality control inspections. The grout manufacturer's representative shall accompany the Project representative's inspection staff on the first installation of each size and type of equipment.

B. Evaluation and Acceptance of Nonshrink Grout:

1. Inspect the surface preparation of concrete substrates onto which nonshrink grout materials are to be applied, for conformance to the specified application criteria including, but not limited to, substrate profile, degree of cleanliness, and moisture.
2. Inspect preparation and application of nonshrink grout form work for conformance to the manufacturer's recommendations.
3. Conduct a final review of completed nonshrink grout installation for conformance to these Specifications.

C. Evaluation and Acceptance of Epoxy Grout:

1. Inspect ambient conditions during various phases of epoxy grouting installation for conformance with the epoxy grout manufacturer's requirements.
2. Inspect the surface preparation of concrete substrates onto which epoxy grout materials are to be applied, for conformance to the specified application criteria including, but not limited to, substrate profile, degree of cleanliness, and moisture.
3. Inspect the surface preparation of the metallic substrates onto which the epoxy primer is to be applied.
4. Inspect the epoxy-primed metallic substrate for coverage and adhesion.
5. Inspect preparation and application of epoxy grout form work for conformance to the manufacturer's recommendation.
6. Verify consistency obtained is sufficient for the proper field placement at the installed temperatures.
7. Inspect and record that the "pot life" of epoxy grout materials is not exceeded during the installation.
8. Inspect epoxy grout for cure.
9. Inspect and record that localized repairs made to grout voids are in conformance with the specification requirements.

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10. Conduct a final review of completed epoxy grout installation for conformance to these Specifications.
11. All grout, already placed, which fails to meet the requirements of these Specifications, is subject to removal and replacement at no additional cost to the Owner.

**END OF SECTION**



**SECTION 03 63 00  
CONCRETE DOWELING**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards that may be referenced in this section:
1. American National Standards Institute (ANSI).
  2. ASTM International (ASTM):
    - a. C881/C881M, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
    - b. E488, Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements.
  3. California Building Standards Commission:
    - a. 2016 California Building Code (CBC).
    - b. Evaluation Services Reports.

**1.02 DEFINITIONS**

- A. ICC Evaluation Services Report: Published by ICC for products provided by concrete adhesive anchor manufacturers.
- B. Special Inspection: As defined in the CBC and indicated on the Statement of Special Inspection (Plan) on Drawings.

**1.03 SUBMITTALS**

- A. Action Submittals:
1. Product Data: Manufacturer's catalog information.
- B. Informational Submittals:
1. Manufacturer's instructions for preparation, placement, drilling of holes, installation of anchors and adhesive, and handling of cartridges, nozzles, and equipment.
  2. Manufacturer's written letter of certification identifying installer's qualifications to install products.
  3. ICC Evaluation Services Report: Specific to proposed doweling system manufacturer.

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1.04 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer: Experience with installation of specified products.
2. Installer: Trained and certified by manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Container Markings: Include manufacturer's name, product name, batch number, mix ratio by volume, product expiration date, ANSI hazard classification, and appropriate ANSI handling precautions.

B. Store adhesive components in accordance with manufacturer's written instructions.

C. Dispose of when:

1. Shelf life has expired.
2. Stored other than per manufacturer's instructions.

**PART 2 PRODUCTS**

2.01 MATERIALS

A. Adhesive:

1. Approved by an ICC Evaluation Services Report for conformance to 2016 CBC requirements for doweling of steel reinforcing bars in cracked concrete.
2. Suitable for long-term loads as well as for wind and seismic loads.
3. Meet requirements of ASTM C881/C881M.
4. Two-component, insensitive to moisture, designed to be used in adverse freeze/thaw environments.
5. Disposable, Self-Contained Cartridge System:
  - a. Capable of dispensing both components in proper mixing ratio.
  - b. Fit into manually or pneumatically operated caulking gun.
6. Mixed Adhesive: Nonsag, light paste consistency with ability to remain in a 1-inch diameter overhead drilled hole without runoff.
7. Cure Temperature, Pot Life, and Workability: Compatible for intended use and anticipated environmental conditions.
8. Manufacturers and Products:
  - a. Hilti, Inc., Tulsa, OK; HIT-RE 500-SD (ESR-2322) or HIT-HY 200 (ESR-3187) Adhesive Anchors.
  - b. Powers Fasteners, Brewster, NY; Power PURE110+ Epoxy Adhesive Anchor System (ESR-3298).

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- c. Simpson Strong-Tie Co., Inc., Pleasanton, CA; SET-XP Epoxy Adhesive Anchors (ESR-2508).
  - a. Or approved equal.
- B. Mixing Nozzles: Disposable, manufactured in several sizes to accommodate size of reinforcing dowels.
- C. Reinforcing Dowels: As specified in Section 03 30 01, Reinforced Concrete.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Drilling Equipment:
- 1. Drilling Hammers for Dowel Holes:
    - a. Electric or pneumatic rotary type with medium or light impact.
    - b. Hollow drills with flushing air systems are preferred.
  - 2. Where edge distances are less than 2 inches, use lighter impact equipment to prevent microcracking and concrete spalling during drilling process.
- B. Hole Diameter: Use drill bit diameter meeting ICC Evaluation Services Report requirements and as recommended by manufacturer.
- C. Obstructions in Drill Path: When existing steel reinforcement is encountered during drilling, obtain Engineer approval for proposed fix.
- D. Doweling:
- 1. Install per details shown on Drawings and in accordance with adhesive manufacturer's instructions.
  - 2. When using epoxy anchors, dowels may be pre-bent prior to installation to 15 degrees to align with other bars. Do not heat dowels to bend.
  - 3. Bent Bar Dowels: Where edge distances are critical, and intersection with steel reinforcement is likely, drill hole at 10-degree angle or less and use pre-bent reinforcing bars.
  - 4. If bars have fused epoxy coating and coating is damaged, recoat damaged area with epoxy.
- E. Adhesive:
- 1. Install in accordance with written manufacturer's instructions.
  - 2. Dispense components through specially designed static mixing nozzle that thoroughly mixes components and places mixed adhesive at base of predrilled hole.

3.02 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

- A. Owner-Furnished Quality Assurance, in accordance with CBC Chapter 17 requirements, is provided in the Statement of Special Inspection (Plan). Contractor responsibilities and related information on special inspection and testing are included in Section 01 45 33, Special Inspection, Observation, and Testing.
1. Special inspection will be performed by the Special Inspector in accordance with ICC ESR requirements and as specified in Section 01 45 33, Special Inspection, Observation, and Testing.
  2. Continuous inspection required where noted on Drawings and where concrete dowels are installed in overhead applications.
  3. Periodic inspection required where continuous inspection is not specified.
  4. Special Inspector will observe installation in accordance with requirements of the ICC Evaluation Services Report and will submit report including the following:
    - a. Product Description: Product name, rod diameter, and length.
    - b. Drill bit compliance.
    - c. Hole diameter, diameter, and depth and cleanliness.
    - d. Adhesive expiration date.
  5. Verification of dowel installation in accordance with manufacturer's published instructions
- B. Contractor-Furnished Quality Control: Inspection and testing as required in Section 01 45 16.13, Contractor Quality Control.

**END OF SECTION**

**SECTION 05 05 19**  
**POST-INSTALLED ANCHORS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Concrete Institute (ACI):
    - a. 318, Building Code Requirements for Structural Concrete.
    - b. 355.2, Qualification of Post-Installed Mechanical Anchors in Concrete.
    - c. 355.4, Qualification of Post-Installed Adhesive Anchors in Concrete.
  2. American Iron and Steel Institute (AISI): Stainless Steel Type 316.
  3. ASTM International (ASTM):
    - a. A123/A123M, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
    - b. A143, Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
    - c. A153/A153M, Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
    - d. A193/A193M, Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
    - e. A194/A194M, Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both.
    - f. A380, Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.
    - g. A385, Practice for Providing High-Quality Zinc Coatings (Hot-Dip).
    - h. A563, Specification for Carbon and Alloy Steel Nuts.
    - i. A780, Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
    - j. A967, Specification for Chemical Passivation Treatments for Stainless Steel Parts.
    - k. E488, Standard Test Methods for Strength of Anchors in Concrete Elements.
    - l. F436, Specification for Hardened Steel Washers.
    - m. F468, Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use.
    - n. F568M, Specification for Carbon and Alloy Steel Externally Threaded Metric Fasteners.

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- o. F593, Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
  - p. F594, Specification for Stainless Steel Nuts.
  - q. F1554, Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- 4. American National Standards Institute (ANSI).
  - 5. International Association of Plumbing and Mechanical Officials Uniform ES (IAPMO-UES): Evaluation Reports for Concrete and Masonry Anchors.
  - 6. International Code Council Evaluation Service (ICC-ES):
    - a. Evaluation Reports for Concrete and Masonry Anchors.
    - b. AC01, Acceptance Criteria for Expansion Anchors in Masonry Elements.
    - c. AC70, Acceptance Criteria for Fasteners Power-driven into Concrete, Steel and Masonry Elements.
    - d. AC106, Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements.
    - e. AC193, Acceptance Criteria for Mechanical Anchors in Concrete Elements.
    - f. AC308, Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements. Evaluation Reports for Concrete and Masonry Anchors.
  - 7. Specialty Steel Industry of North America (SSINA):
    - a. Specifications for Stainless Steel.
    - b. Design Guidelines for the Selection and Use of Stainless Steel.
    - c. Stainless Steel Fabrication.
    - d. Stainless Steel Fasteners.

1.02 DEFINITIONS

- A. Corrosive Area: Containment area or area exposed to delivery, storage, transfer, or use of chemicals.
- B. Exterior Area: Location not protected from weather by a building or other enclosed structure to include buried roof structures.
- C. Interior Dry Area: Location inside building or structure where floor is not subject to liquid spills or wash down, and where wall or roof slab is not common to a water-holding or earth-retaining structure.

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- D. Interior Wet Area: Location inside building or structure where floor is sloped to floor drains or gutters and is subject to liquid spills or wash down, or where wall, floor, or roof slab is common to a water-holding or earth-retaining structure.
- E. Submerged: Location at or below top of wall of open water-holding structure, such as a basin or channel, or wall, ceiling, or floor surface inside a covered water-holding structure, or exterior belowgrade wall or roof surface of water-holding structure, open or covered.

1.03 SUBMITTALS

A. Action Submittals:

- 1. Shop Drawings: Specific instructions for concrete anchor installation, including drilled hole size and depth, preparation, placement, procedures, and instructions for safe handling of anchoring systems.

B. Informational Submittals:

- 1. Concrete Anchors:
  - a. Manufacturer's product description and installation instructions.
  - b. Current ICC-ES or IAPMO-UES Report for each type of post-installed anchor to be used.
  - c. Adhesive Anchor Installer Certification.
- 2. Passivation method for stainless steel members.
- 3. Hot-Dip Galvanizing: Certificate of compliance signed by galvanizer, with description of material processed and ASTM standard used for coating.

1.04 QUALITY ASSURANCE

A. Qualifications:

- 1. Installers of adhesive anchors horizontally or upwardly inclined to support sustained tension loads shall be certified by an applicable certification program. Certification shall include written and performance tests in accordance with the ACI/CRSI Adhesive Installer Certification Program or equivalent.
- 2. Galvanized Coating Applicator: Company specializing in hot-dip galvanizing after fabrication and following procedures of Quality Assurance Manual of the American Galvanizers Association.

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1.05 DELIVERY, STORAGE, AND HANDLING

- A. Package stainless steel items in a manner to provide protection from carbon impregnation.
- B. Protect hot-dip galvanized finishes from damage as a result of metal banding and rough handling.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. Unless otherwise indicated, meet the following requirements:

Item	ASTM Reference
Stainless Steel:	
Threaded Rods	F593, AISI Type 316, Condition CW
Nuts*	F594, AISI Type 316, Condition CW
Carbon Steel:	
Threaded Rods	F1554, Grade 36 or F568M Class 5.8 A193/A193M, Grade B7
Flat and Beveled Washers (Hardened)	F436
Nuts*	A194/A194M, Grade 2H
Galvanized Steel:	
All	A153/A153M
*Nuts of other grades and styles having specified proof load stresses greater than specified grade and style are also suitable. Nuts must have specified proof load stresses equal to or greater than minimum tensile strength of specified threaded rod.	

- B. Bolts, Washers, and Nuts: Use stainless steel, hot-dip galvanized steel, and zinc-plated steel material types as indicated in Fastener Schedule at end of this section.



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2.02 POST-INSTALLED CONCRETE ANCHORS

A. General:

1. AISI Type 316 stainless or hot-dip galvanized as shown in Fastener Schedule at end of this section.
2. Post-installed anchor systems used in concrete shall be approved by ICC Evaluation Services Report or equivalent for use in cracked concrete and for short-term and long-term loads including wind and earthquake.
3. Mechanical Anchors: Comply with the requirements of ICC-ES AC193 or ACI 355.2.
4. Adhesive Anchors: Comply with the requirements of ICC-ES AC308 or ACI 355.4.

B. Torque-Controlled Expansion Anchors (Wedge Anchors):

1. Manufacturers and Products:
  - a. Hilti, Inc., Tulsa, OK; Kwik-Bolt –TZ (KB-TZ) Anchors (ESR-1917).
  - b. Powers Fasteners, Brewster, NY; Power-Stud +SD1, +SD2, +SD4, or +SD6 Anchors (ESR-2502 and ESR-2818).
  - c. Simpson Strong-Tie Co., Inc., Pleasanton, CA; Strong-Bolt 2 Anchors (ESR-1771 and ESR-3037).
  - d. Or approved equal.

C. Undercut Anchors:

1. Manufacturers and Products:
  - a. USP Structural Connectors, Burnsville, MN; DUC Undercut Anchor (ESR-1970).
  - b. Hilti, Inc., Tulsa, OK; HDA Undercut Anchor (ESR-1546).
  - c. Simpson Strong-Tie Co., Inc., Pleasanton, CA; TORQ-CUT Self-Undercutting Anchor (ESR-2705).
  - d. Powers Fasteners, Brewster, NY; Atomic+ Undercut Anchor (ESR-3067).
  - e. Or approved equal.

D. Self-Tapping Concrete Screw Anchors:

1. Manufacturers and Products:
  - a. Powers Fasteners, Brewster, NY; Wedge-Bolt+ (ESR-2526).
  - b. Powers Fasteners, Brewster, NY; Vertigo+ Rod Hanger Screw Anchor (ESR-2989).
  - c. Powers Fasteners, Brewster, NY; Snake+ Flush Mount Screw Anchor (ESR-2272).
  - d. Hilti, Inc., Tulsa, OK; HUS-EZ Screw Anchor (ESR-3027).

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- e. Simpson Strong-Tie Co., Inc., Pleasanton, CA; Titen HD Screw Anchor (ESR-2713).
- f. Or approved equal.

E. Adhesive Anchors:

- 1. Threaded Rod:
  - a. Diameter as shown on Drawings.
  - b. Length as required to provide minimum depth of embedment indicated and thread projection required.
  - c. Clean and free of grease, oil, or other deleterious material.
- 2. Adhesive:
  - a. Two-component, insensitive to moisture, designed to be used in adverse freeze/thaw environments.
  - b. Cure Temperature, Pot Life, and Workability: Compatible for intended use and anticipated environmental conditions.
- 3. Packaging and Storage:
  - a. Disposable, self-contained system capable of dispensing both components in proper mixing ratio and fitting into a manually or pneumatically operated caulking gun.
  - b. Store adhesive on pallets or shelving in a covered storage area.
  - c. Package Markings: Include manufacturer's name, product name, batch number, product expiration date, ANSI hazard classification, and appropriate ANSI handling precautions.
  - d. Dispose of When:
    - 1) Shelf life has expired.
    - 2) Stored other than in accordance with manufacturer's instructions.
- 4. Manufacturers and Products:
  - a. Hilti, Inc., Tulsa, OK; HIT Doweling Anchor System, HIT RE 500 SD (ESR-2322), or HIT-HY 200 (ESR-3187).
  - b. Simpson Strong-Tie Co., Inc., Pleasanton, CA; SET-XP Epoxy Adhesive Anchors (ESR-2508), or AT-XP Adhesive Anchors (IAPMO UES-263).
  - c. Powers Fasteners, Brewster NY; Pure 110+ Epoxy adhesive anchor system (ESR-3298).
  - d. Or approved equal.

F. Adhesive Threaded Inserts:

- 1. Type 316 stainless steel, internally threaded inserts.
- 2. Manufacturer and Product: Hilti, Inc., Tulsa, OK; HIS-RN Insert with HIT-RE 500-SD or HIT-HY 200 adhesive.

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**PART 3 EXECUTION**

3.01 CONCRETE ANCHORS

- A. Begin installation only after concrete to receive anchors has attained its full compressive strength.
- B. Locate existing reinforcing with Ground Penetrating Radar or other method approved by Engineer prior to drilling. Coordinate with Engineer to adjust anchor locations where installation would result in hitting reinforcing.
- C. Install in accordance with approved manufacturer's written instructions.
- D. Provide minimum embedment, edge distance, and spacing as indicated on Drawings.
- E. Use only drill type and bit type and diameter recommended by approved anchor manufacturer.
- F. Properly clean cored hold per approved manufacturer's requirements.
- G. When unidentified embedded steel, rebar, or other obstruction is encountered in drill path, slant drill to clear obstruction. If drill must be slanted more than indicated in approved manufacturer's installation instructions to clear obstruction, notify Engineer for direction on how to proceed.
- H. Adhesive Anchors:
  - 1. Unless otherwise approved by Engineer and approved adhesive manufacturer:
    - a. Do not install adhesive anchors when temperature of concrete is below 40 degrees F or above 100 degrees F.
    - b. Do not install prior to concrete attaining an age of 28 days.
    - c. Remove any standing water from hole with oil-free compressed air. Inside surface of hole shall be dry.
    - d. Do not disturb anchor during recommended curing time.
    - e. Do not exceed maximum torque as specified in approved manufacturer's instructions.

3.02 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

- A. Owner-Furnished Quality Assurance, in accordance with CBC Chapter 17 requirements, is provided in the Statement of Special Inspections Plan on Drawings. Contractor responsibilities and related information are included in Section 01 45 33, Special Inspection, Observation, and Testing.

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- B. Contractor-Furnished Quality Control: Inspection and testing as required in Section 01 45 16.13, Contractor Quality Control.

3.03 FASTENER SCHEDULE

- A. Unless indicated otherwise on Drawings, provide fasteners as follows:

Service Use and Location	Product	Remarks
1. Post Installed Anchors for Metal Components to Cast-in-Place Concrete (such as, Ladders, Handrail Posts, Electrical Panels, Platforms, and Equipment)		
Interior Dry Areas	Anchor material type to match material being anchored (for example, stainless steel anchors to anchor stainless steel equipment, galvanized anchors to anchor galvanized equipment).	Verify product acceptability and approved manufacturer's requirements if anchor installation will occur in an overhead application
Submerged, Exterior, Interior Wet, and Corrosive Areas	Stainless steel adhesive anchors	Verify product acceptability and approved manufacturer's requirements if anchor installation will occur in an overhead application
2. All Others		
All service uses and locations	Stainless steel fasteners	

- B. Antiseizing Lubricant: Use on all stainless steel threads.
- C. Do not use adhesive anchors to support fire-resistive construction or where ambient temperature will exceed 120 degrees F.

**END OF SECTION**

**SECTION 05 12 00**  
**STRUCTURAL STEEL FRAMING**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Galvanizers Association (AGA): Quality Assurance Manual.
  2. American Institute of Steel Construction (AISC):
    - a. 201, Certification Program for Structural Steel Fabricators.
    - b. 206, Certification Program for Structural Steel Erectors—Standard for Structural Steel Erectors.
    - c. 303, Code of Standard Practices for Steel Buildings and Bridges.
    - d. 325, Steel Construction Manual.
    - e. 326, Detailing for Steel Construction.
    - f. 341, Seismic Provisions for Structural Steel Buildings.
    - g. 360, Specification for Structural Steel Buildings.
    - h. 420, Certification Standard for Shop Application of Complex Protective Coating Systems.
  3. American Welding Society (AWS):
    - a. D1.1/D1.1M, Structural Welding Code—Steel.
    - b. D1.8/D1.8M, Structural Welding Code—Seismic Supplement.
  4. ASTM International (ASTM):
    - a. A6/A6M, Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
    - b. A36/A36M, Standard Specification for Carbon Structural Steel.
    - c. A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
    - d. A123/123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
    - e. A143/A143M, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
    - f. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
    - g. A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
    - h. A384/A384M, Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.
    - i. A385/A385M, Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip).

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- j. A490, Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
  - k. A500/A500M, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
  - l. A563, Standard Specification for Carbons and Alloy Steel Nuts.
  - m. A572/A572M, Standard Specification for High-Strength Low Alloy Columbium-Vanadium Structural Steel.
  - n. A780/A780M, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
  - o. A992/A992M, Standard Specification for Structural Steel Shapes.
  - p. B695, Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
  - q. A1085/A1085M, Standard Specification for Cold-Formed Welded Carbon Steel Hollow Structural Sections (HSS).
  - r. F436, Standard Specification for Hardened Steel Washers.
  - s. F959, Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.
  - t. F1136, Standard Specification for Zinc/Aluminum Corrosion Protective Coatings for Fasteners
  - u. F1852, Standard Specification for “Twist Off” Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  - v. F2280, Standard Specification for “Twist Off” Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
  - w. F3125, Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.
- 5. Occupational Safety and Health Administration (OSHA).
  - 6. Research Council on Structural Connections (RCSC): Specification for Structural Joints using High-Strength Bolts.

## 1.02 SUBMITTALS

### A. Action Submittals:

- 1. Provide Shop Drawing details showing:
  - a. Erection plans.
  - b. Members, including piece numbers, sizes, grades, dimensions, cambers, and connection details.
  - c. Anchor bolt layouts.
  - d. Connection material specifications.
  - e. Indicate type, size, and length of bolts.

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- f. Indicate welds by standard AWS symbols, distinguishing between shop and field welds and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
2. Product specifications, including primer and other coatings.
3. Welding requirements as specified in AISC 341 Appendix W, Section W2.2 or AWS D1.8/D1.8M.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Load structural members in such a manner that they will be transported and unloaded without damage to coatings and without being excessively stressed, deformed, or otherwise damaged.
- B. Storage:
  1. Store materials to permit easy access for inspection and identification. Store in a dry area and keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
    - a. Do not store materials in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials as directed.
  2. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
    - a. Fasteners may be repackaged provided testing and inspecting agency observes repackaging and sealing of containers.
    - b. Clean and lubricate bolts and nuts that become dry or rusty before use.
    - c. Comply with manufacturer's written recommendations for cleaning and lubricating fasteners and for retesting fasteners after lubrication.
- C. Handle materials to avoid distortion or damage to members or supporting structures.

**PART 2 PRODUCTS**

2.01 MATERIALS

- A. Rolled Plates, Shapes except W-Shapes and Bars: ASTM A36/A36M or A572/A572M, Grade 50, unless indicated otherwise.
- B. W-Shapes: ASTM A992/A992M, unless indicated otherwise on Drawings.
- C. Steel Pipe: ASTM A53/A53M, Grade B.

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- D. Round Hollow Structural Sections (HSS): ASTM A500/A500M, Grade C (Fy equals 46 ksi) or ASTM A1085/A1085M.
- E. Square and Rectangular Hollow Structural Sections (HSS): ASTM A500/A500M, Grade C (Fy equals 50 ksi) or ASTM A1085/A1085M.

2.02 FASTENERS

- A. Anchor Bolts: As specified in Section 05 50 00, Metal Fabrications.
- B. Post-Installed Anchors: As specified in Section 05 05 19, Post-Installed Anchors.

2.03 ANCILLARY MATERIALS

- A. Surface Preparation and Primer: As specified in Section 09 90 00, Painting and Coating.
- B. Grout: As specified in Section 03 62 00, Grouting.

2.04 FABRICATION

- A. General:
  - 1. Fabricate as shown and in accordance with AISC 360 and AISC 303.
  - 2. Mark and match mark materials for field assembly.
  - 3. Complete assembly, including bolting and welding of units, before start of finishing operations.
  - 4. Fabricate to agree with field measurements.
  - 5. Fillet re-entrant cuts and corners to radius of not less than 1/2 inch.
- B. Connections:
  - 1. Shop Connections: Weld or bolt as shown on Drawings.
  - 2. Meet requirements of AISC 325 for bolted double-angle shear connections, unless indicated otherwise.
- C. Welded Construction:
  - 1. Groove and Butt Joint Welds: Complete penetration, unless otherwise indicated.



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2.05 FINISHES

A. Shop Paint Primer:

1. Surface Preparation and painting as specified in Section 09 90 00, Painting and Coating.
2. Do not shop prime the following surfaces, unless indicated otherwise:
  - a. Within 2 inches of field-welded connections.
  - b. Steel members to be completely encased in reinforced concrete or coated with cementitious fireproofing.
  - c. Faying surfaces of slip critical bolted connections and bolted connections in Seismic Force Resisting Systems.
3. Apply shop primer to top flange surfaces of composite steel beams, unless indicated otherwise.

B. Galvanizing:

1. Fabricate steel to be galvanized in accordance with ASTM A143/A143M, ASTM A384/A384M, and ASTM A385/A385M. Avoid fabrication techniques that could cause distortion or embrittlement of steel.
2. Remove welding slag, splatter, burrs, grease, oil, paint, lacquer, and other deleterious material prior to delivery for galvanizing.
3. Remove, by blast cleaning or other methods, surface contaminants and coatings not removable by normal chemical cleaning process in galvanizing operation.
4. Hot-dip galvanize steel members, fabrications, and assemblies after fabrication in accordance with ASTM A123/A123M. Galvanized coating shall be G90.
5. Hot-dip galvanize ASTM A325 bolts, nuts, washers, and hardware components in accordance with ASTM A153/A153M. Oversize holes to allow for zinc alloy growth. Shop-assemble bolts, nuts, and washers with special lubricant and test in accordance with ASTM A325 and ASTM A563.
6. Mechanically zinc coat ASTM F1852 twist-of-type tension-control (TC) bolts, nuts, and washers in accordance with ASTM F1852 and ASTM B695, Class 50.
7. Coat ASTM F2280 twist-off-type tension-control (TC) bolts, nuts, and washers in accordance with ASTM F1136.
8. Galvanize components of bolted assemblies separately before assembly.

2.06 SOURCE QUALITY CONTROL

A. Welding:

1. Contractor's Certified Welding Inspector (CWI): Inspect and test fabrication.
2. Visually inspect fabrication welds in accordance with AWS D1.1/D1.1M, Section 6 and Table 6.1, Visual Inspection Acceptance Criteria.
3. An independent testing agency will be retained by Owner to perform the inspection and testing of fabrication.

B. Hot-Dip Galvanizing:

1. An independent testing agency shall be retained by Contractor and approved by Engineer to inspect and test hot-dip galvanized fabricated items in accordance with ASTM A123/A123M and ASTM A153/A153M.
2. Visually inspect and test for thickness and adhesion of zinc coating for minimum of three test samples from each lot in accordance with ASTM A123/A123M and ASTM A153/A153M.
3. Reject and retest nonconforming articles in accordance with ASTM A123/A123M and ASTM A153/A153M.

**PART 3 EXECUTION**

3.01 ERECTION

A. General:

1. Meet requirements of AISC 360 and AISC 303, with exceptions as specified.
2. Install Contractor-designed temporary construction bracing to provide necessary support until components are in place and construction is complete.
3. Provide additional field connection material as required by AISC 303.
4. Splice members only where indicated and accepted on Shop Drawings.

B. Field Assembly:

1. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly.
2. Set structural frames accurately to lines and elevations shown.
3. Align and adjust various members forming a part of a complete frame or structure before permanently fastening.

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4. Level and plumb individual members of structure within tolerances shown in AISC 303.
5. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be completed and in service.
6. Perform necessary adjustments to compensate for minor discrepancies in elevations and alignment.

C. Setting Baseplates and Bearing Plates:

1. Clean concrete and masonry bearing surfaces of bond reducing materials and roughen to improve bond to surfaces.
2. Clean bottom surface of baseplates and bearing plates.
3. Set loose and attached baseplates and bearing plates for structural members on wedges, shims, leveling nuts, or other adjustable devices. Use leveling plates where indicated.
4. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to placing grout. Weld plate washer to baseplate where indicated.
5. Grout Under Baseplate: As specified in Section 03 62 00, Grouting, prior to placing loads on structure.

D. Anchor Bolts:

1. Coordinate installation of anchor bolts and other connectors required for securing structural steel to in-place work.
2. Provide templates and other devices for presetting bolts and other anchors to accurate locations.
3. Projection of anchor bolts beyond face of concrete and threaded length shall be adequate to allow for full engagement of threads of hold-down nuts, adjustment of leveling nuts, washer thicknesses, and construction tolerances, unless indicated otherwise.
4. Placement Tolerances:
  - a. As required by AISC 303, unless indicated otherwise.
  - b. Embedded anchor bolts shall not vary from dimensions shown on Drawings by more than the following:
    - 1) Center-to-Center of Any Two Bolts Within an Anchor Group: 1/8 inch.
    - 2) Center-to-Center of Adjacent Anchor Bolt Groups: 1/4 inch.
    - 3) Variation from Perpendicular to Theoretical Bearing Surface: 1:50.

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E. Connections:

1. High-Strength Bolted:
  - a. Tighten in accordance with RCSC Specification for Structural Joints Using High-Strength Bolts.
  - b. For snug-tightened connections (N, X), tighten to snug tight condition. Use hardened washer over slotted or oversize holes in outer plies.

3.02 MISFITS

A. At Bolted Connections:

1. Immediately notify Engineer for approval of one of the following methods of correction:
  - a. Ream holes that must be enlarged to admit bolts and use oversized bolts.
  - b. Plug weld misaligned holes and re-drill holes to admit standard size bolts.
  - c. Drill additional holes in connection, conforming to AISC for bolt spacing and end and edge distances, and add additional bolts.
  - d. Reject member containing misfit, incorrect sized, or misaligned holes and fabricate new member to ensure proper fit.
2. Do not enlarge incorrectly sized or misaligned holes in members by burning or by use of drift pins.

B. At Anchor Bolts:

1. Resolve misalignments between anchor bolts and bolt holes in steel members in accordance with approved Shop Drawing.
2. Do not flame cut to enlarge holes without prior approval of Engineer.

C. Gas Cutting:

1. Do not use gas cutting torches in field for correcting fabrication errors in structural framing.
2. Secondary members not under stress and concealed in finished structure may be corrected by gas cutting torches, if approved by Engineer.
3. Finish flame-cut sections equivalent to sheared and punched appearance.

3.03 REPAIR AND CLEANING

- A. Clean shop primer from field welds, bolted connections, and abraded areas immediately after erection.

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- B. Remove and grind smooth tack welds, fit-up-lugs, and weld runoff tabs.
- C. Remove weld back-up bars and grind smooth where indicated on Drawings.
- D. Apply touchup paint primer by brush or spray of same thickness and material as that used in shop application and as specified in Section 09 90 00, Painting and Coating.
- E. Hot-Dip Galvanized Coating Repair:
  - 1. Conform to ASTM A780/A780M.
  - 2. For minor repairs at abraded areas, use sprayed zinc conforming to ASTM A780/A780M.
  - 3. For flame cut or welded areas, use zinc-based solder, or zinc sticks, conforming to ASTM A780/A780M.
  - 4. Use magnetic gauge to determine thickness is equal to or greater than base galvanized coating.

3.04 FIELD FINISH

- A. Field finish in accordance with Section 09 90 00, Painting and Coating.

3.05 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

- A. Owner-Furnished Quality Assurance, in accordance with CBC Chapter 17 requirements, is provided in Statement of Special Inspections Plan. Contractor responsibilities and related information are included in Section 01 45 33, Special Inspection, Observation, and Testing.
- B. Contractor-Furnished Quality Control: Inspect and test as required in Section 01 45 16.13, Contractor Quality Control.
- C. Welding:
  - 1. Contractor's Certified Welding Inspector (CWI): Inspect and test field welds.
  - 2. Visually inspect field welds in accordance with AWS D1.1/D1.1M, Section 6 and Table 6.1, Visual Inspection Acceptance Criteria.
  - 3. An independent testing agency will be retained by Owner to perform inspection and testing of field welds.
- D. Special inspection will be provided by Owner.

**END OF SECTION**

**SECTION 05 50 00**  
**METAL FABRICATIONS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. The Aluminum Association, Inc. (AA): The Aluminum Design Manual.
  2. American Galvanizers Association (AGA):
    - a. Inspection of Hot-Dip Galvanized Steel Products.
    - b. Quality Assurance Manual.
  3. American Iron and Steel Institute (AISI): Stainless Steel Types.
  4. American Ladder Institute (ALI): A14.3, Ladders - Fixed - Safety Requirements.
  5. American National Standards Institute (ANSI).
  6. American Society of Safety Engineers (ASSE): A10.11, Safety Requirements for Personnel and Debris Nets.
  7. American Welding Society (AWS):
    - a. D1.1/D1.1M, Structural Welding Code - Steel.
    - b. D1.2/D1.2M, Structural Welding Code - Aluminum.
    - c. D1.6/D1.6M, Structural Welding Code - Stainless Steel.
  8. ASTM International (ASTM):
    - a. A36/A36M, Standard Specification for Carbon Structural Steel.
    - b. A48/A48M, Specification for Gray Iron Castings.
    - c. A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
    - d. A108, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
    - e. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
    - f. A143/A143M, Standard for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
    - g. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
    - h. A193/A193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
    - i. A194/A194M, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.

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- j. A240/A240M, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- k. A276, Standard Specification for Stainless Steel Bars and Shapes.
- l. A283/A283M, Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
- m. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- n. A325, Standard Specification for Structural Bolts, Steel, Heat Treated 120/105 ksi Minimum Tensile Strength.
- o. A380, Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.
- p. A384/A384M, Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.
- q. A385/A385M, Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip).
- r. A489, Standard Specification for Carbon Steel Lifting Eyes.
- s. A500/A500M, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- t. A501, Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- u. A563, Standard Specification for Carbon and Alloy Steel Nuts.
- v. A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- w. A780/A780, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
- x. A786/A786M, Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
- y. A793, Standard Specification for Rolled Floor Plate, Stainless Steel.
- z. A967, Standard Specification for Chemical Passivation Treatments for Stainless Steel Parts.
- aa. A992/A992M, Standard Specification for Structural Steel Shapes.
- bb. A1085, Standard Specification for Cold-Formed Welded Carbon Steel Hollow Structural Sections (HSS).
- cc. B209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- dd. B308/B308M, Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
- ee. B429/B429M, Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.

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- ff. B632/B632M, Standard Specification for Aluminum-Alloy Rolled Tread Plate.
  - gg. C881/C881M, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
  - hh. D1056, Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.
  - ii. F436, Standard Specification for Hardened Steel Washers.
  - jj. F468, Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use.
  - kk. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
  - ll. F594, Standard Specification for Stainless Steel Nuts.
  - mm. F844, Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.
  - nn. F1554, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
9. Occupational Safety and Health Administration (OSHA):
- a. 29 CFR 1910.27, Fixed Ladders.
  - b. 29 CFR 1926.105, Safety Nets.
  - c. 29 CFR 1926.502, Fall Protection Systems Criteria and Practices.
10. Specialty Steel Industry of North America (SSINA):
- a. Specifications for Stainless Steel.
  - b. Design Guidelines for the Selection and Use of Stainless Steel.
  - c. Stainless Steel Fabrication.
  - d. Stainless Steel Fasteners.

1.02 DEFINITIONS

- A. Anchor Bolt: Cast-in-place anchor; concrete or masonry.
- B. Corrosive Area: Containment area or area exposed to delivery, storage, transfer, or use of chemicals. Corrosive area includes areas exposed to corrosive atmosphere such as hydrogen sulfide from wastewater.
- C. Exterior Area: Location not protected from weather by building or other enclosed structure.
- D. Interior Dry Area: Location inside building or structure where floor is not subject to liquid spills or washdown, nor where wall or roof slab is common to a water-holding or earth-retaining structure.
- E. Interior Wet Area: Location inside building or structure where floor is sloped to floor drains or gutters and is subject to liquid spills or washdown, or where wall, floor, or roof slab is common to a water-holding or earth-retaining structure.



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- F. Submerged: Location at or below top of wall of open water-holding structure, such as basin or channel, or wall, ceiling or floor surface inside a covered water-holding structure, or exterior belowgrade wall or roof surface of water-holding structure, open or covered.

1.03 SUBMITTALS

A. Action Submittals:

- 1. Shop Drawings: Metal fabrications, including welding and fastener information.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Insofar as practical, factory assemble specified items. Package assemblies, which have to be shipped unassembled to protect materials from damage and tag to facilitate identification and field assembly.
- B. Package stainless steel items to provide protection from carbon impregnation.
- C. Protect painted coatings and hot-dip galvanized finishes from damage as a result of metal banding and rough handling. Use padded slings and straps.
- D. Store fabricated items in dry area, not in direct contact with ground.
- E. Delivery: In accordance with Section 01 61 00, Common Product Requirements.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. For hot-dip galvanized steel that is exposed to view and does not receive paint, limit the combined phosphorus and silicon content to 0.04 percent. For steels that require a minimum of 0.15 percent silicon (such as plates over 1.5 inches thick for ASTM A36/A36M steel), limit maximum silicon content to 0.21 percent and phosphorous content to 0.03 percent.
- B. All aluminum products are to be anodized.

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C. Unless otherwise indicated, meet the following requirements:

Item	ASTM Reference
Steel Wide Flange Shapes	A992/992M
Other Steel Shapes and Plates	A36/A36M or A572/A572M, Grade 50 or A992/A992M for other steel shapes
Steel Pipe	A500, Grade B
Hollow Structural Sections (HSS)	A500/A500M, Grade C
Aluminum:	
Aluminum Plates	B209, Alloy 6061-T6
Aluminum Structural Shapes	B308/B308M, Alloy 6061-T6
Stainless Steel:	
Bars and Angles	A276, AISI Type 316 (316L for welded connections)
Shapes	A276, AISI Type 304 (304L for welded connections)
Steel Plate, Sheet, and Strip	A240/A240M, AISI Type 316 (316L for welded connections)
Bolts, Threaded Rods, Anchor Bolts, and Anchor Studs	F593, AISI Type 316, Group 2, Condition SH
Nuts	F594, AISI Type 316, Condition CW
Steel Bolts and Nuts:	
Carbon Steel	A307 bolts, with A563 nuts
High-Strength	A325, Type 1 bolts, with A563 nuts
Anchor Bolts and Rods	F1554, Grade 36, with weldability supplement S1.
Eyebolts	A489
Threaded Rods	A36/A36M
Flat Washers (Unhardened)	F844

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Item	ASTM Reference
Flat and Beveled Washers (Hardened)	F436
Thrust Ties for Steel Pipe:	
Threaded Rods	A193/A193M, Grade B7
Nuts	A194/A194M, Grade 2H
Plate	A283/A283M, Grade D
Welded Anchor Studs	A108, Grades C-1010 through C-1020
Aluminum Bolts and Nuts	F468, Alloy 2024-T4
Cast Iron	A48/A48M, Class 35

- D. Bolts, Washers, and Nuts: Use stainless steel, hot-dip galvanized steel, zinc-plated steel, and aluminum material types as indicated in Fastener Schedule at end of this section.

2.02 ANCHOR BOLTS AND ANCHOR BOLT SLEEVES

A. Cast-In-Place Anchor Bolts:

1. Headed type, unless otherwise shown on Drawings.
2. Material type and protective coating as shown in Fastener Schedule at end of this section.

B. Anchor Bolt Sleeves:

1. Plastic:
  - a. Single unit construction with corrugated sleeve.
  - b. Top of sleeve shall be self-threading to provide adjustment of threaded anchor bolt projection.
  - c. Material: High-density polyethylene.
2. Fabricated Steel: ASTM A36/A36M.

2.03 POST-INSTALLED CONCRETE ANCHORS

- A. See Section 05 05 19, Post-Installed Anchors.

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2.04 PIPE SLEEVES

- A. As specified in Section 40 27 01, Process Piping Specialties.
- B. ASTM A53/A53M, Schedule 40 steel pipe sleeves with continuously welded 3/16-inch thick seep ring with outside diameter 3 inches greater than sleeve outside diameter. Hot-dip galvanize in accordance with ASTM A123/A123M.

2.05 ACCESSORIES

- A. Antiseizing Lubricant for Stainless Steel Threaded Connections:
  - 1. Suitable for potable water supply.
  - 2. Resists washout.
  - 3. Manufacturers and Products:
    - a. Bostik, Middleton, MA; Neverseez.
    - b. Saf-T-Eze Div., STL Corp., Lombard, IL; Anti-Seize.
    - c. Or approved equal.

2.06 FABRICATION

- A. General:
  - 1. Finish exposed surfaces smooth, sharp, and to well-defined lines.
  - 2. Furnish necessary rabbets, lugs, and brackets so work can be assembled in neat, substantial manner.
  - 3. Conceal fastenings where practical; where exposed, flush countersink.
  - 4. Drill metalwork and countersink holes as required for attaching hardware or other materials.
  - 5. Grind cut edges smooth and straight. Round sharp edges to small uniform radius. Grind burrs, jagged edges, and surface defects smooth.
  - 6. Fit and assemble in largest practical sections for delivery to Site.
- B. Materials:
  - 1. Use steel shapes, unless otherwise noted.
  - 2. Steel to be hot-dip galvanized: Limit silicon content to less than 0.04 percent or to between 0.15 percent and 0.25 percent.
  - 3. Fabricate aluminum in accordance with AA Specifications for Aluminum Structures—Allowable Stress Design.
- C. Welding:
  - 1. Weld connections and grind exposed welds smooth. When required to be watertight, make welds continuous.

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2. Welded fabrications shall be free from twisting or distortion caused by improper welding techniques.
3. Steel: Meet fabrication requirements of AWS D1.1/D1.1M, Section 5.
4. Aluminum: Meet requirements of AWS D1.2/D1.2M.
5. Stainless Steel: Meet requirements of AWS D1.6/D1.6M.
6. Welded Anchor Studs: Prepare surface to be welded and weld with stud welding gun in accordance with AWS D1.1/D1.1M, Section 7, and manufacturer's instructions.
7. Complete welding before applying finish.

D. Painting:

1. Shop prime with rust-inhibitive primer as specified in Section 09 90 00, Painting and Coating, unless otherwise indicated.
2. Coat surfaces of galvanized steel and aluminum fabricated items to be in direct contact with concrete, grout, masonry, or dissimilar metals, as specified in Section 09 90 00, Painting and Coating, unless indicated otherwise.
3. Do not apply protective coating to galvanized steel anchor bolts or galvanized steel welded anchor studs, unless indicated otherwise.

E. Galvanizing:

1. Fabricate steel to be galvanized in accordance with ASTM A143/A143M, ASTM A384/A384M, and ASTM A385/A385M. Avoid fabrication techniques that could cause distortion or embrittlement of the steel.
2. Provide venting and drain holes for tubular members and fabricated assemblies in accordance with ASTM A385/A385M.
3. Remove welding slag, splatter, burrs, grease, oil, paint, lacquer, and other deleterious material prior to delivery for galvanizing.
4. Remove by blast cleaning or other methods surface contaminants and coatings not removable by normal chemical cleaning process in the galvanizing operation.
5. Hot-dip galvanize steel members, fabrications, and assemblies after fabrication in accordance with ASTM A123/A123M. Galvanized coating shall be G90.
6. Hot-dip galvanize bolts, nuts, washers, and hardware components in accordance with ASTM A153/A153M. Oversize holes to allow for zinc alloy growth. Shop assemble bolts and nuts.
7. Galvanized steel sheets in accordance with ASTM A653/A653M.
8. Galvanize components of bolted assemblies separately before assembly. Galvanizing of tapped holes is not required.

- F. Electrolytic Protection: Coat surfaces of galvanized steel and aluminum fabricated items to be in direct contact with concrete, grout, masonry, or

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dissimilar metals, as specified in Section 09 90 00, Painting and Coating, unless indicated otherwise.

- G. Fitting: Where movement of fabrications is required or shown, cut, fit, and align items for smooth operation. Make corners square and opposite sides parallel.
- H. Accessories: Furnish as required for a complete installation. Fasten by welding or with stainless steel bolts or screws.

2.07 SOURCE QUALITY CONTROL

- A. Visually inspect all fabrication welds and correct deficiencies.
  - 1. Steel: AWS D1.1/D1.1M, Section 6 and Table 6.1, Visual Inspection Acceptance Criteria.
  - 2. Aluminum: AWS D1.2/D1.2M.
  - 3. Stainless Steel: AWS D1.6/D1.6M.
- B. Hot-Dip Galvanizing:
  - 1. An independent testing agency will be retained by Owner in accordance with ASTM A123/A123M and ASTM A153/A153M.
  - 2. Visually inspect and test for thickness and adhesion of zinc coating for minimum of three test samples from each lot in accordance with ASTM A123/A123M and ASTM A153/A153M.
  - 3. Reject and retest nonconforming articles in accordance with ASTM A123/A123M and ASTM A153/A153M.

**PART 3 EXECUTION**

3.01 INSTALLATION OF METAL FABRICATIONS

- A. General:
  - 1. Install metal fabrications plumb and level, accurately fitted, free from distortion or defects.
  - 2. Install rigid, substantial, and neat in appearance.
  - 3. Install manufactured products in accordance with manufacturer's recommendations.
  - 4. Obtain Engineer approval prior to field cutting steel members or making adjustments not scheduled.

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B. Aluminum:

1. Do not remove mill markings from concealed surfaces.
2. Remove inked or painted identification marks on exposed surfaces not otherwise coated after installed material has been inspected and approved.
3. Fabrication, mechanical connections, and welded construction shall be in accordance with the AA Aluminum Design Manual.

C. Pipe Sleeves:

1. Provide where pipes pass through concrete or masonry.
2. Holes drilled with a rotary drill may be provided in lieu of sleeves in existing walls.
3. Provide center flange for water stoppage on sleeves in exterior or water-bearing walls.
4. Provide rubber caulking sealant or a modular mechanical unit to form watertight seal in annular space between pipes and sleeves.

3.02 CAST-IN-PLACE ANCHOR BOLTS

- A. Locate and hold anchor bolts in place with templates at time concrete is placed.
- B. Use anchor bolt sleeves for location adjustment and provide two nuts and one washer per bolt of same material as bolt.
- C. Minimum Bolt Size: 1/2-inch diameter by 12 inches long, unless otherwise shown.

3.03 ELECTROLYTIC PROTECTION

A. Aluminum and Galvanized Steel:

1. Coat surfaces of galvanized steel and aluminum fabricated items to be in direct contact with concrete, grout, masonry, or dissimilar metals, as specified in Section 09 90 00, Painting and Coating, unless indicated otherwise.
2. Do not apply protective coating to galvanized steel anchor bolts or galvanized steel welded anchor studs, unless indicated otherwise.
3. Allow coating to dry before installation of the material.
4. Protect coated surfaces during installation.
5. Should coating become marred, prepare and touch up in accordance with paint manufacturer's written instructions.

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B. Stainless Steel:

1. During handling and installation, take necessary precautions to prevent carbon impregnation of stainless steel members.
2. After installation, visually inspect stainless steel surfaces for evidence of iron rust, oil, paint, and other forms of contamination.
3. Remove contamination using cleaning and passivation methods in accordance with requirements of ASTM A380 and ASTM A967.
4. Brushes used to remove foreign substances shall utilize only stainless steel or nonmetallic bristles.
5. After treatment, visually inspect surfaces for compliance.

3.04 PAINTING

A. Painted Galvanized Surfaces: Prepare as specified in Section 09 90 00, Painting and Coating.

B. Repair of Damaged Hot-Dip Galvanized Coating:

1. Conform to ASTM A780/A780M.
2. For minor repairs at abraded areas, use sprayed zinc conforming to ASTM A780/A780M.
3. For flame cut or welded areas, use zinc-based solder, or zinc sticks, conforming to ASTM A780/A780M.
4. Use magnetic gauge to determine thickness is equal to or greater than base galvanized coating.

C. Field Painting of Shop Primed Surfaces: Prepare surfaces and field finish in accordance with Section 09 90 00, Painting and Coating.

3.05 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

A. Owner-Furnished Quality Assurance:

1. In accordance with IBC Chapter 17 requirements, is provided in the Statement of Special Inspections Plan.
2. Contractor responsibilities and related information on special inspection, observation, and testing are included in Section 01 45 33, Special Inspection, Observation, and Testing.

B. Contractor-Furnished Quality Control:

1. Inspection and testing required in Section 01 45 16.13, Contractor Quality Control.
2. Manufacturer's Certificate of Compliance per Section 01 61 00, Common Product Requirements, for test results, or calculations, or



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drawings that ensure material and equipment design and design criteria meet requirements of Section 01 61 00, Common Product Requirements and Section 01 88 15, Anchorage and Bracing.

3. Special inspection shall be provided by Owner where indicated in Statement of Special Inspections Plan.

3.06 FASTENER SCHEDULE

- A. Unless indicated otherwise on Drawings, provide fasteners as follows:

Service Use and Location	Product	Remarks
1. Anchor Bolts Cast Into Concrete for Structural Steel, Metal Fabrications and Castings		
Interior Dry Areas	Hot-dip galvanized steel headed anchor bolts, unless indicated otherwise	
Exterior and Interior Wet Areas	Stainless steel headed anchor bolts	
Submerged and Corrosive Areas	Stainless steel headed anchor bolts with fusion bonded coating	See Section 09 90 00, Painting and Coating
2. Anchor Bolts Cast Into Concrete for Equipment Bases		
Interior Dry Areas	Hot-dip galvanized steel headed anchor bolts, unless otherwise specified with equipment	
Submerged, Exterior, Interior Wet, and Corrosive Areas	Stainless steel headed anchor bolts with fusion bonded coating, unless otherwise specified with equipment	See Section 09 90 00, Painting and Coating

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Service Use and Location	Product	Remarks
3. Post-Installed Anchors: See Section 05 05 19, Post-Installed Anchors		
4. Connections for Structural Steel Framing		
Exterior and Interior Wet and Dry Areas	High-strength steel bolted connections	Use hot-dipped galvanized high-strength bolted connections for galvanized steel framing members.
5. Connections for Steel Fabrications and Wood Components		
Exterior and Interior Wet and Dry Areas	Stainless steel bolted connections	
6. Connections of Aluminum Components		
Submerged, Exterior and Interior Wet and Dry Areas	Stainless steel bolted connections, unless otherwise specified with equipment	
7. All Others		
Exterior and Interior Wet and Dry Areas	Stainless steel fasteners	

B. Antiseizing Lubricant: Use on stainless steel threads.

**END OF SECTION**

**SECTION 05 52 16  
ALUMINUM RAILINGS**

**PART 1 GENERAL**

**1.01 REFERENCES**

A. The following is a list of standards which may be referenced in this section:

1. Aluminum Association: Aluminum Design Manual.
2. Aluminum Association, Incorporated (AA): DAF45, Designation System for Aluminum Finishes.
3. American Concrete Institute (ACI) 318, Building Code Requirements for Structural Concrete.
4. American Iron and Steel Institute (AISI).
5. ASTM International (ASTM):
  - a. A193/A193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
  - b. A194/A194M, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
  - c. E894, Standard Test Method for Anchorage of Permanent Metal Railing Systems and Rails for Buildings.
  - d. E935, Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
  - e. E985, Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.
6. California Buildings Commission: California Building Code (IBC).
7. Occupational Safety and Health Act (OSHA): 29 CFR 1910, Code of Federal Regulations.

**1.02 DEFINITIONS**

- A. ICC Evaluation Services Report: ICC report on evaluation of manufactured concrete anchor systems.
- B. Railings: This term includes guardrail systems, handrail systems, platform railing systems, ramp-rail systems, and stair-rail systems. Railings may be comprised of a framework of vertical, horizontal, or inclined members, grillwork or panels, accessories, or combination thereof.
- C. Special Inspection: As defined by the ICC IBC.

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- D. Toeboards: Vertical barrier at floor level usually erected on railings along exposed edges of floor or wall openings, platforms, or ramps to prevent miscellaneous items from falling through.

1.03 DESIGN REQUIREMENTS

- A. Structural Performance of Railing Systems: Design, test, fabricate, and install railings to withstand the following structural loads without exceeding allowable design working stress or allowable deflection. Apply each load to produce maximum stress and deflection in railing system components.
1. Railing System: Capable of withstanding the following load cases applied:
    - a. Concentrated load of 200 pounds applied at any point and in any direction in accordance with CBC and OSHA.
    - b. Uniform load of 50 pounds per linear foot applied in any direction in accordance with CBC.
    - c. Concentrated load need not be assumed to act concurrently with uniform loads in accordance with CBC.
  2. In-Fill Area of Railing Systems:
    - a. Capable of withstanding a horizontally applied normal load of 50 pounds applied to 1 square foot at any point in system including panels, intermediate rails, balusters, and openings and space between railings.
    - b. Horizontal concentrated load need not be assumed to act concurrently with loads on top rails of railings.
  3. Calculated lateral deflection at top of posts shall not exceed 1 inch.

1.04 SUBMITTALS

- A. Action Submittals:
1. Shop Drawings:
    - a. Project-specific scaled plans and elevations of railings and detail drawings. Include railing profiles, sizes, connections, anchorage, size and type of fasteners, and accessories.
    - b. Manufacturer's literature and catalog data of railing and components.
    - c. Design Data: Calculations or test data using specified design performance loads and including the following:
      - 1) Railing calculations including the connection design shall be performed based on Aluminum Design Manual.
      - 2) Bending stress in, and deflection of, posts in accordance with ASTM E985 as modified herein.
      - 3) Design of post base connection.

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- 4) Documentation that concrete anchors have been designed in accordance with one of the following:
    - a) ACI 318, Appendix D.
    - b) ICC Evaluation Services Report for selected anchor.
  2. Samples:
    - a. Rail sections, 6 inches long showing each type of proposed connection, proposed finish, and workmanship.
    - b. Each fitting including wall brackets, castings, toeboard, and rail expansion joints.
- B. Informational Submittals:
1. Manufacturer's assembly and installation instructions.
  2. Special Inspection: Manufacturer's instructions for Special Inspection of post-installed anchors.
  3. Test Reports: Test data may supplement load calculations providing data covers complete railing system, including anchorage:
    - a. Test data for railing and components showing load and deflection as a result of load, in enough detail to prove railing is strong enough and satisfies national, state, local standards, regulations, code requirements, and OSHA 29 CFR 1910, using design loads specified. Include test data for the following:
      - 1) Railing and post connections.
      - 2) Railing wall connections.
      - 3) Railing expansion joint connections.
      - 4) Railing system gate assembly, including latch, gate stop, and hinges. Both gate latch and stop to support required loads applied independent of each other.
      - 5) Railing picket panel clamps and connections.
    - b. Testing of anchorages shall be in accordance with ASTM E894 and ASTM E935 using applied loads in accordance with ICC IBC.
    - c. Deflection Criteria: In accordance with ASTM E985 and design loads specified, except as follows: maximum calculated lateral deflection at top of posts shall not exceed 1 inch.
    - d. Aluminum Rail Piping: Test data showing yield strength of pipe as delivered equals or exceeds specified values.
  4. Manufacturer's written recommendations describing procedures for maintaining railings including cleaning materials, application methods, and precautions to be taken in use of cleaning materials.

## 1.05 QUALITY ASSURANCE

- A. Qualifications: Calculations required for design data shall be stamped by a registered civil or structural engineer licensed in state where Project will be constructed.

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1.06 DELIVERY, STORAGE, AND HANDLING

- A. Package and wrap railings to prevent scratching and denting during shipment, storage, and installation. Maintain protective wrapping to the extent possible until railing is completely installed.
- B. Delivery:
  - 1. Shop assemble into practical modules of lengths not exceeding 24 feet for shipment.
  - 2. Deliver toeboards loose for field assembly.
  - 3. Deliver clear anodized railing pipe and posts with protective plastic wrap.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Thermal Movements: Allow for thermal movement resulting from the following maximum range in ambient temperature in design, fabrication, and installation of railings to prevent buckling, opening up of joints, over stressing of components, connections and other detrimental effects. Base design calculation on actual surface temperature of material as a result of both solar heat gain and night time sky heat loss. Temperature change is difference between high or low temperature and installation temperature.
  - 1. Temperature Change Range: 70 degrees F, ambient; 100 degrees F, material surfaces.

**PART 2 PRODUCTS**

2.01 ALUMINUM RAILINGS

- A. General:
  - 1. All aluminum members shall be anodized.
  - 2. Furnish pre-engineered and prefabricated railing systems as shown on Drawings.
  - 3. Railing systems using pop rivets or glued railing construction are not permitted.
  - 4. Sand cast accessories and components are not permitted.
  - 5. Fasteners shall be AISI Type 304 or Type 316 stainless steel, unless otherwise noted.
- B. Rails, Posts, and Formed Elbows:
  - 1. Extruded Alloy 6105-T5, 6061-T6, or equivalent.
  - 2. Tensile Strength: 38,000 psi, minimum.
  - 3. Yield Strength: 35,000 psi, minimum.

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4. Wall Thickness: 0.145 inch, minimum.
5. Posts and railings shall be nominal 1-1/2-inch diameter (1.90-inch outside diameter).

C. Accessories:

1. Fittings and Accessories:
  - a. Extruded, machined bar stock, permanent mold castings, or die castings of sufficient strength to meet load requirements.
  - b. Gauge metal components are not acceptable for load-resisting components.
  - c. Fittings shall match color of pipe in railings.
2. Miscellaneous Extruded Aluminum Parts: Alloys 6063-T6, 6061-T6, or 6105 T5 aluminum, or equivalent, and of adequate strength for all loads.
3. Castings for Railings:
  - a. Cast Al-mag with sufficient strength to meet load and test requirements.
  - b. Anodizable grade finish with excellent resistance to corrosion when subjected to exposure of sodium chloride solution intermittent spray and immersion.
4. Post Anchorages:
  - a. Refer to standard details for types of post anchorages and minimum requirements.
  - b. Bolts at anchorages shall be minimum 1/2-inch diameter.
5. Wall Brackets: Adjustable wall fitting, with provision for minimum three 3/8-inch diameter AISI Type 304 or Type 316 stainless steel bolts or concrete anchors.
6. Rail Terminals (including Wall Returns): Aluminum wall fitting with provision for three 3/8-inch Type 304 fasteners.
7. Railing System Gate:
  - a. Extruded aluminum rail components.
  - b. Hardware Manufacturers and Products:
    - 1) Julius Blum & Co., Inc., Carlstadt, NJ; No. 782/3 gate hinges with springs, and No. 784 gate latch and stop.
    - 2) CraneVeyor Corp., South El Monte, CA; No. C4370b gate hinges with spring, No. C4369 gate latch, and No. C4368 gate stop.
    - 3) Moultrie Manufacturing Co., Moultrie, GA; Part No. W60006.
    - 4) Or approved equal.
8. Toeboards:
  - a. Molded or extruded Alloy 6063-T6 or 6061-T6 aluminum.
  - b. Provide slotted holes for expansion and contraction where required.
9. Fasteners: Stainless steel.

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D. Metal Supports Embedded in Concrete: In accordance with Section 05 50 00, Metal Fabrications.

E. Finishes:

1. Pipe and Post: In accordance with AA DAF45, designation AA-M32-C22-A41.
2. Cast Fittings and Toeboards: In accordance with AA DAF45, designation AA-M10-C22-A41.

2.02 ANCHOR BOLTS, FASTENERS, AND CONCRETE ANCHORS

A. Locknuts, Washers, and Screws:

1. Elastic Locknuts, Steel Flat Washers, Round Head Machine Screws (RHMS): AISI Type 304 or Type 316 stainless steel.
2. Flat Washers: Molded nylon.

B. Bolts and Nuts for Bolting Railing to Metal Beams: ASTM A193/A193M and ASTM A194/A194M, Type 304 or Type 316 stainless steel.

C. Concrete Anchors:

1. Stainless steel, AISI Type 304 or Type 316.
2. Post-installed anchors in accordance with Section 05 50 00, Metal Fabrications, unless otherwise specified herein.
3. Bolt Diameter: 1/2-inch, minimum.

2.03 FABRICATION

A. Shop Assembly:

1. Post Spacing: Maximum 6-foot horizontal spacing.
2. Railing Posts Bolted to Metal or Concrete:
  - a. In lieu of field cutting, provide approved fitting with sufficient post overlap, containing provisions for vertical adjustment.
  - b. Field fit-up is required.
3. Free of burrs, nicks, and sharp edges when fabrication is complete.
4. Welding is not permitted.

B. Shop/Factory Finishing:

1. Use same alloy for uniform appearance throughout fabrication for railings.
2. Railing and Post Fittings: Match fittings with color of pipe in railing.



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- C. Shop Assembly:
  - 1. Shop assemble rails, posts, and formed elbows with a close tolerance for tight fit.
  - 2. Fit dowels tightly inside posts.
- D. Repair of Defective Work: Remove stains and replace defective Work.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Field fabrication of aluminum railing systems is not permitted.
- B. Fabricate aluminum railing in accordance with approved Shop Drawings.
- C. Install railing with base that provides plus or minus 1/4-inch vertical adjustment inside base fitting. If adjustment is required in field and exceeds plus or minus 1/4-inch, reduce post length not to exceed beyond bottom of lowest set-screw or bolt in base fitting. Modification to post shall be approved by Engineer prior to making changes.
- D. Modification to supporting structure is not permitted where railing is to be attached.
- E. Mount railings only on completed walls.
- F. Protection from Entrapped Water:
  - 1. Make provisions in exterior and interior installations subject to high humidity to drain water from railing system.
  - 2. For posts mounted in concrete, bends, and elbows occurring at low points, drill weep holes of 1/4-inch diameter at lowest possible elevations, one hole per post or rail. Drill hole in plane of rail.

3.02 RAILING INSTALLATION

- A. Assembly and Installation: Perform in accordance with approved manufacturer's written recommendations for installation.
- B. Posts and Rails:
  - 1. Surface Mounted Posts:
    - a. Bolt post baseplate connectors firmly in place.
    - b. Shims, wedges, grout, and similar devices for railing post alignment not permitted.

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2. Grouted Posts:
    - a. Clean dust and foreign matter from sleeves or blockouts.
    - b. Moisten interior of hole and surrounding surface with clean water. Fill hole with nonshrink grout or epoxy grout prior to installing post.
    - c. Brace railing until grout sets.
    - d. Posts installed outside and exposed to freezing temperatures, drill weep hole through post approximately 1/2 inch above level of grout inside post and in plane of rail to prevent entrapment and freezing of water inside post.
  3. Set posts plumb and aligned to within 1/8 inch in 12 feet.
  4. Set rails horizontal or parallel to slope of steps to within 1/8 inch in 12 feet.
  5. Install posts and rails in same plane.
  6. Remove projections or irregularities and provide a smooth surface for sliding hands continuously along top rail.
  7. Use offset rail for use on stairs and platforms if post is attached to web of stringers or structural platform supports.
  8. Support 1-1/2-inch rails directly above stairway stringers with offset fittings.
- C. Wall Brackets: Support wall rails on brackets spaced maximum 5 feet on centers as measured on the horizontal projection.
- D. Toeboard:
1. Provide at railings, except where 4-inch or higher concrete curbs are installed, at gates, or at stairways unless shown otherwise.
  2. Accurately measure in field for correct length; after railing post installation cut and secure to posts.
  3. Dimension between bottom of toeboard and walking surface not to exceed 1/4 inch.
  4. Install plumb and aligned to within 1/8 inch in 12 feet.
- E. Railing System Gate: Install in accordance with manufacturer's installation instructions.

### 3.03 FIELD FINISHING

- A. Corrosion Protection: Prevent galvanic action and other forms of corrosion caused from direct contact with concrete and dissimilar metals by coating metal surfaces as specified in Section 09 90 00, Painting and Coating.

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3.04 FIELD QUALITY CONTROL

- A. Post-installed anchors supporting railing systems require special inspection.
- B. Owner-Furnished Quality Assurance, in accordance with ICC IBC Chapter 17 requirements, is provided in the Statement of Special Inspections Plan on Drawings. Contractor responsibilities and related information are included in Section 01 45 33, Special Inspection Observation, and Testing.
- C. Contractor-Furnished Quality Control: Inspection and testing as required in Section 01 45 16.13, Contractor Quality Control.

3.05 CLEANING

- A. Wash railing system thoroughly using clean water and soap. Rinse with clean water.
- B. Do not use acid solution, steel wool, or other harsh abrasive.
- C. If stain remains after washing, restore in accordance with approved railing manufacturer's recommendations or replace stained railings.

**END OF SECTION**

**SECTION 05 53 00  
METAL GRATINGS**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. American Association of State Highway and Transportation Officials (AASHTO): Standard Specifications for Highway Bridges.
  2. ASTM International (ASTM):
    - a. A36/A36M, Standard Specification for Carbon Structural Steel.
    - b. A510, Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel.
    - c. A666, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
    - d. A1011/A1011M, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
    - e. B221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  3. National Association of Architectural Metal Manufacturers (NAAMM):
    - a. MBG 531, Metal Bar Grating Manual.
    - b. MBG 532, Heavy-Duty Metal Bar Grating Manual.

**1.02 SUBMITTALS**

- A. Action Submittals:
1. Shop Drawings:
    - a. Grating: Show dimensions, weight, size, and location of connections to adjacent grating, supports, and other Work.
    - b. Grating Anchorage: Show details of anchorage to supports to prevent displacement from traffic impact.
    - c. Product data for grating, grating clips, anchors, accessories, and other manufactured products specified herein.
    - d. Manufacturer's specifications, including coatings, surface treatment, and finishes.
- B. Informational Submittals:
1. Special handling and storage requirements.
  2. Installation instructions.

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1.03 DELIVERY, STORAGE, AND HANDLING

- A. Insofar as is practical, factory assemble items.
- B. Package and clearly tag parts and assemblies that are, due to necessity, shipped unassembled.

**PART 2 PRODUCTS**

2.01 MANUFACTURERS

- A. Materials, equipment, and accessories specified in this section shall be products of:
  - 1. Alabama Metal Industries Corporation (AMICO), Birmingham, AL.
  - 2. IKG Industries, Houston, TX.
  - 3. Ohio Gratings, Inc., Canton, OH.
  - 4. Seidelhuber Metal Products, Inc., South San Francisco, CA.
  - 5. Or approved equal.

2.02 GRATING MATERIALS

- A. Aluminum: Provide alloy and temper as designated below.
  - 1. Bearing Bars and Banding: ASTM B221 alloy 6061-T6 or 6063-T6.
  - 2. Swaged Crossbar Rods: ASTM B221 alloy 6061 or 6063, or ASTM B210 alloy 3003.
  - 3. Finish: Mill.

2.03 METAL BAR GRATING

- A. General Requirements:
  - 1. Maximum Service Load:
    - a. Light Duty (Type A): 100 psf uniformly distributed load.
    - b. Medium Duty (Type B): 500 psf uniformly distributed load.
  - 2. Maximum Deflection: Span/240 or 1/4 inch, whichever is less.
  - 3. Bearing Bar Spacing:
    - a. Light Duty: 1-3/16-inch maximum, center-to-center.
    - b. Medium Duty: 15/16-inch maximum, center-to-center.
  - 4. Cross Bar Spacing: 4 inches maximum, center-to-center. For aluminum I-bar grating with depths greater than 2 inches, provide cross bars at 2 inches maximum, center-to-center.
  - 5. Bearing Bars, Cross Bars and Banding: Minimum thickness as specified in NAAMM MBG 531 or as shown on Drawings.

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- B. Grating Materials: Aluminum, pressure-locked rectangular bar grating fabricated by pressing crossbars between rectangular bearing bars.
- C. Surface: Plain.
- D. Stair Treads:
  - 1. Material and Type: Same as grating material and grating type as furnished for connecting walkway or work surface.
  - 2. Nosings: Integral ribbing and serrated edge on one long axis of tread, or nonslip abrasive on each tread along one long edge.
  - 3. Carrier Plate or Angle: Furnish at each end for connection to stair stringers.

2.04 ACCESSORIES

- A. Embedded Frames: As indicated on Drawings and as specified in Section 05 50 00, Metal Fabrications.
- B. Grating Clamps:
  - 1. Use at flanged beam and bolted angle frame supports.
  - 2. Removable from above grating walkway surface.
  - 3. Provide hat bracket, recessed bolt, and bottom clamp of same material as grating.
  - 4. Manufacturers and Products:
    - a. Direct Metals Company, LLC, Kennesaw, GA; Grating Clamp.
    - b. Grating Fasteners, Inc., Harvey, LA; G-Clip.
    - c. Or approved equal.
- C. Anchor Stud and Saddle Clip:
  - 1. Use at embedded angle frame supports with stud anchor and nut recessed below top of grating surface.
  - 2. Removable from above grating walkway surface.
  - 3. Provide Type 316 stainless steel welded threaded stud anchor, nut, washer, and saddle clip.
  - 4. Manufacturers and Products:
    - a. Welded Stud Anchor:
      - 1) Nelson Stud Welding, Inc., Elyria, OH.
      - 2) Stud Welding Associates, Inc. Elyria, OH.
      - 3) Or approved equal.
    - b. Saddle Clip:
      - 1) Direct Metals Company, LLC, Kennesaw, GA; Saddle Clip.
      - 2) Grating Fasteners, Inc., Harvey, LA; Saddle Clip.

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- 3) Struct-Fast, Inc., Baltimore, MD; Gratefast.
- 4) Or approved equal.

2.05 FABRICATION

A. General:

1. In accordance with NAAMM MBG 531 or NAAMM MBG 532.
2. Do not weld aluminum grating.
3. Conceal fastenings where practical.
4. Drill metalwork and countersink holes as required for attaching hardware or other materials.
5. Cutouts:
  - a. Fabricate in grating sections for penetrations indicated.
  - b. Arrange to permit grating removal without disturbing items penetrating grating.
  - c. Edge band openings in grating that interrupt four or more bearing bars with bars of same size and material as bearing bars.
6. Do not notch bearing bars at supports to maintain elevation.
7. Field measure areas to receive grating. Verify dimensions of new fabricated supports, and fabricate to dimension required for specified clearances.
8. Section Length: Sufficient to prevent section from falling through clear opening when oriented in the span direction and one end is touching either the concrete or the vertical leg of grating support.
9. Minimum Bearing: 1 inch for grating depth up to 2-1/4 inches and 2 inches for grating depth greater than 2-1/4 inches.
10. Banding and Toe Plates: Same material as grating and welded to bearing bars in accordance with requirements of NAAMM MBG 531 and NAAMM MBG 532.

B. Metal Bar Grating: A single grating section shall be not less than 1.5 feet or greater than 3 feet in width, or weigh more than 150 pounds.

C. Heavy Duty Metal Bar Grating: Minimum width of grating sections shall be 2 feet regardless of length and weight.

D. Supports:

1. Same material as grating, except that supports which are to be embedded in concrete shall be Type 316 stainless steel, unless part of an extruded aluminum system.
2. Coordinate dimensions and fabrication with grating to be supported.

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**PART 3 EXECUTION**

3.01 PREPARATION

- A. Electrolytic Protection:
  - 1. Protect aluminum surfaces in contact with dissimilar metals, or embedded or in contact with masonry, grout, or concrete as specified in Section 09 90 00, Painting and Coating.
  - 2. Allow paint to dry before installation of material.

3.02 INSTALLATION

- A. Until grating sections are securely fastened in place, area shall be appropriately barricaded or flagged to alert people working in the area of potential fall hazard.
- B. Install manufactured products in accordance with manufacturer's recommendations.
- C. Install supports such that grating sections have a solid bearing on both ends, and that grating sections will not rock or wobble under design loads.
- D. Install grating supports plumb and level as applicable.
- E. Install sections of welded frames with anchors to straight plane without offsets.
- F. Field locate and install fasteners to fit grating layout.
- G. Anchor grating securely to supports using minimum of four fastener clips and bolts per grating section.
- H. Each grating or plank section shall be easily removable and replaceable.
- I. Completed installation shall be rigid and neat in appearance.
- J. Protect painted and galvanized surfaces during installation.
- K. Repair damaged coatings as specified in Section 09 90 00, Painting and Coating.

**END OF SECTION**



**SECTION 09 90 00**  
**PAINTING AND COATING**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Water Works Association (AWWA):
    - a. C203, Coal-Tar Protective Coatings and Linings for Steel Water Pipelines—Enamel and Tape—Hot-Applied.
    - b. C209, Cold-Applied Tape Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines.
    - c. C213, Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.
    - d. C214, Tape Coating Systems for the Exterior of Steel Water Pipelines.
  2. Environmental Protection Agency (EPA).
  3. NACE International (NACE): SP0188, Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates.
  4. NSF International (NSF): 61, Drinking Water System Components - Health Effects.
  5. Occupational Safety and Health Act (OSHA).
  6. Research Council on Structural Connections (RCSC): Specification for Structural Joints using High-Strength Bolts.
  7. The Society for Protective Coatings (SSPC):
    - a. PA 2, Procedure for Determining Conformance to Dry Coating Thickness Requirements.
    - b. PA 10, Guide to Safety and Health Requirements for Industrial Painting Projects.
    - c. SP 1, Solvent Cleaning.
    - d. SP 2, Hand Tool Cleaning.
    - e. SP 3, Power Tool Cleaning.
    - f. SP 5, White Metal Blast Cleaning.
    - g. SP 6, Commercial Blast Cleaning.
    - h. SP 7, Joint Surface Preparation Standard Brush-Off Blast Cleaning.
    - i. SP 10, Near-White Blast Cleaning.
    - j. SP 11, Power Tool Cleaning to Bare Metal.
    - k. SP 16, Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals.
    - l. SP 13, Surface Preparation of Concrete.

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- m. Guide 15, Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates.

1.02 DEFINITIONS

A. Terms used in this Section:

1. Coverage: Total minimum dry film thickness in mils or square feet per gallon.
2. FRP: Fiberglass Reinforced Plastic.
3. HCl: Hydrochloric Acid.
4. MDFT: Minimum Dry Film Thickness, mils.
5. MDFTPC: Minimum Dry Film Thickness per Coat, mils.
6. Mil: Thousandth of an inch.
7. PPDS: Paint Product Data Sheet.
8. PSDS: Paint System Data Sheet.
9. PVC: Polyvinyl Chloride.
10. SFPG: Square Feet per Gallon.
11. SFPGPC: Square Feet per Gallon per Coat.
12. SP: Surface Preparation.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
  - a. Data Sheets:
    - 1) For each product, furnish a Paint Product Data Sheet (PPDS), the manufacturer's technical data sheets, and paint colors available (where applicable). The PPDS form is appended to the end of this section.
    - 2) For each paint system, furnish a Paint System Data Sheet (PSDS). The PSDS form is appended to the end of this section.
    - 3) Technical and performance information that demonstrates compliance with specification.
    - 4) Furnish copies of paint system submittals to the coating applicator.
    - 5) Indiscriminate submittal of only manufacturer's literature is not acceptable.
  - b. Detailed chemical and gradation analysis for each proposed abrasive material.
2. Samples:
  - a. Proposed Abrasive Materials: Minimum 5-pound sample for each type.

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- b. Reference Panel:
  - 1) Surface Preparation:
    - a) Prior to start of surface preparation, furnish a 4-inch by 4-inch steel panel for each grade of sandblast specified herein, prepared to specified requirements.
    - b) Provide panel representative of the steel used; prevent deterioration of surface quality.
    - c) Panel to be reference source for inspection upon approval by Engineer.
  - 2) Paint:
    - a) Unless otherwise specified, before painting work is started, prepare minimum 8-inch by 10-inch sample with type of paint and application specified on similar substrate to which paint is to be applied.
    - b) Furnish additional samples as required until colors, finishes, and textures are approved.
    - c) Approved samples to be the quality standard for final finishes.

B. Informational Submittals:

- 1. Applicator's Qualification: Shall be experienced as an applicator for similar types of application.
- 2. Coating manufacturer's Certificate of Compliance, in accordance with Section 01 43 33, Manufacturers' Field Services.
- 3. Factory Applied Coatings: Manufacturer's certification stating factory applied coating system meets or exceeds requirements specified.
- 4. Manufacturer's written verification that submitted material is suitable for the intended use.
- 5. Coating for Faying Surfaces: Manufacturer's test results that show the proposed coating meets the slip resistance requirements of the AISC Specification for Structural Joints using ASTM A325 or ASTM A490 bolts.
- 6. If the manufacturer of finish coating differs from that of shop primer, provide finish coating manufacturer's written confirmation that materials are compatible.
- 7. Manufacturer's written instructions and special details for applying each type of paint.

1.04 QUALITY ASSURANCE

- A. Applicator Qualifications: Experience in application of specified products.

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B. Regulatory Requirements:

1. Meet federal, state, and local requirements limiting the emission of volatile organic compounds.
2. Perform surface preparation and painting in accordance with recommendations of the following:
  - a. Paint manufacturer's instructions.
  - b. SSPC PA 10.
  - c. Federal, state, and local agencies having jurisdiction.

C. Mockup:

1. Before proceeding with Work under this section, finish one complete space or item of each color scheme required showing selected colors, finish texture, materials, quality of work, and special details.
2. After Engineer approval, sample spaces or items shall serve as a standard for similar work throughout the Project.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Shipping:

1. Where precoated items are to be shipped to the Site, protect coating from damage. Batten coated items to prevent abrasion.
2. Protect shop painted surfaces during shipment and handling by suitable provisions including padding, blocking, and use of canvas or nylon slings.

B. Storage:

1. Store products in a protected area that is heated or cooled to maintain temperatures within the range recommended by paint manufacturer.
2. Primed surfaces shall not be exposed to weather for more than 2 months before being topcoated, or less time if recommended by coating manufacturer.

1.06 PROJECT CONDITIONS

A. Environmental Requirements:

1. Do not apply paint in temperatures or moisture conditions outside of manufacturer's recommended maximum or minimum allowable.
2. Do not perform final abrasive blast cleaning whenever relative humidity exceeds 85 percent, or whenever surface temperature is less than 5 degrees F above dew point of ambient air.

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1.07 EXTRA MATERIALS

- A. Provide small quantity kits for touchup painting and for painting other small areas.
- B. Fusion Bonded Coating: Provide appropriate liquid repair kits for field use.

**PART 2 PRODUCTS**

2.01 MANUFACTURERS

- A. Nationally recognized manufacturers of paints and protective coatings who are regularly engaged in the production of such materials for essentially identical service conditions.
- B. Experience in providing products as specified for this Project.
- C. Each of the following manufacturers is capable of supplying most of the products specified herein:
  - 1. Sherwin Williams.
  - 2. Tnemec Coatings.
  - 3. Azko Nobel (Devoe, International).
  - 4. Carboline Coatings.
  - 5. PPG Industrial Coatings.
  - 6. Or approved equal.

2.02 ABRASIVE MATERIALS

- A. Select abrasive type and size to produce surface profile that meets coating manufacturer's recommendations for specific primer and coating system to be applied.

2.03 PAINT MATERIALS

- A. General:
  - 1. Manufacturer's highest quality products suitable for intended service.
  - 2. Compatibility: Only compatible materials from a single manufacturer shall be used in the Work. Particular attention shall be directed to compatibility of primers and finish coats.
  - 3. Thinners, Cleaners, Driers, and Other Additives: As recommended by coating manufacturer.

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B. Products:

Product	Definition
Acrylic Latex	Single-component, finish as required
Alkyd Enamel	Optimum quality, gloss or semigloss finish as required, medium long oil
Bituminous Paint	Single-component, coal-tar pitch based
Coal-Tar Epoxy	Amine, polyamide, or phenolic epoxy type 70% volume solids minimum, suitable for immersion service
Epoxy Primer— Ferrous Metal	Anticorrosive, converted epoxy primer containing rust-inhibitive pigments
Epoxy Primer— Other	Epoxy primer, high-build, as recommended by coating manufacturer for specific galvanized metal, copper, or nonferrous metal alloy to be coated
Fusion Bonded Coating	100% solids, thermosetting, fusion bonded, dry powder epoxy, suitable for the intended service
High Build Epoxy	Polyamidoamine epoxy, minimum 69% volume solids, capability of 4 to 8 MDFT per coat
Polyurethane Enamel	Two-component, aliphatic or acrylic based polyurethane; high gloss finish

2.04 MIXING

A. Multiple-Component Coatings:

1. Prepare using each component as packaged by paint manufacturer.
2. No partial batches will be permitted.
3. Do not use multiple-component coatings that have been mixed beyond their pot life.
4. Furnish small quantity kits for touchup painting and for painting other small areas.
5. Mix only components specified and furnished by paint manufacturer.
6. Do not intermix additional components for reasons of color or otherwise, even within the same generic type of coating.

- B. Colors: Formulate paints with colorants free of lead, lead compounds, or other materials that might be affected by presence of hydrogen sulfide or other gas likely to be present at Site.

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2.05 SHOP FINISHES

- A. Shop Blast Cleaning: Reference Paragraph Shop Coating Requirements.
- B. Surface Preparation: Provide Engineer minimum 7 days' advance notice to start of shop surface preparation work and coating application work.
- C. Shop Coating Requirements:
  - 1. When required by equipment specifications, such equipment shall be primed and finish coated in shop by manufacturer and touched up in field with identical material after installation.
  - 2. Where manufacturer's standard coating is not suitable for intended service condition, Engineer may approve use of a tie-coat to be used between manufacturer's standard coating and specified field finish. In such cases, tie-coat shall be surface tolerant epoxy as recommended by manufacturer of specified field finish coat. Coordinate details of equipment manufacturer's standard coating with field coating manufacturer.
- D. Pipe:
  - 1. Ductile Iron Pipe:
    - a. Use SSPC standards as a guide for desired prepared surface. Follow recommendations of pipe and coating manufacturers for means and methods to achieve SSPC-equivalent surface.
    - b. The surface preparation and application of the primer and finish coats shall be performed by pipe manufacturer.
    - c. For high performance (epoxy) coatings, follow additional recommendations of pipe and coating manufacturers.
    - d. Prior to blast cleaning, grind smooth surface imperfections, including, but not limited to delaminating metal or oxide layers.
  - 2. Steel Pipe:
    - a. Surface preparation and application of primer and finish coats shall be performed by pipe manufacturer.
    - b. For pipe with epoxy lining, do not place end cap seals until pipe lining material has sufficiently cured.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Provide Engineer minimum 7 days' advance notice to start of field surface preparation work and coating application work.

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- B. Perform the Work only in presence of Engineer, unless Engineer grants prior approval to perform the Work in Engineer's absence.
- C. Schedule inspection of cleaned surfaces and all coats prior to succeeding coat in advance with Engineer.

3.02 EXAMINATION

- A. Factory Finished Items:
  - 1. Schedule inspection with Engineer before repairing damaged factory-finished items delivered to Site.
  - 2. Repair abraded or otherwise damaged areas on factory-finished items as recommended by coating manufacturer. Carefully blend repaired areas into original finish. If required to match colors, provide full finish coat in field.
- B. Surface Preparation Verification: Inspect and provide substrate surfaces prepared in accordance with these Specifications and printed directions and recommendations of paint manufacturer whose product is to be applied. The more stringent requirements shall apply.

3.03 PROTECTION OF ITEMS NOT TO BE PAINTED

- A. Remove, mask, or otherwise protect hardware, lighting fixtures, switchplates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not specified elsewhere to be painted.
- B. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces.
- C. Protect working parts of mechanical and electrical equipment from damage during surface preparation and painting process.
- D. Mask openings in motors to prevent paint and other materials from entering.
- E. Protect surfaces adjacent to or downwind of Work area from overspray.

3.04 SURFACE PREPARATION

- A. Field Abrasive Blasting:
  - 1. Perform blasting for items and equipment where specified and as required to restore damaged surfaces previously shop or field blasted and primed or coated.
  - 2. Refer to coating systems for degree of abrasive blasting required.



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3. Where the specified degree of surface preparation differs from manufacturer's recommendations, the more stringent shall apply.

B. Metal Surface Preparation:

1. Where indicated, meet requirements of SSPC Specifications summarized below:
  - a. SP 1, Solvent Cleaning: Removal of visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants by cleaning with solvent.
  - b. SP 2, Hand Tool Cleaning: Removal of loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter, using nonpower hand tools.
  - c. SP 3, Power Tool Cleaning: Removal of loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter, using power-assisted hand tools.
  - d. SP 5, White Metal Blast Cleaning: Removal of visible oil, grease, dust, dirt, mill scale, rust, coatings, oxides, corrosion products, and other foreign matter by blast cleaning.
  - e. SP 6, Commercial Blast Cleaning: Removal of visible oil, grease, dust, dirt, mill scale, rust, coatings, oxides, corrosion products, and other foreign matter, except for random staining limited to no more than 33 percent of each unit area of surface which may consist of light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale, or stains of previously applied coatings.
  - f. SP 7, Brush-Off Blast Cleaning: Removal of visible rust, oil, grease, soil, dust, loose mill scale, loose rust, and loose coatings. Tightly adherent mill scale, rust, and coating may remain on surface.
  - g. SP 10, Near-White Blast Cleaning: Removal of visible oil, grease, dust, dirt, mill scale, rust, coatings, oxides, corrosion products, and other foreign matter, except for random staining limited to no more than 5 percent of each unit area of surface which may consist of light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale, or stains of previously applied coatings.
  - h. SP 11, Power Tool Cleaning to Bare Metal: Removal of visible oil, grease, dirt, dust, mill scale, rust, paint, oxide, corrosion products, and other foreign matter using power-assisted hand tools capable of producing suitable surface profile. Slight residues of rust and paint may be left in lower portion of pits if original surface is pitted.

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- i. SP-16, Brush Blasting of Non-Ferrous Metals: A brush-off blast cleaned non-ferrous metal surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, metal oxides (corrosion products), and other foreign matter. Intact, tightly adherent coating is permitted to remain. A coating is considered tightly adherent if it cannot be removed by lifting with a dull putty knife. Bare metal substrates shall have a minimum profile of 19 micrometers (0.75 mil).
2. The words “solvent cleaning”, “hand tool cleaning”, “wire brushing”, and “blast cleaning”, or similar words of equal intent in these Specifications or in paint manufacturer’s specification refer to the applicable SSPC Specification.
3. Where OSHA or EPA regulations preclude standard abrasive blast cleaning, wet or vacu-blast methods may be required. Coating manufacturers’ recommendations for wet blast additives and first coat application shall apply.
4. Ductile Iron Pipe Supplied with Asphaltic Varnish Finish: Remove asphaltic varnish finish prior to performing specified surface preparation.
5. Hand tool clean areas that cannot be cleaned by power tool cleaning.
6. Round or chamfer sharp edges and grind smooth burrs, jagged edges, and surface defects.
7. Welds and Adjacent Areas:
  - a. Prepare such that there is:
    - 1) No undercutting or reverse ridges on weld bead.
    - 2) No weld spatter on or adjacent to weld or any area to be painted.
    - 3) No sharp peaks or ridges along weld bead.
  - b. Grind embedded pieces of electrode or wire flush with adjacent surface of weld bead.
8. Preblast Cleaning Requirements:
  - a. Remove oil, grease, welding fluxes, and other surface contaminants prior to blast cleaning.
  - b. Cleaning Methods: Steam, open flame, hot water, or cold water with appropriate detergent additives followed with clean water rinsing.
  - c. Clean small isolated areas as above or solvent clean with suitable solvent and clean cloth.
9. Blast Cleaning Requirements:
  - a. Type of Equipment and Speed of Travel: Design to obtain specified degree of cleanliness. Minimum surface preparation is as specified herein and takes precedence over coating manufacturer’s recommendations.

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- b. Select type and size of abrasive to produce surface profile that meets coating manufacturer's recommendations for particular primer to be used.
  - c. Use only dry blast cleaning methods.
  - d. Do not reuse abrasive, except for designed recyclable systems.
  - e. Meet applicable federal, state, and local air pollution and environmental control regulations for blast cleaning, confined space entry (if required), and disposition of spent aggregate and debris.
10. Post-Blast Cleaning and Other Cleaning Requirements:
- a. Clean surfaces of dust and residual particles from cleaning operations by dry (no oil or water vapor) air blast cleaning or other method prior to painting. Vacuum clean enclosed areas and other areas where dust settling is a problem and wipe with a tack cloth.
  - b. Paint surfaces the same day they are blasted. Reblast surfaces that have started to rust before they are painted.
- C. Galvanized Metal, Copper, and Nonferrous Metal Alloy Surface Preparation:
- 1. Remove soil, cement spatter, and other surface dirt with appropriate hand or power tools.
  - 2. Brush blast in accordance with SSPC SP 16.
  - 3. Obtain and follow coating manufacturer's recommendations for additional preparation that may be required.
- D. Concrete Surface Preparation:
- 1. Do not begin until 30 days after concrete has been placed.
  - 2. Meet requirements of SSPC SP 13.
  - 3. Remove grease, oil, dirt, salts or other chemicals, loose materials, or other foreign matter by solvent, detergent, or other suitable cleaning methods.
  - 4. Brush-off blast clean to remove loose concrete and laitance, and provide a tooth for binding. Upon approval by Engineer, surface may be cleaned by acid etching method. Approval is subject to producing desired profile equivalent to No. 80 grit flint sandpaper. Acid etching of vertical or overhead surfaces shall not be allowed.
  - 5. Secure coating manufacturer's recommendations for additional preparation, if required, for excessive bug holes exposed after blasting.
  - 6. Unless otherwise required for proper adhesion, ensure surfaces are dry prior to painting.

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- E. Plastic and FRP Surface Preparation:
  - 1. Hand sand plastic surfaces to be coated with medium grit sandpaper to provide tooth for coating system.
  - 2. Large areas may be power sanded or brush-off blasted, provided sufficient controls are employed so surface is roughened without removing excess material.
  
- F. Gypsum Board Surface Preparation: Typically, new gypsum board surfaces need no special preparation before painting.
  - 1. Surface Finish: Dry, free of dust, dirt, powdery residue, grease, oil, or any other contaminants.

3.05 SURFACE CLEANING

- A. Brush-off Blast Cleaning:
  - 1. Equipment, procedure, and degree of cleaning shall meet requirements of SSPC SP 7.
  - 2. Abrasive: Either wet or dry blasting sand, grit, or nutshell.
  - 3. Select various surface preparation parameters, such as size and hardness of abrasive, nozzle size, air pressure, and nozzle distance from surface such that surface is cleaned without pitting, chipping, or other damage.
  - 4. Verify parameter selection by blast cleaning a trial area that will not be exposed to view.
  - 5. Engineer will review acceptable trial blast cleaned area and use area as a representative sample of surface preparation.
  - 6. Repair or replace surface damaged by blast cleaning.
  
- B. Solvent Cleaning:
  - 1. Consists of removal of foreign matter such as oil, grease, soil, drawing and cutting compounds, and any other surface contaminants by using solvents, emulsions, cleaning compounds, steam cleaning, or similar materials and methods that involve a solvent or cleaning action.
  - 2. Meet requirements of SSPC SP 1.

3.06 APPLICATION

- A. General:
  - 1. The intention of these Specifications is for new, interior and exterior concrete and metal and submerged metal surfaces to be painted, whether specifically mentioned or not, except as specified otherwise. Do not paint exterior concrete surfaces, unless specifically indicated.

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2. Extent of Coating (Immersion): Coatings shall be applied to internal vessel and pipe surfaces, nozzle bores, flange gasket sealing surfaces, carbon steel internals, and stainless steel internals, unless otherwise specified.
3. For coatings subject to immersion, obtain full cure for completed system. Consult coatings manufacturer's written instructions for these requirements. Do not immerse coating until completion of curing cycle.
4. Apply coatings in accordance with these Specifications and paint manufacturers' printed recommendations and special details. The more stringent requirements shall apply. Allow sufficient time between coats to assure thorough drying of previously applied paint.
5. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.
6. Fusion Bonded Coatings Method Application: Electrostatic, fluidized bed, or flocking.
7. Coat units or surfaces to be bolted together or joined closely to structures or to one another prior to assembly or installation.
8. Water-Resistant Gypsum Board: Use only solvent type paints and coatings.
9. On pipelines, terminate coatings along pipe runs to 1 inch inside pipe penetrations.
10. Keep paint materials sealed when not in use.
11. Where more than one coat is applied within a given system, alternate colors to provide a visual reference showing required number of coats have been applied.

B. Galvanized Metal, Copper, and Nonferrous Metal Alloys:

1. Concealed galvanized, copper, and nonferrous metal alloy surfaces (behind building panels or walls) do not require painting, unless specifically indicated herein.
2. Prepare surface and apply primer in accordance with System No. 10 specification.
3. Apply intermediate and finish coats of the coating system appropriate for the exposure.

C. Porous Surfaces, Such As Concrete and Masonry:

1. Filler/Surfacer: Use coating manufacturer's recommended product to fill air holes, bug holes, and other surface voids or defects.
2. Prime Coat: May be thinned to provide maximum penetration and adhesion.
  - a. Type and Amount of Thinning: Determined by paint manufacturer and dependent on surface density and type of coating.

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3. Surface Specified to Receive Water Base Coating: Damp, but free of running water, just prior to application of coating.

D. Film Thickness and Coverage:

1. Number of Coats:
  - a. Minimum required without regard to coating thickness.
  - b. Additional coats may be required to obtain minimum required paint thickness, depending on method of application, differences in manufacturers' products, and atmospheric conditions.
2. Application Thickness:
  - a. Do not exceed coating manufacturer's recommendations.
  - b. Measure using a wet film thickness gauge to ensure proper coating thickness during application.
3. Film Thickness Measurements and Electrical Inspection of Coated Surfaces:
  - a. Perform with properly calibrated instruments.
  - b. Recoat and repair as necessary for compliance with specification.
  - c. Coats are subject to inspection by Engineer and coating manufacturer's representative.
4. Visually inspect concrete, masonry, nonferrous metal, plastic, and wood surfaces to ensure proper and complete coverage has been attained.
5. Give particular attention to edges, angles, flanges, and other similar areas, where insufficient film thicknesses are likely to be present, and ensure proper millage in these areas.
6. Apply additional coats as required to achieve complete hiding of underlying coats. Hiding shall be so complete that additional coats would not increase the hiding.

3.07 PROTECTIVE COATINGS SYSTEMS AND APPLICATION SCHEDULE

- A. Unless otherwise shown or specified, paint surfaces in accordance with the following application schedule. In the event of discrepancies or omissions in the following, request clarification from Engineer before starting work in question.
- B. Additional requirements are included in the Piping Schedule.

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C. System No. 4 Exposed Metal—Highly Corrosive:

Surface Prep.	Paint Material	Min. Coats, Cover
SP 10, Near-White Blast Cleaning	Epoxy Primer— Ferrous Metal	1 coat, 2.5 MDFT
	High Build Epoxy	1 coat, 4 MDFT
	Polyurethane Enamel	1 coat, 3 MDFT

1. Use on the following items or areas:
  - a. Exposed metal surfaces new and located inside or outside of structures.

D. System No. 7 Concrete Encased Metal:

Surface Prep.	Paint Material	Min. Coats, Cover
SP 6, Commercial Blast Cleaning	High Build Epoxy	2 coats, 16 MDFT

1. Use on the following items or areas:
  - a. Use on concrete encased ferrous metals including wall pipes, pipe sleeves, access manholes, gate guides, and thimbles.

E. System No. 8 Buried Metal—General:

Surface Prep.	Paint Material	Min. Coats, Cover
SP 10, Near-White Blast Cleaning	Standard Hot Coal-Tar Enamel	AWWA C203
	-OR- Coal-Tar Epoxy	2 coats, 16 MDFT

1. Use on the following items or areas:
  - a. Buried, belowgrade portions of misc. steel items, except buried stainless steel or ductile iron.

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F. System No. 10 Galvanized Metal, Copper, and Nonferrous Metal Alloy Conditioning:

Surface Prep.	Paint Material	Min. Coats, Cover
In accordance with Paragraph Galvanized Metal, Copper, and Nonferrous Metal Alloy Surface Preparation	Epoxy Primer—Other	As recommended by coating manufacturer  Remaining coats as required for exposure

1. Use on the following items or areas:
  - a. Galvanized surfaces requiring painting.
  - b. After application of System No. 10, apply System No. 4 as finish coat.

G. System No. 25 Exposed FRP, CPVC:

Surface Prep.	Paint Material	Min. Coats, Cover
In accordance with Paragraph Plastic and FRP Surface Preparation	Acrylic Latex Semigloss	2 coats, 320 SFPGPC

1. Use on the following items or areas:
  - a. All exposed-to-view PVC and CPVC surfaces, and FRP surfaces without integral UV-resistant gel coat.

H. System No. 27 Aluminum and Dissimilar Metal Insulation:

Surface Prep.	Paint Material	Min. Coats, Cover
Solvent Clean (SP 1)	Prime in accordance with manufacturer's recommendations	
	Bituminous Paint	1 coat, 10 MDFT

1. Use on aluminum surfaces embedded or in contact with concrete.



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I. System No. 29 Fusion Bonded Coating:

Surface Prep.	Paint Material	Min. Coats, Cover
SP 10, Near-White Blast Cleaning	Fusion Bonded Coating 100% Solids Epoxy	1 or 2 coats, 7 MDFT

1. For steel pipe and fittings, meet all requirements of AWWA C213.

3.08 COLORS

- A. Provide as selected by Owner or Engineer.
- B. Proprietary identification of colors is for identification only. Selected manufacturer may supply matches.
- C. Equipment Colors:
  1. Equipment includes the machinery or vessel itself plus the structural supports and fasteners and attached electrical conduits.
  2. Paint nonsubmerged portions of equipment the same color as the piping it serves, except as itemized below:
    - a. Dangerous Parts of Equipment and Machinery: OSHA Orange.
    - b. Fire Protection Equipment and Apparatus: OSHA Red.
    - c. Radiation Hazards: OSHA Purple.
    - d. Physical hazards in normal operating area and energy lockout devices, including, but not limited to, electrical disconnects for equipment and equipment isolation valves in air and liquid lines under pressure: OSHA Yellow.
- D. Pipe Identification Painting:
  1. Color code nonsubmerged metal piping, except electrical conduit. Paint fittings and valves the same color as pipe, except equipment isolation valves.
  2. Pipe Color Coding: In accordance with Piping Schedule.
  3. On exposed stainless steel piping, apply color 24 inches in length along pipe axis at connections to equipment, valves, or branch fittings, at wall boundaries, and at intervals along piping not greater than 9 feet on center.
  4. Pipe Supports: Painted light gray, as approved by Owner.

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5. Fiberglass reinforced plastic (FRP) pipe, polyvinylidene fluoride (PVDF), and polyvinyl chloride (PVC) pipe located inside of buildings and enclosed structures will not require painting, except as noted or scheduled.

3.09 FIELD QUALITY CONTROL

A. Testing Equipment:

1. Provide calibrated electronic type dry film thickness gauge to test coating thickness specified in mils.
2. Provide low-voltage wet sponge electrical holiday detector to test completed coating systems, 20 mils dry film thickness or less, except zinc primer, high-build elastomeric coatings, and galvanizing, for pinholes, holidays, and discontinuities, as manufactured by Tinker and Rasor, San Gabriel, CA, Model M-1.
3. Provide high-voltage spark tester to test completed coating systems in excess of 20 mils dry film thickness. Unit as recommended by coating manufacturer.

B. Testing:

1. Thickness and Continuity Testing:
  - a. Measure coating thickness specified in mils with a magnetic type, dry film thickness gauge, in accordance with SSPC PA 2. Check each coat for correct millage. Do not make measurement before a minimum of 8 hours after application of coating.
  - b. Holiday detect coatings 20 mils thick or less, except zinc primer and galvanizing, with low voltage wet sponge electrical holiday detector in accordance with NACE SP0188.
  - c. Holiday detect coatings in excess of 20 mils dry with high voltage spark tester as recommended by coating manufacturer and in accordance with NACE SP0188.
  - d. After repaired and recoated areas have dried sufficiently, retest each repaired area. Final tests may also be conducted by Engineer.

- C. Inspection: Leave staging and lighting in place until Engineer has inspected surface or coating. Replace staging removed prior to approval by Engineer. Provide additional staging and lighting as requested by Engineer.

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D. Unsatisfactory Application:

1. If item has an improper finish color or insufficient film thickness, clean surface and topcoat with specified paint material to obtain specified color and coverage. Obtain specific surface preparation information from coating manufacturer.
2. Evidence of runs, bridges, shiners, laps, or other imperfections is cause for rejection.
3. Repair defects in accordance with written recommendations of coating manufacturer.

E. Damaged Coatings, Pinholes, and Holidays:

1. Hand or power sand visible areas of chipped, peeled, or abraded paint, and feather edges. Follow with primer and finish coat. Depending on extent of repair and appearance, a finish sanding and topcoat may be required.
2. Remove rust and contaminants from metal surface. Provide surface cleanliness and profile in accordance with surface preparation requirements for specified paint system.
3. Feather edges and repair in accordance with recommendations of paint manufacturer.
4. Apply finish coats, including touchup and damage-repair coats in a manner that will present a uniform texture and color-matched appearance.

3.10 MANUFACTURER'S SERVICES

A. In accordance with Section 01 43 33, Manufacturers' Field Services, coating manufacturer's representative shall be present at Site as follows:

1. On first day of application of any coating system.
2. A minimum of two additional Site inspection visits, each for a minimum of 4 hours, in order to provide Manufacturer's Certificate of Proper Installation.
3. As required to resolve field problems attributable to or associated with manufacturer's product.
4. To verify full cure of coating prior to coated surfaces being placed into immersion service.

3.11 CLEANUP

A. Place cloths and waste that might constitute a fire hazard in closed metal containers or destroy at end of each day.

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- B. Upon completion of the Work, remove staging, scaffolding, and containers from Site or destroy in a legal manner.
- C. Remove paint spots, oil, or stains upon adjacent surfaces and floors and leave entire job clean.

3.12 SUPPLEMENTS

- A. The supplements listed below, following “End of Section,” are a part of this Specification:
  - 1. Paint System Data Sheet (PSDS).
  - 2. Paint Product Data Sheet (PPDS).

**END OF SECTION**

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**PAINT SYSTEM DATA SHEET (PSDS)**

Complete this PSDS for each coating system, include all components of the system (surface preparation, primer, intermediate coats, and finish coats). Include all components of a given coating system on a single PSDS.

Paint System Number (from Spec.):		
Paint System Title (from Spec.):		
Coating Supplier:		
Representative:		
Surface Preparation:		
<b>Paint Material (Generic)</b>	<b>Product Name/Number (Proprietary)</b>	<b>Min. Coats, Coverage</b>

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**PAINT PRODUCT DATA SHEET (PPDS)**

Product: \_\_\_\_\_

Complete and attach manufacturer’s Technical Data Sheet to this PDS for each product submitted. Provide manufacturer’s recommendations for the following parameters at temperature (F)/relative humidity:

<b>Temperature/RH</b>	<b>50/50</b>	<b>70/30</b>	<b>90/25</b>
Induction Time			
Pot Life			
Shelf Life			
Drying Time			
Curing Time			
Min. Recoat Time			
Max. Recoat Time			

Provide manufacturer’s recommendations for the following:

Mixing Ratio: \_\_\_\_\_

Maximum Permissible Thinning: \_\_\_\_\_

Ambient Temperature Limitations: min.: \_\_\_\_\_ max.: \_\_\_\_\_

Surface Temperature Limitations: min.: \_\_\_\_\_ max.: \_\_\_\_\_

Surface Profile Requirements: min.: \_\_\_\_\_ max.: \_\_\_\_\_

Attach additional sheets detailing manufacturer’s recommended storage requirements and holiday testing procedures.

**SECTION 10 14 00**  
**SIGNAGE**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards that may be referenced in this section:
1. American Society of Mechanical Engineers (ASME): A13.1, Scheme for the Identification of Piping Systems.
  2. ASTM International (ASTM):
    - a. A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
    - b. D709, Standard Specification for Laminated Thermosetting Materials.
  3. International Code Council (ICC):
    - a. A117.1, Accessible and Usable Buildings and Facilities.
    - b. International Fire Code (IFC): Chapter 27, Hazardous Materials-General Provisions.
  4. National Fire Protection Association (NFPA):
    - a. 704, Standard System for the Identification of the Hazards of Materials for Emergency Response.
    - b. HAZ-01, Fire Protection Guide to Hazardous Materials.
  5. Occupational Safety and Health Act (OSHA).
  6. U.S. Department of Transportation, Federal Highway Administration: Manual on Uniform Traffic Control Devices for Streets and Highways.

1.02 SUBMITTALS

- A. Action Submittals:
1. Shop Drawings:
    - a. Drawings showing layouts, actual letter sizes and styles, and Project-specific mounting details.
    - b. Manufacturer's literature showing letter sizes and styles, sign materials, and standard mounting details.
  2. Anchorage and bracing data sheets and drawings as required by Section 01 88 15, Anchorage and Bracing.
  3. Samples: One full size for each type of nameplate, sign, and label specified.

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B. Informational Submittals:

1. Manufacturer's installation instructions.
2. Anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.

**PART 2 PRODUCTS**

2.01 SIGN TYPES

A. Metal Sign (Type B):

1. Material: Baked enamel finished 18-gauge (minimum) aluminum signs.
2. Manufacturers:
  - a. Seton Identification Products.
  - b. Nutheme Illustrated Safety Co.
  - c. Or approved equal.

B. Individual Letter and Number Signs (Type E): Stainless steel for concealed flush mounting.

1. Manufacturers:
  - a. Eder Metal Letter Co., Milwaukee, WI.
  - b. Spanjer Brothers, Inc., Chicago, IL.
  - c. Andco Industries Corp., Greensboro, NC.
  - d. Or approved equal.

C. Exit Sign (Type G):

1. Material: Metal (Type B), 1/8-inch minimum thickness.
2. Letters:
  - a. 6 inches high, with 3/4-inch stroke.
  - b. 2 inches wide, except for letter "I", with spacing of 3/8 inch.
3. Colors: Red letters and direction arrows on white background.

2.02 IDENTIFICATION LABELS

A. Pipe Labels:

1. Snap-on, reversible type with lettering and directional arrows, sized for outside diameter of pipe and insulation.
2. Provided with ties or straps for pipes of 6 inches and over diameter.
3. Designed to firmly grip pipe so labels remain fixed in vertical pipe runs.
4. Material: Heavy-duty vinyl or polyester, suitable for exterior use, long lasting, and resistance to moisture, grease, and oils.
5. Letters and Arrows: Black on OSHA safety yellow background.



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6. Color Field and Letter Height: Meet ASME A13.1.
7. Message: Piping system name as indicated on Piping Schedule.
8. Manufacturers and Products:
  - a. Brady Signmark; B-915 BradySnap-On and Strap-On Pipe Markers.
  - b. Seton Identification Products; Ultra-mark Pipe Markers.
  - c. Or approved equal.

B. Equipment Labels:

1. Applies to equipment with assigned tag numbers, where specified.
2. Letters: Black bold face, 3/4-inch minimum high.
3. Background: OSHA safety yellow.
4. Materials: Aluminum or stainless steel with a baked-on finish suitable for use on wet, oily, exposed, abrasive, and corrosive areas.
5. Furnish 1-inch margin with holes at each end of label, for mounting. On fiberglass labels, furnish grommets at each hole.
6. Size:
  - a. 2 inches minimum and 3 inches maximum high, by 14 inches minimum and 18 inches maximum long.
  - b. Furnish same size base dimensions for all labels.
7. Message: Equipment names and tag numbers as used in sections where equipment is specified.
8. Manufacturers:
  - a. Brady Signmark.
  - b. Seton Identification Products.
  - c. Or approved equal.

2.03 ANCILLARY MATERIALS

- A. Fasteners: Stainless steel screws or bolts of appropriate sizes.
- B. Pipe Posts: 2-1/2-inch galvanized steel pipe meeting ASTM A53/A53M, Type S, Grade B.
- C. Chain: Type 304 stainless steel, No. 16 single jack chain or No. 2 double loop coil chain.
- D. Manufacturer's standard brackets for wall mounting of two-sided exit signs.

**PART 3 EXECUTION**

3.01 INSTALLATION—GENERAL

- A. In accordance with manufacturer’s recommendations.
- B. Mount securely, plumb, and level.

3.02 SIGNS

- A. General:
  - 1. Fasten to walls or posts, or as required on new equipment.
  - 2. Anchor in place for easy removal and reinstallation with ordinary hand tools.
- B. Information, Exit, and Safety Signs: Install facing traffic. Locate for high visibility with minimum restriction of working area around walkways and equipment.

3.03 IDENTIFICATION LABELS

- A. Pipe Labels:
  - 1. Locate at connections to equipment, valves, or branching fittings at wall boundaries.
  - 2. At intervals along piping not greater than 18 feet on center with at least one label applied to each exposed horizontal and vertical run of pipe.
  - 3. At exposed piping not normally in view, such as above suspended ceilings and in closets and cabinets.
  - 4. Supplementary Labels: Provide to Owner those listed on Piping Schedule that do not receive arrows.
  - 5. Apply to pipe after painting in vicinity is complete, or as approved by Engineer.
  - 6. Install in accordance with manufacturer’s instructions.
- B. Equipment Labels:
  - 1. Locate and install on equipment or concrete equipment base as shown on Drawings.
  - 2. Anchor to equipment or base for easy removal and replacement with ordinary hand tools.

**END OF SECTION**

**SECTION 26 05 02**  
**BASIC ELECTRICAL REQUIREMENTS**

**PART 1 GENERAL**

1.01 RELATED SECTIONS

- A. Requirements specified within this section apply to Division 26, Electrical. Work specified herein shall be performed as if specified in the individual sections.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. National Electrical Contractors Association (NECA): National Electrical Installation Standards.
  2. National Electrical Manufacturers Association (NEMA):
    - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
    - b. Z535.4, Product Safety Signs and Labels.
  3. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
  4. UL.

1.03 DESIGN REQUIREMENTS

- A. Design and submit conduit layout design and conduit stub-up layout, as required in Section 26 05 33, Raceway and Boxes.

1.04 SUBMITTALS

- A. Action Submittals:
1. Provide manufacturers' data for the following:
    - a. Nameplates, signs, and labels.

1.05 QUALITY ASSURANCE

- A. Provide the Work in accordance with NFPA 70. Where required by Authority Having Jurisdiction (AHJ), material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ, in order to provide a basis for approval under the NEC.
- B. Materials and equipment manufactured within the scope of standards published by UL shall conform to those standards and shall have an applied UL listing mark or label.

## **PART 2 PRODUCTS**

### 2.01 GENERAL

- A. Where two or more units of the same class of material or equipment are required, provide products of a single manufacturer. Component parts of materials or equipment need not be products of the same manufacturer.
- B. Material and equipment installed in heated and ventilated areas shall be capable of continuous operation at their specified ratings within an ambient temperature range of 40 degrees F to 104 degrees F.
- C. Materials and equipment installed outdoors shall be capable of continuous operation at their specified rating within the ambient temperature range stated in Section 01 61 00, Common Product Requirements.

### 2.02 EQUIPMENT FINISH

- A. Manufacturer's standard finish color, except where specific color is indicated. If manufacturer has no standard color, finish equipment in accordance with light gray color finish as approved by Engineer.

### 2.03 NAMEPLATES

- A. Material: Laminated plastic.
- B. Attachment Screws: Stainless steel.
- C. Color: Black, engraved to a white core.
- D. Letter Height:
  - 1. Pushbuttons/Selector Switches: 1/8 inch.
  - 2. Other Electrical Equipment: 3/8 inch.

### 2.04 SIGNS AND LABELS

- A. Sign size, lettering, and color shall be in accordance with NEMA Z535.4.

## **PART 3 EXECUTION**

### 3.01 GENERAL

- A. Electrical Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned. Contractor shall be responsible for actual location of equipment and devices and for proper routing and support of raceways, subject to approval of Engineer.

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- B. Check approximate locations of light fixtures, switches, electrical outlets, equipment, and other electrical system components shown on Drawings for conflicts with openings, structural members, and components of other systems and equipment having fixed locations. In the event of conflicts, notify Engineer in writing.
- C. Install work in accordance with NECA Standard of Installation, unless otherwise specified.
- D. Keep openings in boxes and equipment closed during construction.
- E. Lay out work carefully in advance. Do not cut or notch any structural member or building surface without specific approval of Engineer. Carefully perform cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, paving, or other surfaces required for the installation, support, or anchorage of conduit, raceways, or other electrical materials and equipment. Following such work, restore surfaces to original condition.

3.02 ANCHORING AND MOUNTING

- A. Equipment anchoring and mounting shall be in accordance with manufacturer's requirements for seismic zone criteria given in Section 01 61 00, Common Product Requirements.

3.03 COMBINING CIRCUITS INTO COMMON RACEWAY

- A. Circuits shown on Drawings indicate functional wiring requirements for power and control circuits. Circuits may be combined into common raceways in accordance with the following requirements:
  - 1. Analog control circuits from devices in same general area to same destination.
    - a. No power or AC discrete control circuits shall be combined in same conduit with analog circuits.
    - b. No Class 2 or Class 3 circuits including, but not limited to, HVAC control circuits, fire alarm circuits, paging system circuits shall be combined with power or Class 1 circuits.
    - c. Analog circuits shall be continuous from source to destination. Do not add TJB, splice, or combine into a multi-pair cable without authorization of Engineer.
    - d. Raceways shall be sized per General Circuit and Raceway Schedule and do not exceed 40 percent fill. Follow NEC.
    - e. Changes shall be documented on record drawings.

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2. Discrete control circuits from devices in the same general area to the same destination.
  - a. No power or analog control circuits shall be combined in same conduit with discrete circuits.
  - b. No Class 2 or Class 3 circuits including, but not limited to, HVAC control circuits, fire alarm circuits, and paging system circuits shall be combined with power or Class 1 circuits.
  - c. Raceways shall be sized per the General Circuit and Raceway Schedule and do not exceed 40 percent fill.
  - d. Changes shall be documented on record drawings.
3. Power circuits from loads in same general area to same source location (such as panelboard, switchboard, low voltage motor control center).
  - a. Lighting Circuits: Combine no more than three circuits to a single raceway. Provide a separate neutral conductor for each circuit. Contractor shall be responsible for increasing conduit and conductor size if derating is required by NEC.
  - b. Receptacle Circuits, 120-Volt Only: Combine no more than three circuits to a single raceway. Provide a separate neutral conductor for each circuit. Contractor shall be responsible for increasing conduit and conductor size if derating is required by NEC.
  - c. All Other Power Circuits: Do not combine power circuits without authorization of Engineer.

3.04 NAMEPLATES, SIGNS, AND LABELS

- A. Arc Flash Protection Warning Signs: Refer to Section 26 05 70, Electrical Systems Analysis, for requirements.
- B. Multiple Power Supply Sign: Install permanent plaque or directory at each service disconnect location denoting other services, feeders, and branch circuits supplying the building and the area served by each.
- C. Equipment Nameplates:
  1. Provide a nameplate to label electrical equipment including switchgear, switchboards, motor control centers, panelboards, motor starters, transformers, terminal junction boxes, disconnect switches, switches and control stations.
  2. Switchgear, motor control center, transformer, and terminal junction box nameplates shall include equipment designation.
  3. Disconnect switch, starter, and control station nameplates shall include name and number of equipment powered or controlled by that device.
  4. Switchboard and panelboard nameplates shall include equipment designation, service voltage, and phases.

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3.05 LOAD BALANCE

- A. Drawings and Specifications indicate circuiting to electrical loads and distribution equipment.
- B. Balance electrical load between phases as nearly as possible on switchboards, panelboards, motor control centers, and other equipment where balancing is required.
- C. When loads must be reconnected to different circuits to balance phase loads, maintain accurate record of changes made, and provide circuit directory that lists final circuit arrangement.

3.06 CLEANING AND TOUCHUP PAINTING

- A. Cleaning: Throughout the Work, clean interior and exterior of devices and equipment by removing debris and vacuuming.
- B. Touchup Paint:
  - 1. Touchup scratches, scrapes and chips on exterior and interior surfaces of devices and equipment with finish matching type, color, and consistency and type of surface of original finish.
  - 2. If extensive damage is done to equipment paint surfaces, refinish entire equipment in a manner that provides a finish equal to or better than factory finish, that meets requirements of Specification, and is acceptable to Engineer.

3.07 PROTECTION FOLLOWING INSTALLATION

- A. Protect materials and equipment from corrosion, physical damage, and effects of moisture on insulation and contact surfaces.
- B. When equipment intended for indoor installation is installed at Contractor's convenience in areas where subject to dampness, moisture, dirt or other adverse atmosphere until completion of construction, ensure adequate protection from these atmospheres is provided and acceptable to Engineer.

**END OF SECTION**

**SECTION 26 05 04**  
**BASIC ELECTRICAL MATERIALS AND METHODS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. ASTM International (ASTM):
    - a. A1011/A1011M, Standard Specification for Steel, Sheet, and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low Alloy and High-Strength Low Alloy Formability.
    - b. E814, Method of Fire Tests of Through-Penetration Fire Stops.
  2. Canadian Standards Association (CSA).
  3. Institute of Electrical and Electronics Engineers, Inc. (IEEE): 18, Standard for Shunt Power Capacitors.
  4. International Society of Automation (ISA): RP12.06.01, Wiring Practices for Hazardous (Classified) Locations Instrumentation–Part 1: Intrinsic Safety.
  5. National Electrical Manufacturers Association (NEMA):
    - a. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
    - b. C12.1, Code for Electricity Metering.
    - c. C12.6, Phase-Shifting Devices Used in Metering, Marking and Arrangement of Terminals.
    - d. ICS 2, Industrial Control and Systems: Controllers, Contactors, and Overload Relays Rated 600 Volts.
    - e. ICS 5, Industrial Control and Systems: Control Circuit and Pilot Devices.
    - f. KS 1, Enclosed and Miscellaneous Distribution Switches (600 Volts Maximum).
  6. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
  7. UL:
    - a. 98, Standard for Enclosed and Dead-Front Switches.
    - b. 248, Standard for Low Voltage Fuses.
    - c. 486E, Standard for Equipment Wiring Terminals for use with Aluminum and/or Copper Conductors.
    - d. 489, Standard for Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures.
    - e. 508, Standard for Industrial Control Equipment.
    - f. 810, Standard for Capacitors.



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- g. 943, Standard for Ground-Fault Circuit-Interruption.
- h. 1059, Standard for Terminal Blocks.
- i. 1479, Fire Tests of Through-Penetration Fire Stops.

1.02 SUBMITTALS

A. Action Submittals:

- 1. Provide manufacturers' data for the following:
  - a. Control devices.
  - b. Control relays.
  - c. Circuit breakers.
  - d. Fused switches.
  - e. Nonfused switches.
  - f. Timers.
  - g. Fuses.
  - h. Magnetic contactors.
  - i. Intrinsic safety barriers.
  - j. Enclosures: Include enclosure data for products having enclosures.
- 2. Seismic anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals: Seismic anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.

**PART 2 PRODUCTS**

2.01 MOLDED CASE CIRCUIT BREAKER THERMAL MAGNETIC, LOW VOLTAGE

A. General:

- 1. Type: Molded case.
- 2. Trip Ratings: 15 amps to 100 amps.
- 3. Voltage Ratings: 120, 208, 240, 277V ac.
- 4. Suitable for mounting and operating in any position.
- 5. UL 489.

B. Operating Mechanism:

- 1. Overcenter, trip-free, toggle type handle.
- 2. Quick-make, quick-break action.
- 3. Locking provisions for padlocking breaker in OPEN position.

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4. ON/OFF and TRIPPED indicating positions of operating handle.
5. Operating handle to assume a CENTER position when tripped.

C. Trip Mechanism:

1. Individual permanent thermal and magnetic trip elements in each pole.
2. Two and three pole, common trip.
3. Automatically opens all poles when overcurrent occurs on one pole.
4. Calibrated for 40 degrees C ambient, unless shown otherwise.
5. Do not provide single-pole circuit breakers with handle ties where multi-pole circuit breakers are shown.

D. Short Circuit Interrupting Ratings: Equal to rating of existing equipment.

E. Accessories: Shunt trip, auxiliary switches, handle lock ON devices, mechanical interlocks, key interlocks, unit mounting bases, double lugs as shown or otherwise required. Shunt trip operators shall be continuous duty rated or have coil-clearing contacts.

F. Connections:

1. Supply (line side) at either end.
2. Mechanical wire lugs, except crimp compression lugs where shown.
3. Suitable for 75 degrees C rated conductors without derating breaker or conductor ampacity.

2.02 FUSED SWITCH, INDIVIDUAL, LOW VOLTAGE

A. UL 98 listed for use and location of installation.

B. NEMA KS 1.

C. Short Circuit Rating: 200,000 amps rms symmetrical with Class R, Class J, or Class L fuses installed.

D. Quick-make, quick-break, motor rated, load-break, heavy-duty (HD) type with external markings clearly indicating ON/OFF positions.

E. Connections:

1. Mechanical lugs, except crimp compression lugs where shown.
2. Lugs removable/replaceable.
3. Suitable for 75 degrees C rated conductors at NEC 75 degrees C ampacity.

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- F. Fuse Provisions:
  - 1. 30-amp to 600-amp rated shall incorporate rejection feature to reject all fuses except Class R.
  - 2. 601-amp rated and greater shall accept Class L fuses, unless otherwise shown.
- G. Enclosures: See Article Enclosures.
- H. Interlock: Enclosure and switch to prevent opening cover with switch in ON position. Provide bypass feature for use by qualified personnel.

2.03 NONFUSED SWITCH, INDIVIDUAL, LOW VOLTAGE

- A. NEMA KS 1.
- B. Quick-make, quick-break, motor rated, load-break, heavy-duty (HD) type with external markings clearly indicating ON/OFF positions.
- C. Lugs: Suitable for use with 75 degrees C wire at NEC 75 degrees C ampacity.
- D. Enclosures: See Article Enclosures.
- E. Interlock: Enclosure and switch to prevent opening cover with switch in ON position. Provide bypass feature for use by qualified personnel.

2.04 FUSE, 250-VOLT AND 600-VOLT

- A. Power Distribution, General:
  - 1. Current-limiting, with 200,000 ampere rms interrupting rating.
  - 2. Provide to fit mountings specified with switches.
  - 3. UL 248.
- B. Power Distribution, Ampere Ratings 1 Amp to 600 Amps:
  - 1. Class: RK-1.
  - 2. Type: Dual element, with time delay.
  - 3. Manufacturers and Products:
    - a. Bussmann; Types LPS-RK (600 volts) and LPN-RK (250 volts).
    - b. Littelfuse; Types LLS-RK (600 volts) and LLN-RK (250 volts).
    - c. Or approved equal.

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- C. Power Distribution, Ampere Ratings 601 Amps to 6,000 Amps:
  - 1. Class: L.
  - 2. Double O-rings and silver links.
  - 3. Manufacturers and Products:
    - a. Bussmann; Type KRP-C.
    - b. Littelfuse, Inc.; Type KLPC.
    - c. Or approved equal.
  
- D. Cable Limiters:
  - 1. 600V or less; crimp to copper cable, bolt to bus or terminal pad.
  - 2. Manufacturers and Products:
    - a. Bussmann; K Series.
    - b. Or approved equal.
  
- E. Ferrule:
  - 1. 600V or less, rated for applied voltage, small dimension.
  - 2. Ampere Ratings: 1/10 amp to 30 amps.
  - 3. Dual-element time-delay, time-delay, or nontime-delay as required.
  - 4. Provide with blocks or holders as indicated and suitable for location and use.
  - 5. Manufacturers:
    - a. Bussmann.
    - b. Littlefuse, Inc.
    - c. Or approved equal.

2.05 PUSHBUTTON, INDICATING LIGHT, AND SELECTOR SWITCH

- A. Contact Rating: 7,200VA make, 720VA break, at 600V, NEMA ICS 5 Designation A600.
- B. Selector Switch Operating Lever: Standard.
- C. Indicating Light: Push-to-test.
- D. Pushbutton Color: As shown on Control Diagrams. Depends on application, refer to NEC.
- E. Pushbutton and selector switch lockable in OFF position where indicated.

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F. Legend Plate:

1. Material: Aluminum.
2. Engraving: Enamel filled in high contrasting color.
3. Text Arrangement: 11-character/spaces on one line, 14-character/spaces on each of two lines, as required, indicating specific function.
4. Letter Height: 7/64 inch.

G. Manufacturers and Products:

1. Heavy-Duty, Oil-Tight Type:
  - a. General Electric Co.; Type CR 104P.
  - b. Square D Co.; Type T.
  - c. Eaton/Cutler-Hammer; Type 10250T.
  - d. Or approved equal.
2. Heavy-Duty, Watertight, and Corrosion-Resistant Type:
  - a. Square D Co.; Type SK.
  - b. General Electric Co.; Type CR 104P.
  - c. Eaton/Cutler-Hammer; Type E34.
  - d. Crouse-Hinds; Type NCS.
  - e. Or approved equal.

2.06 TERMINAL BLOCK, 600 VOLTS

- A. UL 486E and UL 1059.
- B. Size components to allow insertion of necessary wire sizes.
- C. Capable of termination of control circuits entering or leaving equipment, panels, or boxes.
- D. Screw clamp compression, dead front barrier type, with current bar providing direct contact with wire between compression screw and yoke.
- E. Yoke, current bar, and clamping screw of high strength and high conductivity metal.
- F. Yoke shall guide all strands of wire into terminal.
- G. Current bar shall ensure vibration-proof connection.
- H. Terminals:
  1. Capable of wire connections without special preparation other than stripping.

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2. Capable of jumper installation with no loss of terminal or rail space.
  3. Individual, rail mounted.
- I. Marking system, allowing use of preprinted or field-marked tags.
- J. Manufacturers:
1. Weidmuller, Inc.
  2. Ideal.
  3. Electrovert USA Corp.
  4. Or approved equal.

2.07 SUPPORT AND FRAMING CHANNELS

- A. Carbon Steel Framing Channel:
1. Material: Rolled, mild strip steel, 12-gauge minimum, ASTM A1011/A1011M, Grade 33.
  2. Finish: Hot-dip galvanized after fabrication.
- B. Paint Coated Framing Channel: Carbon steel framing channel with electro-deposited rust inhibiting acrylic or epoxy paint.
- C. PVC-Coated Framing Channel: Carbon steel framing channel with 40-mil polyvinyl chloride coating.
- D. Stainless Steel Framing Channel: Rolled, Type 316 stainless steel, 12-gauge minimum.
- E. Extruded Aluminum Framing Channel:
1. Material: Extruded from Type 6063-T6 aluminum alloy.
  2. Fittings fabricated from Alloy 5052-H32.
- F. Nonmetallic Framing Channel:
1. Material: Fire retardant, fiber reinforced vinyl ester resin.
  2. Channel fitting of same material as channel.
  3. Nuts and bolts of long glass fiber reinforced polyurethane.
- G. Manufacturers:
1. B-Line Systems, Inc.
  2. Unistrut Corp.
  3. Aickinstrut.
  4. Or approved equal.

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2.08 INTRINSIC SAFETY BARRIER

- A. Provides a safe energy level for exposed wiring in a Class I, Division 1 or Division 2 hazardous area when circuit is connected to power source in nonhazardous area.
- B. Rating: Power source shall be rated 24 volts dc, nominal, with not more than 250 volts available under fault conditions.
- C. Contact Rating: 5 amps, 250 volts ac.
- D. Mounting: Rail or surface.
- E. Manufacturers and Products:
  - 1. MTL, Inc.; Series 2000 or Series 3000.
  - 2. R. Stahl, Inc.
  - 3. Or approved equal.

2.09 FIRESTOPS

- A. General:
  - 1. Provide UL 1479 classified hourly fire rating equal to, or greater than, the assembly penetrated.
  - 2. Prevent the passage of cold smoke, toxic fumes, and water before and after exposure to flame.
  - 3. Sealants and accessories shall have fire-resistance ratings as established by testing identical assemblies in accordance with ASTM E814, by UL, or other testing and inspection agency acceptable to authorities having jurisdiction.
- B. Firestop System:
  - 1. Formulated for use in through-penetration firestopping around cables, conduit, pipes, and duct penetrations through fire-rated walls and floors.
  - 2. Fill, Void, or Cavity Material: 3M Brand Fire Barrier Caulk CP25, Putty 303, Wrap/Strip FS195, Composite Sheet CS195 and Penetration Sealing Systems 7902 and 7904 Series.
  - 3. Two-Part, Foamed-In-Place, Silicone Sealant: Dow Corning Corp. Fire Stop Foam, General Electric Co. Pensil 851.
  - 4. Fire Stop Devices: See Section 26 05 33, Raceway and Boxes, for raceway and cable fittings.

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2.10 ENCLOSURES

- A. Finish: Sheet metal structural and enclosure parts shall be completely painted using an electrodeposition process so interior and exterior surfaces as well as bolted structural joints have a complete finish coat on and between them.
- B. Color: Manufacturer's standard color (gray) baked-on enamel, unless otherwise shown.
- C. Barriers: Provide metal barriers within enclosures to separate wiring of different systems and voltage.
- D. Enclosure Selections:
  - 1. Enclosure shall be selected per their NEMA rating and approved by the City Project Manager.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Install equipment in accordance with manufacturer's recommendations.

3.02 PUSHBUTTON, INDICATING LIGHT, AND SELECTOR SWITCH

- A. Install heavy-duty, oil-tight type in nonhazardous, indoor, dry locations, including motor control centers, control panels, and individual stations, unless otherwise shown.
- B. Install heavy-duty, watertight and corrosion-resistant type in nonhazardous, outdoor, or normally wet areas, unless otherwise shown.

3.03 SUPPORT AND FRAMING CHANNEL

- A. Install where required for mounting and supporting electrical equipment, raceway, and cable tray systems.
- B. Channel Type:
  - 1. Interior, Wet or Dry (Noncorrosive) Locations:
    - a. Aluminum Raceway: Extruded aluminum or carbon steel with neoprene material isolators.
    - b. PVC-Coated Conduit: PVC coated.
    - c. Steel Raceway and Other Systems Not Covered: Carbon steel or paint coated.



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2. Interior, Corrosive (Wet or Dry) Locations:
  - a. Aluminum Raceway: Extruded aluminum.
  - b. PVC Conduit: Type 316 stainless steel or nonmetallic.
  - c. PVC-Coated Steel Conduit and Other Systems Not Covered: Type 316 stainless steel, nonmetallic, or PVC-coated steel.
3. Outdoor, Noncorrosive Locations:
  - a. Steel Raceway: Carbon steel or paint coated framing channel, except where mounted on aluminum handrail, then use aluminum framing channel.
  - b. Aluminum Raceway and Other Systems Not Covered: Aluminum framing channel or carbon steel with neoprene material isolators.
4. Outdoor Corrosive Locations:
  - a. PVC Conduit: Type 316 stainless steel or nonmetallic.
  - b. Aluminum Raceway: Aluminum or carbon steel with neoprene material isolators.
  - c. PVC-Coated Steel Conduit and Other Systems Not Covered: Type 316 stainless steel, nonmetallic, or PVC-coated steel.
5. Aluminum Railings: Devices mounted on aluminum railing shall use aluminum framing channel.

C. Paint cut ends prior to installation with the following:

1. Carbon Steel Channel: Zinc-rich primer.
2. Painted Channel: Rust-inhibiting epoxy or acrylic paint.
3. Nonmetallic Channel: Epoxy resin sealer.
4. PVC-Coated Channel: PVC patch.

### 3.04 INTRINSIC SAFETY BARRIERS

- A. Install in compliance with ISA RP12.06.01.
- B. Arrange conductors such that wiring from hazardous areas cannot short to wiring from nonhazardous area.
- C. Stencil “INTRINSICALLY SAFE CIRCUIT” on all boxes enclosing barriers.

### 3.05 FIRESTOPS

- A. Install in strict conformance with manufacturer’s instructions. Comply with installation requirements established by testing and inspecting agency.

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- B. Sealant: Install sealant including forming, packing, and other accessory materials, to fill openings around electrical services penetrating floors and walls, to provide firestops with fire-resistance ratings indicated for floor or wall assembly in which penetration occurs.

**END OF SECTION**

**SECTION 26 05 05  
CONDUCTORS**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. ASTM International (ASTM):
    - a. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
    - b. B3, Standard Specification for Soft or Annealed Copper Wire.
    - c. B8, Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.
    - d. B496, Standard Specification for Compact Round Concentric-Lay-Stranded Copper Conductors.
  2. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
    - a. 386, Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600V.
  3. Insulated Cable Engineer's Association, Inc. (ICEA):
    - a. S-58-679, Standard for Control Cable Conductor Identification.
    - b. S-73-532, Standard for Control Thermocouple Extensions and Instrumentation Cables.
    - c. T-29-520, Conducting Vertical Cable Tray Flame Tests with Theoretical Heat Input of 210,000 Btu/hour.
  4. National Electrical Manufacturers' Association (NEMA):
    - a. CC 1, Electric Power Connectors for Substations.
    - b. WC 57, Standard for Control, Thermocouple Extension, and Instrumentation Cables.
    - c. WC 70, Standard for Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy.
  5. National Fire Protection Association (NFPA):
    - a. 70, National Electrical Code (NEC).
    - b. 262, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.
  6. Telecommunications Industry Association (TIA): TIA-568-C, Commercial Building Telecommunications Cabling Standard.
  7. UL:
    - a. 13, Standard for Safety for Power-Limited Circuit Cables.
    - b. 44, Standard for Safety for Thermoset-Insulated Wires and Cables.
    - c. 62, Standard for Safety for Flexible Cord and Cables.
    - d. 486A-486B, Standard for Safety for Wire Connectors.

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- e. 486C, Standard for Safety for Splicing Wire Connectors.
- f. 510, Standard for Safety for Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape.
- g. 854, Standard for Safety for Service-Entrance Cables.
- h. 1277, Standard for Safety for Electrical Power and Control Tray Cables with Optional Optical-Fiber Members.
- i. 1569, Standard for Safety for Metal-Clad Cables.
- j. 1581, Standard for Safety for Reference Standard for Electrical Wires, Cables, and Flexible Cords.

1.02 SUBMITTALS

A. Action Submittals:

- 1. Product Data:
  - a. Wire and cable.
  - b. Wire and cable accessories.

1.03 QUALITY ASSURANCE

A. Authority Having Jurisdiction (AHJ):

- 1. Provide the Work in accordance with NFPA 70. Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
- 2. Materials and equipment manufactured within the scope of standards published by UL shall conform to those standards and shall have an applied UL listing mark.

**PART 2 PRODUCTS**

2.01 CONDUCTORS 600 VOLTS AND BELOW

- A. Conform to applicable requirements of NEMA WC 70.
- B. Conductor Type:
  - 1. 120-Volt and 277-Volt Lighting, 10 AWG and Smaller: Solid copper.
  - 2. 120-Volt Receptacle Circuits, 10 AWG and Smaller: Solid copper.
  - 3. All Other Circuits: Stranded copper.
- C. Insulation: Type THHN/THWN-2, except for sizes No. 6 and larger, with XHHW-2 insulation.

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D. Direct Burial and Aerial Conductors and Cables:

1. Type USE/RHH/RHW insulation, UL 854 listed, or Type RHW-2/USE-2.
2. Conform to physical and minimum thickness requirements of NEMA WC 70.

E. Flexible Cords and Cables:

1. Type SOW-A/50 with ethylene propylene rubber insulation in accordance with UL 62.
2. Conform to physical and minimum thickness requirements of NEMA WC 70.

2.02 600-VOLT RATED CABLE

A. General:

1. Type TC, meeting requirements of UL 1277, including Vertical Tray Flame Test at 70,000 Btu per hour, and NFPA 70, Article 340, or UL 13 meeting requirements of NFPA 70, Article 725.
2. Permanently and legibly marked with manufacturer's name, maximum working voltage for which cable was tested, type of cable, and UL listing mark.
3. Suitable for installation in open air, in cable trays, or conduit.
4. Minimum Temperature Rating: 90 degrees C dry locations, 75 degrees C wet locations.
5. Overall Outer Jacket: PVC, flame-retardant, sunlight- and oil-resistant.

B. Type 1, Multiconductor Control Cable:

1. Conductors:
  - a. 14 AWG, seven-strand copper.
  - b. Insulation: 15-mil PVC with 4-mil nylon.
  - c. UL 1581 listed as Type THHN/THWN rated VW-1.
  - d. Conductor group bound with spiral wrap of barrier tape.
  - e. Color Code: In accordance with ICEA S-58-679, Method 1, Table 2.
2. Cable: Passes the ICEA T-29-520, 210,000 Btu per hour Vertical Tray Flame Test.
3. Manufacturers:
  - a. Okonite Co.
  - b. Southwire.
  - c. Or approved equal.

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- C. Type 2, Multiconductor Power Cable (MPC):
1. General:
    - a. Meet or exceed UL 1581 for cable tray use.
    - b. Meet or exceed UL 1277 for direct burial and sunlight-resistance.
    - c. Overall Jacket: PVC.
  2. Conductors:
    - a. Class B stranded, coated copper.
    - b. Insulation: Chemically cross-linked ethylene-propylene or cross-linked polyethylene.
    - c. UL rated VW-1 or listed Type XHHW-2.
    - d. Color Code:
      - 1) Conductors, size 8 AWG and smaller, colored conductors, ICEA S-58-679, Method 1, Table 1.
      - 2) Conductors, size 6 AWG and larger, ICEA S-73-532, Method 4.
  3. Cable shall pass ICEA T-29-520, 210,000 Btu per hour Vertical Tray Flame Test.
  4. Manufacturers:
    - a. Okonite Co.
    - b. Southwire.
    - c. Or approved equal.
- D. Type 3, 16 AWG, Twisted Shielded Pair (TSP), Instrumentation Cable: Single pair, designed for noise rejection for process control, computer, or data log applications meeting NEMA WC 57 requirements.
1. Outer Jacket: 45-mil nominal thickness.
  2. Individual Pair Shield: 1.35-mil, double-faced aluminum/synthetic polymer overlapped to provide 100 percent coverage.
  3. Dimension: 0.31-inch nominal OD.
  4. Conductors:
    - a. Bare soft annealed copper, Class B, seven-strand concentric, meeting requirements of ASTM B8.
    - b. 20 AWG, seven-strand tinned copper drain wire.
    - c. Insulation: 15-mil nominal PVC.
    - d. Jacket: 4-mil nominal nylon.
    - e. Color Code: Pair conductors, black and red.
  5. Manufacturers:
    - a. Okonite Co.
    - b. Alpha Wire Corp.
    - c. Belden.
    - d. Or approved equal.

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- E. Type 4, 16 AWG, Twisted, Shielded Triad Instrumentation Cable (TST): Single triad, designed for noise rejection for process control, computer, or data log applications meeting NEMA WC 57 requirements.
1. Outer Jacket: 45-mil nominal.
  2. Individual Pair Shield: 1.35-mil, double-faced aluminum/synthetic polymer, overlapped to provide 100 percent coverage.
  3. Dimension: 0.32-inch nominal OD.
  4. Conductors:
    - a. Bare soft annealed copper, Class B, seven-strand concentric, meeting requirements of ASTM B8.
    - b. 20 AWG, seven-strand, tinned copper drain wire.
    - c. Insulation: 15-mil nominal PVC.
    - d. Jacket: 4-mil nylon.
    - e. Color Code: Triad conductors black, red, and blue.
  5. Manufacturers:
    - a. Okonite Co.
    - b. Alpha Wire Corp.
    - c. Belden.
    - d. Or approved equal.

2.03 300-VOLT RATED CABLE

- A. General:
1. Type PLTC, meeting requirements of UL 13 and NFPA 70, Article 725.
  2. Permanently and legibly marked with manufacturer's name, maximum working voltage for which cable was tested, type of cable, and UL listing mark.
  3. Suitable for installation in open air, in cable trays, or conduit.
  4. Minimum Temperature Rating: 105 degrees C.
  5. Passes Vertical Tray Flame Test.
  6. Outer Jacket: PVC, flame-retardant, sunlight- and oil-resistant.

2.04 SPECIAL CABLES

- A. Type 30, Unshielded Twisted Pair (UTP) Telephone and Data Cable, 600V:
1. Category 6 UTP, UL listed, and third party verified to comply with TIA/EIA 568-C Category 6 requirements.
  2. Suitable for high speed network applications including gigabit Ethernet and video. Cable shall be interoperable with other standards compliant products and shall be backward compatible with Category 5 and Category 5e.

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3. Provide four each individually twisted pair, 23 AWG conductors, with FEP insulation and blue PVC jacket.
4. NFPA 70 Plenum (CMP) rated; comply with flammability plenum requirements of NFPA 70 and NFPA 262.
5. Cable shall withstand a bend radius of 2.5-inch minimum at a temperature of minus 20 degrees C maximum without jacket or insulation cracking.
6. Manufacturers:
  - a. Belden.
  - b. Or approved equal.

2.05 GROUNDING CONDUCTORS

- A. Equipment: Stranded copper with green, Type USE/RHH/RHW-XLPE or THHN/THWN, insulation.
- B. Direct Buried: Bare stranded copper.

2.06 ACCESSORIES FOR CONDUCTORS 600 VOLTS AND BELOW

- A. Tape:
  1. General Purpose, Flame Retardant: 7-mil, vinyl plastic, Scotch Brand 33+, rated for 90 degrees C minimum, meeting requirements of UL 510.
  2. Flame Retardant, Cold and Weather Resistant: 8.5-mil, vinyl plastic, Scotch Brand 88.
  3. Arc and Fireproofing:
    - a. 30-mil, elastomer.
    - b. Manufacturers and Products:
      - 1) 3M; Scotch Brand 77, with Scotch Brand 69 glass cloth tapebinder.
      - 2) Plymouth; 53 Plyarc, with 77 Plyglas glass cloth tapebinder.
      - 3) Or approved equal.
- B. Identification Devices:
  1. Sleeve:
    - a. Permanent, PVC, yellow or white, with legible machine-printed black markings.
    - b. Manufacturers and Products:
      - 1) Raychem; Type D-SCE or ZH-SCE.
      - 2) Brady, Type 3PS.
      - 3) Or approved equal.



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2. Heat Bond Marker:
  - a. Transparent thermoplastic heat bonding film with acrylic pressure sensitive adhesive.
  - b. Self-laminating protective shield over text.
  - c. Machine printed black text.
  - d. Manufacturers and Products:
    - 1) 3M Co.; Type SCS-HB.
    - 2) Or approved equal.
3. Marker Plate: Nylon, with legible designations permanently hot stamped on plate.
4. Tie-On Cable Marker Tags:
  - a. Chemical-resistant white tag.
  - b. Size: 1/2 inch by 2 inches.
  - c. Manufacturers and Products:
    - 1) Raychem; Type CM-SCE.
    - 2) Or approved equal.
5. Grounding Conductor: Permanent green heat-shrink sleeve, 2-inch minimum.

C. Connectors and Terminations:

1. Nylon, Self-Insulated Crimp Connectors:
  - a. Manufacturers and Products:
    - 1) Thomas & Betts; Sta-Kon.
    - 2) Burndy; Insulug.
    - 3) ILSCO.
    - 4) Or approved equal.
2. Nylon, Self-Insulated, Crimp Locking-Fork, Torque-Type Terminator:
  - a. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
  - b. Seamless.
  - c. Manufacturers and Products:
    - 1) Thomas & Betts; Sta-Kon.
    - 2) Burndy; Insulink.
    - 3) ILSCO; ILSCONS.
    - 4) Or approved equal.
3. Self-Insulated, Freespring Wire Connector (Wire Nuts):
  - a. UL 486C.
  - b. Plated steel, square wire springs.
  - c. Manufacturers and Products:
    - 1) Thomas & Betts.
    - 2) Ideal; Twister.
    - 3) Or approved equal.

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4. Self-Insulated, Set Screw Wire Connector:
  - a. Two piece compression type with set screw in brass barrel.
  - b. Insulated by insulator cap screwed over brass barrel.
  - c. Manufacturers:
    - 1) 3M Co.
    - 2) Thomas & Betts.
    - 3) Marrette.
    - 4) Or approved equal.

D. Cable Lugs:

1. In accordance with NEMA CC 1.
2. Rated 600 volts of same material as conductor metal.
3. Uninsulated Crimp Connectors and Terminators:
  - a. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
  - b. Manufacturers and Products:
    - 1) Thomas & Betts; Color-Keyed.
    - 2) Burndy; Hydent.
    - 3) ILSCO.
    - 4) Or approved equal.
4. Uninsulated, Bolted, Two-Way Connectors and Terminators:
  - a. Manufacturers and Products:
    - 1) Thomas & Betts; Locktite.
    - 2) Burndy; Quiklug.
    - 3) ILSCO.
    - 4) Or approved equal.

E. Cable Ties:

1. Nylon, adjustable, self-locking, and reusable.
2. Manufacturers and Products:
  - a. Thomas & Betts; TY-RAP.
  - b. Or approved equal.

F. Heat Shrinkable Insulation:

1. Thermally stabilized cross-linked polyolefin.
2. Single wall for insulation and strain relief.
3. Dual Wall, adhesive sealant lined, for sealing and corrosion resistance.
4. Manufacturers and Products:
  - a. Thomas & Betts; SHRINK-KON.
  - b. Raychem; RNF-100 and ES-2000.
  - c. Or approved equal.

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2.07 PULLING COMPOUND

- A. Nontoxic, noncorrosive, noncombustible, nonflammable, water-based lubricant; UL listed.
- B. Suitable for rubber, neoprene, PVC, polyethylene, hypalon, CPE, and lead-covered wire and cable.
- C. Approved for intended use by cable manufacturer.
- D. Suitable for zinc-coated steel, aluminum, PVC, bituminized fiber, and fiberglass raceways.
- E. Manufacturers:
  - 1. Ideal Co.
  - 2. Polywater, Inc.
  - 3. Cable Grip Co.
  - 4. Or approved equal.

2.08 WARNING TAPE

- A. As specified in Section 26 05 33, Raceway and Boxes.

2.09 SOURCE QUALITY CONTROL

- A. Conductors 600 Volts and Below: Test in accordance with UL 44 and UL 854.
- B. Conductors Above 600 Volts: Test in accordance with NEMA WC 71 and AEIC CS 8 partial discharge level test for EPR insulated cable.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Conductor installation shall be in accordance with manufacturer's recommendations.
- B. Conductor and cable sizing shown is based on copper conductors for 600V circuits.
- C. Do not exceed cable manufacturer's recommendations for maximum pulling tensions and minimum bending radii.
- D. Terminate conductors and cables, unless otherwise indicated.

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- E. Tighten screws and terminal bolts in accordance with UL 486A-486B for copper conductors.
- F. Cable Lugs: Provide with correct number of holes, bolt size, and center-to-center spacing as required by equipment terminals.
- G. Bundling: Where single conductors and cables in manholes, handholes, vaults, cable trays, and other indicated locations are not wrapped together by some other means, bundle conductors from each conduit throughout their exposed length with cable ties placed at intervals not exceeding 12 inches on center.
- H. Ream, remove burrs, and clear interior of installed conduit before pulling wires or cables.
- I. Concrete-Encased Raceway Installation: Prior to installation of conductors, pull through each raceway a mandrel approximately 1/4 inch smaller than raceway inside diameter.
- J. Cable Tray Installation:
  - 1. Install wire and cable parallel and straight in tray.
  - 2. Bundle, in groups, wire and cable of same voltage having a common routing and destination; use cable ties, at maximum intervals of 8 feet.
  - 3. Clamp cable bundles prior to making end termination connections.
  - 4. Separate cables of different voltage rating in same cable tray with barriers.
  - 5. Fasten wires, cables, and bundles to tray with nylon cable straps at the following maximum intervals:
    - a. Horizontal Runs: 20 feet.
    - b. Vertical Runs: 5 feet.

3.02 POWER CONDUCTOR COLOR CODING

- A. Conductors 600 Volts and Below:
  - 1. 6 AWG and Larger: Apply general purpose, flame retardant tape at each end, and at accessible locations wrapped at least six full overlapping turns, covering area 1-1/2 inches to 2 inches wide.
  - 2. 8 AWG and Smaller: Provide colored conductors.

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3. Colors:

<b>System</b>	<b>Conductor</b>	<b>Color</b>
All Systems	Equipment Grounding	Green
240/120 Volts, Single-Phase, Three-Wire	Grounded Neutral One Hot Leg Other Hot Leg	White Black Red
208Y/120 Volts, Three-Phase, Four-Wire	Grounded Neutral Phase A Phase B Phase C	White Black Red Blue
480Y/277 Volts, Three-Phase, Four-Wire	Grounded Neutral Phase A Phase B Phase C	White Brown Orange Yellow
Note: Phase A, B, C implies direction of positive phase rotation.		

4. Tracer: Outer covering of white with identifiable colored strip, other than green, in accordance with NFPA 70.

3.03 CIRCUIT IDENTIFICATION

- A. Identify power, instrumentation, and control conductor circuits at each termination, and in accessible locations such as manholes, handholes, panels, switchboards, motor control centers, pull boxes, and terminal boxes.
- B. Circuits Appearing in Circuit Schedules: Identify using circuit schedule designations.
- C. Circuits Not Appearing in Circuit Schedules:
  - 1. Assign circuit name based on device or equipment at load end of circuit.
  - 2. Where this would result in same name being assigned to more than one circuit, add number or letter to each otherwise identical circuit name to make it unique.
- D. Method:
  - 1. Conductors 3 AWG and Smaller: Identify with sleeves or heat bond markers.

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2. Cables and Conductors 2 AWG and Larger:
  - a. Identify with marker plates or tie-on cable marker tags.
  - b. Attach with nylon tie cord.
3. Taped-on markers or tags relying on adhesives not permitted.

3.04 CONDUCTORS 600 VOLTS AND BELOW

- A. Install 10 AWG or 12 AWG conductors for branch circuit power wiring in lighting and receptacle circuits.
- B. Do not splice incoming service conductors and branch power distribution conductors 6 AWG and larger, unless specifically indicated or approved by Engineer.
- C. Connections and Terminations:
  1. Install wire nuts only on solid conductors. Wire nuts are not allowed on stranded conductors.
  2. Install nylon self-insulated crimp connectors and terminators for instrumentation and control, circuit conductors.
  3. Install self-insulated, set screw wire connectors for two-way connection of power circuit conductors 12 AWG and smaller.
  4. Install uninsulated crimp connectors and terminators for instrumentation, control, and power circuit conductors 4 AWG through 2/0 AWG.
  5. Install uninsulated, bolted, two-way connectors and terminators for power circuit conductors 3/0 AWG and larger.
  6. Install uninsulated terminators bolted together on motor circuit conductors 10 AWG and larger.
  7. Place no more than one conductor in any single-barrel pressure connection.
  8. Install crimp connectors with tools approved by connector manufacturer.
  9. Install terminals and connectors acceptable for type of material used.
  10. Compression Lugs:
    - a. Attach with a tool specifically designed for purpose. Tool shall provide complete, controlled crimp and shall not release until crimp is complete.
    - b. Do not use plier type crimpers.
- D. Do not use soldered mechanical joints.

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- E. Splices and Terminations:
  - 1. Insulate uninsulated connections.
  - 2. Indoors: Use general purpose, flame retardant tape or single wall heat shrink.
  - 3. Outdoors, Dry Locations: Use flame retardant, cold- and weather-resistant tape or single wall heat shrink.
  - 4. Below Grade and Wet or Damp Locations: Use dual wall heat shrink.
  
- F. Cap spare conductors with UL listed end caps.
  
- G. Cabinets, Panels, and Motor Control Centers:
  - 1. Remove surplus wire, bridle and secure.
  - 2. Where conductors pass through openings or over edges in sheet metal, remove burrs, chamfer edges, and install bushings and protective strips of insulating material to protect the conductors.
  
- H. Control and Instrumentation Wiring:
  - 1. Where terminals provided will accept such lugs, terminate control and instrumentation wiring, except solid thermocouple leads, with insulated, locking-fork compression lugs.
  - 2. Terminate with methods consistent with terminals provided, and in accordance with terminal manufacturer's instructions.
  - 3. Locate splices in readily accessible cabinets or junction boxes using terminal strips.
  - 4. Where connections of cables installed under this section are to be made under Section 40 90 00, Instrumentation and Control for Process Systems, leave pigtails of adequate length for bundled connections.
  - 5. Cable Protection:
    - a. Under Infinite Access Floors: May install without bundling.
    - b. All Other Areas: Install individual wires, pairs, or triads in flex conduit under floor or grouped into bundles at least 1/2 inch in diameter.
    - c. Maintain integrity of shielding of instrumentation cables.
    - d. Ensure grounds do not occur because of damage to jacket over shield.
  
- I. Extra Conductor Length: For conductors to be connected by others, install minimum 6 feet of extra conductor in freestanding panels and minimum 2 feet in other assemblies.

**END OF SECTION**

**SECTION 26 05 26**  
**GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. Institute of Electrical and Electronics Engineers (IEEE) IEEE Standard 3003.2-2014: C2, National Electrical Safety Code (NESC).
2. National Fire Protection Association (NFPA): 70, National Electrical Code. (NEC).

1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
  - a. Product data for the following:
    - 1) Exothermic weld connectors.
    - 2) Mechanical connectors.
    - 3) Compression connectors.

1.03 QUALITY ASSURANCE

A. Authority Having Jurisdiction (AHJ):

1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
2. Materials and equipment manufactured within the scope of standards published by UL shall conform to those standards and shall have an applied UL listing mark.

**PART 2 PRODUCTS**

2.01 GROUND ROD

- A. Material: Copper-clad.
- B. Diameter: Minimum 5/8 inch.



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C. Length: 8 feet.

2.02 GROUND CONDUCTORS

A. As specified in Section 26 05 05, Conductors.

2.03 CONNECTORS

A. Exothermic Weld Type:

1. Outdoor Weld: Suitable for exposure to elements or direct burial.
2. Indoor Weld: Utilize low-smoke, low-emission process.
3. Manufacturers and Products:
  - a. Erico Products, Inc.; Cadweld and Cadweld Exolon.
  - b. Thermoweld.
  - c. Or approved equal.

B. Compression Type:

1. Compress-deforming type; wrought copper extrusion material.
2. Single indentation for conductors 6 AWG and smaller.
3. Double indentation with extended barrel for conductors 4 AWG and larger.
4. Barrels prefilled with oxide-inhibiting and anti-seizing compound and sealed.
5. Manufacturers and Products:
  - a. Burndy Corp.; Hyground Irreversible Compression.
  - b. Thomas and Betts Co.
  - c. ILSCO.
  - d. Or approved equal.

C. Mechanical Type: Split-bolt, saddle, or cone screw type; copper alloy material.

1. Manufacturers:
  - a. Burndy Corp.
  - b. Thomas and Betts Co.
  - c. Or approved equal.

2.04 GROUNDING WELLS

A. Ground rod box complete with cast iron riser ring and traffic cover marked GROUND ROD.

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B. Manufacturers and Products:

1. Christy Co.; No. G5.
2. Lightning and Grounding Systems, Inc.; I-R Series.
3. Or approved equal.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Grounding shall be in compliance with NFPA 70 and IEEE C2 and IEEE Standard 3003.2-2014.
- B. Ground electrical service neutral at service entrance equipment with grounding electrode conductor to grounding electrode system.
- C. Ground each separately derived system neutral with common grounding electrode conductor to grounding electrode system.
- D. Bond together all grounding electrodes that are present at each building or structure served to form one common grounding electrode system.
- E. Bond together system neutrals, service equipment enclosures, exposed noncurrent-carrying metal parts of electrical equipment, metal raceways, ground conductor in raceways and cables, receptacle ground connections, and metal piping systems.
- F. Shielded Power Cables: Ground shields at each splice or termination in accordance with recommendations of splice or termination manufacturer.
- G. Shielded Instrumentation Cables:
  1. Ground shield to ground bus at power supply for analog signal.
  2. Expose shield minimum 1 inch at termination to field instrument and apply heat shrink tube.
  3. Do not ground instrumentation cable shield at more than one point.

3.02 WIRE CONNECTIONS

- A. Ground Conductors: Install in conduit containing power conductors and control circuits above 50 volts.
- B. Nonmetallic Raceways and Flexible Tubing: Install equipment grounding conductor connected at both ends to noncurrent-carrying grounding bus.
- C. Connect ground conductors to raceway grounding bushings.

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- D. Extend and connect ground conductors to ground bus in all equipment containing a ground bus.
- E. Connect enclosure of equipment containing ground bus to that bus.
- F. Bolt connections to equipment ground bus.
- G. Bond grounding conductors to metallic enclosures at each end, and to intermediate metallic enclosures.
- H. Junction Boxes: Furnish materials and connect to equipment grounding system with grounding clips mounted directly on box, or with 3/8-inch machine screws.
- I. Metallic Equipment Enclosures: Use furnished ground lug; if none furnished, tap equipment housing and install solderless terminal connected to box with machine screw. For circuits greater than 20 amps use minimum 5/16-inch diameter bolt.

3.03 MOTOR GROUNDING

- A. Extend equipment ground bus via grounding conductor installed in motor feeder raceway; connect to motor frame.
- B. Nonmetallic Raceways and Flexible Tubing: Install an equipment grounding conductor connected at both ends to noncurrent-carrying grounding bus.
- C. Motors Less Than 10 hp: Use furnished ground lug in motor connection box; if none furnished, provide compression, spade-type terminal connected to conduit box mounting screw.
- D. Motors 10 hp and Above: Use furnished ground lug in motor connection box; if none furnished, tap motor frame or equipment housing; furnish compression, one-hole, lug type terminal connected with minimum 5/16-inch brass threaded stud with bolt and washer.
- E. Circuits 20 Amps or Above: Tap motor frame or equipment housing; install solderless terminal with minimum 5/16-inch diameter bolt.

3.04 GROUND RODS

- A. Install full length with conductor connection at upper end.
- B. Install with connection point below finished grade, unless otherwise shown.

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- C. Space multiple ground rods by one rod length.

3.05 GROUNDING WELLS

- A. Install for ground rods located inside buildings, asphalt and paved areas, and where shown on Drawings.
- B. Install riser ring and cover flush with surface.
- C. Place 6 inches of crushed rock in bottom of each well.

3.06 CONNECTIONS

A. General:

1. Above grade Connections: Install exothermic weld, mechanical, or compression-type connectors; or brazing.
2. Below grade Connections: Install exothermic weld or compression type connectors.
3. Remove paint, dirt, or other surface coverings at connection points to allow good metal-to-metal contact.
4. Notify Owner prior to backfilling ground connections.

B. Exothermic Weld Type:

1. Wire brush or file contact point to bare metal surface.
2. Use welding cartridges and molds in accordance with manufacturer's recommendations.
3. Avoid using badly worn molds.
4. Mold to be completely filled with metal when making welds.
5. After completed welds have cooled, brush slag from weld area and thoroughly clean joint.

C. Compression Type:

1. Install in accordance with connector manufacturer's recommendations.
2. Install connectors of proper size for grounding conductors and ground rods specified.
3. Install using connector manufacturer's compression tool having proper sized dies and operate per manufacturer's instructions.

D. Mechanical Type:

1. Apply homogeneous blend of colloidal copper and rust and corrosion inhibitor before making connection.

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2. Install in accordance with connector manufacturer's recommendations.
3. Do not conceal mechanical connections.

3.07 METAL STRUCTURE GROUNDING

- A. Bond metal sheathing and exposed metal vertical structural elements to grounding system.
- B. Bond electrical equipment supported by metal platforms to the platforms.
- C. Provide electrical contact between metal frames and railings supporting pushbutton stations, receptacles, and instrument cabinets, and raceways carrying circuits to these devices.

3.08 MANHOLE AND HANDHOLE GROUNDING

- A. Install one ground rod inside each manhole and handhole larger than 24-inch by 24-inch inside dimensions.
- B. Ground Rod Floor Protrusion: 4 inches to 6 inches above floor.
- C. Make connections of grounding conductors fully visible and accessible.
- D. Connect all noncurrent-carrying metal parts, and any metallic raceway grounding bushings to ground rod with 6 AWG copper conductor.

3.09 TRANSFORMER GROUNDING

- A. Bond neutrals of transformers within buildings to system ground network, and to any additional indicated grounding electrodes.
- B. Bond neutrals of substation transformers to substation grounding grid and system grounding network.
- C. Bond neutrals of pad-mounted transformers to four locally driven ground rods and buried ground wire encircling transformer and system ground network.

3.10 SURGE PROTECTION EQUIPMENT GROUNDING

- A. Connect surge arrestor ground terminals to equipment ground bus.

**END OF SECTION**

**SECTION 26 05 33  
RACEWAY AND BOXES**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. American Association of State Highway and Transportation Officials (AASHTO): HB, Standard Specifications for Highway Bridges.
  2. ASTM International (ASTM):
    - a. A123/123M, Standard Specification for Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.
    - b. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
    - c. A240/A240M, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
    - d. C857, Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
    - e. D149, Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies.
  3. National Electrical Contractors Association, Inc. (NECA): Installation standards.
  4. National Electrical Manufacturers Association (NEMA):
    - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
    - b. C80.1, Electrical Rigid Steel Conduit (ERSC).
    - c. RN 1, Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
    - d. TC 2, Electrical Polyvinyl Chloride (PVC) Conduit.
    - e. TC 3, Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing.
    - f. TC 6, Polyvinyl Chloride (PVC) Plastic Utilities Duct for Underground Installation.
    - g. TC 14, Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.
    - h. VE 1, Metallic Cable Tray Systems.
  5. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
  6. Telecommunications Industry Association (TIA): 569B, Commercial Building Standard for Telecommunications Pathways and Spaces.

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7. UL:
  - a. 1, Standard for Safety for Flexible Metal Conduit.
  - b. 5, Standard for Safety for Surface Metal Raceways and Fittings.
  - c. 6, Standard for Safety for Electrical Rigid Metal Conduit – Steel.
  - d. 6A, Standard for Safety for Electrical Rigid Metal Conduit – Aluminum, Red Brass and Stainless.
  - e. 360, Standard for Safety for Liquid-Tight Flexible Steel Conduit.
  - f. 514B, Standard for Safety for Conduit, Tubing, and Cable Fittings.
  - g. 651, Standard for Safety for Schedule 40 and 80 Rigid PVC Conduit and Fittings.
  - h. 651A, Standard for Safety for Type EB and A Rigid PVC Conduit and HDPE Conduit.
  - i. 870, Standard for Safety for Wireways, Auxiliary Gutters, and Associated Fittings.
  - j. 1660, Standard for Safety for Liquid-Tight Flexible Nonmetallic Conduit.
  - k. 1684, Standard for Safety for Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.
  - l. 2024, Standard for Safety for Optical Fiber and Communication Cable Raceway.

1.02 SUBMITTALS

A. Action Submittals:

1. Manufacturer’s Literature:
  - a. Conduit and conduit fittings.
  - b. Wireways.
  - c. Junction boxes.
  - d. Terminal junction boxes.
2. Precast Manholes and Handholes:
  - a. Dimensional drawings and descriptive literature.
  - b. Traffic loading calculations.
  - c. Accessory information.
3. Seismic anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.
4. Conduit Layout:
  - a. Provide drawings for conduit installations including, but not limited to ductbanks, under floor slabs, concealed in slabs, and concealed in walls.
  - b. Provide plan and section showing arrangement and location of conduit and duct bank required for:
    - 1) Low and medium voltage feeder and branch circuits.
    - 2) Instrumentation and control systems.

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- 3) Communications systems.
- 4) Empty conduit for future use.
- c. Reproducible scale not greater than 1-inch equals 20 feet.

B. Informational Submittals:

1. Seismic anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
2. Manufacturer's certification of training for PVC-coated rigid galvanized steel conduit installer.

1.03 QUALITY ASSURANCE

A. Authority Having Jurisdiction (AHJ):

1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
2. Materials and equipment manufactured within scope of standards published by UL shall conform to those standards and shall have an applied UL listing mark.

- B. PVC-Coated, Rigid Galvanized Steel Conduit Installer: Certified by conduit manufacturer as having received minimum 2 hours of training on installation procedures.

**PART 2 PRODUCTS**

2.01 CONDUIT AND TUBING

A. Rigid Galvanized Steel Conduit (RGS):

1. Meet requirements of NEMA C80.1 and UL 6.
2. Material: Hot-dip galvanized with chromated protective layer.

B. Electric Metallic Tubing (EMT):

1. Meet requirements of NEMA C80.3 and UL 797.
2. Material: Hot-dip galvanized with chromated and lacquered protective layer.



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- C. PVC Schedule 40 Conduit:
1. Meet requirements of NEMA TC 2 and UL 651.
  2. UL listed for concrete encasement, underground direct burial, concealed or direct sunlight exposure, and 90 degrees C insulated conductors.
- D. PVC Schedule 80 Conduit:
1. Meet requirements of NEMA TC 2 and UL 651.
  2. UL listed for concrete encasement, underground direct burial, concealed or direct sunlight exposure, and 90 degrees C insulated conductors.
- E. PVC-Coated Rigid Galvanized Steel Conduit:
1. Meet requirements of NEMA RN 1 and ETL.
  2. Material:
    - a. Meet requirements of NEMA C80.1 and UL 6.
    - b. Exterior Finish: PVC coating, 40-mil nominal thickness; bond to metal shall have tensile strength greater than PVC.
    - c. Interior Finish: Urethane coating, 2-mil nominal thickness.
  3. Threads: Hot-dipped galvanized and factory coated with urethane.
  4. Bendable without damage to interior or exterior coating.
- F. Flexible Metal, Liquid-Tight Conduit:
1. UL 360 listed for 105 degrees C insulated conductors.
  2. Material: Galvanized steel with extruded PVC jacket.
- G. Flexible, Nonmetallic, Liquid-Tight Conduit:
1. Material: PVC core with fused flexible PVC jacket.
  2. UL 1660 listed for:
    - a. Dry Conditions: 80 degrees C insulated conductors.
    - b. Wet Conditions: 60 degrees C insulated conductors.
  3. Manufacturers and Products:
    - a. Carlon; Carflex or X-Flex.
    - b. T & B; Xtraflex LTC or EFC.
    - c. Or approved equal.
- H. Innerduct:
1. Resistant to spread of fire, per requirements of UL 2024.
  2. Smooth or corrugated HDPE.

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2.02 FITTINGS

A. Rigid Galvanized Steel:

1. General:
  - a. Meet requirements of UL 514B.
  - b. Type: Threaded, galvanized. Set screw and threadless compression fittings not permitted.
2. Bushing:
  - a. Material: Malleable iron with integral insulated throat, rated for 150 degrees C.
  - b. Manufacturers and Products:
    - 1) Appleton; Series BU-I.
    - 2) O-Z/Gedney; Type HB.
    - 3) Or approved equal.
3. Grounding Bushing:
  - a. Material: Malleable iron with integral insulated throat rated for 150 degrees C, with solderless lugs.
  - b. Manufacturers and Products:
    - 1) Appleton; Series GIB.
    - 2) O-Z/Gedney; Type HBLG.
    - 3) Or approved equal.
4. Conduit Hub:
  - a. Material: Malleable iron with insulated throat with bonding screw.
  - b. UL listed for use in wet locations.
  - c. Manufacturers and Products:
    - 1) Appleton, Series HUB-B.
    - 2) O-Z/Gedney; Series CH.
    - 3) Meyers; ST Series.
    - 4) Or approved equal.
5. Conduit Bodies:
  - a. Sized as required by NFPA 70.
  - b. Manufacturers and Products (For Normal Conditions):
    - 1) Appleton; Form 35 threaded unilets.
    - 2) Crouse-Hinds; Form 7 or Form 8 threaded condulets.
    - 3) Killark; Series O electrolets.
    - 4) Thomas & Betts; Form 7 or Form 8.
    - 5) Or approved equal.
  - c. Manufacturers (For Hazardous Locations):
    - 1) Appleton.
    - 2) Crouse-Hinds.
    - 3) Killark.
    - 4) Or approved equal.
6. Couplings: As supplied by conduit manufacturer.

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7. Unions:
  - a. Concrete tight, hot-dip galvanized malleable iron.
  - b. Manufacturers and Products:
    - 1) Appleton; Series SCC bolt-on coupling or Series EC three-piece union.
    - 2) O-Z/Gedney; Type SSP split coupling or Type 4 Series, three-piece coupling.
    - 3) Or approved equal.
8. Conduit Sealing Fitting:
  - a. Manufacturers and Products:
    - 1) Appleton; Type EYF, EYM, or ESU.
    - 2) Crouse-Hinds; Type EYS or EZS.
    - 3) Killark; Type EY or Type EYS.
    - 4) Or approved equal.
9. Drain Seal:
  - a. Manufacturers and Products:
    - 1) Appleton; Type EYD.
    - 2) Crouse-Hinds; Type EYD or Type EZD.
    - 3) Or approved equal.
10. Drain/Breather Fitting:
  - a. Manufacturers and Products:
    - 1) Appleton; Type ECDB.
    - 2) Crouse-Hinds; ECD.
    - 3) Or approved equal.
11. Expansion Fitting:
  - a. Manufacturers and Products:
    - 1) Deflection/Expansion Movement:
      - a) Appleton; Type DF.
      - b) Crouse-Hinds; Type XD.
      - c) Or approved equal.
    - 2) Expansion Movement Only:
      - a) Appleton; Type XJ.
      - b) Crouse-Hinds; Type XJ.
      - c) Thomas & Betts; XJG-TP.
      - d) Or approved equal.
12. Cable Sealing Fitting:
  - a. To form watertight nonslip cord or cable connection to conduit.
  - b. For Conductors with OD of 1/2 inch or Less: Neoprene bushing at connector entry.
  - c. Manufacturers and Products:
    - 1) Appleton; CG-S.
    - 2) Crouse-Hinds; CGBS.
    - 3) Or approved equal.

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B. PVC Conduit and Tubing:

1. Meet requirements of NEMA TC 3.
2. Type: PVC, slip-on.

C. PVC-Coated Rigid Galvanized Steel Conduit:

1. Meet requirements of UL 514B.
2. Fittings: Rigid galvanized steel type, PVC coated by conduit manufacturer.
3. Conduit Bodies: Cast metal hot-dipped galvanized or urethane finish. Cover shall be of same material as conduit body. PVC coated by conduit manufacturer.
4. Finish: 40-mil PVC exterior, 2-mil urethane interior.
5. Overlapping pressure-sealing sleeves.
6. Conduit Hangers, Attachments, and Accessories: PVC-coated.
7. Manufacturers:
  - a. Robroy Industries.
  - b. Ocal.
  - c. Or approved equal.
8. Expansion Fitting:
  - a. Manufacturer and Product:
    - 1) Ocal; OCAL-BLUE XJG.
    - 2) Or approved equal.

D. Flexible Metal, Liquid-Tight Conduit:

1. Metal insulated throat connectors with integral nylon or plastic bushing rated for 105 degrees C.
2. Insulated throat and sealing O-rings.
3. Manufacturers and Products:
  - a. Thomas & Betts; Series 5331.
  - b. O-Z/Gedney; Series 4Q.
  - c. Or approved equal.

E. Flexible, Nonmetallic, Liquid-Tight Conduit:

1. Meet requirements of UL 514B.
2. Type: High strength plastic body, complete with lock nut, O-ring, threaded ferrule, sealing ring, and compression nut.
3. Body/compression nut (gland) design to ensure high mechanical pullout strength and watertight seal.

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4. Manufacturers and Products:
  - a. Carlon; Type LT.
  - b. O-Z/Gedney; Type 4Q-P.
  - c. Thomas & Betts; Series 6300.
  - d. Or approved equal.
  
- F. Flexible Coupling, Hazardous Locations:
  1. Approved for use in atmosphere involved.
  2. Rating: Watertight and UL listed for use in Class I, Division 1 and 2 areas.
  3. Outer bronze braid and an insulating liner.
  4. Conductivity equal to a similar length of rigid metal conduit.
  5. Manufacturers and Products:
    - a. Crouse-Hinds; Type ECGJH or Type ECLK.
    - b. Appleton; EXGJH or EXLK.
    - c. Or approved equal.
  
- G. Watertight Entrance Seal Device:
  1. New Construction:
    - a. Material: Oversized sleeve, malleable iron body with sealing ring, pressure ring, grommet seal, and pressure clamp.
    - b. Manufacturer and Product:
      - 1) O-Z/Gedney; Type FSK or Type WSK, as required.
      - 2) Or approved equal.
  2. Cored-Hole Application:
    - a. Material: Assembled dual pressure disks, neoprene sealing ring, and membrane clamp.
    - b. Manufacturers and Products:
      - 1) O-Z/Gedney; Series CSM.
      - 2) Or approved equal.

2.03 OUTLET AND DEVICE BOXES

- A. Sheet Steel: One-piece drawn type, zinc-plated or cadmium-plated.
  
- B. Cast Metal:
  1. Box: Malleable iron or cast ferrous metal.
  2. Cover: Gasketed, weatherproof, malleable iron, or cast ferrous metal, with stainless steel screws.
  3. Hubs: Threaded.
  4. Lugs: Cast Mounting.
  5. Manufacturers and Products, Nonhazardous Locations:
    - a. Crouse-Hinds; Type FS or Type FD.

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- b. Appleton; Type FS or Type FD.
    - c. Killark.
    - d. Or approved equal.
  6. Manufacturers and Products, Hazardous Locations:
    - a. Crouse-Hinds; Type GUA or Type EAJ.
    - b. Appleton; Type GR.
    - c. Or approved equal.
- C. Cast Aluminum:
  1. Material:
    - a. Box: Cast, copper-free aluminum.
    - b. Cover: Gasketed, weatherproof, cast copper-free aluminum with stainless steel screws.
  2. Hubs: Threaded.
  3. Lugs: Cast mounting.
  4. Manufacturers and Products, Nonhazardous Locations:
    - a. Crouse-Hinds; Type FS-SA or Type FD-SA.
    - b. Appleton; Type FS or Type FD.
    - c. Killark.
    - d. Or approved equal.
  5. Manufacturers and Products, Hazardous Locations:
    - a. Crouse-Hinds; Type GUA-SA.
    - b. Appleton; Type GR.
    - c. Or approved equal.
- D. PVC-Coated Cast Metal:
  1. Type: One-piece.
  2. Material: Malleable iron, cast ferrous metal, or cast aluminum.
  3. Coating:
    - a. Exterior Surfaces: 40-mil PVC.
    - b. Interior Surfaces: 2-mil urethane.
  4. Manufacturers:
    - a. Robroy Industries.
    - b. Ocal.
    - c. Or approved equal.
- E. Nonmetallic:
  1. Box: PVC.
  2. Cover: PVC, weatherproof, with stainless steel screws.
  3. Manufacturers and Products:
    - a. Carlon; Type FS or Type FD, with Type E98 or Type E96 covers.
    - b. Or approved equal.

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2.04 JUNCTION AND PULL BOXES

- A. Outlet Box Used as Junction or Pull Box: As specified under Article Outlet and Device Boxes.
- B. Conduit Bodies Used as Junction Boxes: As specified under Article Fittings.
- C. Sheet Steel Box:
  - 1. NEMA 250, Type 1.
  - 2. Box: Code-gauge, galvanized steel.
  - 3. Cover: Full access, screw type.
  - 4. Machine Screws: Corrosion-resistant.
- D. Cast Metal Box:
  - 1. NEMA 250, Type 4.
  - 2. Box: Cast malleable iron, or ferrous metal, electrogalvanized finished, with drilled and tapped conduit entrances and exterior mounting lugs.
  - 3. Cover: Hinged with clamps.
  - 4. Gasket: Neoprene.
  - 5. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.
  - 6. Manufacturers and Products, Surface Mounted Nonhinged Type:
    - a. Crouse-Hinds; Series W.
    - b. O-Z/Gedney; Series Y.
    - c. Or approved equal.
  - 7. Manufacturer and Product:
    - a. Surface Mounted, Hinged Type: O-Z/Gedney; Series YW.
    - b. Or approved equal.
  - 8. Manufacturers and Products, Recessed Type:
    - a. Crouse-Hinds; Type WJBF.
    - b. O-Z/Gedney; Series YR.
    - c. Or approved equal.
- E. Cast Metal Box, Hazardous Locations:
  - 1. NEMA 250 Type 7 or Type 9 as required for Class, Division, and Group involved.
  - 2. Box: Cast ferrous metal, electro-galvanize finished or copper-free aluminum with drilled and tapped conduit entrances.
  - 3. Cover: Nonhinged with bolts.
  - 4. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.
  - 5. Manufacturers and Products:
    - a. Crouse-Hinds; Type EJB.
    - b. Appleton; Type AJBEW.
    - c. Or approved equal.

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F. Stainless Steel Box:

1. NEMA 250 Type 4X.
2. Box: 14-gauge, ASTM A240/A240M, Type 316 stainless steel, with white enamel painted interior mounting panel.
3. Cover: Hinged with clamps.
4. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.
5. Manufacturers:
  - a. Hoffman Engineering Co.
  - b. Robroy Industries.
  - c. Wiegman.
  - d. Or approved equal.

G. Steel Box:

1. NEMA 250 Type 1, 3R and 12.
2. Box: 10-gauge steel, with white enamel painted interior and gray primed exterior, over phosphated surfaces. Provide gray finish.
3. Cover: Hinged with clamps.
4. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.
5. Manufacturers:
  - a. Hoffman Engineering Co.
  - b. Robroy Industries.
  - c. Wiegman.
  - d. Or approved equal.

H. Nonmetallic Box:

1. NEMA 250 Type 4X.
2. Box: High-impact, fiberglass-reinforced polyester or engineered thermoplastic, with stability to high heat.
3. Cover: Hinged with clamps.
4. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.
5. Conduit hubs and mounting lugs.
6. Manufacturers and Products:
  - a. Crouse-Hinds; Type NJB.
  - b. Carlon; Series N, C, or H.
  - c. Robroy Industries.
  - d. Or approved equal.

I. Concrete Box, Nontraffic Areas:

1. Box: Reinforced, cast concrete with extension.
2. Cover: Steel diamond plate with locking bolts.
3. Cover Marking: ELECTRICAL, TELEPHONE, or as shown.
4. Size: 10 inches by 17 inches, minimum.



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5. Manufacturers and Products:
  - a. Utility Vault Co.; Series 36-1017.
  - b. Christy, Concrete Products, Inc.; N9.
  - c. Quazite; "PG" Style.
  - d. Or approved equal.

J. Concrete Box, Traffic Areas:

1. Box: Reinforced, cast concrete with extension and bottom slab.
2. Cover: Steel checked plate; H/20 loading with screw down.
3. Cover Marking: ELECTRICAL, TELEPHONE, or as shown.
4. Manufacturers and Products:
  - a. Christy, Concrete Products, Inc.; B1017BOX.
  - b. Utility Vault Co.; 3030 SB.
  - c. Or approved equal.

2.05 TERMINAL JUNCTION BOX

- A. Cover: Hinged, unless otherwise shown.
- B. Interior Finish: Paint with white enamel or lacquer.
- C. Terminal Blocks:
  1. Separate connection point for each conductor entering or leaving box.
  2. Spare Terminal Points: 25 percent, minimum.

2.06 SURFACE METAL RACEWAY

- A. Outlets:
  1. Manufacturers:
    - a. The Wiremold Co.
    - b. Walker.
    - c. Or approved equal.

2.07 METAL WIREWAYS

- A. Meet requirements of UL 870.
- B. Type: Steel-enclosed, lay-in type.
- C. Cover: Removable, screw type.
- D. Rating: Indoor.
- E. Finish: Rust inhibiting phosphatizing primer and gray baked enamel.

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- F. Hardware: Plated to prevent corrosion; screws installed toward the inside protected by spring nuts or otherwise guarded to prevent wire insulation damage.
- G. Knockouts: Without knockouts, unless otherwise indicated.
- H. Manufacturers:
  - 1. Circle AW.
  - 2. Hoffman.
  - 3. Square D.
  - 4. Or approved equal.

2.08 PRECAST MANHOLES AND HANDHOLES

- A. Concrete Strength: Minimum, 3,000 psi compressive, in 28 days.
- B. Loading: AASHTO, H-20 in accordance with ASTM C857.
- C. Access: Provide cast concrete risers and access hole adapters between top of manhole and finished grade at required elevations.
- D. Drainage:
  - 1. Slope floors toward drain points, leaving no pockets or other nondraining areas.
  - 2. Provide drainage outlet or sump at low point of floor constructed with a heavy, cast iron, slotted or perforated hinged cover, and a minimum 4-inch outlet and outlet pipe.
- E. Raceway Entrances:
  - 1. Provide on all four sides.
  - 2. Provide knockout panels or precast individual raceway openings.
  - 3. At entrances where raceways are to be installed by others, provide minimum 12-inch-high by 24-inch-wide knockout panels for future raceway installation.
- F. Embedded Pulling Iron:
  - 1. Material: 3/4-inch-diameter stock, fastened to overall steel reinforcement before concrete is placed.
  - 2. Location:
    - a. Wall: Opposite each raceway entrance and knockout panel for future raceway entrance.
    - b. Floor: Centered below manhole or handhole cover.

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G. Cable Racks:

1. Arms and Insulators: Adjustable, of sufficient number to accommodate cables for each raceway entering or leaving manhole, including spares.
2. Wall Attachment:
  - a. Adjustable inserts in concrete walls. Bolts or embedded studs not permitted.
  - b. Insert Spacing: Maximum 3 feet on center for inside perimeter of manhole.
  - c. Arrange in order that spare raceway ends are clear for future cable installation.

H. Manhole Frames and Covers:

1. Material: Machined cast iron.
2. Diameter: 36-1/2 inch nominal unless otherwise indicated on Drawings.
3. Cover Type: Indented, solid top design, with two drop handles each.
4. Cover Loading: AASHTO H-20.
5. Cover Designation: Cast, on upper side, in integral letters, minimum 2 inches in height, appropriate titles:
  - a. Above 600 Volts: ELECTRIC HV.
  - b. 600 Volts and Below: ELECTRIC LV.
  - c. COMMUNICATIONS.

I. Handhole Frames and Covers:

1. Material: Steel, hot-dipped galvanized.
2. Cover Type: Solid, torsion spring, of nonskid design.
3. Cover Loading: AASHTO H-20.
4. Cover Designation: Burn by welder, on upper side in integral letters, minimum 2 inches in height, appropriate titles:
  - a. 600 Volts and Below: ELECTRIC LV.
  - b. COMMUNICATIONS.

J. Hardware: Steel, hot-dip galvanized.

K. Furnish knockout for ground rod in each handhole and manhole.

L. Manufacturers:

1. Utility Vault Co.
2. Penn-Cast Products, Inc.
3. Concrete Conduit Co.
4. Associated Concrete Products, Inc.
5. Pipe, Inc.
6. Or approved equal.

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2.09 ACCESSORIES

A. Duct Bank Spacers:

1. Modular Type:
  - a. Nonmetallic, interlocking, for multiple conduit sizes.
  - b. Suitable for all types of conduit.
  - c. Manufacturers:
    - 1) Underground Device, Inc.
    - 2) Carlon.
    - 3) Or approved equal.
2. Template Type:
  - a. Nonmetallic, custom made one-piece spacers.
  - b. Suitable for all types of conduit.
  - c. Material: HDPE or polypropylene, 1/2-inch minimum thickness.
  - d. Conduit openings cut 1 inch larger than conduit outside diameter.
  - e. Additional openings for stake-down, rebar, and concrete flow through as required.
  - f. Manufacturers and Products
    - 1) SP Products; Quik Duct.
    - 2) Or approved equal.

B. Identification Devices:

1. Raceway Tags:
  - a. Material: Permanent, nylon.
  - b. Raceway Designation: Pressure stamped, embossed, or engraved.
  - c. Tags relying on adhesives or taped-on markers not permitted.
2. Warning Tape:
  - a. Material: Polyethylene, 4-mil gauge with detectable strip.
  - b. Color: Red.
  - c. Width: Minimum 6 inches.
  - d. Designation: Warning on tape that electric circuit is located below tape.
  - e. Identifying Letters: Minimum 1-inch-high permanent black lettering imprinted continuously over entire length.
  - f. Manufacturers and Products:
    - 1) Panduit; Type HTDU.
    - 2) Reef Industries; Terra Tape.
    - 3) Or approved equal.

C. Heat Shrinkable Tubing:

1. Material: Heat-shrinkable, cross-linked polyolefin.
2. Semi-flexible with meltable adhesive inner liner.

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3. Color: Black.
  4. Manufacturers:
    - a. Raychem.
    - b. 3M.
    - c. Or approved equal.
- D. Wraparound Duct Band:
1. Material: Heat-shrinkable, cross-linked polyolefin, precoated with hot-melt adhesive.
  2. Width: 50 mm minimum.
  3. Manufacturers and Products
    - a. Raychem; Type TWDB.
    - b. Or approved equal.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Conduit and tubing sizes shown are based on use of copper conductors. Reference Section 26 05 05, Conductors, concerning conduit sizing for aluminum conductors.
- B. Comply with NECA Installation Standards.
- C. Crushed or deformed raceways not permitted.
- D. Maintain raceway entirely free of obstructions and moisture.
- E. Immediately after installation, plug or cap raceway ends with watertight and dust-tight seals until time for pulling in conductors.
- F. Sealing Fittings: Provide drain seal in vertical raceways where condensate may collect above sealing fitting.
- G. Avoid moisture traps where possible. When unavoidable in exposed conduit runs, provide junction box and drain fitting at conduit low point.
- H. Group raceways installed in same area.
- I. Proximity to Heated Piping: Install raceways minimum 12 inches from parallel runs.
- J. Follow structural surface contours when installing exposed raceways. Avoid obstruction of passageways.

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- K. Run exposed raceways parallel or perpendicular to walls, structural members, or intersections of vertical planes.
- L. Block Walls: Do not install raceways in same horizontal course or vertical cell with reinforcing steel.
- M. Install watertight fittings in outdoor, underground, or wet locations.
- N. Paint threads and cut ends, before assembly of fittings, galvanized conduit, PVC-coated galvanized conduit, or IMC installed in exposed or damp locations with zinc-rich paint or liquid galvanizing compound.
- O. Metal conduit shall be reamed, burrs removed, and cleaned before installation of conductors, wires, or cables.
- P. Do not install raceways in concrete equipment pads, foundations, or beams without Engineer approval.
- Q. Horizontal raceways installed under floor slabs shall lie completely under slab, with no part embedded within slab.
- R. Install concealed, embedded, and buried raceways so that they emerge at right angles to surface and have no curved portion exposed.
- S. Install conduits for fiber optic cables, telephone cables, and Category 6 data cables in strict conformance with the requirements of TIA 569B.

3.02 REUSE OF EXISTING CONDUITS

- A. Where Drawings indicate existing conduits may be reused, they may be reused only where they meet the following criteria.
  - 1. Conduit is in useable condition with no deformation, corrosion, or damage to exterior surface.
  - 2. Conduit is sized per the NEC.
  - 3. Conduit is of the type specified in Contract Documents.
  - 4. Conduit is supported as specified in Contract Documents.
- B. Conduit shall be reamed with wire brush, then with a mandrel approximately 1/4 inch smaller than raceway inside diameter then cleaned prior to pulling new conductors.

3.03 INSTALLATION IN CAST-IN-PLACE STRUCTURAL CONCRETE

- A. Minimum Cover: 2 inches, including fittings.

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- B. Conduit placement shall not require changes in reinforcing steel location or configuration.
- C. Provide nonmetallic support during placement of concrete to ensure raceways remain in position.
- D. Conduit larger than 1 inch shall not be embedded in concrete slabs, walls, foundations, columns, or beams unless approved by Engineer.
- E. Slabs and Walls (Requires Engineer Approval):
  - 1. Trade size of conduit not to exceed one-fourth of slab or wall thickness.
  - 2. Install within middle two-fourths of slab or wall.
  - 3. Separate conduit less than 2-inch trade size by a minimum ten times conduit trade size, center-to-center, unless otherwise shown.
  - 4. Separate conduit 2-inch and greater trade size by a minimum eight times conduit trade size, center-to-center, unless otherwise shown.
  - 5. Cross conduit at an angle greater than 45 degrees, with minimum separation of 1 inch.
  - 6. Separate conduit by a minimum six times the outside dimension of expansion/deflection fittings at expansion joints.
  - 7. Conduit shall not be installed below the maximum water surface elevation in walls of water holding structures.
- F. Columns and Beams (Requires Engineer Approval):
  - 1. Trade size of conduit not to exceed one-fourth of beam thickness.
  - 2. Conduit cross-sectional area not to exceed 4 percent of beam or column cross section.

3.04 CONDUIT APPLICATION

- A. Diameter: Minimum 3/4 inch.
- B. In addition to the requirements below, refer to the Area Classification Table on Drawings.
- C. Direct Earth Burial: PVC Schedule 40.
- D. Concrete-Encased Ductbank: PVC Schedule 40 for ac circuits, PVC-Coated Rigid Galvanized Steel for dc, analog, or copper communication or other circuits sensitive to electromagnetic interference.
- E. Under Slabs-on-Grade: PVC Schedule 40 for ac circuits, PVC-Coated Rigid Galvanized Steel for dc, analog, or copper communication or other circuits sensitive to electromagnetic interference.

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- F. Transition from Underground or Concrete Embedded to Exposed: PVC-coated rigid steel conduit.

3.05 FLEXIBLE CONNECTIONS

- A. For motors, wall or ceiling mounted fans and unit heaters, dry type transformers, electrically operated valves, instrumentation, and other locations approved by Engineer where flexible connection is required to minimize vibration:
  - 1. Conduit Size 4 Inches or Less: Flexible, liquid-tight conduit.
  - 2. Conduit Size Over 4 Inches: Nonflexible.
  - 3. Wet or Corrosive Areas: Flexible, nonmetallic liquid-tight.
  - 4. Dry Areas: Flexible, metallic liquid-tight.
  - 5. Hazardous Areas: Flexible coupling suitable for Class I, Division 1 and 2 areas.
- B. Suspended Lighting Fixtures in Dry Areas: Flexible steel, nonliquid-tight conduit.
- C. Outdoor Areas, Process Areas Exposed to Moisture, and Areas Required to be Oil-Tight and Dust-Tight: Flexible metal, liquid-tight conduit.
- D. Flexible Conduit Length: 18 inches minimum, 60 inches maximum; sufficient to allow movement or adjustment of equipment.

3.06 PENETRATIONS

- A. Make at right angles, unless otherwise shown.
- B. Notching or penetration of structural members, including footings and beams, not permitted.
- C. Fire-Rated Walls, Floors, or Ceilings: Firestop openings around penetrations to maintain fire-resistance rating as specified in Section 26 05 04, Basic Electrical Materials and Methods.
- D. Apply heat shrinkable tubing or single layer of wraparound duct band to metallic conduit protruding through concrete floor slabs to a point 2 inches above and 2 inches below concrete surface.
- E. Concrete Walls, Floors, or Ceilings (Aboveground): Provide non-shrink grout dry-pack, or use watertight seal device.



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F. Entering Structures:

1. General: Seal raceway at first box or outlet with oakum or expandable plastic compound to prevent entrance of gases or liquids from one area to another.
2. Concrete Roof or Membrane Waterproofed Wall or Floor:
  - a. Provide a watertight seal.
  - b. Without Concrete Encasement: Install watertight entrance seal device on each side.
  - c. With Concrete Encasement: Install watertight entrance seal device on accessible side.
  - d. Securely anchor malleable iron body of watertight entrance seal device into construction with one or more integral flanges.
  - e. Secure membrane waterproofing to watertight entrance seal device in a permanent, watertight manner.
3. Corrosive-Sensitive Areas:
  - a. Seal conduit passing through walls.
  - b. Seal conduit entering equipment panel boards and field panels containing electronic equipment.
  - c. Seal penetration with Type 5 sealant, as specified in Section 07 92 00, Joint Sealants.
4. Existing or Precast Wall (Underground): Core drill wall and install watertight entrance seal device.
5. Nonwaterproofed Wall or Floor (Underground, without Concrete Encasement):
  - a. Provide Schedule 40 galvanized pipe sleeve, or watertight entrance seal device.
  - b. Fill space between raceway and sleeve with expandable plastic compound or oakum and lead joint, on each side.
6. Manholes and Handholes:
  - a. Metallic Raceways: Provide insulated grounding bushings.
  - b. Nonmetallic Raceways: Provide bell ends flush with wall.
  - c. Install such that raceways enter as near as possible to one end of wall, unless otherwise shown.

3.07 SUPPORT

- A. Support from structural members only, at intervals not exceeding NFPA 70 requirements. Do not exceed 10 feet in any application. Do not support from piping, pipe supports, or other raceways.
- B. Multiple Adjacent Raceways: Provide ceiling trapeze. For trapeze-supported conduit, allow 25 percent extra space for future conduit.

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- C. Application/Type of Conduit Strap:
  - 1. Rigid Steel Conduit: Zinc coated steel, pre-galvanized steel or malleable iron.
  - 2. PVC-Coated Rigid Steel Conduit: PVC-coated metal.
  - 3. Nonmetallic Conduit: Nonmetallic or PVC-coated metal.
  
- D. Provide and attach wall brackets, strap hangers, or ceiling trapeze as follows:
  - 1. Wood: Wood screws.
  - 2. Hollow Masonry Units: Toggle bolts.
  - 3. Concrete or Brick: Expansion shields, or threaded studs driven in by powder charge, with lock washers and nuts.
  - 4. Steelwork: Machine screws.
  - 5. Location/Type of Hardware: Refer to the Area Classification and Materials Selection Table on Drawings.
  
- E. Nails or wooden plugs inserted in concrete or masonry for attaching raceway not permitted. Do not weld raceways or pipe straps to steel structures. Do not use wire in lieu of straps or hangers.
  
- F. Support aluminum conduit on concrete surfaces with stainless steel or nonmetallic spacers, or aluminum or nonmetallic framing channel.

3.08 BENDS

- A. Install concealed raceways with a minimum of bends in the shortest practical distance.
  
- B. Make bends and offsets of longest practical radius. Bends in conduits and ducts being installed for fiber optic cables shall be not less than 20 times cable diameter, 15 inches minimum.
  
- C. Install with symmetrical bends or cast metal fittings.
  
- D. Avoid field-made bends and offsets, but where necessary, make with acceptable hickey or bending machine. Do not heat metal raceways to facilitate bending.
  
- E. Make bends in parallel or banked runs from same center or centerline with same radius so that bends are parallel.
  
- F. Factory elbows may be installed in parallel or banked raceways if there is change in plane of run, and raceways are same size.

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- G. PVC Conduit:
  - 1. Bends 30 Degrees and Larger: Provide factory-made elbows.
  - 2. 90-Degree Bends: Provide rigid steel elbows, fiberglass where direct buried.
  - 3. Use manufacturer's recommended method for forming smaller bends.
- H. Flexible Conduit: Do not make bends that exceed allowable conductor bending radius of cable to be installed or that significantly restricts conduit flexibility.

3.09 EXPANSION/DEFLECTION FITTINGS

- A. Provide on raceways at structural expansion joints and in long tangential runs.
- B. Provide expansion/deflection joints for 50 degrees F maximum temperature variation.
- C. Install in accordance with manufacturer's instructions.

3.10 PVC CONDUIT

- A. Solvent Welding:
  - 1. Apply manufacturer recommended solvent to joints.
  - 2. Install in order that joint is watertight.
- B. Adapters:
  - 1. PVC to Metallic Fittings: PVC terminal type.
  - 2. PVC to Rigid Metal Conduit or IMC: PVC female adapter.
- C. Belled-End Conduit: Bevel unbelled end of joint prior to joining.

3.11 PVC-COATED RIGID STEEL CONDUIT

- A. Install in accordance with manufacturer's instructions.
- B. Tools and equipment used in cutting, bending, threading and installation of PVC-coated rigid conduit shall be designed to limit damage to PVC coating.
- C. Provide PVC boot to cover exposed threading.

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3.12 WIREWAYS

- A. Install in accordance with manufacturer's instructions.
- B. Locate with cover on accessible vertical face of wireway, unless otherwise shown.
- C. Applications:
  - 1. Metal wireway in indoor dry locations.
  - 2. Nonmetallic wireway in indoor wet, outdoor, and corrosive locations.

3.13 TERMINATION AT ENCLOSURES

- A. Cast Metal Enclosure: Install manufacturer's pre-molded insulating sleeve inside metallic conduit terminating in threaded hubs.
- B. Nonmetallic, Cabinets, and Enclosures:
  - 1. Terminate conduit in threaded conduit hubs, maintaining enclosure integrity.
  - 2. Metallic Conduit: Provide ground terminal for connection to maintain continuity of ground system.
- C. Sheet Metal Boxes, Cabinets, and Enclosures:
  - 1. General:
    - a. Install insulated bushing on ends of conduit where grounding is not required.
    - b. Provide insulated throat when conduit terminates in sheet metal boxes having threaded hubs.
    - c. Utilize sealing locknuts or threaded hubs on sides and bottom of NEMA 3R and NEMA 12 enclosures.
    - d. Terminate conduits at threaded hubs at the tops of NEMA 3R and NEMA 12 boxes and enclosures.
    - e. Terminate conduits at threaded conduit hubs at NEMA 4 and NEMA 4X boxes and enclosures.
  - 2. Rigid Galvanized Conduit:
    - a. Provide one lock nut each on inside and outside of enclosure.
    - b. Install grounding bushing at source enclosure.
    - c. Provide bonding jumper from grounding bushing to equipment ground bus or ground pad.
  - 3. Electric Metallic Tubing: Provide gland compression, insulated connectors.
  - 4. Flexible Metal Conduit: Provide two screw type, insulated, malleable iron connectors.

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5. Flexible, Nonmetallic Conduit: Provide nonmetallic, liquid-tight strain relief connectors.
  6. PVC-Coated Rigid Galvanized Steel Conduit: Provide PVC-coated, liquid-tight, metallic connector.
  7. PVC Schedule 40 Conduit: Provide PVC terminal adapter with lock nut, except where threaded hubs required above.
- D. Control Center, Switchboard, Switchgear, and Free-Standing Enclosures:
1. Terminate metal conduit entering bottom with grounding bushing; provide grounding jumper extending to equipment ground bus or grounding pad.
  2. Terminate PVC conduit entering bottom with bell end fittings.

3.14 UNDERGROUND RACEWAYS

- A. Grade: Maintain minimum grade of 4 inches in 100 feet, either from one manhole, handhole, or pull box to the next, or from a high point between them, depending on surface contour.
- B. Cover: Maintain minimum 2-foot cover above concrete encasement, unless otherwise shown.
- C. Make routing changes as necessary to avoid obstructions or conflicts.
- D. Couplings: In multiple conduit runs, stagger so couplings in adjacent runs are not in same transverse line.
- E. Union type fittings not permitted.
- F. Spacers:
  1. Provide preformed, nonmetallic spacers designed for such purpose, to secure and separate parallel conduit runs in a trench or concrete encasement.
  2. Install at intervals not greater than that specified in NFPA 70 for support of the type conduit used, but in no case greater than 10 feet.
- G. Support conduit so as to prevent bending or displacement during backfilling or concrete placement.
- H. Installation with Other Piping Systems:
  1. Crossings: Maintain minimum 12-inch vertical separation.
  2. Parallel Runs: Maintain minimum 12-inch separation.
  3. Installation over valves or couplings not permitted.

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- I. Provide expansion fittings that allow minimum of 4 inches of movement in vertical conduit runs from underground where exposed conduit will be fastened to or will enter building or structure.
- J. Provide expansion/deflection fittings in conduit runs that exit building or structure below grade. Conduit from building wall to fitting shall be PVC-coated rigid steel.
- K. Concrete Encasement: As specified in Section 03 30 01, Reinforced Concrete.
- L. Backfill: As specified in Section 31 23 23.15, Trench Backfill.

3.15 UNDER SLAB RACEWAYS

- A. Make routing changes as necessary to avoid obstructions or conflicts.
- B. Support raceways to prevent bending or displacement during backfilling or concrete placement.
- C. Install raceways with no part embedded within slab and with no interference with slab on grade construction.
- D. Raceway spacing, in a single layer or multiple layers:
  - 1. 3 inches clear between adjacent 2-inch or larger raceway.
  - 2. 2 inches clear between adjacent 1-1/2-inch or smaller raceway.
- E. Multiple Layers of Raceways: Install under slab on grade in trench below backfill zone, as specified in Section 31 23 23.15, Trench Backfill.
- F. Individual Raceways and Single Layer Multiple Raceways: Install at lowest elevation of backfill zone with spacing as specified herein. Where conduits cross at perpendicular orientation, installation of conduits shall not interfere with placement of under slab fill that meets compaction and void limitations of earthwork specifications.
- G. Under slab raceways that emerge from below slab to top of slab as exposed, shall be located to avoid conflicts with structural slab rebar. Coordinate raceway stub ups with location of structural rebar.
- H. Fittings:
  - 1. Union type fittings are not permitted.
  - 2. Provide expansion/deflection fittings in raceway runs that exit building or structure below slab. Locate fittings 18 inches, maximum, beyond exterior wall. Raceway type between building exterior wall to fitting shall be PVC-coated rigid steel.

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3. Couplings: In multiple raceway runs, stagger so couplings in adjacent runs are not in same traverse line.

### 3.16 OUTLET AND DEVICE BOXES

#### A. General:

1. Install plumb and level.
2. Install suitable for conditions encountered at each outlet or device in wiring or raceway system, sized to meet NFPA 70 requirements.
3. Open no more knockouts in sheet steel device boxes than are required; seal unused openings.
4. Install galvanized mounting hardware in industrial areas.

#### B. Size:

1. Depth: Minimum 2 inches, unless otherwise required by structural conditions. Box extensions not permitted.
  - a. Hollow Masonry Construction: Install with sufficient depth such that conduit knockouts or hubs are in masonry void space.
2. Ceiling Outlet: Minimum 4-inch octagonal device box, unless otherwise required for installed fixture.
3. Switch and Receptacle: Minimum 2-inch by 4-inch device box.

#### C. Locations:

1. Drawing locations are approximate.
2. To avoid interference with mechanical equipment or structural features, relocate outlets as directed by Engineer.
3. Light Fixture: Install in symmetrical pattern according to room layout, and to meet minimum recommended lighting levels, unless otherwise shown.

#### D. Mounting Height:

1. General:
  - a. Dimensions given to centerline of box.
  - b. Where specified heights do not suit building construction or finish, adjust up or down to avoid interference.
  - c. Do not straddle CMU block or other construction joints.
2. Light Switch:
  - a. 48 inches above floor.
  - b. When located next to door, install on lock side of door.
3. Thermostat: 54 inches above floor.

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4. Telephone Outlet:
    - a. 15 inches above floor.
    - b. 6 inches above counter tops.
    - c. Wall Mounted: 52 inches above floor.
  5. Convenience Receptacle:
    - a. General Interior Areas: 15 inches above floor.
    - b. General Interior Areas (Counter Tops): Install device plate bottom or side flush with top of backsplash, or 6 inches above counter tops without backsplash.
    - c. Outdoor Areas: 24 inches above finished grade.
  6. Special-Purpose Receptacle: 24 inches above floor or as shown.
  7. Switch, Motor Starting: 48 inches above floor, unless otherwise indicated on Drawings.
- E. Flush Mounted:
1. Install with concealed conduit.
  2. Install proper type extension rings or plaster covers to make edges of boxes flush with finished surface.
  3. Holes in surrounding surface shall be no larger than required to receive box.
- F. Supports:
1. Support boxes independently of conduit by attachment to building structure or structural member.
  2. Install bar hangers in frame construction or fasten boxes directly as follows:
    - a. Wood: Wood screws.
    - b. Concrete or Brick: Bolts and expansion shields.
    - c. Hollow Masonry Units: Toggle bolts.
    - d. Steelwork: Machine screws.
  3. Threaded studs driven in by powder charge and provided with lock washers and nuts are acceptable in lieu of expansion shields.
  4. Provide plaster rings where necessary.
  5. Boxes embedded in concrete or masonry need not be additionally supported.
- G. Install separate junction boxes for flush or recessed lighting fixtures where required by fixture terminal temperature.
- H. Boxes Supporting Fixtures: Provide means of attachment with adequate strength to support fixture.



3.17 JUNCTION AND PULL BOXES

A. General:

1. Install plumb and level.
2. Installed boxes shall be accessible.
3. Do not install on finished surfaces.
4. Use outlet boxes as junction and pull boxes wherever possible and allowed by applicable codes.
5. Use conduit bodies as junction and pull boxes where no splices are required and allowed by applicable codes.
6. Install pull boxes where necessary in raceway system to facilitate conductor installation.
7. Install where shown and where necessary to terminate, tap-off, or redirect multiple conduit runs.
8. Install in conduit runs at least every 150 feet or after the equivalent of three right-angle bends.

B. Mounting Hardware: Refer to the Area Classification and Material Selection Table on Drawings.

C. Supports:

1. Support boxes independently of conduit by attachment to building structure or structural member.
2. Install bar hangers in frame construction or fasten boxes directly as follows:
  - a. Wood: Wood screws.
  - b. Concrete or Brick: Bolts and expansion shields.
  - c. Hollow Masonry Units: Toggle bolts.
  - d. Steelwork: Machine screws.
3. Threaded studs driven in by powder charge and provided with lock washers and nuts are acceptable in lieu of expansion shields.
4. Boxes embedded in concrete or masonry need not be additionally supported.

D. At or Below Grade:

1. Install boxes for below grade conduit flush with finished grade in locations outside of paved areas, roadways, or walkways.
2. If adjacent structure is available, box may be mounted on structure surface just above finished grade in accessible but unobtrusive location.
3. Obtain Engineer's written acceptance prior to installation in paved areas, roadways, or walkways.
4. Use boxes and covers suitable to support anticipated weights.

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- E. Install Drain/breather fittings in NEMA 250 Type 4 and Type 4X enclosures.

3.18 MANHOLES AND HANDHOLES

- A. Excavate, shore, brace, backfill, and final grade in accordance with Section 31 23 16, Excavation, and Section 31 23 23.15, Trench Backfill.
- B. Do not install until final raceway grading has been determined.
- C. Install such that raceway enters at nearly right angle and as near as possible to end of wall, unless otherwise shown.
- D. Grounding: As specified in Section 26 05 26, Grounding and Bonding for Electrical Systems.
- E. Identification: Field stamp covers with manhole or handhole number as shown. Stamped numbers to be 1-inch minimum height.

3.19 EMPTY RACEWAYS

- A. Provide permanent, removable cap over each end.
- B. Provide PVC plug with pull tab for underground raceways with end bells.
- C. Provide nylon pull cord.
- D. Identify, as specified in Article Identification Devices, with waterproof tags attached to pull cord at each end, and at intermediate pull point.

3.20 IDENTIFICATION DEVICES

- A. Raceway Tags:
  - 1. Identify origin and destination.
  - 2. For exposed raceways, install tags at each terminus, near midpoint, and at minimum intervals of every 50 feet, whether in ceiling space or surface mounted.
  - 3. Install tags at each terminus for concealed raceways.
  - 4. Provide nylon strap for attachment.
- B. Warning Tape: Install approximately 12 inches above underground or concrete-encased raceways. Align parallel to, and within 12 inches of, centerline of run.

3.21 PROTECTION OF INSTALLED WORK

- A. Protect products from effects of moisture, corrosion, and physical damage during construction.
- B. Provide and maintain manufactured watertight and dust-tight seals over conduit openings during construction.
- C. Touch up painted conduit threads after assembly to cover nicks or scars.
- D. Touch up coating damage to PVC-coated conduit with patching compound approved by manufacturer. Compound shall be kept refrigerated according to manufacturers' instructions until time of use.

**END OF SECTION**

**SECTION 26 05 70**  
**ELECTRICAL SYSTEMS ANALYSIS**

**PART 1 GENERAL**

1.01 EXISTING MODEL

- A. An existing SKM up-to-date current model will be provided by the Owner to the Contractor upon request. It will not be the responsibility of the Contractor to verify any of the settings or values in the model provided. The Contractor will only be responsible for adding new equipment, provided under this contract, to the model. Arc flash labels will only be required for new serviceable equipment that has been added under this contract. In the case of new MCC equipment, arc flash labels will only be required to be affixed to the affected MCC bucket. In addition, arc flash labels will be required for VFDs and disconnects.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American National Standards Institute (ANSI).
  2. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
    - a. C57.12.00, Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers.
    - b. 242, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.
    - c. 399, Recommended Practice for Industrial and Commercial Power System Analysis.
    - d. 1584, Guide for Performing Arc Flash Hazard Calculations.
  3. National Electrical Manufacturers Association (NEMA): Z535.4, Product Safety Signs and Labels.
  4. National Fire Protection Association (NFPA):
    - a. 70, National Electrical Code (NEC).
    - b. 70E, Standard for Electrical Safety in the Workplace.
  5. Occupational Safety and Health Standards (OSHA): 29 CFR, Part 1910 Subpart S, Electrical.

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1.03 SUBMITTALS

A. Action Submittals:

1. Short circuit study.
2. Arc Flash Study: Submit initial study with short circuit study. Submit final study prior to equipment energization.
3. Arc flash warning labels; submit sample with initial study.
4. Electronic files of final studies including all engineering software input files, output reports, and libraries.

1.04 QUALITY ASSURANCE

- A. Short circuit and arc flash studies shall be prepared by manufacturer furnishing the majority VFDs and stamped by a professional electrical engineer registered in the State of California.

1.05 SEQUENCING AND SCHEDULING

- A. Initial complete short circuit study shall be submitted and reviewed before Design Engineer will review Shop Drawings for VFD equipment.
- B. Initial complete arc flash studies shall be submitted within 90 days after approval of initial short circuit study.
- C. Initial complete arc flash study shall be submitted and accepted prior to energization of the electrical equipment.
- D. Revised short circuit, arc flash studies, and arc flash labels shall be submitted 10 days before energizing electrical equipment.
- E. Final short circuit and arc flash studies shall be completed prior to Project Substantial Completion. Final version of study shall include as-installed equipment, materials, and parameter data or settings entered into equipment based on study.
- F. Submit final arc flash labels described herein and in compliance with NEMA Z535.4 and NFPA 70E prior to Project Substantial Completion.

1.06 GENERAL STUDY REQUIREMENTS

- A. Equipment and component titles used in the studies shall be identical to equipment and component titles shown on Drawings.

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- B. Perform studies using one of the following electrical engineering software packages:
  - 1. SKM Power Tools for Windows.
  - 2. ETAP.
  - 3. Paladin.
  - 4. Easy Power.
- C. Perform complete fault calculations for each new piece of electrical equipment that is serviceable during energization.
- D. Device coordination time-current curves for low voltage distribution system; include individual protective device time-current characteristics.

1.07 SHORT CIRCUIT STUDY

- A. General:
  - 1. Prepare in accordance with IEEE 399.
  - 2. Use cable impedances based on copper conductors, except where aluminum conductors are specified or shown.
  - 3. Use bus impedances based on copper bus bars, except where aluminum bus bars are specified or shown.
  - 4. Use cable and bus resistances calculated at 25 degrees C.
  - 5. Use 600-volt cable reactances based on use of typical dimensions of XHHW conductors.
  - 6. Use transformer impedances 92.5 percent of “nominal” impedance based on tolerances specified in IEEE C57.12.00.
- B. Provide:
  - 1. Calculation methods and assumptions.
  - 2. Typical calculation.
  - 3. Tabulations of calculated quantities.
  - 4. Results, conclusions, and recommendations.
  - 5. Selected base per unit quantities.
  - 6. One-line diagrams.
  - 7. Source impedance data, including electric utility system and motor fault contribution characteristics.
  - 8. Impedance diagrams.
  - 9. Zero-sequence impedance diagrams.

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- C. Calculate short circuit interrupting and momentary (when applicable) duties for an assumed three-phase bolted fault at each:
1. Low-voltage switchboard.
  2. Adjustable speed drives.
  3. Disconnect switches.
  4. Transfers switches.
  5. Branch circuit panelboards.
- D. Verify:
1. Equipment and protective devices are applied within their ratings.
  2. Adequacy of electrical distribution equipment bus bars to withstand short circuit stresses.
  3. Adequacy of transformer windings to withstand short circuit stresses.
  4. Cable and busway sizes for ability to withstand short circuit heating, in addition to normal load currents.
- E. Tabulations:
1. General Data:
    - a. Short circuit reactances of rotating machines.
    - b. Cable and conduit material data.
    - c. Bus data.
    - d. Transformer data.
    - e. Circuit resistance and reactance values.
  2. Short Circuit Data (for each source combination):
    - a. Fault impedances.
    - b. X to R ratios.
    - c. Asymmetry factors.
    - d. Motor contributions.
    - e. Short circuit kVA.
    - f. Symmetrical and asymmetrical fault currents.
  3. Equipment Evaluation:
    - a. Equipment bus bracing, equipment short circuit rating, transformer, cable, busway.
    - b. Maximum fault current available.
- F. Written Summary:
1. Scope of studies performed.
  2. Results of short circuit study.
  3. Results of arc flash study.
  4. Comments or suggestions.

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- G. Suggest changes and additions to equipment rating and/or characteristics.
- H. Notify Construction Manager in writing of existing circuit protective devices improperly rated for new fault conditions.
- I. Revise data for “as-installed” condition.

1.08 ARC FLASH STUDY

- A. Perform arc flash hazard study after short circuit study has been completed, reviewed and accepted.
- B. Perform arc flash study in accordance with NFPA 70E, OSHA 29 CFR, Part 1910 Subpart S, and IEEE 1584.
- C. Base Calculation:
  - 1. For each major part of electrical power system, determine the following:
    - a. Flash hazard protection boundary.
    - b. Limited approach boundary.
    - c. Restricted approach boundary.
    - d. Incident energy level.
    - e. Glove class required.
- D. Produce arc flash warning labels that list items in Paragraph Base Calculation and the following additional items.
  - 1. Equipment name.
  - 2. Equipment voltage.
- E. Produce equipment detail sheets that list items in Paragraph Base Calculation and the following additional items:
  - 1. Equipment name.
  - 2. Upstream protective device name, type, and settings.
  - 3. Equipment line-to-line voltage.
- F. Produce arc flash evaluation summary sheet listing the following additional items:
  - 1. Equipment name.
  - 2. Upstream protective device name, type, settings.
  - 3. Equipment line-to-line voltage.
  - 4. Equipment bolted fault.
  - 5. Protective device bolted fault current.
  - 6. Arcing fault current.



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7. Protective device trip/delay time.
  8. Breaker opening time.
  9. Equipment type.
  10. Gap.
  11. Arc flash boundary.
  12. Working distance.
  13. Incident energy.
- G. Analyze short circuit and arc flash calculations and highlight equipment that is determined to be underrated or causes incident energy values greater than 8 cal/cm<sup>2</sup>. Propose approaches to reduce energy levels.
- H. Prepare report summarizing arc flash study with conclusions and recommendations which may affect integrity of electric power distribution system. As a minimum, include the following:
1. Equipment manufacturer's information used to prepare study.
  2. Assumptions made during study.
  3. Reduced copy of one-line drawing; 11 inches by 17 inches maximum.
  4. Arc flash evaluations summary spreadsheet.
  5. Equipment detail sheets.
  6. Arc flash warning labels printed in color on thermally bonded adhesive backed UV and weather-resistant labels.

**PART 2 PRODUCTS**

2.01 ARC FLASH WARNING LABELS

- A. Arc flash warning labels printed in color on thermally bonded adhesive backed, UV- and weather-resistant labels. An example label is located following end of section in Figure 1.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Adjust relay and protective device settings according to values established by coordination study.
- B. Make minor modifications to equipment as required to accomplish conformance with short circuit and protective device coordination studies.
- C. Notify Construction Manager in writing of required major equipment modifications.

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- D. Provide laminated one-line diagrams (minimum size 11 inches by 17 inches) to post on interior of electrical room doors.
- E. Provide arc flash warning labels on equipment as specified in this section.

3.02 SUPPLEMENT

- A. The supplement listed below, following “End of Section,” is a part of this Specification:
  - 1. Shock and Arc Flash Hazard Label.

**END OF SECTION**

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SHOCK AND ARC FLASH HAZARD: APPROPRIATE PPE REQUIRED, ONLY QUALIFIED PERSONS MAY PERFORM ENERGIZED WORK ON THIS EQUIPMENT				
SHOCK HAZARD		ARC FLASH HAZARD		Incident Energy <b>0.31 cal/cm<sup>2</sup></b> @ Working Distance
<b>208 VAC</b>	With Cover Removed	<b>18 in</b>	Working Distance	
<b>42 in</b>	Limited Approach	<b>4 in</b>	Arc Flash Boundary	
<b>12 in</b>	Restricted Approach			
<b>265-LP-001</b>				
<b>00</b>	Glove Class	<b>ch2m.</b> 1100 112th AVE NE, Suite 500 Bellevue, WA (425) 453-5000		
<b>2.90 kA</b>	Bus Bolted Fault			
CH2M ID:	439172			
<b>WARNING: This label is valid for five years after Label Date. Changes to equipment, settings or system configuration will invalidate this information. Calculation Method IEEE1584.</b>			Label Date	Label
			18 Jul 2016	# 0003

SHOCK AND ARC FLASH HAZARD: APPROPRIATE PPE REQUIRED, ONLY QUALIFIED PERSONS MAY PERFORM ENERGIZED WORK ON THIS EQUIPMENT				
SHOCK HAZARD		ARC FLASH HAZARD		Incident Energy <b>1.3 cal/cm<sup>2</sup></b> @ Working Distance
<b>480 VAC</b>	With Cover Removed	<b>18 in</b>	Working Distance	
<b>42 in</b>	Limited Approach	<b>12 in</b>	Arc Flash Boundary	
<b>12 in</b>	Restricted Approach			
<b>265-MCC-001-2</b>				
<b>00</b>	Glove Class	<b>ch2m.</b> 1100 112th AVE NE, Suite 500 Bellevue, WA (425) 453-5000		
<b>12.86 kA</b>	Bus Bolted Fault			
CH2M ID:	439172			
<b>WARNING: This label is valid for five years after Label Date. Changes to equipment, settings or system configuration will invalidate this information. Calculation Method IEEE1584.</b>			Label Date	Label
			18 Jul 2016	# 0004-Line

**SECTION 26 08 00**  
**COMMISSIONING OF ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. ASTM International (ASTM):
    - a. D877, Standard Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes.
    - b. D923, Standard Practice for Sampling Electrical Insulating Liquids.
    - c. D924, Standard Test Method for Dissipation Factor (or Power Factor) and Relative Permittivity (Dielectric Constant) of Electrical Insulating Liquids.
    - d. D971, Standard Test Method for Interfacial Tension of Oil Against Water by the Ring Method.
    - e. D974, Standard Test Method for Acid and Base Number by Color-Indicator Titration.
    - f. D1298, Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method.
    - g. D1500, Standard Test Method for ASTM Color of Petroleum Products (ASTM Color Scale).
    - h. D1524, Standard Test Method for Visual Examination of Used Electrical Insulating Oils of Petroleum Origin in the Field.
    - i. D1533, Standard Test Method for Water in Insulating Liquids by Coulometric Karl Fischer Titration.
    - j. D1816, Standard Test Method for Dielectric Breakdown Voltage of Insulating Oils of Petroleum Origin Using VDE Electrodes.
  2. Institute of Electrical and Electronics Engineers (IEEE):
    - a. 43, Recommended Practice for Testing Insulating Resistance of Rotating Machinery.
    - b. 81, Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.
    - c. 400, Guide for Field Testing and Evaluation of the Insulation of Shielded Power Cable Systems.
    - d. C2, National Electrical Safety Code.
    - e. C37.20.1, Standard for Metal-Enclosed Low Voltage Power Circuit Breaker Switchgear.
    - f. C37.20.2, Standard for Metal-Clad Switchgear.

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- g. C37.20.3, Standard for Metal-Enclosed Interrupter Switchgear.
  - h. C37.23, Standard for Metal-Enclosed Bus.
  - i. C62.33, Standard Test Specifications for Varistor Surge-Protective Devices.
- 3. InterNational Electrical Testing Association (NETA): ATS, Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
  - 4. National Electrical Manufacturers Association (NEMA):
    - a. AB 4, Guidelines for Inspection and Preventive Maintenance of Molded Case Circuit Breakers Used in Commercial and Industrial Applications.
    - b. PB 2, Deadfront Distribution Switchboards.
  - 5. National Fire Protection Association (NFPA):
    - a. 70, National Electrical Code (NEC).
    - b. 70B, Recommended Practice for Electrical Equipment Maintenance.
    - c. 70E, Standard for Electrical Safety in the Workplace.
    - d. 101, Life Safety Code.
  - 6. National Institute for Certification in Engineering Technologies (NICET).
  - 7. Occupational Safety and Health Administration (OSHA): CFR 29, Part 1910, Occupational Safety and Health Standards.

1.02 SUBMITTALS

A. Informational Submittals:

- 1. Submit 30 days prior to performing inspections or tests:
  - a. Schedule for performing inspection and tests.
  - b. List of references to be used for each test.
  - c. Sample copy of equipment and materials inspection form(s).
  - d. Sample copy of individual device test form.
  - e. Sample copy of individual system test form.
- 2. Energization Plan: Prior to initial energization of electrical distribution equipment; include the following:
  - a. Owner's representative sign-off form for complete and accurate arc flash labeling and proper protective device settings for equipment to be energized.
  - b. Staged sequence of initial energization of electrical equipment.
  - c. Lock-Out-Tag-Out plan for each stage of the progressive energization.
  - d. Barricading, signage, and communication plan notifying personnel of newly energized equipment.

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3. Submit test or inspection reports and certificates for each electrical item tested within 30 days after completion of test:
4. Operation and Maintenance Data:
  - a. In accordance with Section 01 78 23, Operation and Maintenance Data.
  - b. After test or inspection reports and certificates have been reviewed by Engineer and returned, insert a copy of each in Operation and Maintenance Manual.
5. Programmable Settings: At completion of Performance Demonstration Test, submit final hardcopy printout and electronic files on compact disc of as-left setpoints, programs, and device configuration files for:
  - a. Protective relays.
  - b. Intelligent overload relays.
  - c. Variable frequency drives.
  - d. Electrical communications modules.

1.03 QUALITY ASSURANCE

- A. Test equipment shall have an operating accuracy equal to or greater than requirements established by NETA ATS.
- B. Test instrument calibration shall be in accordance with NETA ATS.

1.04 SEQUENCING AND SCHEDULING

- A. Perform inspection and electrical tests after equipment listed herein has been installed.
- B. Perform tests with apparatus de-energized whenever feasible.
- C. Inspection and electrical tests on energized equipment shall be:
  1. Scheduled with Engineer prior to de-energization.
  2. Minimized to avoid extended period of interruption to the operating plant equipment.
- D. Notify Engineer at least 24 hours prior to performing tests on energized electrical equipment.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 GENERAL

- A. Perform tests in accordance with requirements of Section 01 91 14, Equipment Testing and Facility Startup.
- B. Tests and inspections shall establish:
  - 1. Electrical equipment is operational within industry and manufacturer's tolerances and standards.
  - 2. Installation operates properly.
  - 3. Equipment is suitable for energization.
  - 4. Installation conforms to requirements of Contract Documents and NFPA 70, NFPA 70E, NFPA 101, and IEEE C2.
- C. Perform inspection and testing in accordance with NETA ATS, industry standards, and manufacturer's recommendations.
- D. Set, test, and calibrate protective relays, circuit breakers, power monitoring meters, and other applicable devices.
- E. Adjust mechanisms and moving parts of equipment for free mechanical movement.
- F. Adjust and set electromechanical electronic relays and sensors to correspond to operating conditions, or as recommended by manufacturer.
- G. Verify nameplate data for conformance to Contract Documents and approved Submittals.
- H. Realign equipment not properly aligned and correct unlevelness.
- I. Properly anchor electrical equipment found to be inadequately anchored.
- J. Tighten accessible bolted connections, including wiring connections, with calibrated torque wrench/screw driver to manufacturer's recommendations, or as otherwise specified in NETA ATS.
- K. Clean contaminated surfaces with cleaning solvents as recommended by manufacturer.
- L. Provide proper lubrication of applicable moving parts.

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- M. Inform Engineer of working clearances not in accordance with NFPA 70.
- N. Investigate and repair or replace:
  - 1. Electrical items that fail tests.
  - 2. Active components not operating in accordance with manufacturer's instructions.
  - 3. Damaged electrical equipment.
- O. Electrical Enclosures:
  - 1. Remove foreign material and moisture from enclosure interior.
  - 2. Vacuum and wipe clean enclosure interior.
  - 3. Remove corrosion found on metal surfaces.
  - 4. Repair or replace, as determined by Engineer door and panel sections having dented surfaces.
  - 5. Repair or replace, as determined by Engineer poor fitting doors and panel sections.
  - 6. Repair or replace improperly operating latching, locking, or interlocking devices.
  - 7. Replace missing or damaged hardware.
  - 8. Finish:
    - a. Provide matching paint and touch up scratches and mars.
    - b. If required because of extensive damage, as determined by Engineer, refinish entire assembly.
- P. Replace fuses and circuit breakers that do not conform to size and type required by the Contract Documents or approved Submittals.

3.02 CHECKOUT AND STARTUP

- A. Voltage Field Test: Check voltage amplitude and balance between phases for loaded and unloaded conditions.
- B. Equipment Line Current Tests:
  - 1. Check line current in each phase for each piece of equipment.
  - 2. If phase current for a piece of equipment is above rated nameplate current, prepare Equipment Line Phase Current Report that identifies cause of problem and corrective action taken.



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3.03 LOW VOLTAGE CABLES, 600 VOLTS MAXIMUM

A. Visual and Mechanical Inspection:

1. Inspect each individual exposed new and existing power Conductor No. 12 and larger for:
  - a. Physical damage.
  - b. Proper connections in accordance with single-line diagram.
  - c. Cable bends not in conformance with manufacturer's minimum allowable bending radius where applicable.
  - d. Color coding conformance with specification.
  - e. Proper circuit identification.
2. Mechanical Connections For:
  - a. Proper lug type for conductor material.
  - b. Proper lug installation.
  - c. Bolt torque level in accordance with NETA ATS, Table 100.12, unless otherwise specified by manufacturer.
3. Shielded Instrumentation Cables For:
  - a. Proper shield grounding.
  - b. Proper terminations.
  - c. Proper circuit identification.
4. Control Cables For:
  - a. Proper termination.
  - b. Proper circuit identification.
5. Cables Terminated Through Window Type CTs: Verify neutrals and grounds are terminated for correct operation of protective devices.

B. Electrical Tests for new and existing power Conductors No. 12 and larger:

1. Insulation Resistance Tests:
  - a. Utilize 1,000V dc megohmmeter for 600-volt insulated conductors and 500V dc megohmmeter for 300-volt insulated conductors.
  - b. Test each conductor with respect to ground and to adjacent conductors for 1 minute.
  - c. Evaluate ohmic values by comparison with conductors of same length and type.
  - d. Investigate values less than 50 megohms.
2. Continuity test by ohmmeter method to ensure proper cable connections.

C. Low-voltage cable tests may be performed by installer in lieu of independent testing firm.

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3.04 SAFETY SWITCHES, 600 VOLTS MAXIMUM

A. Visual and Mechanical Inspection:

1. Proper blade pressure and alignment.
2. Proper operation of switch operating handle.
3. Adequate mechanical support for each fuse.
4. Proper contact-to-contact tightness between fuse clip and fuse.
5. Cable connection bolt torque level in accordance with NETA ATS, Table 100.12.
6. Proper phase barrier material and installation.
7. Verify fuse sizes and types correspond to one-line diagram or approved Submittals.
8. Perform mechanical operational test and verify mechanical interlocking system operation and sequencing.

B. Electrical Tests:

1. Insulation Resistance Tests:
  - a. Applied megohmmeter dc voltage in accordance with NETA ATS, Table 100.1.
  - b. Phase-to-phase and phase-to-ground for 1 minute on each pole.
  - c. Insulation resistance values equal to, or greater than, ohmic values established by manufacturer.
2. Contact Resistance Tests:
  - a. Contact resistance in microhms across each switch blade and fuse holder.
  - b. Investigate deviation of 50 percent or more from adjacent poles or similar switches.

3.05 MOLDED AND INSULATED CASE CIRCUIT BREAKERS

A. General: Inspection and testing limited to circuit breakers 70 amperes and larger and to motor circuit protector breakers rated 50 amperes and larger.

B. Visual and Mechanical Inspection:

1. Proper mounting.
2. Proper conductor size.
3. Feeder designation according to nameplate and one-line diagram.
4. Cracked casings.
5. Connection bolt torque level in accordance with NETA ATS, Table 100.12.
6. Operate breaker to verify smooth operation.

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7. Compare frame size and trip setting with circuit breaker schedules or one-line diagram.
8. Verify that terminals are suitable for 75 degrees C rated insulated conductors.

C. Electrical Tests:

1. Insulation Resistance Tests:
  - a. Utilize 1,000V dc megohmmeter for 480-volt and 600-volt circuit breakers and 500V dc megohmmeter for 240-volt circuit breakers.
  - b. Pole-to-pole and pole-to-ground with breaker contacts opened for 1 minute.
  - c. Pole-to-pole and pole-to-ground with breaker contacts closed for 1 minute.
  - d. Test values to comply with NETA ATS, Table 100.1.
2. Contact Resistance Tests:
  - a. Contact resistance in microhms across each pole.
  - b. Investigate deviation of 50 percent or more from adjacent poles and similar breakers.
3. Primary Current Injection Test to Verify:
  - a. Long-time minimum pickup and delay.
  - b. Short-time pickup and delay.
  - c. Ground fault pickup and delay.
  - d. Instantaneous pickup by run-up or pulse method.
  - e. Trip characteristics of adjustable trip breakers shall be within manufacturer's published time-current characteristic tolerance band, including adjustment factors.
  - f. Trip times shall be within limits established by NEMA AB 4, Table 5-3. Alternatively, use NETA ATS, Table 100.7.
  - g. Instantaneous pickup value shall be within values established by NEMA AB 4, Table 5-4. Alternatively, use NETA ATS, Table 100.8.

### 3.06 INSTRUMENT TRANSFORMERS

A. Visual and Mechanical Inspection:

1. Visually check current, potential, and control transformers for:
  - a. Cracked insulation.
  - b. Broken leads or defective wiring.
  - c. Proper connections.
  - d. Adequate clearances between primary and secondary circuit wiring.

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2. Verify Mechanically:
  - a. Grounding and shorting connections have good contact.
  - b. Withdrawal mechanism and grounding operation, when applicable, operate properly.
3. Verify proper primary and secondary fuse sizes for potential transformers.

B. Electrical Tests:

1. Current Transformer Tests:
  - a. Insulation resistance test of transformer and wiring-to-ground at 1,000V dc for 30 seconds.
  - b. Polarity test.
2. Potential Transformer Tests:
  - a. Insulation resistance test at test voltages in accordance with NETA ATS, Table 100.9, for 1 minute on:
    - 1) Winding-to-winding.
    - 2) Winding-to-ground.
  - b. Polarity test to verify polarity marks or H1-X1 relationship as applicable.
3. Insulation resistance measurement on instrument transformer shall not be less than that shown in NETA ATS, Table 100.5.

3.07 AC INDUCTION MOTORS

A. General: Inspection and testing limited to motors rated 1/2 horsepower and larger.

B. Visual and Mechanical Inspection:

1. Proper electrical and grounding connections.
2. Shaft alignment.
3. Blockage of ventilating air passageways.
4. Operate motor and check for:
  - a. Excessive mechanical and electrical noise.
  - b. Overheating.
  - c. Correct rotation.
  - d. Check vibration detectors, resistance temperature detectors, or motor inherent protectors for functionality and proper operation.
  - e. Excessive vibration, in excess of values in NETA ATS, Table 100.10.
5. Check operation of space heaters.

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C. Electrical Tests:

1. Insulation Resistance Tests:
  - a. In accordance with IEEE 43 at test voltages established by NETA ATS, Table 100.1 for:
    - 1) Motors above 200 horsepower for 10-minute duration with resistances tabulated at 30 seconds, 1 minute, and 10 minutes.
    - 2) Motors 200 horsepower and less for 1-minute duration with resistances tabulated at 30 seconds and 60 seconds.
  - b. Insulation resistance values equal to, or greater than, ohmic values established by manufacturers.
2. Calculate polarization index ratios for motors above 200 horsepower. Investigate index ratios less than 1.5 for Class A insulation and 2.0 for Class B insulation.
3. Insulation resistance test on insulated bearings in accordance with manufacturer's instructions.
4. Measure running current and voltage, and evaluate relative to load conditions and nameplate full-load amperes.

3.08 LOW-VOLTAGE MOTOR CONTROL

A. Visual and Mechanical Inspection:

1. Proper operation of indicating and monitoring devices.
2. Proper overload protection for each motor.
3. Improper blockage of air-cooling passages.
4. Check door and device interlocking system by:
  - a. Closure attempt of device when door in in OPEN position.
  - b. Opening attempt of door when device in in ON position.
5. Check nameplates for proper identification of:
  - a. Equipment title and tag number with latest one-line diagram.
  - b. Pushbuttons.
  - c. Control switches.
  - d. Pilot lights.
  - e. Control relays.
  - f. Circuit breakers.
  - g. Indicating meters.
6. Verify fuse and circuit breaker sizes and types conform to Contract Documents.
7. Verify current and potential transformer ratios conform to Contract Documents.
8. Check bus connections for high resistance by low-resistance ohmmeter and thermographic survey:

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9. Temperature gradient of conductors, connections and contacts:
  - a. Thermographic survey temperature gradient of 2 degrees C, or less per NETA ATS, Table 100.18.
10. Check operation and sequencing of electrical and mechanical interlock systems by:
  - a. Closure attempt for locked open devices.
  - b. Opening attempt for locked closed devices.
  - c. Key exchange to operate devices in OFF-NORMAL positions.
11. Verify performance of each control device and feature furnished as part of motor control center.
12. Control Wiring:
  - a. Compare wiring to local and remote control, and protective devices with elementary diagrams.
  - b. Check for proper conductor lacing and bundling.
  - c. Check for proper conductor identification.
  - d. Check for proper conductor lugs and connections.
13. Exercise active components.
14. Inspect contactors for:
  - a. Correct mechanical operations.
  - b. Correct contact gap, wipe, alignment, and pressure.
  - c. Correct torque of connections.
15. Compare overload heater rating with full-load current for proper size.
16. Compare fuse motor protector and circuit breaker with motor characteristics for proper size.

B. Electrical Tests:

1. Insulation Resistance Tests:
  - a. Applied megohmmeter dc voltage in accordance with NETA ATS, Table 100.1.
  - b. Contactor phase-to-ground and across open contacts for 1 minute on each phase.
  - c. Starter section phase-to-phase and phase-to-ground on each phase with starter contacts closed and protective devices open.
  - d. Test values to comply with NETA ATS, Table 100.1.

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2. Control Wiring Tests:
  - a. Apply secondary voltage to control power and potential circuits.
  - b. Check voltage levels at each point on terminal board and each device terminal.
  - c. Insulation resistance test at 1,000V dc on control wiring, except that connected to solid state components; 1 megohm minimum insulation resistance.
3. Operational test by initiating control devices to affect proper operation.

**END OF SECTION**

**SECTION 26 20 00**  
**LOW-VOLTAGE AC INDUCTION MOTORS**

**PART 1 GENERAL**

1.01 RELATED SECTIONS

- A. This section applies only when referenced by a motor-driven equipment specification. Application, horsepower, enclosure type, mounting, shaft type, synchronous speed, and deviations from this section will be listed in the equipment specification. Where such deviations occur, they shall take precedence over this section.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Bearing Manufacturers Association (ABMA):
    - a. 9, Load Ratings and Fatigue Life for Ball Bearings.
    - b. 11, Load Ratings and Fatigue Life for Roller Bearings.
  2. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
    - a. 112, Standard Test Procedure for Polyphase Induction Motors and Generators.
    - b. 620, Guide for the Presentation of Thermal Limit Curves for Squirrel Cage Induction Machines.
    - c. 841, Standard for Petroleum and Chemical Industry—Premium Efficiency Severe Duty Totally Enclosed Fan-Cooled (TEFC) Squirrel Cage Induction Motors—Up to and Including 370 kW (500 hp).
  3. National Electrical Manufacturers Association (NEMA):
    - a. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
    - b. C50.41, Polyphase Induction Motors for Power Generating Stations.
    - c. MG 1, Motors and Generators.
  4. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
  5. UL:
    - a. 83, Standard for Safety for Thermoplastic-Insulated Wire and Cables.
    - b. 674, Standard for Safety for Electric Motors and Generators for Use in Division 1 Hazardous (Classified) Locations.
    - c. 2111, Standard for Safety for Overheating Protection for Motors.



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1.03 DEFINITIONS

- A. CISD-TEFC: Chemical industry, severe-duty enclosure.
- B. DIP: Dust-ignition-proof enclosure.
- C. EXP: Explosion-proof enclosure.
- D. Inverter Duty Motor: Motor meeting applicable requirements of NEMA MG 1, Section IV, Parts 30 and 31.
- E. Motor Nameplate Horsepower: That rating after any derating required to allow for extra heating caused by the harmonic content in the voltage applied to the motor by its controller.
- F. ODP: Open drip-proof enclosure.
- G. TEFC: Totally enclosed, fan-cooled enclosure.
- H. TENV: Totally enclosed, nonventilated enclosure.
- I. WPI: Open weather protected enclosure, Type I.
- J. WPPI: Open weather protected enclosure, Type II.

1.04 SUBMITTALS

- A. Action Submittals:
  - 1. Descriptive information.
  - 2. Nameplate data in accordance with NEMA MG 1.
  - 3. Additional Rating Information:
    - a. Service factor.
    - b. Locked rotor current.
    - c. No load current.
    - d. Multispeed load classification (for example, variable torque).
    - e. Adjustable frequency drive motor load classification (for example, variable torque) and minimum allowable motor speed for that load classification.
    - f. Guaranteed minimum full load efficiency and power factor.
  - 4. Enclosure type and mounting (such as, horizontal, vertical).
  - 5. Dimensions and total weight.
  - 6. Conduit box dimensions and usable volume as defined in NEMA MG 1 and NFPA 70.
  - 7. Bearing type.
  - 8. Bearing lubrication.

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9. Bearing life.
10. Space heater voltage and watts.
11. Description, ratings, and wiring diagram of motor thermal protection.
12. Motor sound power level in accordance with NEMA MG 1.
13. Maximum brake horsepower required by the equipment driven by the motor.
14. Description and rating of submersible motor moisture sensing system.

B. Informational Submittals:

1. Factory test reports.
2. Component and attachment testing seismic certificate of compliance as required by Section 01 45 33, Special Inspection, Observation, and Testing.
3. Operation and Maintenance Data: As specified in Section 01 78 23, Operation and Maintenance Data.

**PART 2 PRODUCTS**

2.01 MANUFACTURERS

A. Materials, equipment, and accessories specified in this section shall be products of:

1. General Electric.
2. Reliance Electric.
3. MagneTek.
4. Siemens Energy and Automation, Inc., Motors and Drives Division.
5. Baldor.
6. U.S. Electrical Motors.
7. TECO-Westinghouse Motor Co.
8. Toshiba International Corp., Industrial Division.
9. WEG Electric Motors Corp.
10. Or approved equal.

2.02 GENERAL

- A. For multiple units of the same type of equipment, furnish identical motors and accessories of a single manufacturer.
- B. In order to obtain single source responsibility, use a single supplier to provide drive motor, its driven equipment, and specified motor accessories.
- C. Meet requirements of NEMA MG 1.

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- D. For motors used in hazardous (classified) locations, Class I, Division 1, Groups B, C, and D, and Class II, Division 1, Groups E, F, and G provide motors that conform to UL 674 and have an applied UL listing mark.
- E. Motors shall be specifically designed for the use and conditions intended, with a NEMA design letter classification to fit the application.
- F. Lifting lugs on motors weighing 100 pounds or more.
- G. Operating Conditions:
  - 1. Maximum ambient temperature not greater than 40 degrees C.
  - 2. Motors shall be suitable for operating conditions without reduction being required in nameplate rated horsepower or exceeding rated temperature rise.
  - 3. Overspeed in either direction in accordance with NEMA MG 1.

2.03 HORSEPOWER RATING

- A. As designated in motor-driven equipment specification.
- B. Constant Speed Applications: Brake horsepower of driven equipment at any operating condition not to exceed motor nameplate horsepower rating, excluding service factor.
- C. Adjustable Frequency and Adjustable Speed Applications (Inverter Duty Motor): Driven equipment brake horsepower at any operating condition not to exceed motor nameplate horsepower rating, excluding service factor.

2.04 SERVICE FACTOR

- A. Inverter-duty Motors: 1.0 at rated ambient temperature, unless otherwise noted.
- B. Other Motors: 1.15 minimum at rated ambient temperature, unless otherwise noted.

2.05 VOLTAGE AND FREQUENCY RATING

- A. System Frequency: 60-Hz.

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B. Voltage Rating:

1. Unless otherwise indicated in motor-driven equipment specification:

Voltage Rating		
Size	Voltage	Phase
1/2 hp and smaller	115	1
3/4 hp through 400 hp	460	3

C. Suitable for full voltage starting.

D. 100 hp and larger also suitable for reduced voltage starting with 65 percent or 80 percent voltage tap settings on reduced inrush motor starters.

E. Suitable for accelerating the connected load with supply voltage at motor starter supply terminals dipping to 90 percent of motor rated voltage.

2.06 EFFICIENCY AND POWER FACTOR

A. For all motors except single-phase, under 1 hp, multispeed, short-time rated and submersible motors, or motors driving gates, valves, elevators, cranes, trolleys, and hoists:

1. Efficiency:

- a. Tested in accordance with NEMA MG 1, Paragraph 12.59.
- b. Guaranteed minimum at full load in accordance with NEMA MG 1 Table 12-12, Full-load Efficiencies for NEMA Premium Efficiency Electric Motors Rated 600 Volts or Less (Random Wound), or as indicated in motor-driven equipment specification.

2. Power Factor: Guaranteed minimum at full load shall be manufacturer's standard or as indicated in motor-driven equipment specification.

2.07 LOCKED ROTOR RATINGS

A. Locked rotor kVA Code F or lower, if motor horsepower not covered by NEMA MG 1 tables.

B. Safe Stall Time: 12 seconds or greater.

2.08 INSULATION SYSTEMS

A. Single-Phase, Fractional Horsepower Motors: Manufacturer's standard winding insulation system.

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- B. Motors Rated Over 600 Volts: Sealed windings in accordance with NEMA MG 1.
- C. Three-phase and Integral Horsepower Motors: Unless otherwise indicated in motor-driven equipment specification, Class F with Class B rise at nameplate horsepower and designated operating conditions, except EXP motors which must be Class B with Class B rise.

2.09 ENCLOSURES

- A. Enclosures to conform to NEMA MG 1.
- B. TEFC and TENV: Furnish with drain hole with porous drain/weather plug.
- C. Explosion-Proof (EXP):
  - 1. TEFC listed to meet UL 674 and NFPA 70 requirements for Class I, Division 1, Group D hazardous locations.
  - 2. Drain holes with drain and breather fittings.
  - 3. Integral thermostat opening on excessive motor temperature in accordance with UL 2111 and NFPA 70.
  - 4. Terminate thermostat leads in terminal box separate from main terminal box.
- D. Submersible: In accordance with Article Special Motors.
- E. Chemical Industry, Severe-Duty (CISD-TEFC): In accordance with Article Special Motors.

2.10 TERMINAL (CONDUIT) BOXES

- A. Oversize main terminal boxes for motors.
- B. Diagonally split, rotatable to each of four 90-degree positions. Threaded hubs for conduit attachment.
- C. Except ODP, furnish gaskets between box halves and between box and motor frame.

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- D. Minimum usable volume in percentage of that specified in NEMA MG 1, Section 1, Paragraph 4.19 and NFPA 70, Article 430:

<b>Terminal Box Usable Values</b>		
<b>Voltage</b>	<b>Horsepower</b>	<b>Percentage</b>
Below 600	15 through 125	500
Below 600	150 through 300	275
Below 600	350 through 600	225
Above 600	All sizes	200

- E. Terminal for connection of equipment grounding wire in each terminal box.
- F. Coordinate motor terminal box conduit entries versus size and quantity of conduits shown on Drawings.

2.11 BEARINGS AND LUBRICATION

A. Horizontal Motors:

1. 3/4 hp and Smaller: Permanently lubricated and sealed ball bearings, or regreasable ball bearings in labyrinth sealed end bells with removable grease relief plugs.
2. 1 hp through 400 hp: Regreasable ball bearings in labyrinth sealed end bells with removable grease relief plugs.
3. Above 400 hp: Split sleeve, oil insulated bearings.
4. Minimum 100,000 hours L-10 bearing life for ball and roller bearings as defined in ABMA 9 and ABMA 11.

B. Vertical Motors:

1. Thrust Bearings:
  - a. Antifriction bearing.
  - b. Manufacturer's standard lubrication 200 hp and smaller.
  - c. Oil lubricated 125 hp and larger.
  - d. Minimum 50,000 hours L-10 bearing life.
2. Guide Bearings:
  - a. Manufacturer's standard bearing type.
  - b. Manufacturer's standard lubrication 200 hp and smaller.
  - c. Oil lubricated 250 hp and larger.
  - d. Minimum 100,000 hours L-10 bearing life.

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- C. Regreasable Antifriction Bearings:
  - 1. Readily accessible, grease injection fittings.
  - 2. Readily accessible, removable grease relief plugs.
- D. Oil Lubrication Systems:
  - 1. Oil reservoirs with sight level gauge.
  - 2. Oil fill and drain openings with opening plugs.
  - 3. Provisions for necessary oil circulation and cooling.
- E. Inverter Duty Rated Motors, Bearing Isolation: Motors larger than 50 hp shall have electrically isolated bearings to prevent stray current damage.

2.12 NOISE

- A. Measured in accordance with NEMA MG 1.
- B. Motors controlled by adjustable frequency drive systems shall not exceed sound levels of 3 dBA higher than NEMA MG 1.

2.13 BALANCE AND VIBRATION CONTROL

- A. In accordance with NEMA MG 1, Part 7.

2.14 EQUIPMENT FINISH

- A. External Finish: Prime and finish coat manufacturer's standard. Finish color manufacturer's standard.
- B. Internal Finish: Bore and end turns coated with clear polyester or epoxy varnish.

2.15 SPECIAL FEATURES AND ACCESSORIES

- A. Screen Over Air Openings: Stainless steel on motors with ODP, WPI, and WPII enclosures meeting requirements for guarded machine in NEMA MG 1, and attached with stainless steel screws.
- B. Winding Thermal Protection:
  - 1. Thermostats:
    - a. Motors for constant and adjustable speed application 5 hp to 100 hp.
    - b. Bi-metal disk or rod type thermostats embedded in stator windings.

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- c. Automatic reset contacts rated 120 volts ac, 5 amps minimum, opening on excessive temperature. (Provide manual reset at motor controller.)
- C. Bearing Temperature Protection:
1. On each bearing of horizontal motors 100 hp and larger.
  2. On the thrust bearing of each vertical motor 100 hp and larger.
  3. Bearing temperature sensor/relay, Mercoid, with contact closing on bearing overtemperature mounted in NEMA 250, Type 4X enclosure.
- D. Vibration detection relay mounted in NEMA 250, Type 4X enclosure on side of motors 200 hp and larger.
- E. Nameplates:
1. Raised or stamped letters on stainless steel or aluminum.
  2. Display motor data required by NEMA MG 1, Paragraph 10.39 and Paragraph 10.40 in addition to bearing numbers for both bearings.
  3. Premium efficiency motor nameplates to display NEMA nominal efficiency, guaranteed minimum efficiency, full load power factor, and maximum allowable kVAR for power factor correction capacitors.
- F. Space Heaters:
1. Provide winding space heaters with leads wired out to motor terminal junction box.
  2. Provide extra hole or hub on motor terminal junction box as required.
  3. Unless shown otherwise, heater shall be suitable for 120V ac supply, with wattage suitable for motor frame size.
- G. Anchor Bolts: Provide meeting manufacturer's recommendations and of sufficient size and number for specified seismic condition.

2.16 SPECIAL MOTORS

- A. Requirements in this article take precedence over conflicting features specified elsewhere in this section.
- B. Chemical Industry, Severe-Duty (CISD-TEFC):
1. In accordance with IEEE 841.
  2. TEFC in accordance with NEMA MG 1.
  3. Suitable for indoor or outdoor installation in severe-duty applications including high humidity, chemical (corrosive), dirty, or salty atmospheres.



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4. Motor Frame, End Shields, Terminal Box, and Fan Cover: Cast iron.
  5. Ventilating Fan: Corrosion-resistant, nonsparking, external.
  6. Drain and Breather Fittings: Stainless steel.
  7. Nameplate: Stainless steel.
  8. Gaskets between terminal box halves and terminal box and motor frame.
  9. Extra slinger on rotor shaft to prevent moisture seepage along shaft into motor.
  10. Double shielded bearings.
  11. 125,000 hours minimum L-10 bearing life for direct-connected loads.
  12. External Finish: Double-coated epoxy enamel.
  13. Coated rotor and stator air gap surfaces.
  14. Insulation System, Windings, and Connections:
    - a. Class F insulation, Class B rise or better at 1.0 service factor.
    - b. Multiple dips and bakes of non-hygroscopic polyester varnish.
  15. Service Factor:
    - a. At 40 Degrees C Ambient: 1.15.
    - b. At 65 Degrees C Ambient: 1.00.
  16. Safe Stall Time Without Injurious Heating: 20 seconds minimum.
- C. Severe-duty Explosion-proof: Meet requirements for EXP enclosures and CISC-TEFC motors.
- D. Severe-duty, Dust-ignition-proof: Meet requirements for DIP enclosures and CISC-TEFC motors.
- E. Multispeed: Meet requirements for speeds, number of windings, and load torque classification indicated in motor-driven equipment specification.
- F. Inverter Duty Motor:
1. Motor supplied power by adjustable voltage and adjustable frequency drives shall be inverter duty rated.
  2. Suitable for operation over entire speed range indicated.
  3. Provide forced ventilation where speed ratio is greater than published range for motor provided.
  4. When installed in Division 1 hazardous (classified) location shall be identified as acceptable for variable speed when used in Division 1 location.
- G. Inclined Motors:
1. Motors suitable for operation only in horizontal position not acceptable.
  2. Bearings designed for thrust imposed by driven equipment and by motor rotor when motor is in inclined position.
  3. Lubrication system designed to provide adequate bearing lubrication when motor is in inclined position.

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2.17 FACTORY TESTING

A. Tests:

1. In accordance with IEEE 112 for polyphase motors.
2. Routine (production) tests in accordance with NEMA MG 1. Test multispeed motors at all speeds.
3. For energy efficient motors, test efficiency and power factor at 50 percent, 75 percent, and 100 percent of rated horsepower:
  - a. In accordance with IEEE 112, Test Method B, and NEMA MG 1, Paragraph 12.59 and Paragraph 12.60.
  - b. For motors 500 hp and larger where facilities are not available to test by dynamometer (Test Method B), determine efficiency by IEEE 112, Test Method F.
  - c. On motors of 100 hp and smaller, furnish certified copy of motor efficiency test report on an identical motor.
4. Provide test reports for polyphase motors 100 hp and larger.

B. Test Report Forms:

1. Routine Tests: IEEE 112, Form A-1.

**PART 3 EXECUTION**

3.01 INSTALLATION

- A. In accordance with manufacturer's instructions and recommendations.
- B. Align motor carefully and properly with driven equipment.
- C. Secure equipment to mounting surface with anchor bolts.

3.02 MANUFACTURER'S SERVICES

- A. Furnish manufacturer's representative at Site in accordance with Section 01 43 33, Manufacturers' Field Services, for installation assistance, inspection, equipment testing, and startup assistance for motors larger than 150 hp.
- B. Manufacturer's Certificate of Proper Installation.

**END OF SECTION**

**SECTION 26 24 19**  
**LOW-VOLTAGE MOTOR CONTROL**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which shall be followed for this section:
1. Institute of Electrical and Electronics Engineers (IEEE): C2, National Electrical Safety Code (NESC).
  2. National Electrical Contractors Association (NECA): 402, Standard for Installing and Maintaining Motor Control Centers.
  3. National Electrical Manufacturers Association (NEMA):
    - a. 250, Enclosures for Electrical Equipment (1,000 volts maximum).
    - b. ICS 1, Industrial Control and Systems: General Requirements.
    - c. ICS 2, Controllers, Contactors, and Overload Relays Rated 600 Volts.
    - d. ICS 2.3, Instructions for the Handling, Installation, Operation, and Maintenance of Motor Control Centers Rated Not More Than 600V.
    - e. ICS 18, Motor Control Centers.
    - f. KS 1, Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
  4. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
  5. UL:
    - a. 98, Enclosed and Dead-Front Switches.
    - b. 489, Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures.
    - c. 845, Motor Control Centers.

1.02 DEFINITIONS

- A. CT: Current Transformer.
- B. LCD: Liquid Crystal Display.
- C. N.C.: Normally Closed.
- D. N.O.: Normally Open.
- E. THD: Total Harmonic Distortion.
- F. VT: Voltage Transformer.

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1.03 SUBMITTALS

A. Action Submittals:

1. Descriptive information.
2. Itemized Bill of Material.
3. Conduit entrance locations.
4. Typed Tabulation:
  - a. Motor name; tag (equipment) numbers as shown on Drawings.
  - b. Motor horsepower.
  - c. Nameplate full load current.
  - d. Heater model number and relay setting.
  - e. Protective device trip settings.
  - f. Attach above typed, tabulated data to a copy of starter manufacturer's overload heater or setting selection tables for starters provided.
5. Control diagrams.

B. Informational Submittals:

1. Manufacturer's installation instructions.
2. Operation and Maintenance Data as specified in Section 01 78 23, Operation and Maintenance Data.

1.04 QUALITY ASSURANCE

- A. Provide products manufactured within scope of UL that conform to UL Standards and have applied UL Listing Mark.

**PART 2 PRODUCTS**

2.01 MANUFACTURERS

- A. Materials, equipment, and accessories specified in this section shall be products of:
1. Eaton Electrical/Cutler-Hammer.
  2. Or approved equal.

2.02 GENERAL

- A. Like Items of Equipment: End product of one manufacturer.
- B. Make adjustments necessary to wiring, conduit, disconnect devices, motor starters, branch circuit protection, and other affected material or equipment to accommodate motors actually provided under this Contract.

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- C. Controllers: NEMA ICS 1, NEMA ICS 2, Class A or match existing when possible.
- D. Control Transformer:
  - 1. Two winding, 120-volt secondary, primary voltage to suit.
  - 2. Two current-limiting fuses for primary circuit.
  - 3. One fuse in secondary circuit with blown fuse indicator.
  - 4. Mount within starter unit.
- E. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.

2.03 MOTOR CONTROL CENTERS

- A. General:
  - 1. In accordance with NEMA ICS 1, NEMA ICS 2, NEMA ICS 18, and UL 845.
  - 2. Voltage Rating: As shown.
  - 3. Short Circuit Rating: As shown on Drawings.
  - 4. Main and branch circuit breakers, controllers, wire connections, and other devices to be front mounted and accessible, unless otherwise noted.
- B. Motor Controller Unit:
  - 1. Starters:
    - a. NEMA ICS 18, standard rating, except none smaller than NEMA ICS, Size 1.
    - b. Rating: Horsepower rated at 600 volt, UL labeled for 65,000 amperes at 480 volts short circuit capacity with overload protection.
    - c. Three-phase, nonreversing, unless specified otherwise.
    - d. Disconnect Type: Motor circuit protector or circuit breaker.
    - e. Combination Full Voltage, Magnetic Starter:
      - 1) Control: As shown on Drawings.
  - 2. Disconnecting Device:
    - a. In each starter, control circuit disconnect to de-energize circuits in unit which are not de-energized by starter power disconnect device.
    - b. Padlockable in OPEN position for up to three locks.
  - 3. Circuit Breaker:
    - a. Meet requirements of UL 489.
    - b. Molded case with manufacturer's recommended trip setting for maximum motor protection.

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- c. Thermal-magnetic trip or magnetic trip only as shown.
  - d. Tripping indicated by operating-handle position.
  - e. Interrupting capacity required for connection to system with short-circuit capacity indicated.
4. Thermal Motor Overload Protection:
- a. Inverse-time-limit characteristic.
  - b. Heater: Bimetallic overload, adjustable trip, or directly heated melting alloy, ratchet principle type element.
  - c. Relay Trip: Standard, Class 20.
  - d. Manual reset.
  - e. Provide in each ungrounded phase.
  - f. Mount within starter unit.
5. Solid State Motor Overload Protection:
- a. Inverse-time-limit characteristic.
  - b. Phase loss, phase unbalance and Class II ground fault protection.
  - c. Current operated electronic circuitry with adjustable trip.
  - d. Class 10/20/30 relay trip, switch selectable.
  - e. One N.O. auxiliary contact for remote monitoring.
  - f. Manual reset.
  - g. Provide in each ungrounded phase.
  - h. Mount within starter unit.
  - i. Communications: None.
6. Motor Thermal Protector Interface: Manual-reset interposing relay for connection to motor-mounted thermal protector system.
- C. Control Unit:
- 1. Disconnecting Device: Pull-apart terminal blocks capable of de-energizing external source control circuits in unit.
  - 2. Control Devices: As indicated and as specified in Section 26 05 04, Basic Electrical Materials and Methods.
  - 3. Control Wiring:
    - a. Copper, 14 AWG, minimum.
    - b. Permanent sleeve type markers with wire numbers applied to each end of wires.
    - c. Terminate wires using insulated locking fork or ring type crimp terminals.
    - d. Terminate current transformer leads on shorting type terminal blocks.
- D. Incoming Line Terminal:
- 1. Construction: As specified in Paragraph, Motor Controller Unit.
  - 2. Incoming Service Feeder: Cable.
  - 3. Mechanical type CU-/AL lugs for 75 degrees C cable.

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**PART 3 EXECUTION**

3.01 INSTALLATION

A. General:

1. Motor Data: Provide typed, self-adhesive label attached inside each motor starter enclosure door displaying the following information:
  - a. Motor served by tag number and equipment name.
  - b. Nameplate horsepower.
  - c. Motor code letter.
  - d. Full load amperes.
  - e. Service factor.
  - f. Installed overload relay heater catalog number.

B. Circuit Breakers:

1. Field adjust trip settings of motor starter magnetic-trip-only circuit breakers.
2. Adjust to approximately 11 times motor rated current.
3. Determine motor rated current from motor nameplate following installation.

C. Overload Relay: Select and install overload relay heaters and switch settings after actual nameplate full-load current rating of motor has been determined.

**END OF SECTION**

**SECTION 26 29 23**  
**LOW-VOLTAGE VARIABLE FREQUENCY DRIVE SYSTEM**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. Electronic Industries Alliance (EIA): 359-A-1, Special Colors.
  2. Hydraulic Institute Standards (HIS).
  3. Institute of Electrical and Electronics Engineers (IEEE):
    - a. 112, Standard Test Procedure for Polyphase Induction Motors and Generators.
    - b. 519, Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems.
    - c. C62.41, Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.
  4. National Electrical Manufacturer's Association (NEMA):
    - a. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
    - b. CP 1, Shunt Capacitors.
    - c. MG 1, Motors and Generators.
    - d. WC 57, Standard for Control, Thermocouple Extensions, and Instrumentation Cables.
  5. National Fire Protection Association (NFPA): 79, Electrical Standard for Industrial Machinery.

1.02 DEFINITIONS

- A. Terms that may be used in this section:
1. VFD: Variable frequency drive.
  2. CMOS: Complementary metal oxide semiconductor.
  3. CSI: Current source inverter.
  4. EMU: Energy monitoring unit.
  5. GTO: Gate turn-off thyristor.
  6. MPR: Motor protection relay.
  7. MTBF: Mean time between failure.
  8. PWM: Pulse width modulation.
  9. ROM: Read only memory.
  10. RTD: Resistance temperature detector.
  11. RTU: Remote Telemetry Unit.
  12. Rated Load: Load specified for equipment.



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13. Rated Speed: Nominal rated (100 percent) speed specified for equipment.
14. TDD: Total demand distortion.
15. THD: Total harmonic distortion.
16. TTL: Transistor logic.

1.03 SYSTEM DESCRIPTION

A. Performance Requirements:

1. Rated Continuous Operation Capacity: Not less than 1.15 times full load current rating of driven motor, as indicated on motor nameplate, and suitable for continuous operation at continuous overload which may be imposed on motor by driven pump operating over specified speed range.

B. Design Requirements:

1. Furnish VFD rated on basis of actual motor full load nameplate current rating times the service factor.
2. Drive System: Convert incoming three-phase, 60-Hz ac power to variable voltage, adjustable frequency output for adjustable speed operation of a standard ac induction squirrel-cage motor, using pulse-width-modulation (PWM) technique to produce adjustable frequency output.
3. System rated for continuous industrial duty and suitable for use with NEMA MG 1, Design B motors.
4. Incoming Line Circuit Breaker: Provide positive means of disconnecting incoming power, and overcurrent protection for drive system.
5. Incoming Line Filters: Design to minimize harmonic distortion on incoming power feeder. Provide ultra-low harmonic generation with no additional transformers or external filters.

1.04 SUBMITTALS

A. Action Submittals:

1. Overall drive system operating data, including efficiencies, input currents, and power factors, at driven equipment actual load and rated system input voltage, at 0, 40, 60, 80, 100, and 110 percent of rated speed.
2. VFD output pulse maximum peak voltage, pulse rise time, and pulse rate of rise including justification for proposed deviation from specified values. Include motor manufacturer's certification motor insulation will

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- withstand long-term overvoltages caused at motor terminals due to specified output pulse data or proposed deviation from this data.
3. Complete system rating, including nameplate data, continuous operation load capability throughout speed range of 0 percent to 120 percent of rated speed.
  4. Complete variable frequency controller rating coordinated with motor full load nameplate current rating; list controller special features being supplied.
  5. Controller, reactor, harmonic filter, and isolating transformer (if applicable) dimensional drawings; information on size and location of space for incoming and outgoing conduit.
  6. Maximum heat dissipation from enclosures.
  7. Should separate enclosures and equipment be necessary for filter elements or isolation transformers, provide complete dimensional information including location of space for incoming and outgoing conduit, weight, maximum heat loss, and minimum current carrying capacity and recommended wire size for required interconnecting circuits.
  8. Layout of controller face showing pushbuttons, switches, instruments, and indicating lights.
  9. Complete system operating description.
  10. Complete system schematic (elementary) wiring diagrams.
  11. Complete system interconnection diagrams between controller, drive motor, and related components or controls external to system, including wire numbers and terminal board point identification.
  12. One-line diagram of system, including component ratings.
  13. Description of diagnostic features being provided.
  14. Descriptive literature for control devices such as relays and timers.
  15. Itemized bill-of-materials listing system components.
  16. Seismic anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

1. Seismic anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
2. Special shipping, storage and protection, and handling instructions.
3. Manufacturer's installation instructions.
4. Factory functional test reports.
5. Field test reports.
6. Component and attachment testing seismic certificate of compliance as required by Section 01 45 33, Special Inspection, Observation, and Testing.

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7. Operation and Maintenance Data: As specified in Section 01 78 23, Operation and Maintenance Data.

1.05 WARRANTY

- A. Warranty period shall cover 24 months from date of startup, not to exceed 30 months from date of shipment. During this period repairs, including parts and labor, shall be provided at no cost to the Owner.

**PART 2 PRODUCTS**

2.01 MANUFACTURERS AND PRODUCTS

- A. Components and accessories specified in this section shall be products of:
  1. All VFDs shall be active front-end type and shall be separately mounted:
    - a. ABB; Model ACS880-37.
    - b. Allen-Bradley; Powerflex 755TL.
    - c. Or approved equal.

2.02 SERVICE CONDITIONS

- A. Ambient Operating Temperature: 32 degrees F to 104 degrees F.
- B. Storage Temperature: Minus 40 degrees F to 158 degrees F.
- C. Humidity: 0 percent to 95 percent relative (noncondensing).
- D. Altitude: 0 foot to 3,300 feet.
- E. Frequency Stability: Plus or minus 0.1 percent of maximum frequency.

2.03 COMPONENTS

- A. Drive Units:
  1. Incorporate switching power supply operating from dc bus, to produce PWM output waveform simulating sine wave and providing power loss ride through of 2 milliseconds at full load, full speed.
  2. Current-limiting semiconductor fuses for protection of internal power semiconductors.
  3. Provide constant displacement power factor of 0.95 minimum at all operating speeds and loads.
  4. Output Section: Provide a minimum 97 percent drive efficiency at full speed, full load.

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5. Employ dc power discharge circuit so that after removal of input power dc link capacitor voltage level will decay below 50V dc within 1 minute after de-energizing following NEMA CP 1 and NFPA 79. Operate with open circuited output.
6. Input Voltage: 480V ac plus or minus 10 percent.
7. Output Voltage: 0 volt to 480 volts, three-phase, 0-Hz to 66-Hz, minimum.
8. Maximum peak voltage of PWM VFD output pulse of 1,000 volts, with pulse rise time of not less than 2 microseconds, and maximum rate of rise of 500 volts per microsecond. Maximum frequency of PWM VFD output pulse (carrier) frequency of 3,000-Hz. Should magnitudes of these characteristics be more stressful to motor insulation than specified values, furnish insulation systems on motors suitable for proposed values.
9. Motor Audible Noise Level: When operating throughout speed range of PWM VFD, no more than 3 dBA above that designated in NEMA MG 1 for same motor operated at constant speed with a 60-Hz supply voltage.
10. Short-Time Overload Capacity: 115 percent of rated load in rms current for 1 minute following full load, full speed operation.
11. Equipment Short-Circuit Rating: Suitable for connection to system with maximum source three-phase, bolted fault, short-circuit available of 42,000 amps rms symmetrical at 480 volts.
12. Furnish drives with output current-limiting reactors mounted within equipment enclosure.
13. Diagnostics. Comprehensive for drive adjustment and troubleshooting:
  - a. Memory battery backup; 100-hour minimum during power loss.
  - b. Status messages will not stop drive from running but will prevent it from starting.
  - c. Fault Condition Messages and History:
    - 1) First fault protection function to be activated, ability to store six successive fault occurrences in order. Minimum faults numerically:
      - a) Overcurrent (time and instantaneous).
      - b) Overvoltage.
      - c) Undervoltage (dc and ac).
      - d) Overtemperature (drive, motor windings, motor bearing, pump bearing).
      - e) Serial communication fault.
      - f) Short-circuit/ground fault (motor and drive).
      - g) Motor stalled.
      - h) Semiconductor fault.
      - i) Microprocessor fault.
      - j) Single-phase voltage condition.

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14. Drive Protection:
  - a. Fast-acting semiconductor fuses.
  - b. Overcurrent, instantaneous overcurrent trip.
  - c. Dc undervoltage protection, 70 percent dropout.
  - d. Dc overvoltage protection, 130 percent pickup.
  - e. Overtemperature, drive, inverter, converter, and dc link components.
  - f. Overtemperature, motor, and pump.
  - g. Single-phase protection.
  - h. Reset overcurrent protection (manual or automatic reset).
  - i. Active current limit/torque limit protection.
  - j. Semiconductor fault protection.
  - k. Short-circuit/ground fault protection.
  - l. Serial communication fault protection.
  - m. Microprocessor fault.
  - n. Surge protection for transient overvoltage (6,000 volts, 80 joule surge, tested per IEEE C62.41).
  - o. Visual display of specific fault conditions.
15. Operational Features:
  - a. Use manufacturer's standard unless otherwise indicated.
  - b. Sustained power loss.
  - c. Momentary power loss.
  - d. Power interruption.
  - e. Power loss ride through (0.1 second).
  - f. Start on the fly.
  - g. Electronic motor overload protection.
  - h. Stall protection.
  - i. Slip compensation.
  - j. Automatic restart after power return (ability to enable/disable function).
  - k. Critical frequency lockout (three selectable points minimum, by 1.5-Hz steps in 10-Hz bands, to prevent resonance of system).
  - l. Drive maintenance system software for complete programming and diagnostics.
  - m. Ground fault protection, drive, and motor.
  - n. Operate with no motor connected to output terminals.

B. Rectifier:

1. Active Front-end Drives: Three-phase, active front end.

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C. Harmonics (Active Front-end Drives Only):

1. All harmonic management devices must be internal to the VFD enclosure and supplied as a complete solution.
2. Drive shall have an active line supply unit which controls the waveform of the input current and reduces the low order harmonic current drawn from the power line. Line currents and voltages shall be nearly sinusoidal. IGBTs shall be used in the rectified and inverter circuits.
3. Each input phase of the drive shall incorporate a symmetrical LCL filter arranged in a T-configuration. The inductors are to be series power components that carry the full current of the drive.
4. The input current to the drive shall have a total harmonic content less than 5 percent of full rated capability at the input terminals of the drive on power system sized according to IEEE 519 at line voltage unbalance up to 3 percent and under all motor load conditions.
5. The drive shall operate at fundamental power factor 1.0 on the supply side under all motor load conditions.
6. The input power factor shall be programmable from 0.8 lagging to 0.8 leading, allowing the drive to be used as a compensating device for installations that are excessively inductive or excessively capacitive in reactive power.

D. Controller: Microprocessor-controller PWM inverter to convert to dc voltage to variable voltage, variable frequency, three-phase ac output. Output voltage shall vary proportionally with frequency to maintain constant ratio of volts to hertz up to 60-Hz; above 60-Hz, voltage shall remain constant with drive operating in constant horsepower output mode.

E. Enclosure:

1. NEMA 250, Type 1, gasketed, freestanding, enclosure for mounting against wall, completely front accessible, and hinged doors. Properly sized to dissipate heat generated by controller within limits of specified operating conditions (including ambient temperature and ambient airflow).
2. Door mounted equipment/features:
  - a. Door mounted handle interlocked to main circuit breaker/disconnect, defeatable.
  - b. Control switches and indicating lights as indicated on Drawings.
  - c. Emergency stop pushbutton.
  - d. Keypad and display. Components and controls specified in Section 26 05 04, Basic Electrical Materials and Methods.
3. Wire drive from below for power and control wiring.

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4. Size forced-ventilation for periodic operation to cool each unit with maximum room ambient temperature of 95 degrees F. Furnish redundant fans such that if one fan fails remaining fans furnish adequate ventilation for drive when operating at maximum capacity. Furnish filters on ventilation intakes.
  5. Wiring:
    - a. Bundle stranded copper wiring neatly with nylon tie wraps or with continuous plastic spiral binding.
    - b. Label each terminal for permanent identification of leads.
    - c. Identify each wire at each end with imprinted mylar adhesive-back wire markers.
    - d. Incorporate in as-installed wiring diagrams for wire and terminal numbers shown.
    - e. Wiring across door hinge, use 19-strand, NEMA WC 57 Class C stranding looped for proper twist rather than bending at hinge.
    - f. Wire connections internal to panels by crimp-on terminal types.
    - g. For multiple enclosure systems, complete interconnection wiring with gasketed enclosure openings for wiring.
    - h. Multipoint plug receptacles for control wiring crossing equipment shipping splits.
  6. Selector switches, indicating lights, potentiometers, instruments, protective devices, and major system components identified by means of mechanically attached, engraved, laminated nameplates.
- F. Operator Interface:
1. Controls:
    - a. Mount drive local control on front door of enclosure and include control switch and membrane type keypad for the following operator functions:
      - 1) Start (when in local mode).
      - 2) Stop (when in local mode).
      - 3) Speed increase (when in local mode).
      - 4) Speed decrease (when in local mode).
      - 5) Parameter mode selection (recall programmed parameters).
      - 6) LOCAL/OFF/REMOTE control selection (in remote, furnish for remote RUN command digital input and speed increase/decrease via remote 4 mA to 20 mA analog signal).
      - 7) Fault reset, manual for faults, except loss of ac voltage which is automatic upon return.
      - 8) RUN/preset speed.
      - 9) Parameter lock, password or key switch lockout of changes to parameters.
      - 10) Start disable, key switch or programmed code.

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2. Control circuit disconnect shall de-energize circuits in units that are not de-energized by main power disconnect device as required by California Administrative Code.
3. 120 volts, single-phase, 60-Hz circuits for control power and operator controls from internal control power transformer. Furnish power for motor space heaters rated 120 volts where indicated.
4. Arrange component and circuit such that failure of a single component cannot cause cascading failure(s) of other component(s).
5. Alphanumeric Display:
  - a. During normal operation and routine test, the following parameters shall be available:
    - 1) Motor current (percent of drive rated current).
    - 2) Output frequency (Hertz).
    - 3) Output voltage.
    - 4) Running time.
    - 5) Local/remote indicator.
    - 6) Status of digital inputs and outputs.
    - 7) Analog input and output values.
    - 8) Output motor current per leg.
    - 9) All test points.
6. Adjustable Parameters:
  - a. Set drive operating parameters and indicate in numeric form. Potentiometers may not be used for parameter adjustment. Minimum setup parameters available:
    - 1) Frequency range, minimum, maximum.
    - 2) Adjustable acceleration/deceleration rate.
    - 3) Volts per Hertz (field weakening point).
    - 4) Active current limit/torque limit, 0 percent to 140 percent of drive rating.
    - 5) Adjustable voltage boost (IR compensation).
    - 6) Preset speed (adjustable, preset operating point).
    - 7) Provision for adjustment of minimum and maximum pump speed to be furnished as function of 4 mA to 20 mA remote speed signal.

G. Signal Interface:

1. Digital Input:
  - a. Accept a remote RUN command contact closure input.
  - b. High temperature contact closure input from field mounted motor temperature monitoring relay.



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2. Digital Output: Furnish three discrete output dry contact closures rated 5 amps at 120V ac.
  - a. DRIVE RUNNING.
  - b. DRIVE FAULT (with common contact closure for all fault conditions).
  - c. DRIVE IN REMOTE MODE.
3. Analog Input: When LOCAL/OFF/REMOTE switch is in REMOTE, control drive speed from remote 4 mA to 20 mA dc signal.
  - a. Make provisions for adjustment of minimum and maximum motor speed which shall result from this signal.
  - b. Factory set this adjustment to comply with operating speed range designated in driven equipment specifications.
  - c. Frequency resolution shall be 0.1 percent of base speed.
  - d. Accept second analog input from speed transmitter located on motor shaft.
4. Analog Output: Furnish two 4 mA to 20 mA dc signals for actual frequency, actual load.
5. Network Communications: Modbus TCP/IP.
  - a. Provide the following parameters/information to the plant control system via the network connection (except for HVAC drives):
    - 1) Run Forward Command.
    - 2) Run Reverse Command.
    - 3) Local/Remote Status.
    - 4) Motor Running Status – Forward Direction.
    - 5) Motor Running Status – Reverse Direction.
    - 6) Drive Fault.
    - 7) Motor Current.
    - 8) Motor Voltage.
    - 9) Motor Power (kW).
    - 10) Power Factor Applied to Motor.
    - 11) Motor Speed Command (0 percent to 100 percent).
    - 12) Motor Speed Feedback (0 percent to 100 percent).

H. Accessories:

1. Equipment Identification Plate: 16-gauge stainless steel with 1/4-inch die-stamped equipment tag number securely mounted in readily visible location.
2. Lifting Lugs: Equipment weighing over 100 pounds.
3. Anchor Bolts: Sized by equipment manufacturer, and as specified in Section 05 50 00, Metal Fabrications.

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2.04 FACTORY FINISHING

- A. Enclosure:
  - 1. Primer: One coat of rust-inhibiting coating.
  - 2. Finish:
    - a. Interior: One coat white enamel.
    - b. Exterior: One coat manufacturer's standard gray enamel or EIA 359-A-1, No. 61.

2.05 SOURCE QUALITY CONTROL

- A. Factory Inspections: Inspect control panels for required construction, electrical connection, and intended function.
- B. Factory Tests and Adjustments: Test all control panels actually furnished.
- C. Record test data for report.
- D. Functional Test: Perform manufacturer's standard.

**PART 3 EXECUTION**

3.01 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions.

3.02 FIELD QUALITY CONTROL

- A. Functional Test:
  - 1. Conduct on each controller.
  - 2. Inspect controller for electrical supply termination connections, interconnections, proper installation, and quiet operation.
  - 3. Vibration Test:
    - a. Complete assembly, consisting of motor, load, and flexible shafting, connected and in normal operation shall not develop amplitudes of vibration exceeding limits recommended by HIS.
    - b. Where loads and drives are separated by intermediate flexible shafting, measure vibration both at top motor bearing and at two points on top pump bearing, 90 degrees apart.
  - 4. Record test data for report.

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- B. Network and Communication Test:
  - 1. Coordinate with plant control system to ensure that all specified data points are communicated over the network.
  - 2. Conduct on each drive unit.
  
- C. Performance Test:
  - 1. Conduct on each controller.
  - 2. Perform under actual or approved simulated operating conditions.
  - 3. Test for continuous 6-hour period without malfunction.
  - 4. Demonstrate performance by operating continuous period while varying application load, as input conditions allow, to verify system performance.
  - 5. Record test data for report.
  
- D. Test Equipment: Provide diagnostic plug-in test card complete with instructions, multiposition selector switch, and meters or built-in diagnostic control panel or ROM-based processor for monitoring ac, dc, and digital signals to assist in troubleshooting and startup of drive.

3.03 MANUFACTURERS' SERVICES

- A. Manufacturer's Representative:
  - 1. Present at Site or classroom designated by Owner, for minimum person-days listed below, travel time excluded:
    - a. 2 person-days for installation assistance and inspection.
    - b. 2 person-days for programming of network connection and coordination of required data exchange with plant control system.
    - c. 1 person-day for functional and performance testing and completion of Manufacturer's Certificate of Proper Installation.
    - d. 1 person-day for facility startup.
    - e. 1 person-day for post-startup training
  
- B. See Section 01 43 33, Manufacturers' Field Services, and Section 01 91 14, Testing, Integration, and Startup.

**END OF SECTION**

**SECTION 31 10 00  
SITE CLEARING**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Interfering or Objectionable Material: Trash, rubbish, and junk; vegetation and other organic matter, whether alive, dead, or decaying; topsoil.
- B. Clearing: Removal of interfering or objectionable material lying on or protruding above ground surface.
- C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots greater than 2-inch caliper to a depth of 6 inches below subgrade.
- D. Stripping: Removal of topsoil.
- E. Project Limits: Areas, as shown or specified, within which Work is to be performed.

1.02 SUBMITTALS

- A. Action Submittals: Drawings clearly showing clearing, grubbing, and stripping limits.

1.03 QUALITY ASSURANCE

- A. Obtain Engineer's approval of staked clearing, grubbing, and stripping limits, prior to commencing clearing, grubbing, and stripping.

1.04 SCHEDULING AND SEQUENCING

- A. Prepare Site only after adequate erosion and sediment controls are in place. Limit areas exposed uncontrolled to erosion during installation of temporary erosion and sediment controls.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 GENERAL

- A. Clear, grub, and strip areas actually needed for Site improvements within limits shown or specified.
- B. Do not injure or deface vegetation that is not designated for removal.

3.02 LIMITS

- A. As follows, but not to extend beyond Project limits:
  - 1. Structures: 10 feet outside of new structures or slabs.
  - 2. Other Areas: As shown.
- B. Remove rubbish, trash, and junk from entire area within Project limits.

3.03 CLEARING

- A. Clear areas within limits shown or specified.
- B. Fell trees so that they fall away from facilities and vegetation not designated for removal.
- C. Cut stumps not designated for grubbing flush with ground surface.
- D. Cut off shrubs, brush, weeds, and grasses to within 2 inches of ground surface.

3.04 GRUBBING

- A. Grub areas within limits shown or specified.

3.05 STRIPPING

- A. Strip areas within limits to minimum depths shown or specified. Do not remove subsoil with topsoil.

3.06 TREE REMOVAL OUTSIDE CLEARING LIMITS

- A. Remove Within Project Limits: Dead, dying, leaning, or otherwise unsound trees that may strike and damage Project facilities in falling.
- B. Cut stumps off flush with ground, remove debris, and if disturbed, restore surrounding area to its original condition.

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3.07 DISPOSAL

A. Clearing, Grubbing, and Stripping Debris:

1. Dispose of debris offsite.
2. Burning of debris onsite will not be allowed.
3. Woody debris may be chipped. Chips may be sold to Contractor's benefit. Dispose of chips that are unsaleable with unchipped debris.
4. Limit offsite disposal of clearing and grubbing debris to locations that are approved by federal, state, and local authorities, and that will not be visible from Project.

**END OF SECTION**

**SECTION 31 23 13**  
**SUBGRADE PREPARATION**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. ASTM International (ASTM):
    - a. D1557, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft lbf/ft<sup>3</sup>).
    - b. D6938, Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.02 DEFINITIONS

- A. Optimum Moisture Content:
1. Determined in accordance with ASTM D1557 to determine maximum dry density for relative compaction.
  2. Determine field moisture content on basis of fraction passing 3/4-inch sieve.
- B. Prepared Ground Surface: Ground surface after completion of clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and scarification and compaction of subgrade.
- C. Relative Compaction:
1. Ratio, in percent, of as-compacted field dry density to laboratory maximum dry density as determined in accordance with ASTM D1557.
  2. Apply corrections for oversize material to either as-compacted field dry density or maximum dry density, as determined by Engineer.
- D. Subgrade: Layer of existing soil after completion of clearing, grubbing, and stripping prior to placement of base rock, roadway structure or concrete.
- E. Unsuitable Material: Soil with organics, expansive clay or other deleterious materials, that are not suitable to support the applied loads.

1.03 SEQUENCING AND SCHEDULING

- A. Complete applicable Work specified in Sections 02 41 00, Demolition; 31 10 00, Site Clearing; and 31 23 16, Excavation, prior to subgrade preparation.

1.04 QUALITY ASSURANCE

- A. Notify Engineer when subgrade is ready for compaction or whenever compaction is resumed after a period of extended inactivity.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 GENERAL

- A. Keep subgrade free of water, debris, and foreign matter during compaction or proof-rolling.
- B. Bring subgrade to proper grade and cross-section and uniformly compact surface.
- C. Do not use sections of prepared ground surface as haul roads. Protect prepared subgrade from traffic.
- D. Maintain prepared ground surface in finished condition until next course is placed.

3.02 COMPACTION

- A. Under Pavement Structure, Floor Slabs On Grade, or Granular Fill Under Structures: Compact the upper 6 inches to minimum of 95 percent relative compaction as determined in accordance with ASTM D1557.
- B. Pipe Trench Subgrade: Make three complete passes using hand guided vibratory plate compactors, under observation by Engineer. Operate at a slow walking pace as coordinated with the Engineer.

3.03 MOISTURE CONDITIONING

- A. Adjust moisture to within 2 percent of the optimum moisture content.
- B. Dry Subgrade: Scarify, add water, then mix to make moisture content uniform throughout upper 6 inches.



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- C. Wet Subgrade: Scarify and aerate material in upper 6 inches by blading, discing, harrowing, or other methods, to hasten drying process.

3.04 TESTING

- A. Detect soft or loose pipe trench subgrade by observation of the vibratory plate compactors in Article Compaction above.
- B. Perform a minimum of one in-place density test in accordance with ASTM D6938 for every 50-foot by 50-foot subgrade area beneath structures or slabs on grade.

3.05 CORRECTION

- A. If subgrade is pumping or otherwise yielding during compaction:
  - 1. Scarify, adjust moisture content and recompact, or
  - 2. Overexcavate as specified in Section 31 23 16, Excavation, and replace with trench stabilization material, as specified in Section 31 23 23.15, Trench Backfill.
- B. Unsuitable Material: Overexcavate as specified in Section 31 23 16, Excavation, and replace with suitable earth backfill material from the excavation, as specified in Section 31 23 23.15, Trench Backfill.

**END OF SECTION**

**SECTION 31 23 16  
EXCAVATION**

**PART 1 GENERAL**

1.01 QUALITY ASSURANCE

- A. Provide adequate survey control to avoid unauthorized overexcavation.

1.02 WEATHER LIMITATIONS

- A. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

1.03 SEQUENCING AND SCHEDULING

- A. Demolition: Complete applicable Work specified in Section 02 41 00, Demolition, prior to excavating.
- B. Clearing and Grubbing: Complete applicable Work specified in Section 31 10 00, Site Clearing, prior to excavating.
- C. Excavation Support: Install and maintain shoring, as necessary to support sides of excavations and prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed Work.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 GENERAL

- A. Comply with applicable excavation permits.
- B. Prior to excavating, install erosion and sediment control measures as specified with required permits.
- C. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot, except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth. Furnish, place, and maintain supports and shoring that may be required for the sides of the excavations.

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- D. Use of Excess Excavated Materials: Use of excess excavated materials to complete fills or produce granular rock products required for the Work is permitted.
  - 1. Process excavated materials to meet specified material requirements.
  - 2. In the event that excavated materials or processed materials do not meet the specified material requirements, import the specified material.
  - 3. Only use excavated materials from excavations actually required for the Work for generating fills or other granular rock products required for the Work. No borrow excavations intended solely to generate materials for processing are allowed.
  
- E. Removal and Exclusion of Water: Remove and exclude water, if encountered, from open excavations, including stormwater, groundwater, irrigation water and wastewater. Use well points, sump pumps or other means to remove water and continuously maintain groundwater at a level at least 2 feet below the lowest point of excavations. Remove and exclude water until backfilling is complete and field soils testing has been completed, or as approved by Engineer. Excavate and replace any subgrade soil that is loosened or damaged by water as directed by Engineer.
  
- F. Do not overexcavate without written authorization of Engineer.
  
- G. Remove or protect obstructions as shown and as specified in Section 01 50 00, Temporary Facilities and Controls, Article Protection of Work and Property.
  
- H. Use of explosives for blasting to assist rock excavation is not allowed.

3.02 UNCLASSIFIED EXCAVATION

- A. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

3.03 TRENCH WIDTH

- A. Minimum Width of Trenches:
  - 1. For sewers, potable water mains, irrigation, recycled water mains, and storm drains, refer to Drawing No. SDS-110, SDW-110, SDI-110, SDRW-101, and SDD-110, respectively, of the City of San Diego Standard Drawings.
  - 2. For Single Pipe, Conduit, Direct-Buried Cable, and Duct Bank:
    - a. Less than 4-inch Outside Diameter or Width: 18 inches.
    - b. Greater than 4-inch Outside Diameter or Width: 24 inches greater than outside diameter or width of pipe, conduit, direct-buried cable, or duct bank.

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3. Multiple Pipes, Conduits, Cables, or Duct Banks in Single Trench:  
24 inches greater than aggregate width of pipes, conduits, cables, duct banks, plus space between.
4. Increase trench widths by thicknesses of shoring.

B. Maximum Trench Width:

1. For sewers, potable water mains, irrigation, recycled water mains, and storm drains, refer to Drawing No. SDS-110, SDW-110, SDI-110, SDRW-101, and SDD-110, respectively, of the City of San Diego Standard Drawings.
2. No more than 48 inches greater than outside diameter or width of pipe, conduit, direct-buried cable, or duct bank.

3.04 PIPE AND UTILITY TRENCH EXCAVATION

- A. Perform in accordance with the safety requirements of the California Occupational Safety and Health Administration, latest edition.
- B. General: Unless otherwise indicated or ordered, open-cut trenches with widths as indicated for excavation for pipelines and utilities.
- C. Open Trench Length: Unlimited.
- D. Trench Bottom: Uniformly excavate and smooth the bottom of the trench to the grade of the bottom of the pipe bedding. Remove loose or disturbed material from the bottom of the trench, including excavator ridges.
- E. Overexcavation: Overexcavate where required by Engineer. Backfill excavation below the grade ordered with the indicated material and compaction specified in Section 31 23 23.15, Trench Backfill.
- F. Trench Overexcavation: Where trenches are indicated to be overexcavated, excavate to the depth indicated, and install stabilization material to the grade of the bottom of the pipe bedding.
- G. If a moveable trench shield is used during excavation operations, construct the trench width wider than the shield so that the shield is free to be lifted and then moved horizontally without binding against the trench sidewalls. Remove the trench shield and stabilize the trench if the trench walls cave in or slough.

3.05 STOCKPILING EXCAVATED MATERIAL

- A. Stockpile excavated material that is suitable for use as trench backfill until material is needed.

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- B. Confine stockpiles to within approved work areas. Do not obstruct roads or streets.
- C. Do not stockpile excavated material adjacent to trenches and other excavations, unless excavation side slopes and excavation support systems are designed, constructed, and maintained for stockpile loads.
- D. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce excessive settlement.
- E. Stockpile excavated material on the downhill side of the excavation where practicable.

3.06 INSPECTION AND TESTING

- A. Excavation will be performed under the observation of the Engineer. The Engineer must be notified at the following stages:
  - 1. Upon completion of site clearing.
  - 2. During excavation.
  - 3. After completion of excavations and prior to placement of concrete or backfill.
  - 4. When any unusual or unexpected geotechnical conditions are encountered.

3.07 DISPOSAL OF SPOIL

- A. Dispose of excavated materials, which are unsuitable or exceed quantity needed for trench backfill, offsite.
- B. Dispose of debris resulting from removal of underground facilities as specified in Section 02 41 00, Demolition, for demolition debris.
- C. Dispose of debris resulting from removal of organic matter, trash, refuse, and junk as specified in Section 31 10 00, Site Clearing, for clearing and grubbing debris.

**END OF SECTION**

**SECTION 31 23 23.15  
TRENCH BACKFILL**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Public Works Association (APWA): Uniform Color Code for Temporary Marking of Underground Utility Locations.
  2. ASTM International (ASTM):
    - a. C33, Standard Specification for Concrete Aggregates.
    - b. C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
    - c. C150, Standard Specification for Portland Cement.
    - d. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
    - e. D1140, Standard Test Method for Amount of Material in Soils Finer than the No. 200 (75 micrometer) Sieve.
    - f. D1557, Standard Test Method for Laboratory Compaction Characteristics of Soil using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>).
    - g. D4832, Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.
  3. National Electrical Manufacturers Association (NEMA): Z535.1, Safety Color Code.

1.02 DEFINITIONS

- A. Base Rock: Granular material upon which manhole bases and other structures are placed.
- B. Bedding Material: Granular material upon which pipes, conduits, cables, or duct banks are placed.
- C. Imported Material: Material obtained by Contractor from source(s) offsite.
- D. Lift: Loose (uncompacted) layer of material.
- E. Pipe Zone: Backfill zone that includes full trench width and extends from prepared trench bottom to an upper limit above top outside surface of pipe, conduit, cable, or duct bank.

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- F. Prepared Trench Bottom: Graded trench bottom after excavation and installation of stabilization material, if required, but before installation of bedding material.
- G. Relative Compaction: The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by ASTM D1557. Corrections for oversize material may be applied to either as-compacted field dry density or maximum dry density, as determined by Engineer.
- H. Selected Backfill Material: Material available onsite that Engineer determines to be suitable for a specific use.
- I. Well-Graded: A mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes producing a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids. Does not define numerical value that must be placed on coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.

1.03 SUBMITTALS

A. Action Submittals:

- 1. Shop Drawings: Manufacturer's descriptive literature for marking tapes and tracer wire.

B. Informational Submittals:

- 1. Catalog and manufacturer's data sheets for compaction equipment.
- 2. Certified Gradation Analysis: Submit not less than 30 days prior to delivery for imported materials or anticipated use for excavated materials, except for trench stabilization material that will be submitted prior to material delivery to Site.
- 3. Controlled Low Strength Material: Certified mix design and test results. Include material types and weight per cubic yard for each component of mix.

**PART 2 PRODUCTS**

2.01 MARKING TAPE

A. Nondetectable:

- 1. Inert polyethylene, impervious to known alkalis, acids, chemical reagents, and solvents likely to be encountered in soil.

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2. Thickness: Minimum 5 mils.
3. Width: 6 inches.
4. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
5. Manufacturers and Products:
  - a. Reef Industries; Terra Tape.
  - b. Mutual Industries; Non-detectable Tape.
  - c. Presco; Non-detectable Tape.
  - d. Or approved equal.

B. Detectable:

1. Solid aluminum foil, visible on unprinted side, encased in protective high visibility, inert polyethylene plastic jacket.
2. Foil Thickness: Minimum 0.35 mils.
3. Laminate Thickness: Minimum 5 mils.
4. Width: 6 inches.
5. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
6. Joining Clips: Tin or nickel-coated furnished by tape manufacturer.
7. Manufacturers and Products:
  - a. Reef Industries; Terra Tape, Sentry Line Detectable.
  - b. Mutual Industries; Detectable Tape.
  - c. Presco; Detectable Tape.
  - d. Or approved equal.

C. Color: In accordance with APWA Uniform Color Code.

<b>Color*</b>	<b>Facility</b>
Red	Electric power lines, cables, conduit, and lightning cables
Orange	Communicating alarm or signal lines, cables, or conduit
Yellow	Gas, oil, steam, petroleum, or gaseous materials
Green	Sewers and drain lines
Blue	Potable water
Purple	Reclaimed water, irrigation, and slurry lines
*As specified in NEMA Z535.1, Safety Color Code.	



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2.02 TRACER WIRE

- A. Material: Minimum 12-gauge solid copper or copper jacket with a steel core, with high-density polyethylene (HDPE) or high-molecular weight polyethylene (HMWPE) insulation suitable for direct bury.
- B. Splices: Use wire nut or lug suitable for direct burial as recommended by tracer wire manufacturer.
- C. Manufacturers:
  - 1. Copperhead Industries, LLC.
  - 2. Performance Wire & Cable Inc.
  - 3. Pro-line Safety Products Company.
  - 4. Or approved equal.

2.03 TRENCH STABILIZATION MATERIAL

- A. Clean, hard, durable 3-inch minus crushed rock or gravel, or pit run, free from clay balls, other organic materials, or debris.
- B. Uniformly graded from coarse to fine, less than 10 percent by weight passing the 1/4-inch sieve.

2.04 BEDDING MATERIAL AND PIPE ZONE MATERIAL

- A. For sewers, potable water mains, irrigation, recycled water mains, and storm drains, refer to Drawing No. SDS 110, SDW-110, SDI-110, SDRW-101, and SDD-110, respectively, of the City of San Diego Standard Drawings.
- B. Unfrozen, friable, and no clay balls, roots, or other organic material.
- C. Clean or gravelly sand with less than 5 percent passing No. 200 sieve, as determined in accordance with ASTM D1140, with a maximum particle size and other requirements as follows unless otherwise specified.
  - 1. Stainless Steel Pipe, Copper Pipe, and Plastic Pipe Under 3-inch Diameter: 1/4 inch maximum particle size.
  - 2. All Other Pipe: 3/4 inch maximum particle size.
  - 3. Conduit and Direct-Buried Cable:
    - a. Individual Particles: Free of sharp edges.
    - b. Maximum Size Particle: Pass a No. 4 sieve.

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2.05 EARTH BACKFILL ABOVE PIPE ZONE

- A. Excavated material from required excavations and designated borrow sites, free from rocks larger than 4 inches, from roots and other organic matter, trash, debris, and other deleterious materials.
- B. Provide imported material of equivalent quality, if required to accomplish Work.

2.06 CONTROLLED LOW STRENGTH MATERIAL (CLSM)

- A. A fluid, workable mixture of aggregate, cement, admixtures, and water.
- B. Select and proportion ingredients to obtain compressive strength between a minimum of 50 psi at 4 days and a maximum of 150 psi at 28 in accordance with ASTM D4832.
- C. Materials:
  - 1. Cement: ASTM C150/C150M, Type I or Type II.
  - 2. Aggregate: ASTM C33/C33M, Size 8 to 9, or fine aggregate.
  - 3. Fly Ash (Pozzolan): Class F or Class C fly ash in accordance with ASTM C618.
  - 4. Water: Clean, potable, containing less than 500 ppm of chlorides.

2.07 GRAVEL SURFACING ROCK

- A. As specified in Section 32 11 23, Aggregate Base Courses.

2.08 SOURCE QUALITY CONTROL

- A. Perform gradation analysis in accordance with ASTM C136 for:
  - 1. Trench stabilization material.
  - 2. Bedding and pipe zone material.
- B. Certified Laboratory Performance of Mix Designs: Controlled low strength material.

**PART 3 EXECUTION**

3.01 TRENCH PREPARATION

- A. Water Control:
  - 1. Promptly remove and dispose of water entering trench as necessary to grade trench bottom and to compact backfill and install manholes, pipe,

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conduit, direct-buried cable, or duct bank. Do not place concrete, lay pipe, conduit, direct-buried cable, or duct bank in water.

2. Remove water in a manner that minimizes soil erosion from trench sides and bottom.
  3. Provide continuous water control until trench backfill is complete.
- B. Remove foreign material and backfill contaminated with foreign material that falls into trench.

3.02 TRENCH BOTTOM

- A. Firm Subgrade: Grade with hand tools, remove loose and disturbed material, and trim off high areas and ridges left by excavating bucket teeth. Allow space for bedding material if shown or specified.
- B. Soft Subgrade: If subgrade is encountered that may require removal to prevent pipe settlement, notify Engineer. Engineer will determine depth of overexcavation, if any required.

3.03 TRENCH STABILIZATION MATERIAL INSTALLATION

- A. Rebuild trench bottom with trench stabilization material.
- B. Place material over full width of trench in 6-inch lifts to required grade, providing allowance for bedding thickness.
- C. Compact each lift so as to provide a firm, unyielding support for the bedding material prior to placing succeeding lifts.

3.04 BEDDING

- A. Furnish imported bedding material where, in the opinion of Engineer, excavated material is unsuitable for bedding or insufficient in quantity.
- B. Place over full width of prepared trench bottom in two equal lifts when required depth exceeds 6 inches.
- C. Hand grade and compact each lift to provide a firm, unyielding surface.
- D. Minimum Thickness:
  1. For sewers, potable water mains, irrigation, recycled water mains, and storm drains, refer to Drawing No. SDS 110, SDW-110, SDI-110, SDRW-101, and SDD-110, respectively, of the City of San Diego Standard Drawings.
  2. Pipe: 6 inches.
  3. Conduit, Duct Banks, or Buried Cable: 3 inches.

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- E. Check grade and correct irregularities in bedding material. Loosen top 1 inch to 2 inches of compacted bedding material with a rake or by other means to provide a cushion before laying each section of pipe, conduit, direct-buried cable, or duct bank.
- F. Install to form continuous and uniform support except at bell holes, if applicable, or minor disturbances resulting from removal of lifting tackle.
- G. Bell or Coupling Holes: Excavate in bedding at each joint to permit proper assembly and inspection of joint and to provide uniform bearing along barrel of pipe or conduit.

3.05 BACKFILL PIPE ZONE

- A. Upper limit of pipe zone shall not be less than following:
  - 1. Pipe: 12 inches above top of pipe, unless shown otherwise.
  - 2. Conduit: 3 inches above conduit, unless shown otherwise.
  - 3. Direct-Buried Cable: 3 inches above cable, unless shown otherwise.
  - 4. Duct Bank: 3 inches above duct bank, unless shown otherwise.
- B. Restrain pipe, conduit, cables, and duct banks as necessary to prevent their movement during backfill operations.
- C. Place material simultaneously in lifts on both sides of pipe and, if applicable, between pipes, conduit, cables, and duct banks installed in same trench.
  - 1. Pipe 10-Inch and Smaller Diameter: First lift less than or equal to 1/2 pipe diameter.
  - 2. Pipe Over 10-Inch Diameter: Maximum 6-inch lifts.
- D. Thoroughly tamp each lift, including area under haunches, with handheld tamping bars supplemented by “walking in” and slicing material under haunches with a shovel to ensure voids are completely filled before placing each succeeding lift.
- E. Do not use power-driven impact compactors to compact pipe zone material. After full depth of pipe zone material has been placed as specified, compact material by a minimum of three passes with a vibratory plate compactor.

3.06 MARKING TAPE INSTALLATION

- A. Continuously install marking tape along centerline of buried piping, at depth of 2 feet unless otherwise indicated on Drawings. Coordinate with piping installation drawings.

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1. Detectable Marking Tape: Install with nonmetallic piping and waterlines.
2. Nondetectable Marking Tape: Install with metallic piping.

3.07 TRACER WIRE INSTALLATION AND TESTING

- A. Install tracer wire continuously along centerline of nonmetallic buried piping.
- B. Attach wire to top of pipe using tape at maximum of 10-foot intervals. In areas where depth of cover is excessive for allowing detection of tracer wire with electronic pipe locator, install tracer wire within pipe backfill directly above pipe centerline at a minimum depth of 3 feet.
- C. Install splices in accordance with manufacturer's instructions for direct bury applications. Tie ends of wire to be joined in a knot as required to reduce tension on splice.
- D. Bring tracer wire to surface at each condensate drainage structure. Tracer wire shall be brought to surface at least every 1,000 feet. If distance between pipe appurtenances exceeds 1,000 feet, install valve box to allow access to tracer wire. Mark valve box cover with the word "TRACER". Coil enough excess tracer wire at each appurtenance to extend wire 12 inches above ground.
- E. Test continuity of tracer wire using electronic pipe locator in presence of Engineer prior to paving.

3.08 BACKFILL ABOVE PIPE ZONE

- A. For repair or relocation of sewers, potable water mains, irrigation, recycled water mains, and storm drains, refer to Drawing No. SDS 110, SDW 110, SDI 110, SDRW 101, and SDD 110, respectively, of the City of San Diego Standard Drawings, for backfill material and compaction requirement.
- B. General:
  1. Process excavated material to meet specified gradation requirements.
  2. Adjust moisture content as necessary to obtain specified compaction.
  3. Do not allow backfill to free fall into trench or allow heavy, sharp pieces of material to be placed as backfill until after at least 2 feet of backfill has been provided over top of pipe.
  4. Do not use power driven impact type compactors for compaction until at least 4 feet of backfill is placed over top of pipe.
  5. Backfill to grade with proper allowances for surfacing and pavement thicknesses, wherever applicable.
  6. Backfill around structures with same backfill as specified for adjacent trench, unless otherwise shown or specified.

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C. Placement and Compaction:

1. Place in lifts not exceeding thickness of 8 inches prior to compaction.
2. Mechanically compact each lift to a minimum of 90 percent relative compaction in accordance with ASTM D1557 prior to placing succeeding lifts.
3. For areas under roadways, mechanically compact each lift to a minimum of 95 percent relative compaction in accordance with ASTM D1557 prior to placing succeeding lifts.

D. Controlled Low Strength Material:

1. Discharge from truck mounted drum type mixer into trench.
2. Place in lifts as necessary to prevent uplift (flotation) of new and existing facilities.
3. In traveled areas, fill entire trench section to pavement finish grade for a temporary driving surface, and screed off excess and finish with a float.
4. In other areas, fill trench section as shown.

3.09 SITE TESTING

- A. Gradation of Bedding and Pipe Zone Material: In accordance with ASTM C136. One sample from each 500 tons of bedding and pipe zone material or more often as determined by Engineer, if variation in gradation is occurring, or if material appears to depart from the Specifications.
- B. In-Place Density Testing of Trench Backfill Above Pipe Zone: In accordance with ASTM D6938. Minimum one test per foot of fill for every 100 linear feet of trench.
- C. If test results indicate material does not meet Specification requirements, terminate material placement until corrective measures are taken.

3.10 MAINTENANCE OF TRENCH BACKFILL

- A. After each section of trench is backfilled, maintain surface of backfilled trench even with adjacent ground surface until final surface restoration is completed.
- B. Gravel Surfacing Rock: Add gravel surfacing rock where applicable and as necessary to keep surface of backfilled trench even with adjacent ground surface, and grade and compact as necessary to keep surface of backfilled trenches smooth, free from ruts and potholes, and suitable for normal traffic flow.
- C. Concrete Pavement: Replace settled slabs as specified in Section 32 12 16, Asphalt Paving.

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- D. Asphaltic Pavement: Replace settled areas or fill with asphalt as specified in Section 32 12 16, Asphalt Paving.
- E. Other Areas: Add excavated material where applicable and keep surface of backfilled trench level with adjacent ground surface.

3.11 SETTLEMENT OF BACKFILL

- A. Settlement of trench backfill, or of fill, or facilities constructed over trench backfill will be considered a result of defective compaction of trench backfill.

**END OF SECTION**

**SECTION 32 11 23**  
**AGGREGATE BASE COURSES**

**PART 1 GENERAL**

**1.01 REFERENCES**

A. The following is a list of standards which may be referenced in this section:

1. American Association of State Highway and Transportation Officials (AASHTO):
  - a. T11, Standard Method of Test for Materials Finer Than 75 $\mu$ m (No. 200) Sieve in Mineral Aggregates by Washing.
  - b. T27, Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates.
  - c. T89, Standard Specification for Determining the Liquid Limit of Soils.
  - d. T90, Standard Specification for Determining the Plastic Limit and Plasticity Index of Soils.
  - e. T96, Standard Specification for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - f. T99, Standard Specification for the Moisture-Density Relations of Soils Using a 2.5 kg (5.5 pound) Rammer and a 305 mm (12 in) Drop.
  - g. T180, Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18-in) Drop.
  - h. T190, Standard Specification for Resistance R-Value and Expansion Pressure of Compacted Soils.
  - i. T265, Standard Method of Test for Laboratory Determination of Moisture Content of Soils.
  - j. T310, Standard Specification for In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
2. ASTM International (ASTM):
  - a. C88, Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
  - b. D1883, Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
  - c. D2419, Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
  - d. D4791, Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.



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1.02 DEFINITIONS

- A. Completed Course: Compacted, unyielding, free from irregularities, with smooth, tight, even surface, true to grade, line, and cross-section.
- B. Completed Lift: Compacted with uniform cross-section thickness.
- C. Standard Specifications: When referenced in this section, shall mean 2018 “Greenbook” Standard Specifications for Public Works Construction.

1.03 SUBMITTALS

- A. Action Submittals:
  - 1. Samples: Submit for specified materials 20 days prior to delivery to Site.
- B. Informational Submittals: See Section 3-8 of the 2018 “Greenbook” Standard Specifications for Public Works Construction, and 3-8 of the City of San Diego Supplement “Whitebook” Standard Specifications for Public Works Construction.

**PART 2 PRODUCTS**

2.01 BASE COURSE

- A. As specified in Section 200 of the Standard Specifications, and Section 200-2.9 of the 2018 City of San Diego Supplemental “Whitebook” Standard Specifications for Public Works Construction.

2.02 SOURCE QUALITY CONTROL

- A. See Section 200-2 of the 2018 “Greenbook” Standard Specifications for Public Works Construction, and Section 200-2.9.3 of the City of San Diego 2018 Supplement “Whitebook” Standard Specification for Public Works Construction for quality requirement tests.

**PART 3 EXECUTION**

3.01 SUBGRADE PREPARATION

- A. As specified in Section 31 23 13, Subgrade Preparation.

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3.02 EQUIPMENT

- A. Compaction Equipment: Adequate in design and number to provide compaction and to obtain specified density for each layer as required by Section 301-1 of the Standard Specifications, and Section 301 of the 2018 City of San Diego Supplement “Whitebook” Standard Specifications for Public Works Construction.

3.03 HAULING AND SPREADING

- A. In accordance with Section 301-2 of the Standard Specifications.

3.04 CONSTRUCTION OF COURSES

- A. Construction of Courses: In accordance with Section 301 of the Standard Specifications, and Section 301 of the 2018 City of San Diego Supplement “Whitebook” Standard Specifications for Public Works Construction.

3.05 ROLLING AND COMPACTION

- A. Subgrade and base material shall be compacted per Section 301-1 and Section 301-2 of the Standard Specifications, and Section 301-1.3 of the 2018 City of San Diego Supplement “Whitebook” Standard Specifications for Public Works Construction.

3.06 SURFACE TOLERANCES

- A. See Section 301-2 of the Standard Specifications for compaction and surface tolerance of aggregate base.

3.07 CLEANING

- A. Remove excess material from the work area. Clean stockpile and staging areas of all excess aggregate.

**END OF SECTION**

**SECTION 32 12 16  
ASPHALT PAVING**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. American Association of State Highway and Transportation Officials (AASHTO):
    - a. M17, Standard Specification for Mineral Filler for Bituminous Paving Mixtures.
    - b. M81, Standard Specification for Cut-Back Asphalt (Rapid Curing Type).
    - c. M82, Standard Specification for Cut-Back Asphalt (Medium Curing Type).
    - d. M140, Standard Specification for Emulsified Asphalt.
    - e. M208, Standard Specification for Cationic Emulsified Asphalt.
    - f. T166, Standard Method of Test for Bulk Specific Gravity of Compacted Asphalt Mixtures Using Saturated Surface-Dry Specimens.
    - g. T176 Standard Method of Test for Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test.
    - h. T230, Standard Method of Test for Determining Degree of Pavement Compaction of Bituminous Aggregate Mixtures.
    - i. T245, Standard Method of Test for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.
    - j. T246, Standard Method of Test for Resistance to Deformation and Cohesion of Bituminous Mixtures by Means of Hveem Apparatus.
    - k. T247, Standard Method of Test for Preparation of Test Specimens of Bituminous Mixtures by Means of California Kneading Compactor.
    - l. T283, Standard Method of Test for Resistance of Compacted Bituminous Mixture to Moisture Induced Damage.
    - m. T304, Standard Method of Test for Uncompacted Void Content of Fine Aggregate (Method A).
  2. Asphalt Institute (AI):
    - a. Manual Series No. 2 (MS-2), Mix Design Methods for Asphalt Concrete.
    - b. Superpave Series No. 2 (SP-2), Superpave Mix Design.
  3. ASTM International (ASTM):
    - a. D2041, Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.

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- b. D4318, Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- c. D4791, Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
- d. D5821, Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate.
- e. E329, Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
- 4. 2018 “Greenbook” Standard Specifications for Public Works Construction.
- 5. 2018 City of San Diego Supplement “Whitebook” Standard Specifications for Public Works Construction.

1.02 DEFINITIONS

- A. Combined Aggregate: All mineral constituents of asphalt concrete mix, including mineral filler and separately sized aggregates.
- B. RAP: Reclaimed asphalt pavement.
- C. Standard Specifications: 2018 “Greenbook” Standard Specifications for Public Works Construction and 2018 City of San Diego Supplement “Whitebook” Standard Specifications for Public Works Construction.

1.03 SUBMITTALS

- A. Informational Submittals: See Section 3-8 of the Standard Specifications and Section 203-6.3.1 of the City of San Diego Supplement Standard Specifications.

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Temperature: Do not apply asphalt materials or place asphalt mixes when ground temperature is lower than 10 degrees C (50 degrees F) or air temperature is lower than 4 degrees C (40 degrees F). Measure ground and air temperature in shaded areas away from heat sources or wet surfaces.
- B. Moisture: Do not apply asphalt materials or place asphalt mixes when application surface is wet.

**PART 2 PRODUCTS**

2.01 MATERIALS

- A. Tack Coat: Emulsified asphalt, conform to Section 302-5.4 of the Standard Specifications.

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- B. Sand (Blotter Material): As specified in Section 200-1.5.5 of the Standard Specifications.

2.02 ASPHALT CONCRETE MIX

- A. See Section 203-6 of the Standard Specifications.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Traffic Control:
  - 1. In accordance with Section 01 50 00, Temporary Facilities and Controls.
  - 2. Minimize inconvenience to traffic, but keep vehicles off freshly treated or paved surfaces to avoid pickup and tracking of asphalt.
- B. Driveways: Repave driveways from which pavement was removed. Leave driveways in as good or better condition than before start of construction.

3.02 LINE AND GRADE

- A. Provide and maintain intermediate control of line and grade, independent of underlying base, to meet finish surface grades and minimum thickness.
- B. Shoulders: Construct to line, grade, and cross-section shown.

3.03 PREPARATION

- A. Prepare subgrade as specified in Section 301-1 of the Standard Specifications.
- B. Existing Roadway: Cold milling of existing pavement in accordance with Section 404 of the Standard Specifications.
- C. Thoroughly coat edges of contact surfaces (curbs, manhole frames) with emulsified asphalt or asphalt cement prior to laying new pavement. Prevent staining of adjacent surfaces.

3.04 PAVEMENT APPLICATION

- A. General: Place asphalt concrete mixture on approved, prepared base in conformance with Section 302-5 of the Standard Specifications.
- B. Compaction: See Section 302-5 of the Standard Specifications.

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- C. Tolerances:
1. General: Conduct measurements for conformity with crown and grade immediately after initial compression. Correct variations immediately by removal or addition of materials and by continuous rolling.
  2. Completed Surface or Wearing Layer Smoothness see Section 302-5 of Standard Specifications.
  3. Transverse Slope Maximum Deviation: 6.4 millimeters (1/4 inch) in 3 meters (10 feet) from rate of slope shown.
  4. Finished Grade:
    - a. Perform field differential level survey on maximum 15-meter (50-foot) meter grid and along grade breaks.
    - b. Maximum Deviation: 6 millimeters (0.02 foot) from grade shown.
- D. Seal Coat in accordance of with Section 302-5 of the Standard Specifications.

3.05 PAVEMENT OVERLAY

- A. For Cold Milling of Existing Pavement see Section 404 of the Standard Specifications.
- B. Application: See Section 302-5 of the Standard Specifications.

3.06 PATCHING

- A. See Section 301-1.6 of the 2018 City of San Diego Supplement “Whitebook” Standard Specifications for Public Works Construction.

**END OF SECTION**

**SECTION 33 05 01**  
**CONVEYANCE PIPING—GENERAL**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Concrete Institute (ACI): 301, Specifications for Structural Concrete.
  2. American Water Works Association (AWWA):
    - a. C110/A21.10, Ductile-Iron and Gray-Iron Fittings.
    - b. C115/A21.15, Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
    - c. C207, Steel Pipe Flanges for Waterworks Service - Sizes 4 in. Through 144 in. (100 mm Through 3,600 mm).
    - d. C210 Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines.
    - e. C213, Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.
    - f. C217, Petrolatum and Petroleum Wax Tape Coatings for the Exterior of Connections and Fittings for Steel Water Pipelines.
    - g. C219, Bolted, Sleeve-Type Couplings for Plain-End Pipe.
    - h. C221, Fabricated Steel Mechanical Slip-Type Expansion Joints.
    - i. C606, Grooved and Shouldered Joints.
  3. ASTM International (ASTM):
    - a. A497/A497M, Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
    - b. A615/A615M, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
    - c. C94/C94M, Standard Specification for Ready-Mixed Concrete.
    - d. C150/C150M, Standard Specification for Portland Cement.
    - e. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
  4. NSF International (NSF):
    - a. NSF/ANSI 61, Drinking Water System Components - Health Effects.
    - b. NSF/ANSI 372, Drinking Water System Components - Lead Content.

1.02 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with manufacturer's recommendations and as specified in individual specification(s) following this section.

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- B. Pipe, specials, and fittings received at Project Site in damaged condition will not be accepted.
- C. Gasket Storage: Store rubber gaskets in cool, well ventilated place, and do not expose to direct rays of sun. Do not allow contact with oils, fuels, petroleum, or solvents.
- D. Store and support pipe securely to prevent accidental rolling and to avoid contact with mud, water, or other deleterious materials.
- E. Handling:
  - 1. Pipe shall be handled with proper equipment in a manner to prevent distortion or damage. Use of hooks, chains, wire ropes, or clamps that could damage pipe, damage coating or lining, or kink and bend pipe ends is not permitted.
  - 2. Use heavy canvas, or nylon slings of suitable strength for lifting and supporting materials.
  - 3. Lifting pipe during unloading or lifting into trench shall be done using two slings placed at quarter point of pipe section. Pipe may be lifted using one sling near center of pipe, provided pipe is guided to prevent uncontrolled swinging and no damage will result to pipe or harm to workers. Slings shall bear uniformly against pipe.
  - 4. Pipe and fittings shall not be stored on rocks or gravel, or other hard material that might damage pipe. This includes storage area and along pipe trench.
  - 5. Handle as specified in individual specification(s) following this section.

## **PART 2 PRODUCTS**

### **2.01 PIPE**

- A. HDPE Gas Distribution Pipe and Fittings:
  - 1. Provide 12-inch diameter factory manufactured section of HDPE gas distribution pipe and fittings where shown on Drawing 41198-1192-D. Pipe shall be Performance Pipe 8300, or approved equal.
  - 2. Pipe and fittings shall conform to requirements of ASTM D2513 incorporated by reference in 49 CFR Part 192.
  - 3. Resin:
    - a. Polyethylene resin shall meet or exceed requirements of ASTM D3350 for PE 4710 material with cell classification of 445574C, or better. PE 4710 HDPE pipe and fittings shall be manufactured from bimodal resins. Pressure rating shall be based on hydrostatic design stress of 1,000 psi at 73.4 degrees F.



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4. DR: 13.5.
5. Outside Diameter Basis: IPS.
6. Pipe lengths, fittings, and flanged connections to be joined by thermal butt-fusion shall be of a compatible resin mix for the fusion process.
7. Fittings: Polyethylene fittings shall have same or higher-pressure rating as pipe.

B. HDPE Pipe and Fitting: As specified in the individual specification following this section.

2.02 PIPE LOCATING TAPE

A. As specified in Section 31 23 23.15, Trench Backfill.

2.03 BACKFILL ABOVE PIPE ZONE

A. As specified in Section 31 23 23.15, Trench Backfill.

2.04 PIPE BEDDING AND PIPE ZONE MATERIAL

A. Granular material or controlled low strength material as specified in Section 31 23 23.15, Trench Backfill.

2.05 TRENCH STABILIZATION MATERIAL

A. As specified in Section 31 23 23.15, Trench Backfill.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Notify Engineer at least 2 weeks prior to field fabrication of pipe or fittings.
- B. Distributing Materials: Place materials along trench only as will be used each day, unless otherwise approved by Engineer. Placement of materials shall not be hazardous to traffic or to general public, obstruct access to adjacent property, or obstruct others working in area.

3.02 EXAMINATION

- A. Verify size, material, joint types, elevation, and horizontal location of existing pipeline to be connected to new pipeline or new equipment.
- B. Inspect size and location of structure penetrations to verify adequacy of wall pipes, sleeves, and other openings.

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- C. Damaged Coatings and Linings: Repair using coating and lining materials in accordance with manufacturer's instructions.

3.03 PREPARATION OF TRENCH

- A. Prepare trench as specified in Section 31 23 16, Excavation.

3.04 INSTALLATION

A. General:

1. Join pipe and fittings in accordance with manufacturer's instructions, unless otherwise shown or specified.
2. Install individual pipe lengths in accordance with approved lay diagram. Misplaced pipe shall be removed and replaced.
3. Inspect pipe and fittings before installation, clean ends thoroughly, remove foreign matter and dirt from inside.
4. Flanged Joints:
  - a. Install perpendicular to pipe centerline.
  - b. Bolt Holes: Straddle vertical centerline, aligned with connecting equipment flanges or as shown on Drawings.
  - c. Use torque-limiting wrenches to provide uniform bearing and proper bolt tightness.
  - d. Flange Type: Use flat-faced flange when joining with flat-faced ductile or cast iron flange.

B. Buried Pressure Pipe:

1. Butt fuse DR 13.5 HDPE gas distribution pipe to DR 17 HDPE pipe using procedures that have been qualified and approved by the operator in accordance with Title 49, CFR and Part 192.283.
2. Concrete Encased or Embedded Pipe: Do not encase joints in concrete, unless specifically shown on Drawings.
3. Placement:
  - a. Keep trench dry until pipe laying and joining is completed.
  - b. Exercise care when lowering pipe into trench to prevent twisting or damage to pipe.
  - c. Measure for grade at pipe invert, not at top of pipe.
  - d. Excavate trench bottom and sides of ample dimensions to permit proper joining, welding, visual inspection, and testing of entire joint.
  - e. Prevent foreign material from entering pipe during placement.
  - f. Close and block open end of last laid pipe section when placement operations are not in progress and at close of day's work.
  - g. In general, lay pipe upgrade in direction of laying.

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- h. Check pipe alignment and grade and record pipe inverts, northings, eastings at all pipe bends, pipe beginning and pipe end.
- i. Place sufficient pipe zone material to secure pipe from movement before next pipe section is installed.
- j. Prevent uplift and floating of pipe prior to backfilling.
- 4. Tolerances:
  - a. Deflection From Horizontal Line: Maximum 2 inches.
  - b. Deflection From Vertical Line: Maximum 1 inch.
- 5. Cover Over Top of Pipe: Minimum 3 feet, unless otherwise shown.
- 6. Disposal of Excess Excavated Material: As specified in Section 31 23 16, Excavation.

3.05 PLACEMENT OF PIPE LOCATING TAPE

- A. Place pipe locating tape in accordance with Section 31 23 23.15, Trench Backfill.

3.06 PIPE BEDDING AND ZONE MATERIAL

- A. Place pipe bedding and pipe zone material in accordance with Section 31 23 23.15, Trench Backfill.

3.07 FIELD QUALITY CONTROL

- A. Pressure Leakage Testing: As specified in the individual specification(s) following this section.

3.08 CLEANING

- A. Following assembly and testing, and prior to final acceptance, flush pipelines with water at 2.5 fps minimum flushing velocity until foreign matter is removed. Dispose of water and flushed foreign matter.
- B. If impractical to flush large diameter pipe at 2.5 fps, clean pipe by use of pipe pig as approved by Engineer. Multiple passes of pipe pig may be required to adequately clean line.
- C. Remove accumulated debris through blow-offs 2 inches and larger or by removing spools and valves from piping.

**END OF SECTION**

**SECTION 33 05 01.10**  
**HIGH-DENSITY POLYETHYLENE (HDPE) PRESSURE PIPE AND FITTINGS**

**PART 1 GENERAL**

1.01 REFERENCES

A. The following is a list of standards that may be referenced in this section:

1. American Society of Mechanical Engineers (ASME):
  - a. Boiler and Pressure Vessel Code Section IX Article XXI-XXIV.
  - b. B16.1, Gray Iron Pipe Flanges and Flanged Fittings (Classes 25, 125, and 250).
  - c. B18.2.1, Square, Hex, Heavy Hex, and Askew Head Bolts.
  - d. B18.2.2, Square and Hex Nuts (Inch Series).
2. American Water Works Association (AWWA):
  - a. C906, Polyethylene (PE) Pressure Piping and Fittings, 4 in. through 65 in., for Water Distribution and Transmission.
  - b. Manual M55, PE Pipe - Design and Installation.
3. ASTM International (ASTM):
  - a. A193/A193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications.
  - b. A194/A194M, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
  - c. A240/A240M, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
  - d. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
  - e. A536, Standard Specification for Ductile Iron Castings.
  - f. A563, Standard Specification for Carbon and Alloy Steel Nuts.
  - g. D3035, Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
  - h. ASTM D3261, Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
  - i. D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
  - j. F714, Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

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- k. F2164, Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure.
- l. F2620, Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings.
- 4. Code of Federal Regulations (CFR): Title 49 Part 192.285, Plastic Pipe: Qualifying Persons to Make Joints.
- 5. NSF International (NSF): 61, Drinking Water System Components - Health Effects.
- 6. Plastics Pipe Institute (PPI):
  - a. Handbook of Polyethylene Pipe.
  - b. Technical Note 38, Bolt Torque for Polyethylene Flanged Joints.
  - c. TR-33, Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe.

1.02 SUBMITTALS

A. Action Submittals:

- 1. Shop Drawings:
  - a. Detailed pipe fabrication drawings showing pipe details, special fittings and bends, dimensions, coatings, and other pertinent information.
  - b. Catalog information confirming pipe, fittings, and other materials conform to requirements of this section.
  - c. Drawings of pipe layout and specific connection details as shown on Drawings.
  - d. Product Data: Manufacturer's data for couplings, saddles, gaskets, and other pipe accessories. Indicate maximum rated working pressure and test pressure for each item.
- 2. Submit HDPE temperature control plan describing Contractor's approach to controlling movement of the pipe related to the thermal expansion and contraction of the pipeline during installation. Plan shall outline Contractor's approach to mitigate and control movement during installation, backfill, and connection to flanges or structures. Plan shall include means of reducing pipe temperature to the limits stated in Part 3 of this Specification.
- 3. Joint Logs of First Three Joints: Logs to be approved by the Design Engineer prior to installation of pipe.

B. Informational Submittals:

- 1. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements.
- 2. Infrared temperature gun product data.

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3. Certificates of qualification for persons to be fusing HDPE pipe. Experience, training record, and certificates of persons to be fusing HDPE pipe.
4. Information on manufacturer and model of machine to be used for fusion of HDPE pipe.
5. Hydrostatic Testing Plan: Submit at least 15 days prior to testing and include the following as a minimum:
  - a. Testing dates.
  - b. Piping systems and section(s) to be tested.
  - c. Method of isolation from existing piping and equipment.
  - d. Method of isolation from instrumentation and other items not to be tested.
  - e. Provisions for supporting and providing thrust restraint for buried piping during hydrostatic testing.
  - f. Method to remove all air from piping prior to testing.
  - g. Method of conveying water from source to system being tested.
  - h. Method of filling and removing water.
  - i. Calculation of acceptable pressure range for piping section(s) to be tested
6. Certifications of Calibration: Approved testing laboratory certificate if pressure gauge for hydrostatic test has been previously used. If pressure gauge is new, no certificate is required.
7. Test report documentation.
8. Installation Plan following the Plastic Pipe Institute, ASTM F2620, and manufacturer's recommendations. Plan shall include, but not be limited to the following major components:
  - a. Pipe and fitting storage.
  - b. Pipe and fitting handling equipment.
  - c. Proposed means to maintain required temperatures for fusing.
  - d. Proposed means to shield the fusing area from wind, snow, blowing dust, and rain.
  - e. Proposed means to maintain uniform pipe wall temperature prior to fusing.
9. Fusion parameters including recommended limits of criteria recorded by data logger.
10. Fusion report for each joint, including information listed under Article Field Quality Control. Submit joint reports, within 24 hours after fusion.
11. Gasket manufacturer's table for recommended bolt torque and tightening pattern.

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1.03 QUALITY ASSURANCE

A. Qualifications:

1. Pipe Manufacturer: Listed with Plastic Pipe Institute.
2. Persons fusing HDPE pipe shall be certified under 49 CFR § 192.285, shall have experience fusing similar diameter HDPE pipe sizes and shall have received a minimum of 20 hours of training for fusing HDPE pipe from pipe supplier or fusing equipment supplier

B. Marking at Plant: Mark each pipe and fitting in accordance with AWWA C906.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Shipping: Do not cut, kink, or otherwise damage pipe during transportation.

B. Storage and Handling:

1. Pipe interiors are to be inspected and all debris removed, prior to storage.
2. Limit stacking of pipe to a height that will not cause excessive deformation of bottom layers of pipes under anticipated temperature conditions. Do not exceed the stacking heights stated in AWWA Manual M55 Table 7-1.
3. Where necessary, because of ground conditions, store pipe on wooden sleepers, spaced suitably and of such widths as not to allow deformation of pipe at point of contact with sleeper or between supports.
4. Comply with the requirements of the approved installation plan.
5. Keep pipes completely shaded from direct sunlight prior to fusion and installation in trench. Provide a white colored shading material.

1.05 CONNECTIONS TO EXISTING PIPE

A. Fusing to Existing Pipe: Comply with manufacturer's or distributor's recommendations based on Site conditions and PPI TR-33.

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**PART 2 PRODUCTS**

2.01 MATERIALS

A. Pipe and Fittings:

1. Conform to requirements of AWWA C906-15.
2. Resin: Polyethylene resin shall meet or exceed requirements of ASTM D3350 for PE 4710 material with cell classification of 445574C, or better. PE 4710 HDPE pipe and fittings shall be manufactured from bimodal resins. Pressure rating shall be based on hydrostatic design stress of 1,000 psi at 73.4 degrees F.
3. Maximum DR: 17.
4. Outside Diameter Basis: Iron Pipe Size (IPS).
5. Pipe lengths, fittings, and flanged connections to be joined by thermal butt-fusion shall be of a compatible resin mix for the fusion process.
6. Fittings:
  - a. Polyethylene fittings shall have same or higher pressure rating as pipe.
  - b. Sizes 12 inches and Smaller: Molded and manufactured to the requirements of ASTM D3261, Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
  - c. Unless noted otherwise, provide fittings with a factory fused 4-foot long spool on each end to facilitate on-site fusion.

B. Backup Rings:

1. Convolved for Flanged Connections:
  - a. ASTM A240/A240M, Type 316 stainless steel.
  - b. Complete with one-piece, molded polyethylene flange adapters.
  - c. Flanged Connections: Same or greater pressure rating as pipe.
2. Gaskets:
  - a. Gylon Style 3545.
  - b. Multi-Swell Styles 3760/3760U.
  - c. Gasket manufacturer shall provide a table with recommended bolt torque and tightening pattern.
  - d. No "or approved equal."

- C. Joints: Thermal butt-fusion or electrofusion (at approved field closures), except where connecting to unions, valves, and equipment with flanged or threaded connections that may require future disassembly. Use appropriate transition fitting or adapter for all joints that are not thermal butt-fused or electro-fused.



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D. Bolts, Nuts, Washers:

1. Bolt Materials: Type 316 stainless steel, ASTM A193/A193M, Grade B8M hex-head, carbide solution treated and strained hardened.
2. Bolt Fabrication: In accordance with ASME B18.2.1.
3. Nut Materials: Type 316 stainless steel, ASTM A194/A194M, Grade 8 hex-head.
4. Nut Fabrication: In accordance with ASME B18.2.2.
5. Washers: Type 316 stainless steel, same material as bolts in accordance with ASME B18.21.1.
6. Thread Lubricant: Provide bolt manufacturer's recommended lubricant on bolt threads, nuts, the nut face and around the bolt hole.

E. Wall Anchor:

1. Material: Same as HDPE pipe.
2. Internal Diameter: Equal to adjacent pipe.
3. Shear Strength: Equal to or greater than tensile strength of adjacent pipe.
4. Fabrication: Butt fusion. Extrusion bead welding is not allowed.

F. Electrofusion Couplings:

1. Material: HDPE.
2. Method of Attachment: Electrofusion.
3. Designed for coupling HDPE pipe.
4. Manufacturers:
  - a. Central Plastics Company.
  - b. ISCO Industries.
  - c. Or approved equal.

G. Products that restrain HDPE pipe with wedges, or clamps are not acceptable.

**PART 3 EXECUTION**

3.01 INSTALLATION

A. General:

1. Install polyethylene pipe in conformance with AWWA M55, PPI TR-33, ASTM F2620, and pipe manufacturer's recommendations.
2. If HDPE pipe surface temperature is above 80 degrees F as measured with infrared temperature gun, allow pipe to cool prior to making any connections to flanges, existing pipeline systems, or structures.

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3. Connect HDPE pipe to auxiliary equipment such as valves, pumps, tanks, and other piping systems with flanged connections as follows:
  - a. Polyethylene flange adapter, thermally butt-fused to end of pipe. Flange “stub ends” are not allowed.
  - b. Convoluted backing flange, as specified.
  - c. Bolt and nut of sufficient length to show a minimum of three complete threads when joint is made and tightened to manufacturer’s standard.
  - d. Follow requirements of PPI Technical Note 38 including mandatory 4-hour bolt re-torquing.
4. Special Precautions at Flanges: Support polyethylene pipe connected to heavy fittings, manholes, and rigid structures in such a manner that no subsequent relative movement between polyethylene pipe at flanged joint and rigid structures is possible.
5. Minimum Long-Term Field Bending Radius: 100 times pipe outside diameter.

B. Placement in Trench:

1. In accordance with AWWA M55 and manufacturers installation recommendations, including but not limited to the following:
  - a. Handle joined pipeline in such a manner that pipe is not damaged by dragging it over sharp and cutting objects.
  - b. Position slings for handling pipeline away from butt-fused joints.
  - c. Remove sections of damaged pipe and replace it with undamaged pipe. Damaged pipe is defined as pipe with kinks or gouges exceeding 10 percent of pipe wall thickness.
  - d. Exercise care when lowering pipe into trench to prevent damage or twisting of pipe.

3.02 FIELD QUALITY CONTROL

A. Joint Butt Fusion:

1. Measure and log each joint fusion by an electronic monitoring device (data logger) affixed to fusion machine. Data to be logged shall include the following and shall be capable of being retrieved electronically:
  - a. Pipe size, dimensions, and wall thickness.
  - b. Machine model and size.
  - c. Operator identification.
  - d. Job identification number.
  - e. Weld number.
  - f. Fusion, heating, and drag pressure settings.
  - g. Heater plate temperature.

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- h. Time stamp showing when weld was performed.
  - i. Heating and curing time of weld.
  - j. Curing temperature readings and time stamps of readings.
  - k. Error messages and warnings for out of range temperature or pressure settings.
2. In addition to logged items above, the following shall be logged or annotated on report:
- a. Location of joint being fused by pipeline station or by reference to pipe shop drawing.
  - b. Ambient temperature, wind speed, precipitation, and humidity.
  - c. Environmental actions taken (e.g., use of tarps, enclosures, blankets, etc.).
  - d. Type of HDPE and manufacturer.
- B. Joint Weld Inspection:
- 1. Visually examine each joint in accordance with the guidelines in ASTM F2620. Remove and replace any joints not meeting the standard.
  - 2. Mechanical Joint Testing:
    - a. Pipe Wall Thickness 1 Inch or Less: Test joints in accordance with the bend back testing provided in Appendix X4 of ASTM F2620.
    - b. Pipe Wall Thickness Greater than 1 Inch: Test joints in accordance with the guided side bend testing in accordance with ASME BPVC Section IX Article XXI-XXIV.
    - c. Specimens: Cut pipe 12 inches on each side of field made joint. Rejoin ends and proceed with Work.
    - d. Test Frequency:
      - 1) Two joints selected at random by Engineer.
      - 2) Each Test Failure: Two additional joints selected at random by Engineer.
- C. Pipeline Hydrostatic Test:
- 1. General:
    - a. Notify Engineer in writing 5 days in advance of testing. Perform testing in presence of Engineer.
    - b. Furnish testing equipment and perform tests in manner satisfactory to Engineer.
    - c. Test newly installed pipelines.
    - d. Isolate new pipelines that are connected to existing pipelines.
    - e. Provide temporary air vents with manual valves at high points for venting during initial fill-up and draining.

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- f. Using water as test medium, pipes shall successfully pass a hydrostatic test prior to acceptance.
  - g. Conduct field hydrostatic test on buried piping after trench has been completely backfilled. Testing may, as approved by Engineer, be done prior to placement of asphaltic concrete or roadway structural section.
  - h. Contractor may, if field conditions permit and as determined by Engineer, partially backfill trench and leave joints open for inspection and conduct initial service leak test. Final field hydrostatic test shall not be conducted until backfilling has been completed as specified above.
  - i. Supply of temporary water shall be as stated in Section 01 50 00, Temporary Facilities and Controls.
  - j. Dispose of water used in testing in accordance with federal, state, and local requirements.
2. Preparation:
- a. Install temporary thrust blocking or other restraint as necessary to prevent movement of pipe and protect adjacent piping or equipment. Make necessary taps in piping prior to testing.
  - b. Wait 5 days minimum after concrete thrust blocking or designed thrust collars are installed to perform pressure tests. If high-early strength cement is used for thrust blocking, wait may be reduced to 2 days.
  - c. Prior to test, remove or suitably isolate appurtenant instruments or devices that could be damaged by pressure testing.
  - d. New Piping Connected to Existing Piping: Isolate new piping with grooved-end pipe caps, blind flanges, or other means as acceptable to Engineer.
3. Procedure:
- a. Initial expansion pressure shall be 25 psi as measured at ground surface.
  - b. Test pressure shall be 15 psi.
  - c. Maximum filling velocity shall not exceed 0.25 feet per second, calculated based on full area of the pipe.
  - d. Expel air from pipe system during filling through temporary vent valves and other end vents.
  - e. Test procedure shall be in accordance with ASTM F2164.
    - 1) Initial Expansion Phase: Add water as required to maintain initial expansion pressure for 4 hours.
    - 2) Test Phase: Reduce pressure by 10 psi to test pressure and start pressure test.
    - 3) Test is successful if pressure stays within 5 percent of initial value for 1 hour.

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- f. If test is not completed because of leakage, equipment failure, or other reasons, depressurize test section and allow it to relax for at least 8 hours before retesting.
- g. If there is leakage, repair defective pipe section and repeat hydrostatic test.

3.03 MANUFACTURER'S SERVICES

- A. Provide pipe manufacturer's representative in accordance with Section 01 43 33, Manufacturers' Field Services, for assistance during pipe joining operations and pipe installation.

**END OF SECTION**

**SECTION 40 05 15**  
**PIPING SUPPORT SYSTEMS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Society of Civil Engineers (ASCE): 7, Minimum Design Loads for Buildings and Other Structures.
  2. ASTM International (ASTM):
    - a. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
    - b. A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
    - c. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
  3. International Building Code (IBC).
  4. International Code Council (ICC):
  5. International Mechanical Code (IMC).
  6. Manufacturers' Standardization Society (MSS):
    - a. SP 58, Pipe Hangers and Supports—Materials, Design and Manufacture.
    - b. SP 127, Bracing for Piping Systems Seismic-Wind-Dynamic Design, Selection, and Application.

1.02 DEFINITIONS

- A. Wetted or Submerged: Submerged, less than 1 foot above liquid surface, below top of channel wall, under cover or slab of channel or tank, or in other damp locations.

1.03 SUBMITTALS

- A. Action Submittals:
1. Catalog information and drawings of piping support system, locating each support, sway brace, seismic brace, hanger, guide, component, and anchor for all piping. Identify support, hanger, guide, and anchor type by catalog number and Shop Drawing detail number.
  2. Calculations for each type of pipe support, attachment and anchor.
  3. Revisions to support systems resulting from changes in related piping system layout or addition of flexible joints.

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4. Seismic anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

1. Seismic anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
2. Component and attachment testing seismic certificate of compliance as required by Section 01 45 33, Special Inspection, Observation, and Testing.
3. Maintenance information on piping support system.

1.04 QUALIFICATIONS

- A. Piping support systems shall be designed and Shop Drawings prepared and sealed by a Registered Professional Engineer in the State of California.

1.05 DESIGN REQUIREMENTS

A. General:

1. Design, size, and locate piping support systems throughout facility, whether shown or not.
2. Piping Smaller than 30 Inches: Supports are shown only where specific types and locations are required; additional pipe supports may be required.
3. Piping 30 Inches and Larger: Support systems have been designed for piping shown.
4. Meet requirements of MSS SP 58 and ASME B31.1 or as modified by this section.

B. Pipe Support Systems:

1. Design pipe support systems for gravity and thrust loads imposed by weight of pipes or internal pressures, including insulation and weight of fluid in pipes.
2. Seismic loads in accordance with governing codes and as shown on Structural General Drawings.
3. Wind loads in accordance with governing codes and as shown on Structural General Drawings.
4. Maximum Support Spacing and Minimum Rod Size: In accordance MSS SP 58 Table 3 and Table 4.
  - a. Ductile-iron Pipe 8 Inches and Under: Maximum span limited to that for standard weight steel pipe for water service.
  - b. Ductile-iron Pipe 10 Inches and Larger: Maximum span limited to 20 feet.

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- C. Anchoring Devices: Design, size, and space support anchoring devices, including anchor bolts, inserts, and other devices used to anchor support, to withstand shear and pullout loads imposed by loading and spacing on each particular support.
- D. Vertical Sway Bracing: 10-foot maximum centers or as shown.
- E. Existing Support Systems: Use existing supports systems to support new piping only if Contractor can show they are adequate for additional load, or if they are strengthened to support additional load.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. When specified items are not available, fabricate pipe supports of correct material and to general configuration indicated.
- B. Special support and hanger details may be required for cases where standard catalog supports are not applicable.
- C. Materials: In accordance with Table 1 and Table 2, attached as Supplements at end of section.

2.02 HANGERS

- A. Clevis: MSS SP 58, Type 1:
  - 1. Anvil; Figure 260 for steel pipe and Figure 590 for ductile-iron pipe, sizes 1/2 inch through 30 inches.
  - 2. Insulated Steel Pipe: Anvil; Figure 260 with insulated saddle system (ISS), sizes 1/2 inch through 16 inches.
  - 3. B-Line; Figure B3100, sizes 1/2 inch through 30 inches.
  - 4. Or approved equal.
- B. Adjustable Swivel Split-Ring Pipe Clamp: MSS SP 58, Type 6:
  - 1. Anvil; Figure 104, sizes 3/4 inch through 8 inches.
  - 2. B-Line; Figure B3171, sizes 3/4 inch through 8 inches.
  - 3. Or approved equal.
- C. Steel Yoke Pipe Rolls and Roller Supports: MSS SP 58, Type 41 or Type 43:
  - 1. Anvil; Figure 181 for sizes 2-1/2 inches through 24 inches, and Figure 171 for sizes 1 inch through 30 inches.



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2. B-Line; Figure B3110 for sizes 2 inches through 24 inches and Figure B3114 for 30 inches.
3. Or approved equal.

D. Pipe Rollers and Supports: MSS SP 58, Type 44:

1. Anvil; Figure 175, sizes 2 inches through 30 inches.
2. B-Line; Figure B3120, sizes 2 inches through 24 inches.
3. Or approved equal.

2.03 WALL BRACKETS, SUPPORTS, AND GUIDES

A. Welded Steel Wall Bracket: MSS SP 58, Type 33 (heavy-duty):

1. Anvil; Figure 199, 3,000-pound rating.
2. B-Line; Figure B3067, 3,000-pound rating.
3. Or approved equal.

B. Adjustable “J” hanger MSS SP 58, Type 5:

1. Anvil; Figure 67, sizes 1/2 inch through 8 inches.
2. B-Line; Figure B3690, sizes 1/2 inch through 8 inches.
3. Or approved equal.

C. Offset Pipe Clamp:

1. Anvil; Figure 103, sizes 3/4 inch through 8 inches.
2. Or approved equal.

D. Channel Type:

1. Unistrut.
2. Anvil; Power-Strut.
3. B-Line; Strut System.
4. Aickinstrut (FRP).
5. Or approved equal.

2.04 PIPE SADDLES

A. Provide 90-degree to 120-degree pipe saddle for pipe 6 inches and larger with baseplates drilled for anchors bolts.

1. In accordance with Standard Details.
2. Sizes 20 inches through 60 inches, Piping Technology & Products, Inc.; Figure 2000.

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B. Saddle Supports, Pedestal Type:

1. Minimum standard weight pipe stanchion, saddle, and anchoring flange.
2. Nonadjustable Saddle: MSS SP, Type 37 with U-bolt.
  - a. Anvil; Figure 259, sizes 4 inches through 36 inches with Figure 63C base.
  - b. B-Line; Figure B3095, sizes 1 inch through 36 inches with Figure B3088S base.
  - c. Or approved equal.
3. Adjustable Saddle: MSS SP 58, Type 38 without clamp.
  - a. Anvil; Figure 264, sizes 2-1/2 inches through 36 inches with Figure 62C base.
  - b. B-Line; Figure B3092, sizes 3/4 inch through 36 inches with Figure B3088S base.
  - c. Or approved equal.

2.05 CHANNEL TYPE SUPPORT SYSTEMS

- A. Channel Size: 12-gauge, 1-5/8-inch wide minimum steel, or 1-1/2-inch wide, minimum FRP.
- B. Members and Connections: Design for loads using one-half of manufacturer's allowable loads.
- C. Fasteners: Vinyl ester fiber, polyurethane base composite nuts and bolts, or encapsulated steel fasteners.
- D. Manufacturers and Products:
  1. B-Line; Strut System.
  2. Unistrut.
  3. Anvil; Power-Strut.
  4. Aickinstrut (FRP System).
  5. Enduro-Durostrut (FRP Systems).
  6. Or approved equal.

2.06 FRP PIPE SUPPORTS SYSTEMS

- A. General:
  1. FRP with UV additive, protective veil, and vinyl ester resins resistance to chemicals listed in Supplement at end of section.
  2. Fire Retardant: ASTM E84.
  3. Include hangers, rods, attachments, and fasteners.

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B. Clevis Hangers:

1. Factor of Safety: 3 to 1.
2. Minimum Design Load: 200 pounds.

C. Design:

1. Design pipe supports spacing, hanger rod sizing based upon manufacturer's recommendations.
2. Identify and highlight non-FRP fasteners or components on Shop Drawing.

D. Manufacturers:

1. Aickinstrut.
2. Enduro.
3. Century Composite.
4. Or approved equal.

2.07 PIPE CLAMPS

A. Riser Clamp: MSS SP 58, Type 8.

1. Anvil; Figure 261, sizes 3/4 inch through 24 inches.
2. B-Line; Figure B3373, sizes 1/2 inch through 30 inches.
3. Or approved equal.

2.08 ELBOW AND FLANGE SUPPORTS

A. Elbow with Adjustable Stanchion: Sizes 2 inches through 18 inches, Anvil; Figure 62C base.

B. Elbow with Nonadjustable Stanchion: Sizes 2-1/2 inches through 42 inches, Anvil; Figure 63A or Figure 63B base.

C. Flange Support with Adjustable Base: Sizes 2 inches through 24 inches, Standon; Model S89.

D. Or approved equal.

2.09 INTERMEDIATE PIPE GUIDES

A. Type: Hold down pipe guide.

1. Manufacturer and Product:
  - a. B-Line; Figure B3552, 1-1/2 inches through 30 inches.
  - b. Or approved equal.

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- B. Type: U-bolts with double nuts to provide nominal 1/8-inch to 1/4-inch clearance around pipe; MSS SP 58, Type 24.
  - 1. Anvil; Figure 137 and Figure 137S.
  - 2. B-Line; Figure B3188 and Figure B3188NS.
  - 3. Or approved equal.

2.10 PIPE ALIGNMENT GUIDES

- A. Type: Spider.
- B. Manufacturers and Products:
  - 1. Anvil; Figure 255, sizes 1/2 inch through 24 inches.
  - 2. B-Line; Figure B3281 through Figure B3287, sizes 1/2 inch through 24 inches.
  - 3. Or approved equal.

2.11 PIPE ANCHORS

- A. Type: Anchor chair with U-bolt strap.
- B. Manufacturers and Products:
  - 1. B-Line; Figure B3147A or Figure B3147B.
  - 2. Or approved equal.

2.12 SEISMIC RESTRAINTS

- A. Solid pipe bracing attachment to pipe clevis with clevis cross brace and angle rod reinforcement.
- B. Manufacturers:
  - 1. Mason Industries.
  - 2. B-Line.
  - 3. Anvil.
  - 4. Or approved equal.

2.13 ACCESSORIES

- A. Anchor Bolts:
  - 1. Size and Material: Sized by Contractor for required loads, 1/2-inch minimum diameter, and as specified in Section 05 50 00, Metal Fabrications.

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2. Bolt Length (Extension Above Top of Nut):
  - a. Minimum Length: Flush with top of nut preferred. If not flush, shall be no more than one thread recessed below top of nut.
  - b. Maximum Length: No more than a full nut depth above top of nut.
  
- B. Dielectric Barriers:
  1. Plastic coated hangers, isolation cushion, or tape.
  2. Manufacturer and Products:
    - a. B-Line; B1999 Vibra Cushion.
    - b. B-Line; Iso Pipe, Isolation Tape.
    - c. Or approved equal.
  
- C. Insulation Shields:
  1. Type: Galvanized steel or stainless steel, MSS SP 58, Type 40.
  2. Manufacturers and Products:
    - a. Anvil; Figure 167, sizes 1/2 inch through 24 inches.
    - b. B-Line; Figure B3151, sizes 1/2 inch through 24 inches.
    - c. Or approved equal.
  
- D. Welding Insulation Saddles:
  1. Type: MSS SP 58, Type 39.
  2. Manufacturers and Products:
    - a. Anvil; Figure Series 160, sizes 1 inch through 36 inches.
    - b. B-Line; Figure Series B3160, sizes 1/2 inch through 24 inches.
    - c. Or approved equal.
  
- E. Plastic Pipe Support Channel:
  1. Type: Continuous support for plastic pipe and to increase support spacing.
  2. Manufacturers and Products:
    - a. B-Line; Figure Series B3106V, sizes 1/2 inch through 6 inches with Figure B3106 Vee bottom hanger.
    - b. Or approved equal.
  
- F. Hanger Rods, Clevises, Nuts, Sockets, and Turnbuckles: In accordance with MSS SP 58.
  
- G. Attachments:
  1. I-Beam Clamp: Concentric loading type, MSS SP 58, Type 21, Type 28, Type 29, or Type 30, which engage both sides of flange.

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2. Concrete Insert: MSS SP 58, Type 18, continuous channel insert with load rating not less than that of hanger rod it supports.
3. Welded Beam Attachment: MSS SP 58, Type 22.
  - a. Anvil; Figure 66.
  - b. B-Line; Figure B3083.
  - c. Or approved equal.
4. U-Channel Concrete Inserts: As specified in Section 05 50 00, Metal Fabrications.
5. Concrete Attachment Plates:
  - a. Anvil; Figure 47, Figure 49, or Figure 52.
  - b. B-Line; Figure B3084, Figure B3085, or Figure B3086.
  - c. Or approved equal.

**PART 3 EXECUTION**

3.01 INSTALLATION

A. General:

1. Install support systems in accordance with MSS SP 58, unless shown otherwise.
2. Install pipe hanger rods plumb, within 4 degrees of vertical during shut down, start up or operations.
3. Support piping connections to equipment by pipe support and not by equipment.
4. Support large or heavy valves, fittings, and appurtenances independently of connected piping.
5. Support no pipe from pipe above it.
6. Support pipe at changes in direction or in elevation, adjacent to flexible joints and couplings, and where shown.
7. Do not use adhesive anchors for attachment of supports to ceiling or walls.
8. Do not install pipe supports and hangers in equipment access areas or bridge crane runs.
9. Brace hanging pipes against horizontal movement by both longitudinal and lateral sway bracing and to reduce movement after startup.
10. Install lateral supports for seismic loads at changes in direction.
11. Install pipe anchors where required to withstand expansion thrust loads and to direct and control thermal expansion.
12. Repair mounting surfaces to original condition after attachments are completed.

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B. Standard Pipe Supports:

1. Horizontal Suspended Piping:
  - a. Single Pipes: Clevis hangers or adjustable swivel split-ring.
  - b. Grouped Pipes: Trapeze hanger system.
2. Horizontal Piping Supported from Walls:
  - a. Single Pipes: Wall brackets, or attached to wall, or to wall mounted framing with anchors.
  - b. Stacked Piping: Wall mounted framing system and “J” hangers acceptable for pipe smaller than 3-inch.
  - c. Pipe clamp that resists axial movement of pipe through support is not acceptable. Use pipe rollers supported from wall bracket.
3. Horizontal Piping Supported from Floors:
  - a. Saddle Supports:
    - 1) Pedestal Type, elbow and flange.
    - 2) Provide minimum 1-1/2-inch grout beneath baseplate.
  - b. Floor Mounted Channel Supports:
    - 1) Use for pipe smaller than 3-inch running along floors and in trenches at pipe elevations lower than can be accommodated using pedestal pipe supports.
    - 2) Attach channel framing to floors with baseplate on minimum 1-1/2-inch nonshrink grout and with anchor bolts.
    - 3) Attach pipe to channel with clips or pipe clamps.
  - c. Concrete Cradles: Use for pipe larger than 3 inches along floor and in trenches at pipe elevations lower than can be accommodated using stanchion type.
4. Insulated Pipe:
  - a. Pipe hanger and support shall be on outside of insulation. Do not enclose within insulation.
  - b. Provide precut 120-degree sections of rigid insulation (minimum length same as shield), shields and oversized hangers or insulated saddle system (ISS).
  - c. Wall-mounted pipe clips not acceptable for insulated piping.
5. Vertical Pipe: Support with wall bracket and elbow support, or riser clamp on floor penetration.

C. Standard Attachments:

1. New Concrete Ceilings: Concrete inserts, concrete attachment plates, or concrete anchors as limited below:
  - a. Single point attachment to ceiling allowed only for 3/4-inch rod and smaller (8 inches and smaller pipe).
  - b. Where there is vibration or bending considerations, do not connect a single pipe support hanger rod directly to a drilled concrete anchor (single point attachment) regardless of size.

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- 1) These lines include air operated diagram pumps and other lines, if any, as identified below:
  2. Existing Concrete Ceilings: Channel type support with minimum of two anchor points, concrete attachment plates or concrete anchors as limited below:
    - a. Single point attachment to ceiling is allowed only for 3/4-inch rod and smaller (8 inches and smaller pipe).
    - b. Where there is vibration or bending considerations do not connect a single pipe support hanger rod directly to a drilled concrete anchor (single point attachment) regardless of size.
      - 1) These lines include air operated diagram pumps and other lines, if any, as identified below:
  3. Steel Beams: I-beam clamp or welded attachments.
  4. Wooden Beams: Lag screws and angle clips to members not less than 2-1/2 inches thick.
  5. Concrete Walls: Concrete inserts or brackets or clip angles with concrete anchors.
  6. Concrete Beams: Concrete inserts, or if inserts are not used attach to vertical surface similar to concrete wall. Do not drill into beam bottom.
- D. Saddles for Steel or Concrete Pipe: Provide 90-degree to 120-degree pipe saddle for pipe sizes 6 inches and larger when installed on top of steel or concrete beam or structure, pipe rack, trapeze, or where similar concentrated point supports would be encountered.
- E. Intermediate and Pipe Alignment Guides:
1. Provide pipe alignment guides, or pipe supports that provide same function, at expansion joints and loops.
  2. Guide pipe on each side of expansion joint or loop at four-pipe and 14-pipe diameters from each joint or loop.
  3. Install intermediate guides on metal framing support systems not carrying pipe anchor or alignment guide.
- F. Accessories:
1. Insulation Shield: Install on insulated piping with oversize rollers and supports.
  2. Welding Insulation Saddle: Install on insulated steel pipe with oversize rollers and supports.
  3. Dielectric Barrier:
    - a. Provide between painted or galvanized carbon steel members and copper or stainless steel pipe or between stainless steel supports and nonstainless steel ferrous metal piping.



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- b. Install rubber wrap between submerged metal pipe and oversized clamps.

3.02 FIELD FINISHING

- A. Paint atmospheric exposed surfaces hot-dip galvanized steel components as specified in Section 09 90 00, Painting and Coating.

3.03 SUPPLEMENTS

- A. The supplements listed below, following “End of Section,” are a part of this Specification:
  - 1. Table 1: Nonchemical Areas.
  - 2. Table 2: Chemical Areas.

**END OF SECTION**

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<b>Table 1 Nonchemical Areas</b>	
<b>Exposure Conditions</b>	<b>Support Material</b>
Pipe Galleries Process Areas: Exposed	Galvanized steel or precoated steel, plastic coated hangers for uninsulated copper or stainless steel piping
Process Areas: Wetted or Submerged	Stainless steel or FRP
Pipes conveying chemicals listed in Table 2	Provide with corresponding support per Table 2
<p>Notes:</p> <ol style="list-style-type: none"> <li>1. Precoated steel to be fusion bonded epoxy or vinyl copolymer (Plastisol).</li> <li>2. Stainless steel to be Type 316.</li> <li>3. Galvanized steel to be per ASTM A653/A653M, Class G90, or hot-dip galvanized after fabrication to ASTM A123/A123M.</li> </ol>	

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<b>Table 2 Chemical Areas</b>		
<b>Exposure Conditions</b>	<b>Support for Direct Exposure</b>	<b>Support for Remote Exposure</b>
Coagulants	FRP	Precoated steel or galvanized steel
Ferric Chloride	FRP	Precoated steel
Polymers	FRP	Precoated steel
<p>Notes:</p> <ol style="list-style-type: none"> <li>1. Direct exposure includes entire area within containment area; area within 20 feet horizontal and 10 feet vertical of chemical pumps or chemical mixing stations; or as specified.</li> <li>2. Remote exposure is area beyond area defined as direct exposure, but within designated building.</li> <li>3. Precoated steel to be fusion bonded epoxy or vinyl copolymer (Plastisol).</li> <li>4. Galvanized steel to be per ASTM A653/A653M, Class G90, or hot-dip galvanized after fabrication to ASTM A123/A123M.</li> </ol>		

**SECTION 40 27 00**  
**PROCESS PIPING—GENERAL**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section and any supplemental Data Sheets:
1. American Association of State Highway and Transportation Officials (AASHTO): HB-17, Standard Specifications for Highway Bridges.
  2. American Petroleum Institute (API): SPEC 5L, Specification for Line Pipe.
  3. American Society of Mechanical Engineers (ASME):
    - a. Boiler and Pressure Vessel Code, Section IX, Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators.
    - b. B1.20.1, Pipe Threads, General Purpose (Inch).
    - c. B16.1, Gray Iron Pipe Flanges and Flanged Fittings Classes 25, 125, and 250.
    - d. B16.3, Malleable Iron Threaded Fittings Classes 150 and 300.
    - e. B16.5, Pipe Flanges and Flanged Fittings NPS 1/2 through NPS 24 Metric/Inch Standard.
    - f. B16.9, Factory-Made Wrought Buttwelding Fittings.
    - g. B16.11, Forged Fittings, Socket-Welding and Threaded.
    - h. B16.15, Cast Copper Alloy Threaded Fittings Classes 125 and 250.
    - i. B16.21, Nonmetallic Flat Gaskets for Pipe Flanges.
    - j. B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
    - k. B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings Classes 150, 300, 600, 900, 1500, and 2500.
    - l. B16.25, Buttwelding Ends.
    - m. B16.42, Ductile Iron Pipe Flanges and Flanged Fittings Classes 150 and 300.
    - n. B31.1, Power Piping.
    - o. B31.3, Process Piping.
    - p. B31.9, Building Services Piping.
    - q. B36.10M, Welded and Seamless Wrought Steel Pipe.
  4. American Society for Nondestructive Testing (ASNT): SNT-TC-1A, Recommended Practice for Personal Qualification and Certification in Nondestructive Testing.

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5. American Water Works Association (AWWA):
  - a. C104/A21.4, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
  - b. C105/A21.5, Polyethylene Encasement for Ductile-Iron Pipe Systems.
  - c. C110/A21.10, Ductile-Iron and Gray-Iron Fittings.
  - d. C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  - e. C115/A21.15, Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
  - f. C151/A21.51, Ductile-Iron Pipe, Centrifugally Cast.
  - g. C207, Steel Pipe Flanges for Waterworks Service, Sizes 4 In. Through 144 In. (100 mm Through 3,600 mm).
  - h. C606, Grooved and Shouldered Joints.
6. American Welding Society (AWS):
  - a. Brazing Handbook.
  - b. A5.8M/A5.8, Specification for Filler Metals for Brazing and Braze Welding.
  - c. D1.1/D1.1M, Structural Welding Code - Steel.
  - d. QC1, Standard for AWS Certification of Welding Inspectors.
7. ASTM International (ASTM):
  - a. A47/A47M, Standard Specification for Ferritic Malleable Iron Castings.
  - b. A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  - c. A105/A105M, Standard Specification for Carbon Steel Forgings for Piping Applications.
  - d. A106/A106M, Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service.
  - e. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
  - f. A135/A135M, Standard Specification for Electric-Resistance-Welder Steel Pipe.
  - g. A139/A139M, Standard Specification for Electro-Fusion (Arc)-Welded Steel Pipe (NPS 4 Inches and Over).
  - h. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - i. A181/A181M, Standard Specification for Carbon Steel Forgings, for General-Purpose Piping.
  - j. A182/A182M, Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
  - k. A183, Standard Specification for Carbon Steel Track Bolts and Nuts.

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- l. A193/A193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
- m. A194/A194M, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
- n. A197/A197M, Standard Specification for Cupola Malleable Iron.
- o. A216/A216M, Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service.
- p. A234/A234M, Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
- q. A240/A240M, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- r. A276, Standard Specification for Stainless Steel Bars and Shapes.
- s. A269, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- t. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
- u. A312/A312M, Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
- v. A320/A320M, Standard Specification for Alloy-Steel and Stainless Steel Bolting for Low-Temperature Service.
- w. A351/A351M, Standard Specification for Castings, Austenitic, for Pressure-Containing Parts.
- x. A380, Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.
- y. A395/A395M, Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
- z. A403/A403M, Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings.
- aa. A409/A409M, Standard Specification for Welded Large Diameter Austenitic Steel Pipe for Corrosive or High-Temperature Service.
- bb. A536, Standard Specification for Ductile Iron Castings.
- cc. A563, Standard Specification for Carbon and Alloy Steel Nuts.
- dd. A587, Standard Specification for Electric-Resistance-Welded Low-Carbon Steel Pipe for the Chemical Industry.
- ee. A743/A743M, Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application.
- ff. A744/A744M, Standard Specification for Castings, Iron-Chromium-Nickel, Corrosion Resistant, for Severe Service.

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- gg. A774/A774M, Standard Specification for As-Welded Wrought Austenitic Stainless Steel Fittings for General Corrosive Service at Low and Moderate Temperatures.
- hh. A778, Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products.
- ii. B32, Standard Specification for Solder Metal.
- jj. B43, Standard Specification for Seamless Red Brass Pipe, Standard Sizes.
- kk. B61, Standard Specification for Steam or Valve Bronze Castings.
- ll. B62, Standard Specification for Composition Bronze or Ounce Metal Castings.
- mm. B75/B75M, Standard Specification for Seamless Copper Tube.
- nn. B88, Standard Specification for Seamless Copper Water Tube.
- oo. B98/B98M, Standard Specification for Copper-Silicon Alloy Rod, Bar and Shapes.
- pp. B462, Standard Specification for Forged or Rolled UNS N06030, UNS N06022, UNS N06035, UNS N06200, UNS N06059, UNS N10362, UNS N06686, UNS N08020, UNS N08024, UNS N08026, UNS N08367, UNS N10276, UNS N10665, UNS N10675, UNS N10629, UNS N08031, UNS N06045, UNS N06025, and UNS R20033 Alloy Pipe Flanges, Forged Fittings, and Valves and Parts for Corrosive High-Temperature Service.
- qq. B464, Standard Specification for Welded UNS N08020 Alloy Pipe.
- rr. B474, Standard Specification for Electric Fusion Welded Nickel and Nickel Alloy Pipe.
- ss. C582, Standard Specification for Contact-Molded Reinforced Thermosetting Plastic (RTP) Laminates for Corrosion-Resistant Equipment.
- tt. D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- uu. D413, Standard Test Methods for Rubber Property-Adhesion to Flexible Substrate.
- vv. D543, Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.
- ww. D1248, Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable.
- xx. D1330, Standard Specification for Rubber Sheet Gaskets.
- yy. D1784, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
- zz. D1785, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

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- aaa. D2000, Standard Classification System for Rubber Products in Automotive Applications.
- bbb. D2310, Standard Classification for Machine-Made “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.
- ccc. D2464, Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- ddd. D2466, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- eee. D2467, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- fff. D2564, Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
- ggg. D2837, Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products.
- hhh. D2996, Standard Specification for Filament-Wound “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.
- iii. D3222, Standard Specification for Unmodified Poly(Vinylidene Fluoride) (PVDF) Molding Extrusion and Coating Materials.
- jjj. D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
- kkk. D4101, Standard Specification for Polypropylene Injection and Extrusion Materials.
- lll. D4894, Standard Specification for Polytetrafluoroethylene (PTFE) Granular Molding and Ram Extrusion Materials.
- mmm. D4895, Standard Specification for Polytetrafluoroethylene (PTFE) Resin Produced from Dispersion.
- nnn. F423, Standard Specification for Polytetrafluoroethylene (PTFE) Plastic-Lined Ferrous Metal Pipe, Fittings, and Flanges.
- ooo. F436, Standard Specification for Hardened Steel Washers.
- ppp. F437, Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- qqq. F439, Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- rrr. F441/F441M, Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
- sss. F493, Standard Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
- ttt. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
- uuu. F656, Standard Specification for Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings.



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8. FM Global (FM).
9. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS): SP-43, Wrought and Fabricated Butt-Welding Fittings for Low-Pressure, Corrosion Resistant Applications.
10. National Electrical Manufacturers Association (NEMA): LI 1, Industrial Laminating Thermosetting Products.
11. National Fire Protection Association (NFPA): 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances.
12. NSF International (NSF):
  - a. ANSI 61: Drinking Water System Components - Health Effects.
  - b. ANSI 372: Drinking Water System Components - Lead Content.

1.02 DEFINITIONS

A. Submerged or Wetted:

1. Zone below elevation of:
  - a. Top face of channel walls and cover slabs.
  - b. Roof of digester, including structure pipe penetrations.
  - c. Liquid surface or within 2 feet above top of liquid surface.
  - d. Top of tank wall or under tank cover.

1.03 DESIGN REQUIREMENTS

A. Where pipe diameter, thickness, pressure class, pressure rating, or thrust restraint is not shown or specified, design piping system in accordance with the following:

1. Process Piping: ASME B31.3, normal fluid service unless otherwise specified.
2. Buried Piping: H20-S16 traffic load with 1.5 impact factor, AASHTO HB-17, as applicable.
3. Thrust Restraints: Restrained pipe joints shall be used. Thrust blocks shall be used only as shown on Drawings or as approved by the Engineer.
  - a. Design for test pressure shown in Piping Schedule.
  - b. Allowable Soil Pressure: 1,000 pounds per square foot.
  - c. Low Pressure Pipelines:
    - 1) When bearing surface of the fitting against soil provides an area equal to or greater than area required for thrust restraint, concrete thrust blocks will not be required.
    - 2) Determine bearing area for fittings without thrust blocks by projected area of 70 percent of internal diameter multiplied by chord length for fitting centerline curve.

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1.04 SUBMITTALS

A. Action Submittals:

1. Shop Fabricated Piping:
  - a. Detailed pipe fabrication or spool drawings showing special fittings and bends, dimensions, coatings, and other pertinent information.
  - b. Layout drawing showing location of each pipe section and each special length; number or otherwise designate laying sequence on each piece.
2. Pipe Wall Thickness: Identify wall thickness and rational method or standard applied to determine wall thickness for each size of each different service including exposed, submerged, buried, and concrete-encased installations for Contractor-designed piping.
3. Hydraulic Thrust Restraint for Restrained Joints: Details including materials, sizes, assembly ratings, and pipe attachment methods.
4. Thrust Blocks: Concrete quantity, bearing area on pipe, and fitting joint locations.
5. Dissimilar Buried Pipe Joints: Joint types and assembly drawings.
6. Pipe Corrosion Protection: Product data.
7. Anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

1. Manufacturer's Certification of Compliance, in accordance with Section 01 61 00, Common Product Requirements:
  - a. Pipe and fittings.
  - b. Factory applied resins and coatings.
2. Anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
3. Flanged Pipe and Fittings: Manufacturer's product data sheets for gaskets including torquing requirements and bolt tightening procedures.
4. Qualifications:
  - a. Nondestructive Testing Personnel: SNT-TC-1A Level II certification and qualifications.
  - b. AWS QC1 Certified Welding Inspector: Submit evidence of current certification prior to commencement of welding activities.
  - c. Welders:
    - 1) Continuity log for welders and welding operators.
    - 2) Welder qualification test records conducted by Contractor or manufacturer.

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5. Welding Procedures: Qualified in accordance with ASME Boiler and Pressure Vessel Code, Section IX for weld type(s) and base metal(s).
6. Nondestructive inspection and testing procedures.
7. Test logs.
8. Pipe coating applicator certification.
9. Laboratory Testing Equipment: Certified calibrations, manufacturer's product data, and test procedures.
10. CWI inspection records and NDE test records.
11. Component and attachment testing seismic certificate of compliance as required by Section 01 45 33, Special Inspection, Observation, and Testing.

1.05 QUALITY CONTROL

A. Qualifications:

1. Independent Inspection and Testing Agency:
  - a. Experience in field of welding and welded pipe fittings testing required for this Project.
  - b. Calibrated instruments and equipment, and documented standard procedures for performing specified testing.
  - c. Certified in accordance with ASNT SNT-TC-1A for testing procedures required for this Project.
  - d. Testing Agency: Personnel performing tests shall be NDT Level II certified in accordance with ASNT SNT-TC-1A.
2. Welding Procedures: In accordance with ASME BPVC SEC IX (Forms QW-482 and QW-483) or AWS D1.1/D1.1M (Annex N Forms).
3. Welder Qualifications: In accordance ASME BPVC SEC IX (Form QW-484) or AWS D1.1/D1.1M (Annex N Forms).
4. Contractor's CWI: Certified in accordance with AWS QC1, and having prior experience with specified welding codes. Alternate welding inspector qualifications require approval by Engineer.

1.06 QUALITY ASSURANCE

- A. Owner will retain an independent inspection and testing agency. The presence of the Owner's Special Inspectors or Verification CWI does not relieve Contractor from performing own Quality Control, including 100 percent visual inspection of welds and other testing required by ASME B31.3 for Normal Fluid Service Category piping.

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1.07 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with Section 01 61 00, Common Product Requirements, and:
1. Flanges: Securely attach metal, hardboard, or wood protectors over entire gasket surface.
  2. Threaded or Socket Welding Ends: Fit with metal, wood, or plastic plugs or caps.
  3. Linings and Coatings: Prevent excessive drying.
  4. Cold Weather Storage: Locate products to prevent coating from freezing to ground.
  5. Handling: Use heavy canvas or nylon slings to lift pipe and fittings.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 PIPING

- A. As specified on Piping Data Sheet(s) located at the end of this section as Supplement and on Piping Schedule located on Drawings.
- B. Diameters Shown:
1. Standardized Products: Nominal size.
  2. Fabricated Steel Piping (Except Cement-Lined): Outside diameter, ASME B36.10M.
  3. Cement-Lined Steel Pipe: Lining inside diameter.

2.03 JOINTS

- A. Grooved End System:
  - 1. Rigid type.
  - 2. Use of flexible grooved joints only allowed where shown on Drawings or with prior approval by Engineer.
  - 3. Flanges: When required, furnish with grooved type flange adapters of same manufacturer as grooved end couplings.
  
- B. Flanged Joints:
  - 1. Flat-faced, carbon steel, or alloy flanges when mating with flat-faced cast or ductile iron flanges.
  - 2. Higher pressure rated flanges as required to mate with equipment when equipment flange is of higher pressure rating than required for piping.
  
- C. Threaded Joints: NPT taper pipe threads in accordance with ASME B1.20.1.
  
- D. Mechanical Joint Anchor Gland Follower:
  - 1. Ductile iron anchor type, wedge action, with break-off tightening bolts.
  - 2. Thrust rated to 250 psi minimum.
  - 3. Rated operating deflection not less than:
    - a. 3 degrees for sizes through 12 inches.
    - b. 2 degrees for sizes 14 inches through 16 inches.
    - c. 1.5 degrees for sizes 18 inches through 24 inches.
    - d. 1 degree for sizes 30 inches through 48 inches.
  - 4. UL and FM approved.
  
- E. Flexible Mechanical Compression Joint Coupling:
  - 1. Stainless steel, ASTM A276, Type 305 bands.
  - 2. Manufacturers:
    - a. Pipeline Products Corp.
    - b. Fernco Joint Sealer Co.
    - c. Or approved equal.
  
- F. Mechanical connections of high-density polyethylene pipe to auxiliary equipment such as valves, pumps, tanks, and other piping systems shall be through-flanged connections consisting of the following:
  - 1. Polyethylene stub end thermally butt-fused to end of pipe.
  - 2. ASTM A240/A240M, Type 304 stainless steel backing flange, 125-pound, ASME B16.1 standard. Use insulating flanges where shown.

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3. Bolts and nuts of sufficient length to show a minimum of three complete threads when joint is made and tightened to manufacturer's standard.  
Retorque nuts after 4 hours.
4. Gaskets as specified on Data Sheet.

2.04 GASKET LUBRICANT

- A. Lubricant shall be supplied by pipe manufacturer and no substitute or approved equal will be allowed.

2.05 PIPE CORROSION PROTECTION

- A. Coatings: See Section 09 90 00, Painting and Coating, for details of coating requirements.
- B. Heat Shrink Wrap:
  1. Type: Cross-linked polyolefin wrap or sleeve with mastic sealant.
  2. Manufacturers and Products:
    - a. Raychem; WPC or TPS.
    - b. Or approved equal.
- C. Polyethylene Encasement (Bagging):
  1. Encasement Tube: Black polyethylene encasement tube, 8 mils minimum thickness, conforming to AWWA C105/A21.5, free of gels, streaks, pinholes, foreign matter, undispersed raw materials, and visible defects such as tears, blisters, and thinning at folds.
  2. Securing Tape: Thermoplastic tape, 8 mils minimum thickness, 1 inch wide, pressure sensitive adhesive face capable of bonding to metal, bituminous coating, and polyethylene encasement tube.
- D. Insulating Flanges, Couplings, and Unions:
  1. Materials:
    - a. In accordance with applicable piping material specified in Pipe Data Sheet. Complete assembly shall have ASME B31.3 working pressure rating equal to or higher than that of joint and pipeline.
    - b. Galvanically compatible with piping.
    - c. Resistant for intended exposure, operating temperatures, and products in pipeline.
  2. Union Type, 2 Inches and Smaller:
    - a. Screwed or solder-joint.
    - b. O-ring sealed with molded and bonded insulation to body.

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3. Flange Type, 2-1/2 Inches and Larger:
  - a. Flanged, complete with bolt insulators, dielectric gasket, bolts, and nuts.
  - b. Bolt insulating sleeves shall be provided full length between insulating washers.
  - c. Ensure fit-up of components of insulated flange assembly to provide a complete functioning installation.
  - d. AWWA C207 steel flanges may be drilled oversize up to 1/8-inch to accommodate insulating sleeves.
  - e. No less than minimum thread engagement in accordance with specified bolting standards will be permitted to accommodate thicknesses of required washers, flanges, and gasket.
4. Flange Insulating Kits:
  - a. Gaskets: Full-face, Type E with elastomeric sealing element. Sealing element shall be retained in a groove within retainer portion of gasket.
  - b. Insulating Sleeves: Full-length fiberglass reinforced epoxy (NEMA LI-1, G-10 grade).
  - c. Insulating Washers: Fiberglass-reinforced epoxy (NEMA LI-1, G-10 grade).
  - d. Steel Washers: Hardened steel, ASTM F436, 1/8 inch thick.
    - 1) Flange Diameters 36 Inches or Less: Provide two washers per bolt.
    - 2) Flange Diameters Larger Than 36 Inches: Provide four washers per bolt.
5. Manufacturers and Products:
  - a. Dielectric Flanges and Unions:
    - 1) PSI, Houston, TX.
    - 2) Advance Products and Systems, Lafayette, LA.
    - 3) Or approved equal.
  - b. Insulating Couplings:
    - 1) Dresser; STAB-39.
    - 2) Baker Coupling Company, Inc.; Series 216.
    - 3) Or approved equal.

2.06 THRUST BLOCKS

- A. Concrete: As specified in Section 03 30 01, Reinforced Concrete.

2.07 THRUST TIES

- A. Steel Pipe: Fabricated lugs and rods in accordance with details shown on Drawings.

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2.08 VENT AND DRAIN VALVES

- A. Pipeline 2-Inch Diameter and Smaller: 1/2-inch vent, 1-inch drain, unless shown otherwise.
- B. Pipelines 2-1/2-Inch Diameter and Larger: 3/4-inch vent, 1-inch drain, unless shown otherwise.

2.09 FABRICATION

- A. Mark each pipe length on outside with the following:
  - 1. Size or diameter and class.
  - 2. Manufacturer's identification and pipe serial number.
  - 3. Location number on laying drawing.
  - 4. Date of manufacture.
- B. Code markings according to approved Shop Drawings.
- C. Shop fabricate flanged pipe in shop, not in field, and delivered to Site with flanges in place and properly faced. Threaded flanges shall be individually fitted and machine tightened on matching threaded pipe by manufacturer.

2.10 FINISHES

- A. Factory prepare, prime, and finish coat in accordance with Pipe Data Sheet(s) and Piping Schedule.
- B. Galvanizing:
  - 1. Hot-dip applied, meeting requirements of ASTM A153/A153M.
  - 2. Electroplated zinc or cadmium plating is unacceptable.
  - 3. Stainless steel components may be substituted where galvanizing is specified.

**PART 3 EXECUTION**

3.01 EXAMINATION

- A. Verify size, material, joint types, elevation, horizontal location, and pipe service of existing pipelines to be connected to new pipelines or new equipment.
- B. Inspect size and location of structure penetrations to verify adequacy of wall pipes, sleeves, and other openings.



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3.02 PREPARATION

- A. See Piping Schedule and Section 09 90 00, Painting and Coating, for additional requirements.
- B. Notify Engineer at least 2 weeks prior to field fabrication of pipe or fittings.
- C. Inspect pipe and fittings before installation, clean ends thoroughly, and remove foreign matter and dirt from inside.
- D. Damaged Coatings and Linings: Repair using original coating and lining materials in accordance with manufacturer's instructions.

3.03 WELDING

- A. Perform in accordance with Section IX, ASME Boiler and Pressure Vessel Code and ASME B31.3 for Pressure Piping, as may be specified on Piping Data Sheets, and if recommended by piping or fitting manufacturer.
- B. Weld Identification: Keep paper record of which welder welded each joint.
- C. Pipe End Preparation:
  - 1. Machine Shaping: Preferred.
  - 2. Oxygen or Arc Cutting: Smooth to touch, true, and slag removal by chipping or grinding.
  - 3. Beveled Ends for Butt Welding: ASME B16.25.
- D. Surfaces:
  - 1. Clean and free of paint, oil, rust, scale, slag, or other material detrimental to welding.
  - 2. Clean stainless steel joints with stainless steel wire brushes or stainless steel wool prior to welding.
  - 3. Thoroughly clean each layer of deposited weld metal, including final pass, prior to deposition of each additional layer of weld metal with a power-driven wire brush.
- E. Alignment and Spacing:
  - 1. Align ends to be joined within existing commercial tolerances on diameters, wall thicknesses, and out-of-roundness.
  - 2. Root Opening of Joint: As stated in qualified welding procedure.
  - 3. Minimum Spacing of Circumferential Butt Welds: Minimum four times pipe wall thickness or 1 inch, whichever is greater.

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- F. Climatic Conditions:
  - 1. Do not perform welding if there is impingement of any rain, snow, sleet, or wind exceeding 5 mph on the weld area, or if ambient temperature is below 32 degrees F.
  - 2. Stainless Steel and Alloy Piping: If ambient is less than 32 degrees F, local preheating to a temperature warm to the hand is required.
- G. Tack Welds: Performed by qualified welder using same procedure as for completed weld, made with electrode similar or equivalent to electrode to be used for first weld pass, and not defective. Remove those not meeting requirements prior to commencing welding procedures.
- H. Surface Defects: Chip or grind out those affecting soundness of weld.
- I. Weld Quality: Meet requirements of governing welding codes.

3.04 INSTALLATION—GENERAL

- A. Join pipe and fittings in accordance with manufacturer's instructions, unless otherwise shown or specified.
- B. Remove foreign objects prior to assembly and installation.
- C. Flanged Joints:
  - 1. Install perpendicular to pipe centerline.
  - 2. Bolt Holes: Straddle vertical centerlines, aligned with connecting equipment flanges or as shown.
  - 3. Use torque-limiting wrenches to ensure uniform bearing and proper bolt tightness.
  - 4. Plastic Flanges: Install annular ring filler gasket at joints of raised-face flange.
  - 5. Grooved Joint Flange Adapters: Include stainless steel washer plates as required for mating to serrated faces and lined valves and equipment.
  - 6. Raised-Face Flanges: Use flat-face flange when joining with flat-faced ductile or cast iron flange.
  - 7. Verify compatibility of mating flange to adapter flange gasket prior to selecting grooved adapter flanging.
  - 8. Flange fillers are to be avoided, but if necessary, may be used to make up for small angles up to 6 degrees and for filling gaps up to 2 inches between flanges. Stacked flange fillers shall not be used.
  - 9. Threaded flanged joints shall be shop fabricated and delivered to Site with flanges in-place and properly faced.
  - 10. Manufacturer: Same as pipe manufacturer or grooved joint flange adapter manufacturer.

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- D. Threaded and Coupled Joints:
1. Conform to ASME B1.20.1.
  2. Produce sufficient thread length to ensure full engagement when screwed home in fittings.
  3. Countersink pipe ends, ream and clean chips and burrs after threading.
  4. Make connections with not more than three threads exposed.
  5. Lubricate male threads only with thread lubricant or tape as specified on Piping Data Sheets.
- E. Grooved-End Joints:
1. Piping shall be grooved in accordance with manufacturer's latest published instructions and shall be accurately cut with tools conforming to coupling manufacturer's standards and to AWWA C606.
  2. Install grooved joint couplings and gaskets in accordance with manufacturer's latest published installation instructions.
- F. Soldered Joints:
1. Use only solder specified for particular service.
  2. Cut pipe ends square and remove fins and burrs.
  3. After thoroughly cleaning pipe and fitting of oil and grease using solvent and emery cloth, apply noncorrosive flux to the male end only.
  4. Wipe excess solder from exterior of joint before hardened.
  5. Before soldering, remove stems and washers from solder joint valves.
- G. Pipe Connections at Concrete Structures: As specified in Article Piping Flexibility Provisions in Section 40 27 01, Process Piping Specialties.
- H. PVC and CPVC Piping:
1. Provide Schedule 80 threaded nipple where necessary to connect to threaded valve or fitting.
  2. Use strap wrench for tightening threaded plastic joints. Do not overtighten fittings.
  3. Do not thread Schedule 40 pipe.
- I. Ductile Iron Piping:
1. Cutting Pipe: Cut pipe with milling type cutter, rolling pipe cutter, or abrasive blade cutter. Do not flame cut.
  2. Dressing Cut Ends:
    - a. General: As required for the type of joint to be made.
    - b. Rubber Gasketed Joints: Remove sharp edges or projections.
    - c. Push-On Joints: Bevel, as recommended by pipe manufacturer.

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- d. Flexible Couplings, Flanged Coupling Adapters, and Grooved End Pipe Couplings: As recommended by the coupling or adapter manufacturer.

3.05 INSTALLATION—EXPOSED PIPING

- A. Piping Runs:
  1. Parallel to building or column lines and perpendicular to floor, unless shown otherwise.
  2. Piping upstream and downstream of flow measuring devices shall provide straight lengths as required for accurate flow measurement.
- B. Supports: As specified in Section 40 05 15, Piping Support Systems.
- C. Group piping wherever practical at common elevations; install to conserve building space and not interfere with use of space and other work.
- D. Unions or Flanges: Provide at each piping connection to equipment or instrumentation on equipment side of each block valve to facilitate installation and removal.
- E. Install piping so that no load or movement in excess of that stipulated by equipment manufacturer will be imposed upon equipment connection; install to allow for contraction and expansion without stressing pipe, joints, or connected equipment.
- F. Piping clearance, unless otherwise shown:
  1. Over Walkway and Stairs: Minimum of 7 feet 6 inches, measured from walking surface or stair tread to lowest extremity of piping system including flanges, valve bodies or mechanisms, insulation, or hanger/support systems.
  2. Between Equipment or Equipment Piping and Adjacent Piping: Minimum 3 feet, measured from equipment extremity and extremity of piping system including flanges, valve bodies or mechanisms, insulation, or hanger/support systems.
  3. From Adjacent Work: Minimum 1 inch(es) from nearest extremity of completed piping system including flanges, valve bodies or mechanisms, insulation, or hanger/support systems.
  4. Do not route piping in front of or to interfere with access ways, ladders, stairs, platforms, walkways, openings, doors, or windows.
  5. Headroom in front of openings, doors, and windows shall not be less than the top of the opening.
  6. Do not install piping containing liquids or liquid vapors in transformer vaults or electrical equipment rooms.

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7. Do not route piping over, around, in front of, in back of, or below electrical equipment including controls, panels, switches, terminals, boxes, or other similar electrical work.

3.06 INSTALLATION—BURIED PIPE

A. Joints:

1. Dissimilar Buried Pipes:
  - a. Provide flexible mechanical compression joints for pressure pipe.
  - b. Provide concrete closure collar for gravity and low pressure (maximum 10 psi) piping or as shown.
2. Concrete Encased or Embedded Pipe: Do not encase joints in concrete, unless specifically shown.

B. Placement:

1. Keep trench dry until pipe laying and joining are completed.
2. Pipe Base and Pipe Zone: As specified in Section 31 23 23.15, Trench Backfill.
3. Exercise care when lowering pipe into trench to prevent twisting or damage to pipe.
4. Measure for grade at pipe invert, not at top of pipe.
5. Excavate trench bottom and sides of ample dimensions to permit visual inspection and testing of entire flange, valve, or connection.
6. Prevent foreign material from entering pipe during placement.
7. Close and block open end of last laid pipe section when placement operations are not in progress and at close of day's work.
8. Lay pipe upgrade with bell ends pointing in direction of laying.
9. Install closure sections and adapters for gravity piping at locations where pipe laying changes direction.
10. Deflect pipe at joints for pipelines laid on a curve using unsymmetrical closure of spigot into bell. If joint deflection of standard pipe lengths will not accommodate horizontal or vertical curves in alignment, provide:
  - a. Shorter pipe lengths.
  - b. Special mitered joints.
  - c. Standard or special fabricated bends.
11. After joint has been made, check pipe alignment and grade.
12. Place sufficient pipe zone material to secure pipe from movement before next joint is installed.
13. Prevent uplift and floating of pipe prior to backfilling.

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C. PVC, CPVC, or HDPE Pipe Placement:

1. Lay pipe snaking from one side of trench to other.
2. Offset: As recommended by manufacturer for maximum temperature variation between time of solvent welding and during operation.
3. Do not lay pipe when temperature is below 40 degrees F, or above 90 degrees F when exposed to direct sunlight.
4. Shield ends to be joined from direct sunlight prior to and during the laying operation.

D. Tolerances:

1. Deflection from Horizontal Line, Except PVC, CPVC, or HDPE: Maximum 2 inches.
2. Deflection From Vertical Grade: Maximum 1/4 inch(es).
3. Joint Deflection: Maximum of 75 percent of manufacturer's recommendation.
4. Horizontal position of pipe centerline on alignment around curves maximum variation of 1.75 feet from position shown.
5. Pipe Cover: Minimum 3 feet, unless otherwise shown.

3.07 INSTALLATION—CONCRETE ENCASED

- A. Provide reinforced concrete pipe encasement where shown on Drawings and where otherwise required. Some piping may be required to be concrete encased for pipe strength requirements that are included in the Specifications. Piping under and within the influence of buildings, utility trenches, vaults, slabs, and other structures shall be concrete encased. See details on Drawings for encasement requirements.
- B. Where concrete encased piping crosses structure construction and expansion joints, provide flexible piping joints to coincide with structure joints to prevent excessive pipe stress and breakage.

3.08 PIPE CORROSION PROTECTION

A. Ductile Iron Pipe:

1. Exposed: As specified in Section 09 90 00, Painting and Coating, and as shown in Piping Schedule.
2. Buried: Wrap with polyethylene bagging.
3. Submerged or Embedded: Coat with coal-tar epoxy as specified in Section 09 90 00, Painting and Coating. If in potable water service, use NSF/ANSI 61 approved epoxy.

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- B. Carbon Steel Pipe:
1. Exposed: As specified in Section 09 90 00, Painting and Coating.
  2. Buried:
    - a. Pipe: Wrap with tape coating system as specified in Section 09 90 00, Painting and Coating.
    - b. Joints: Wrap with tape coating system as specified in Section 09 90 00, Painting and Coating, or heat shrink wrap as specified herein.
  3. Submerged or Embedded: Shop coat with coal-tar epoxy as specified in Section 09 90 00, Painting and Coating. If in potable water service, use NSF/ANSI 61 approved epoxy.
- C. Copper Pipe:
1. Exposed: As specified in Section 09 90 00, Painting and Coating.
  2. Buried:
    - a. Pipe: Tape Wrap.
    - b. Joints: Tape Wrap.
- D. PVC and CPVC Pipe, Exposed: As specified in Section 09 90 00, Painting and Coating.
- E. Piping Accessories:
1. Exposed:
    - a. Field paint black and galvanized steel, brass, copper, and bronze piping components as specified in Section 09 90 00, Painting and Coating, as applicable to base metal material.
    - b. Accessories include, but are not limited to, pipe hangers, supports, expansion joints, pipe guides, flexible couplings, vent and drain valves, and fasteners.
  2. Buried:
    - a. Ferrous Metal and Stainless Steel Components: Coat with coal-tar epoxy as specified in Section 09 90 00, Painting and Coating.
    - b. Bolts, Nuts, and Similar Items: Coat with bituminous paint.
    - c. Flexible Couplings, Grooved Couplings, and Similar Items: Wrap with heat shrink wrap or coat with cement.
    - d. Buried Valves and Similar Elements on Wrapped Pipelines: Coat with bituminous paint and wrap entire valve in polyethylene encasement.
    - e. Cement-Coated Pipelines: Cement coat appurtenances same as pipe.
- F. Polyethylene Encasement: Install in accordance with AWWA C105/A21.5 and manufacturer's instructions.

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- G. Tape Coating System: As specified in Section 09 90 00, Painting and Coating.
- H. Heat Shrink Wrap: Apply in accordance with manufacturer's instructions to surfaces that are cleaned, prepared, and primed.
- I. Insulating Flanges, Couplings, and Unions:
  - 1. Applications:
    - a. Dissimilar metal piping connections.
    - b. Cathodically protected piping penetration to buildings and watertight structures.
    - c. Submerged to unsubmerged metallic piping connections.
    - d. Connections to existing metallic pipe.
    - e. Where required for electrically insulated connection.
  - 2. Pipe Installation:
    - a. Insulating joints connecting immersed piping to nonimmersed piping shall be installed above maximum water surface elevation.
    - b. Submerged carbon steel, ductile iron, or galvanized piping in reinforced concrete shall be isolated from the concrete reinforcement steel.
    - c. Align and install insulating joints as shown on the Drawings and according to manufacturer's recommendations. Bolt lubricants that contain graphite or other metallic or electrically conductive components that can interfere with the insulating capabilities of the completed flange shall not be used.

3.09 THRUST RESTRAINT

- A. Location:
  - 1. Buried Piping: Where shown and where required to restrain force developed at pipeline tees, plugs, caps, bends, and other locations where unbalanced forces exist because of hydrostatic testing and normal operating pressure.
  - 2. Exposed Piping: At all joints in piping.
- B. Thrust Ties:
  - 1. Flanged Coupling Adapters: For exposed installations, install manufacturer's anchor studs through coupling sleeve or use dismantling joints.
- C. Mechanical Joint Valve Restraint in Proprietary Restrained Joint Piping: Install pipe joint manufacturer's adapter gland follower and pipe end retainer, or mechanical joint anchor gland follower.



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D. Thrust Blocking:

1. Place between undisturbed ground and fitting to be anchored only as shown on Drawings.
2. Quantity of Concrete: Sufficient to cover bearing area on pipe and provide required soil bearing area as shown.
3. Place blocking so that pipe and fitting joints will be accessible for repairs.
4. Place concrete in accordance with Section 03 30 00, Cast-in-Place Concrete.

3.10 SLAB, FLOOR, WALL, AND ROOF PENETRATIONS

- A. Application and Installation: As specified in Section 40 27 01, Process Piping Specialties.

3.11 BRANCH CONNECTIONS

- A. Do not install branch connections smaller than 1/2-inch nominal pipe size, including instrument connections, unless shown otherwise.
- B. When line of lower pressure connects to a line of higher pressure, requirements of Piping Data Sheet for higher pressure rating prevails up to and including first block valve in the line carrying the lower pressure, unless otherwise shown.
- C. Threaded Pipe Tap Connections:
1. Ductile Iron Piping: Connect only with service saddle or at tapping boss of a fitting, valve body, or equipment casting.
  2. Welded Steel or Alloy Piping: Connect only with welded threadolet or half-coupling as specified on Piping Data Sheet.
  3. Limitations: Threaded taps in pipe barrel are unacceptable.

3.12 VENTS AND DRAINS

- A. Vents and drains at high and low points in piping required for completed system may or may not be shown. Install vents on high points and drains on low points of pipelines as shown and at all low and high point locations.

3.13 FIELD FINISHING

- A. Notify Engineer at least 3 days prior to start of surface preparation or coating application work.
- B. As specified in Section 09 90 00, Painting and Coating.

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3.14 PIPE IDENTIFICATION

- A. As specified in Section 10 14 00, Signage, Section 31 23 23.15, Trench Backfill, and Section 09 90 00, Painting and Coating.

3.15 FIELD QUALITY CONTROL

- A. Pressure Leakage Testing: As specified in Section 40 80 01, Process Piping Leakage Testing.
- B. Minimum Duties of Welding Inspector:
  - 1. Job material verification and storage.
  - 2. Qualification of welders.
  - 3. Certify conformance with approved welding procedures.
  - 4. Maintenance of records and preparation of reports in a timely manner.
  - 5. Notification to Engineer of unsatisfactory weld performance within 24 hours of weld test failure.
- C. Required Weld Examinations:
  - 1. Perform examinations in accordance with Piping Code ASME B31.3 for Normal Fluid Service, except that 5 percent of circumferential butt welds shall be random radiographed.
  - 2. Perform examinations for every pipe thickness and for each welding procedure, progressively, for piping covered by this section.
  - 3. Examine at least one of each type and position of weld made by each welder or welding operator.
  - 4. For each weld found to be defective under the acceptance standards or limitations on imperfections contained in the applicable Piping Code, examine two additional welds made by the same welder that produced the defective weld. Such additional examinations are in addition to the minimum required above. Examine, progressively, two additional welds for each tracer examination found to be unsatisfactory.

3.16 CLEANING

- A. Following assembly and testing, and final acceptance, flush pipelines, except as stated below, with water at 2.5 fps minimum flushing velocity until foreign matter is removed.
- B. Blow clean of loose debris natural gas, and instrument air lines with compressed air at 4,000 fpm; do not flush with water.

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- C. If impractical to flush large diameter pipe at 2.5 fps or blow at 4,000 fpm velocity, clean in-place from inside by brushing and sweeping, then flush or blow line at lower velocity.
- D. Insert cone strainers in flushing connections to attached equipment and leave in-place until cleaning is complete.
- E. Remove accumulated debris through drains 2 inches and larger or by removing spools and valves from piping.

3.17 SUPPLEMENTS

- A. The supplements listed below, following “End of Section,” are a part of this Specification:
  - 1. Piping Schedule as shown on Drawings.
  - 2. Data Sheets.

Number	Title
40 27 00.01	Cement-Mortar, Glass, and Polyurethane-Lined Ductile Iron Pipe and Fittings
40 27 00.02	Carbon Steel Pipe and Fittings – Special Service
40 27 00.08	Stainless Steel Pipe and Fittings General Service Data Sheet
40 27 00.11	Chlorinated Polyvinyl Chloride (CPVC) Pipe and Fittings
40 27 00.13	Copper and Copper Alloy Pipe, Tubing, and Fittings

**END OF SECTION**

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<b>SECTION 40 27 00.01                      CEMENT-MORTAR, GLASS, AND POLYURETHANE-LINED                      DUCTILE IRON PIPE AND FITTINGS</b>	
<b>Item</b>	<b>Description</b>
General	<p>Materials in contact with potable water shall conform to NSF 61 acceptance.</p> <p>Pipe manufacturer shall submit certification that source manufacturing facility has experience producing ductile iron pipe of the specified diameters, dimensions, and standards. Testing of pipe required by AWWA A21.51 shall be conducted in testing and laboratory facilities located in the USA and operating under USA laws and regulations. Pipe shall be handled during manufacture and shipped without nesting (without insertion of one pipe inside another).</p>
Pipe	<p>Buried Liquid Service Using, Mechanical, or Proprietary Restrained Joints: AWWA C111/A21.11, and AWWA C151/A21.51, pressure class conforming to Table 5 and Table 7 for Type 4 trench, 250 psi minimum working pressure. Follower glands shall be ductile iron.</p> <p>Exposed Pipe Using Grooved End and Flange Joints:                      AWWA C115/A21.15, thickness Class 53 minimum, 250 psi minimum working pressure.</p>
Lining	<p>Cement-mortar: AWWA C104/A21.4 with double lining thickness.</p> <p>Glass: Completely fused above 1,400 degrees F, 6 mils to 10 mils thick, defects which expose base metal not greater than 0.01 percent of total lined surface, hardness greater than 5 on the Mohs scale, lining bonded sufficiently to withstand a metal strain of 0.001 inch/inch without damage to the glass lining, finished lined pipe not to deviate more than 0.0125 inch per foot of length from a centerline perpendicular to the flange face or square end of the pipe. Fast Fabricators, Inc., Ferroch MEH-32; Ceramic Coating Co., SL-31; VITCO Corp., SG-14.</p>

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<b>SECTION 40 27 00.01 CEMENT-MORTAR, GLASS, AND POLYURETHANE-LINED DUCTILE IRON PIPE AND FITTINGS</b>	
<b>Item</b>	<b>Description</b>
Fittings	<p>Lined and coated same as pipe.</p> <p>Mechanical: AWWA C110/A21.10 and AWWA C111/A21.11 ductile iron, 250 psi minimum working pressure. Follower glands shall be ductile iron. Compact fittings not allowed.</p> <p>Proprietary Restrained: AWWA C110/A21.10 and AWWA C111/A21.11 ductile iron, 250 psi minimum working pressure. Restraint shall be achieved with removable metal elements fitted between a welded bar on the pipe barrel and the inside of the joint bell or fitting sizes smaller than 16 inches may be mechanical joint, restrained by anchor gland followers, ductile iron anchor type, wedge action, with break-off tightening bolts. Assembled joints shall be rated for deflection in operation at rated pressure. Rated deflection shall be not less than 1-1/2 degrees for 36-inch and smaller pipe. Rated deflection shall be not less than 1/2 degree for 42-inch and larger pipe. Clow Corp., American Cast Iron Pipe Co., U.S. Pipe. Restrained joints relying on metal teeth molded into the gasket to prevent joint separation under pressure will not be accepted. Compact fittings not allowed.</p> <p>Grooved End: AWWA C606 and AWWA C110/A21.10, ductile iron, 250 psi minimum working pressure; Victaulic.</p> <p>Flange: AWWA C110/A21.10 ductile iron, faced and drilled, Class 125 flat face or ASME B16.1, Class 250 raised face. Gray cast iron will not be allowed.</p>

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<b>SECTION 40 27 00.01            CEMENT-MORTAR, GLASS, AND POLYURETHANE-LINED            DUCTILE IRON PIPE AND FITTINGS</b>	
<b>Item</b>	<b>Description</b>
Joints	<p>Mechanical: 250 psi minimum working pressure.</p> <p>Proprietary Restrained: 150 psi minimum working pressure. Clow Corp., Super-Lock; American Cast Iron Pipe Co., Flex-Ring or Lok-Ring; U.S. Pipe, TR Flex.</p> <p>Grooved End: Rigid type radius cut conforming to AWWA C606, 250 psi minimum working pressure; Victaulic.</p> <p>Flange: Class 125 flat face, Class 250 raised face, ductile iron, threaded conforming to AWWA C115/A21.15. Gray cast iron will not be allowed.</p> <p>Branch connections 3 inches and smaller, except from glass-lined pipe, shall be made with service saddles as specified in Section 40 27 01, Process Piping Specialties. Branch connections, 3 inches and smaller from glass-lined pipe shall be made with glass-lined tee with a flanged branch for adapting to branch piping.</p>
Couplings	<p>Grooved End: 250 psi minimum working pressure, malleable iron per ASTM A47/A47M or ductile iron per ASTM A536; Victaulic.</p> <p>Grooved End Adapter Flanges: 250 psi minimum working pressure, malleable iron per ASTM A47/A47M or ductile iron per ASTM A536; Victaulic.</p>
Bolting	<p>Mechanical, Proprietary Restrained, and Grooved End Joints: Manufacturer's standard.</p> <p>Class 125 Flat-Faced Flange: ASTM A307, Grade B carbon steel hex head bolts, ASTM A563, Grade A carbon steel hex head nuts and ASTM F436/F436M hardened steel washers at nuts and bolt heads. Bolting to be torqued to gasket manufacturer's recommendation.</p> <p>Flanged Joints in Sumps, Wet Wells, and Submerged and Wetted Installations: Type 316 stainless steel, ASTM A320/A320M, Grade B8M hex head bolts; ASTM A194/A194M, Grade 8M hex nuts and Type 316 Stainless Steel washers at nuts and bolt heads. Bolting to be torqued to gasket manufacturer's recommendation.</p>

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<b>SECTION 40 27 00.01 CEMENT-MORTAR, GLASS, AND POLYURETHANE-LINED DUCTILE IRON PIPE AND FITTINGS</b>	
<b>Item</b>	<b>Description</b>
	Class 250 Raised-Face Flange: ASTM A307, Grade B carbon steel hex head bolts, ASTM A563, Grade A carbon steel heavy hex head nuts and ASTM F436/F436M hardened steel washers at nuts and bolt heads. Bolting to be torqued to gasket manufacturer's recommendation.
Gaskets	<p>General: Gaskets in contact with potable water shall be NSF 61 certified.</p> <p>Mechanical, and Proprietary Restrained Joints; Water and Sewage Service: Rubber conforming to AWWA C111/A21.11.</p> <p>Grooved End Joints: Halogenated butyl conforming to ASTM D2000 and AWWA C606.</p> <p>Flanged, Water, Sewage and Hot Air Services: 1/8-inch-thick, homogeneous black rubber (EPDM), hardness 60 (Shore A), rated to 275 degrees F, conforming to ASME B16.21 and ASTM D2000 4CA 415 A25 B35 C32 EA14 F19.</p> <p>Full face for Class 125 flat-faced flanges, flat-ring type for Class 250 raised-face flanges. Blind flanges shall be gasketed covering entire inside face with gasket cemented to blind flange.</p> <p>Gasket pressure rating to equal or exceed the system hydrostatic test pressure.</p>
Joint Lubricant	Manufacturer's standard.

**END OF SECTION**

CEMENT-MORTAR, GLASS,  
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<b>SECTION 40 27 00.02            CARBON STEEL PIPE AND FITTINGS—SPECIAL SERVICE</b>		
<b>Item</b>	<b>Size</b>	<b>Description</b>
Pipe	All  Screwed: 1-1/2" & smaller  Welded: 2" through 4"	Black carbon steel, ASTM A106/A106M, Grade B seamless or ASTM A53/A53M, Grade B seamless or ERW. Threaded, butt-welded, and flanged joints:  Schedule 40.  Standard weight.
Joints	1-1/2" & smaller  2" & larger	Threaded or socket-welded; flanged at equipment as required or shown.  Butt-welded or flanged at valves and equipment.
Fittings	1-1/2" & smaller  2" & larger	Threaded or socket-weld, forged carbon steel, ASTM A105/A105M, 2,000-pound or 3,000-pound WOG (3,000-pound chlorine service), conforming to ASME B16.11; bore to match pipe inside diameter.  Wrought carbon steel butt-welding, ASTM A234/A234M, Grade WPB meeting the requirements of ASME B16.9; fitting wall thickness to match adjoining pipe; long radius elbows unless shown otherwise.
Branch Connections	1-1/2" & smaller  2" & larger	Threadolet or socket in conformance with Fittings above.  Butt-welding tee in accordance with Fittings above.
Flanges	1-1/2" & smaller	Forged carbon steel, ASTM A105/A105M, ASME B16.5 Class 150 or Class 300 socket-weld or threaded, 1/16-inch raised face.



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<b>SECTION 40 27 00.02 CARBON STEEL PIPE AND FITTINGS—SPECIAL SERVICE</b>		
<b>Item</b>	<b>Size</b>	<b>Description</b>
	2" & larger	Forged carbon steel, ASTM A105/A105M, ASME B16.5 Class 150 or Class 300 slip-on or welding neck, 1/16-inch raised face. Weld neck bore to match pipe internal diameter. Use weld neck flanges when abutting butt-weld fittings. Weld slip-on flanges inside and outside.
Unions	1-1/2" & smaller	Threaded or socket-weld, forged carbon steel, ASTM A105/A105M, 2,000-pound or 3,000-pound WOG, integral ground steel-to-steel seats, AAR design meeting the requirements of ASME B16.11, bore to match pipe.
Bolting	All	Carbon steel ASTM A193/A193M, Grade B7 studs; ASTM A194/A194M, Grade 2H hex head nuts and ASTM F436 hardened steel washers at nuts and bolt heads. Achieve 40 percent to 60 percent of bolt minimum yield stress.
		When mating flange on equipment is cast iron and gasket is flat ring, provide ASTM A307, Grade B hex head bolts; ASTM A563, Grade A heavy hex nuts and ASTM F436 hardened steel washers at nuts and bolt heads. Achieve 40 percent to 60 percent of bolt minimum yield stress.
Gaskets	All flanges	General Service and Oil/Gas: 1/16-inch-thick compressed nonasbestos composition flat ring type, rated 400 degrees F continuous. Garlock, Blue-Gard 3000; Durlon 7950.
		Steam Service: 1/8-inch-thick compressed inorganic or carbon fiber with nitrile binder, flat ring type, rated 600 degrees F continuous. Garlock, ST-706; Durlon, Style 8300; Leader Global Technologies, Type 2078.
		Chlorine Unions: Chemical lead, 2 percent to 4 percent antimony, 1/8-inch-thick.

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<b>SECTION 40 27 00.02                  CARBON STEEL PIPE AND FITTINGS—SPECIAL SERVICE</b>		
<b>Item</b>	<b>Size</b>	<b>Description</b>
Thread Lubricant		General Service: 100 percent virgin PTFE Teflon tape.  Fuel Gas Service: Yellow Teflon tape designed for fuel gas service. Air Force A-A-58092.  Chlorine Service: 100 percent virgin PTFE tape or PTFE paste.

**END OF SECTION**

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<b>SECTION 40 27 00.08 STAINLESS STEEL PIPE AND FITTINGS—GENERAL SERVICE</b>		
<b>Item</b>	<b>Size</b>	<b>Description</b>
Pipe	2-1/2" & smaller	Schedule 40S: ASTM A312/A312M, Type 316 seamless, pickled and passivated.
	3" through 6"	Schedule 10S: ASTM A778, "as-welded" grade, Type 316L, pickled and passivated.
	8" & larger	Schedule 5S: ASTM A778, "as-welded" grade, Type 316L, pickled and passivated.
Tubing	All	ASTM A269, Type 316 stainless steel, seamless, fully annealed hydraulic tubing, 0.065-inch wall thickness minimum.
Joints	1-1/2" & smaller	Threaded or flanged at equipment as required or shown.
	2" & larger	Butt-welded or flanged at valves and equipment.
Tubing Joints	All	Flareless compression fitting.
Fittings	1-1/2" & smaller	Threaded: Forged 1,000 CWP minimum, ASTM A182/A182M, Grade F316 or cast Class 150, ASTM A351/A351M, Grade CF8M/316.
	2" & 2-1/2"	Butt Welded: ASTM A403/A403M, Grade WP316L conforming to ASME B16.9 and MSS SP 43, annealed, pickled and passivated; fitting wall thickness to match adjoining pipe; long radius elbows, unless shown otherwise.
	3" & larger	Butt-Welded: ASTM A774/A774M conforming to MSS SP 43, "as-welded" grade, Type 316L pickled and passivated; fitting wall thickness to match adjoining pipe; long radius elbows, unless shown otherwise.

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<b>SECTION 40 27 00.08 STAINLESS STEEL PIPE AND FITTINGS—GENERAL SERVICE</b>		
<b>Item</b>	<b>Size</b>	<b>Description</b>
Tubing Fittings	All	Flareless Compression Type Forged: ASTM A182/A182M, Grade F316, Parker-Hannifin Ferulok, Flodar BA Series.
Branch Connections	1-1/2" & smaller	Tee or reducing tee in conformance with fittings above.
	2" & larger	Butt-welding tee or reducing tee in accordance with fittings above.
Tubing Branch Connections	All	Compression type tees or reducing tees in accordance with Tubing Fittings above.
Flanges	All	<p>Forged Stainless Steel: ASTM A182/A182M, Grade F316L, ASME B16.5 Class 150 or Class 300, slip-on weld neck or raised face. Weld slip-on flanges inside and outside.</p> <p>Cast Carbon Steel: ASTM A216/A216M Grade WCA, drilled, ASME B16.5 Class 150 or Class 300 Van Stone Type with stainless steel stub ends, ASTM A240/A240M Type 316L "as-welded grade", conforming to MSS SP 43, wall thickness same as pipe.</p> <p>Blind Flanges, exposed to the atmosphere and not buried nor immersed in liquid, may be either stainless steel or Class 125 ductile iron or Class 150 carbon steel with gaskets as specified herein.</p>
Unions	2" & smaller	Threaded Forged: ASTM A182/A182M, Grade F316, 2,000-pound or 3,000-pound WOG, integral ground seats, AAR design meeting the requirements of ASME B16.11, bore to match pipe.

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<b>SECTION 40 27 00.08                  STAINLESS STEEL PIPE AND FITTINGS—GENERAL SERVICE</b>		
<b>Item</b>	<b>Size</b>	<b>Description</b>
Bolting	All	<p>Forged Flanges: Type 304 stainless steel, ASTM A320/A320M Grade B8M hex head bolts, ASTM A194/A194M Grade 8M hex head nuts and ASTM F436 Type 3 alloy washers at nuts and bolt heads. Achieve 40 percent to 60 percent of bolt minimum yield stress.</p> <p>Van Stone Flanges and anywhere mating flange on equipment is cast iron and gasket is flat ring: Carbon steel ASTM A307 Grade B hex head bolts, ASTM A563 Grade A hex head nuts and ASTM F436 hardened steel washers at nuts and bolt heads. Achieve 40 percent to 60 percent of bolt minimum yield stress.</p> <p>Flanged Joints in Sumps, Wet Wells, and Submerged and Wetted Installations: Type 316 stainless steel, ASTM A320/A320M, Grade B8M hex head bolts and ASTM A194/A194M, Grade 8M hex nuts and ASTM F436 Type 3 alloy washers at nuts and bolt heads. Achieve 40 percent to 60 percent of bolt minimum yield stress.</p>
Gaskets	All Flanges	<p>Flanged, Water, Hot Air, Fuel Gas, Digester Gas and Sewage Services: 1/8-inch thick, homogeneous black rubber (EPDM), hardness 60 (Shore A), rated to 250 degrees F. continuous and conforming to ASME B16.21 and ASTM D1330, Steam Grade.</p> <p>Blind Flanges: Gasketed covering entire inside face with gasket cemented to blind flange.</p>

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<b>SECTION 40 27 00.08 STAINLESS STEEL PIPE AND FITTINGS—GENERAL SERVICE</b>		
<b>Item</b>	<b>Size</b>	<b>Description</b>
Thread Lubricant	2" & smaller	General Service: 100 percent virgin PTFE Teflon tape.  Fuel Gas and Digester Gas Service: Yellow Teflon tape designed for fuel gas service, Air Force A-A-58092, AA Thread Seal Tape, Inc.

**END OF SECTION**

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<b>SECTION 40 27 00.11                  CHLORINATED POLYVINYL CHLORIDE (CPVC)                  PIPE AND FITTINGS</b>		
<b>Item</b>	<b>Size</b>	<b>Description</b>
Pipe	All	Schedule 80 CPVC: Type IV, Grade I or Class 23447-B conforming to ASTM D1784 and ASTM F441/F441M. Pipe shall be manufactured with titanium dioxide for ultraviolet protection.  Threaded nipples shall be Schedule 80.
Fittings	All	Schedule to Match Pipe Above: Conforming to the requirements of ASTM F439 for socket weld type and Schedule 80 ASTM F437 for threaded type. Fittings shall be manufactured with titanium dioxide for ultraviolet protection.
Joints	All	Solvent socket weld except where connection to threaded valves and equipment may require future disassembly.
Flanges	All	One piece, molded hub Type CPVC flat face flange in accordance with Fittings above; ASME B16.1, Class 125 drilling.
Bolting	All	Flat Face Mating Flange and In Corrosive Areas: ASTM A193/A193M, Type 316 stainless steel Grade B8M hex head bolts, ASTM A194/A194M Grade 8M hex head nuts and ASTM F436 Type 3 alloy washers at nuts and bolt heads. Achieve 40 percent to 60 percent of bolt minimum yield stress.  Raised Face Mating Flange: Carbon steel ASTM A307 Grade B square head bolts, ASTM A563 Grade A heavy hex head nuts and ASTM F436 hardened steel washers at nuts and bolt heads. Achieve 40 percent to 60 percent of bolt minimum yield stress.

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<b>SECTION 40 27 00.11 CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPE AND FITTINGS</b>		
<b>Item</b>	<b>Size</b>	<b>Description</b>
Gaskets	All	Flat Face Mating Flange: Full faced 1/8-inch thick ethylene propylene (EPR) rubber.  Raised Face Mating Flange: Flat ring 1/8-inch Durlon, 9200W RCA, Garlock Gylon 3510, with filler gasket between OD of raised face and flange OD to protect the flange from bolting moment.
Solvent Cement	All	All socket type joints shall be made employing primer and solvent cements that meet or exceed the requirements of ASTM F493 and primers that meet or exceed the requirements of ASTM F656, resistant to the fluid service, and as recommended by the approved pipe and fitting manufacturer, except solvent weld cement for CPVC pipe joints in sodium hypochlorite service shall be free of silica filler and shall be certified by the approved cement manufacturer to be suitable for that service, IPS Weld-On 724, or approved equal. Certification shall be submitted. Solvent cement and primer shall be listed by NSF 61 for contact with potable water.
Thread Lubricant	All	Teflon tape.

**END OF SECTION**



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<b>SECTION 40 27 00.13 COPPER AND COPPER ALLOY PIPE, TUBING, AND FITTINGS</b>	
<b>Item</b>	<b>Description</b>
General	Materials in contact with potable water shall conform to NSF 61 acceptance.
Tubing	Seamless, conforming to ASTM B88 as follows: Water (buried) ..... Type K, soft or hard temper Water (exposed)..... Type L, hard drawn Domestic hot water ..... Type L, hard drawn Compressed air service ..... Type L, hard drawn Refrigerant service..... Type L, hard drawn P-Trap priming service ..... Type L, soft temper Sample line service ..... Type L, hard drawn
Fittings	ASTM B75 commercially pure wrought copper, socket joint, dimensions conforming to ASME B16.22.
Flanges	Class 150, ASTM B75 commercially pure wrought copper, socket joint, ASME B16.24 standard.
Bolting	ASTM A307, carbon steel, Grade A hex head bolts, ASTM A563 Grade A hex head nuts and ASTM F436/F436M hardened steel washers at nuts and bolt heads. Torque to gasket manufacturers recommendations.
Gaskets	1/16-inch-thick nonasbestos compression type, full face, Cranite, John Manville.
Solder	Joints 2-1/2 Inch and Smaller: Wire solder (95 percent tin), conforming to ASTM B32 Alloy Grade Sn95. Do not use cored solder.  Joints Larger Than 2-1/2 Inch: Wire solder, melt range approximately 440 degrees F to 660 degrees F, conforming to ASTM B32 Alloy Grade HB or HN. Do not use cored solder.

**END OF SECTION**

**SECTION 40 27 01**  
**PROCESS PIPING SPECIALTIES**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Society of Mechanical Engineers (ASME):
    - a. B16.1, Gray Iron Pipe Flanges and Flanged Fittings (Classes 25, 125, and 250).
    - b. B16.5, Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.
  2. American Water Works Association (AWWA):
    - a. C110/A21.10, Ductile-Iron and Gray-Iron Fittings.
    - b. C210, Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines.
    - c. C213, Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.
    - d. C219, Bolted, Sleeve-Type Couplings for Plain-End Pipe.
    - e. Manual M11, Steel Pipe—A Guide for Design and Installation.
  3. ASTM International (ASTM):
    - a. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
    - b. A276, Standard Specification for Stainless Steel Bars and Shapes.
  4. National Fire Protection Association (NFPA): 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances.
  5. NSF International (NSF):
    - a. NSF/ANSI 61, Drinking Water System Components - Health Effects.
    - b. NSF/ANSI 372, Drinking Water System Components - Lead Content.

1.02 SUBMITTALS

- A. Action Submittals:
1. Manufacturer's data on materials, construction, end connections, ratings, overall lengths, and live lengths (as applicable).

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2. Metal Bellows Field Finishing:
    - a. Manufacturer's recommended weld procedures for joining welded carbon steel piping to stainless steel bellows.
    - b. Welder qualifications for joining welded carbon steel piping to stainless steel bellows.
    - c. Product data for field-applied System No. 4, high temperature, epoxy lining and coating in accordance with Section 09 90 00, Painting and Coating.
  3. Chemical Injectors:
    - a. Type, size, quantity, materials, and model number of each.
    - b. Sketch of each showing major parts, main pipe, and dimensions.
    - c. Details and model number of each support system and component.
    - d. Details and model of connects (for example, service saddle, weld-o-let).
- B. Informational Submittals:
1. Coupling Harness:
    - a. Details, ratings, calculations and test reports for thrust restraints relying on welded bars or rings.
    - b. Weld procedure qualifications.
    - c. Load proof-testing report of prototype restraint for any size coupling.
  2. Basket Strainer:
    - a. Manufacturer's written/printed installation instructions.
    - b. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services.
- C. Operation and Maintenance Data as specified in Section 01 78 23, Operation and Maintenance Data.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. Provide required piping specialty items, whether shown or not shown on Drawings, as required by applicable codes and standard industry practice.
- B. Rubber ring joints, mechanical joints, flexible couplings, and proprietary restrained ductile iron pipe joints are considered flexible joints; welded, screwed, and flanged pipe joints are not considered flexible.

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- C. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 CONNECTORS

A. Elastomer Bellows Connector:

1. Type: Fabricated spool, with single filled arch.
2. Materials: Nitrile tube and wrap-applied neoprene cover.
3. End Connections: Flanged, drilled 125-pound ASME B16.1 standard, with full elastomer face and steel retaining rings.
4. Working Pressure Rating: 140 psig, minimum, at 180 degrees F for all services pipe sizes 12 inches and smaller, 65 psig, minimum, at 180 degrees F for digester gas service pipe sizes between 14 inches and 24 inches.
5. Thrust Restraint: Control rods to limit travel of elongation and compression.
6. Manufacturers and Products:
  - a. Garlock; Style 204.
  - b. Unisource Manufacturing, Inc.; Style 1501.
  - c. Goodall Rubber Co.; Specification E-1462.
  - d. Proco Products, Inc.; Series 220.
  - e. Or approved equal.

B. Flexible Metal Hose Connector:

1. Type: Close pitch, annular corrugated with single braided jacket.
2. Material: Bronze.
3. End Connections: Female copper solder joint.
4. Minimum Burst Pressure: 500 psig at 70 degrees F.
5. Length: Minimum manufacturer recommendation for vibration isolation.
6. Manufacturers:
  - a. U.S. Hose Corp.; Series 300.
  - b. Anamet Industrial, Inc.
  - c. Unisource Manufacturing, Inc.

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- d. Proco Products, Inc.
  - e. Or approved equal.
- C. Closure Collar Concrete: As specified in Section 03 30 00, Cast-in-Place Concrete, and Section 03 30 01, Reinforced Concrete.
- D. Quick Connect Couplings for Chemical Services:
- 1. Type: Twin cam arm actuated, male and female, locking, for chemical loading and transfer.
  - 2. Materials: Glass-filled polypropylene or PVDF with EPDM, Viton-A or Teflon gaskets as recommended for the service by manufacturer.
  - 3. End Connections: NPT threaded or flanged to match piping connections. Hose shank for chemical installations.
  - 4. Plugs and Caps: Female dust cap for each male end; male dust plug for each female end.
  - 5. Pressure Rating: 125 psi, minimum, at 70 degrees F.
  - 6. Manufacturers and Products:
    - a. OPW; Kamlock.
    - b. Ryan Herco; 1300 Series.
    - c. Or approved equal.

## 2.03 COUPLINGS

### A. General:

- 1. Coupling linings for use in potable water systems shall be in conformance with NSF/ANSI 61.
- 2. Couplings shall be rated for working pressure not less than indicated in Piping Schedule for the service and not less than 150 psi.
- 3. Couplings shall be lined and coated with fusion-bonded epoxy in accordance with AWWA C213.
- 4. Unless thrust restraint is provided by other means, couplings shall be harnessed in accordance with requirements of AWWA Manual M11 or as shown on Drawings.
- 5. Sleeve type couplings shall conform to AWWA C219 and shall be hydraulically expanded beyond minimum yield for accurate sizing and proofing of tensile strength.

### B. Flexible Sleeve Type Coupling:

- 1. Manufacturers and Products:
  - a. Steel Pipe:
    - 1) Dresser Piping Specialties; Style 38.
    - 2) Smith-Blair, Inc.; Style 411.
    - 3) Or approved equal.

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- b. Ductile Iron Pipe:
  - 1) Dresser Piping Specialties; Style 253.
  - 2) Smith-Blair, Inc.; Style 441.
  - 3) Or approved equal.
  
- C. Transition Coupling for Steel Pipe:
  - 1. Manufacturers and Products:
    - a. Dresser Piping Specialties; Style 162.
    - b. Smith-Blair, Inc.; Style 413.
    - c. Or approved equal.
  
- D. Flanged Coupling Adapter:
  - 1. Anchor studs where required for thrust restraint.
  - 2. Manufacturers and Products:
    - a. Steel Pipe:
      - 1) Dresser Piping Specialties; Style 128.
      - 2) Smith-Blair, Inc.; Style 913.
      - 3) Or approved equal.
    - b. Ductile Iron Pipe:
      - 1) Dresser Piping Specialties; Style 128.
      - 2) Smith-Blair, Inc.; Style 912.
      - 3) Or approved equal.
  
- E. Restrained Flange Adapter:
  - 1. Pressure Rating:
    - a. Minimum Working Pressure Rating: Not less than 150 psi.
    - b. Safety Factor: Not less than two times working pressure and shall be supported by manufacturer's proof testing.
  - 2. Thrust Restraint:
    - a. Provide hardened steel wedges that bear against and engage outer pipe surface, and allow articulation of pipe joint after assembly while wedges remain in their original setting position on pipe surface.
    - b. Products employing set screws that bear directly on pipe will not be acceptable.
  - 3. Manufacturer and Product:
    - a. EBAA Iron Sales Co.; Mega-Flange.
    - b. Or approved equal.

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F. Restrained Dismantling Joints:

1. Pressure Rating:
  - a. Minimum working pressure rating shall not be less than rating of the connecting flange.
  - b. Proof testing shall conform to requirements of AWWA C219 for bolted couplings.
2. Manufacturers and Products:
  - a. Dresser Piping Specialties; Style 131.
  - b. Smith Blair, Inc.; Model 975.
  - c. Or approved equal.

G. Exposed Metallic Piping Plain End Couplings:

1. Plain end pipe couplings shall be self-restrained against hydrostatic thrust forces equal to not less than two times the working pressure rating of the coupling. Couplings shall accommodate 4 degrees angular deflection at the time of installation and subsequent to pressurization.
2. Casing, bolts, and nuts shall be Type 304 or Type 316 stainless steel. The sealing sleeve shall be EPDM or NBR elastomer as best suited for the fluid service.
3. Couplings Manufacturer and Products:
  - a. Straub Couplings, Grip-L or Metal Grip.
  - b. Or approved equal.

2.04 EXPANSION JOINTS

A. Elastomer Bellows:

1. Type: Reinforced molded wide arch.
2. End Connections: Flanged, drilled 125-pound ASME B16.1 standard, with split galvanized steel retaining rings.
3. Washers: Over retaining rings to help provide leak-proof joint under test pressure.
4. Thrust Protection: Control rods to protect the bellows from overextension.
5. Bellows Arch Lining: Buna-N, nitrile, or butyl.
6. Rated Temperature: 250 degrees F.
7. Rated Deflection and Pressure:
  - a. Lateral Deflection: 3/4 inch, minimum.
  - b. Burst Pressure: Four times the working pressure.

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- c. Compression deflection and minimum working pressure as follows:

Size (inch)	Deflection (inch)	Pressure (psig)
2-1/2 to 12	1.06	150
14	1.65	130
16 to 20	1.65	110

8. Manufacturers and Products:
- General Rubber Corp.; Style 1015 Maxijoint.
  - Mercer; Flexmore Style 450.
  - Goodall Rubber Co.; Specification E-711.
  - Unisource Manufacturing, Inc.; Series 1500.
  - Proco Products, Inc.; Series 251.
  - Or approved equal.

B. Flexible Metal Hose:

- Type: Close pitch, annular corrugated with single braided jacket.
- Material: Stainless steel, ASTM A276, Type 321.
- End Connections:
  - 3 Inches and Larger: Shop fabricated flanged ends to match mating flanges.
  - 2-1/2 Inches and Smaller: Screwed ends with one union end.
- Minimum Burst Pressure: 600 psig at 70 degrees F for 12 inches and smaller.
- Length: Provide hose live-length equal to lengths shown on Drawings.
- Manufacturer:
  - U.S. Hose Corp.; Series 401M.
  - Anamet Industrial, Inc.; BWC21-1.
  - Or approved equal.

2.05 SERVICE SADDLES

A. Double-Strap Iron:

- Pressure Rating: Capable of withstanding 150 psi internal pressure without leakage or over stressing.
- Run Diameter: Compatible with outside diameter of pipe on which saddle is installed.
- Taps: Iron pipe threads.



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4. Materials:
  - a. Body: Malleable or ductile iron.
  - b. Straps: Galvanized steel.
  - c. Hex Nuts and Washers: Steel.
  - d. Seal: Rubber.
5. Connecting Piping 3-Inches and Smaller: All pipe nipples 3-inches and smaller connecting to valves or instrumentation shall be Type 316 stainless steel unless specifically called out on Drawings.
6. Manufacturers and Products:
  - a. Smith-Blair; Series 313 or 366.
  - b. Dresser; Style 91.
  - c. Or approved equal.

2.06 OUTLET/TAPPING SADDLES

- A. Materials:
  1. Straps: Alloy steel with 3/4-inch threaded ends.
  2. Seal: O-Ring SBR rubber gasket.
  3. Compatible with ductile iron pipe.
- B. Connection: AWWA C110/A21.10 flange or Mechanical joint outlet as shown.
- C. Pressure Rating: Capable of withstanding 250 psi internal pressure without leakage over stressing.
- D. Manufacturers and Products:
  1. American Ductile Iron; Outlet/Tapping Saddle.
  2. Or approved equal.

2.07 PIPE SLEEVES

- A. Steel Pipe Sleeve:
  1. Minimum Thickness: 3/16 inch.
  2. Seep Ring:
    - a. Center steel flange for water stoppage on sleeves in exterior or water-bearing walls, 3/16-inch minimum thickness.
    - b. Outside Diameter: Unless otherwise shown, 3 inches greater than pipe sleeve outside diameter.
    - c. Continuously fillet weld on each side all around.

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3. Factory Finish:
    - a. Galvanizing:
      - 1) Hot-dip applied, meeting requirements of ASTM A153/A153M.
      - 2) Electroplated zinc or cadmium plating is unacceptable.
    - b. Shop Lining and Coating: Factory prepare, prime, and finish coat in accordance with Section 09 90 00, Painting and Coating.
- B. Molded Polyethylene Pipe Sleeve:
1. Molded HDPE with integral water stop ring not less than 3 inches larger than sleeve.
  2. Provided with end caps for support during concrete placement.
  3. Manufacturers and Products:
    - a. Century-Line, Model CS sleeves as manufactured by PSI-Thunderline/Link-Seal.
    - b. Or approved equal.
- C. Insulated and Encased Pipe Sleeve:
1. Manufacturers and Products:
    - a. Pipe Shields, Inc.; Models WFB, WFB-CS and -CW Series, as applicable.
    - b. Or approved equal.
- D. Modular Mechanical Seal:
1. Type: Interconnected synthetic rubber links shaped and sized to continuously fill annular space between pipe and wall sleeve opening.
  2. Fabrication:
    - a. Assemble interconnected rubber links with ASTM A276, Type 316 stainless steel bolts and nuts.
    - b. Pressure plates shall be reinforced nylon polymer.
  3. Size: According to manufacturer's instructions for size of pipes shown to provide a watertight seal between pipe and wall sleeve opening and to withstand a hydrostatic head of 40 feet of water.
  4. Manufacturers:
    - a. Thunderline Corp., Link-Seal Division.
    - b. Or approved equal.

2.08 SLAB, FLOOR, WALL AND ROOF PENETRATIONS

- A. Ductile Iron Wall Pipe:
1. Diameter, Lining, and Ends: Same as connecting ductile iron pipe.
  2. Thickness: Equal to or greater than remainder of pipe in line.

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3. Fittings: In accordance with applicable Pipe Data Sheet.
4. Thrust Collars:
  - a. Rated for thrust load developed at 250 psi.
  - b. Safety Factor: 2, minimum.
  - c. Material and Construction: Ductile iron or cast iron, cast integral with wall pipe wherever possible, or thrust rated, welded attachment to wall pipe.
5. Manufacturers:
  - a. American Cast Iron Pipe Co.
  - b. U.S. Pipe and Foundry Co
  - c. Or approved equal..

B. Steel or Stainless Steel Wall Pipe:

1. Same material and thickness as connecting pipe, except 1/4-inch minimum thickness.
2. Lining: Same as connecting pipe.
3. Thrust Collar:
  - a. Outside Diameter: Unless otherwise shown, 3 inches greater than outside diameter of wall pipe.
  - b. Continuously fillet welded on each side all around.

2.09 MISCELLANEOUS SPECIALTIES

A. Strainers, Water Service, 2 Inches and Smaller:

1. Type: Bronze body, Y-pattern, 200 psi nonshock rated, with screwed gasketed bronze cap.
2. Screen: Heavy-gauge Type 304 stainless steel or monel, 20-mesh.
3. Manufacturers and Products:
  - a. Armstrong International; Inc.; Model F.
  - b. Mueller Steam Specialty; Model 351M.
  - c. Or approved equal.

B. Strainers, Water Service, 2-1/2 Inches and Larger:

1. Type: Cast iron or ductile iron body, Y-pattern, 175 psi nonshock rated, with flanged gasketed iron cap.
2. Screen: Heavy-gauge Type 316 stainless steel, 0.045-inch perforations.
3. Manufacturers and Products:
  - a. Armstrong International, Inc.; Model A7FL 125.
  - b. Or approved equal.

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- C. Strainers, Plastic Piping Systems, 4 Inches and Smaller:
  - 1. Type: Y-pattern PVC body, 150 psi nonshock rated, with screwed PVC cap and Viton seals.
  - 2. End Connections: Screwed or solvent weld, 2 inches and smaller. Class 150 ANSI flanged, 2-1/2 inches and larger.
  - 3. Screen: Heavy-gauge PVC, 1/32-inch mesh, minimum 2 to 1 screen area to pipe size ratio.
  - 4. Manufacturers:
    - a. Hayward.
    - b. Or approved equal.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Provide accessibility to piping specialties for control and maintenance.

3.02 PIPING FLEXIBILITY PROVISIONS

- A. General:
  - 1. Thrust restraint shall be provided as specified in Section 40 27 00, Process Piping—General.
  - 2. Install flexible couplings to facilitate piping installation, in accordance with approved Shop Drawings.
- B. Flexible Joints at Concrete Backfill or Encasement: Install within 18 inches or one-half pipe diameter, whichever is less, from the termination of any concrete backfill or concrete encasement.
- C. Buried Flexible Joints at Concrete Structures – Ductile Iron Pipe:
  - 1. Install 18 inches or less from face of structures; joint may be flush with face.
  - 2. Install a second flexible joint, whether or not shown.
    - a. Pipe Diameter 18 Inches and Smaller: Within 18 inches of first joint.
    - b. Pipe Diameter Larger than 18 Inches: Within two to three pipe diameter of first joint.
- D. Buried Flexible Joints at Concrete Structures – All others: Install as shown on Drawings.

### 3.03 PIPING TRANSITION

#### A. Applications:

1. Provide complete closure assembly where pipes meet other pipes or structures.
2. Pressure Pipeline Closures: Plain end pieces with double flexible couplings, unless otherwise shown.
3. Restrained Joint Pipe Closures: Install with thrust tie-rod assemblies as shown or in accordance with NFPA 24.
4. Gravity Pipe Closures: As specified for pressure pipelines, or concrete closures.
5. Concrete Closures: Use to make connections between dissimilar pipe where standard rubber gasketed joints or flexible couplings are impractical, as approved.
6. Elastomer sleeves bonded to pipe ends are not acceptable.

#### B. Installation:

1. Flexible Transition Couplings: Install in accordance with coupling manufacturer's instructions to connect dissimilar pipe and pipes with a small difference in outside diameter.
2. Concrete Closures:
  - a. Locate away from structures so there are at least two flexible joints between closure and pipe entering structure.
  - b. Clean pipe surface before placing closure collars.
  - c. Wet nonmetallic pipe thoroughly prior to pouring collars.
  - d. Prevent concrete from entering pipe.
  - e. Extend collar a minimum of 12 inches on each side of joint with minimum thickness of 6 inches around outside diameter of pipe.
  - f. Make entire collar in one placement.
  - g. After concrete has reached initial set, cure by covering with well-moistened earth.

### 3.04 PIPING EXPANSION

A. Piping Installation: Allow for thermal expansion due to differences between installation and operating temperatures.

#### B. Expansion Joints:

1. Grooved Joint and Flanged Piping Systems: Elastomer bellows expansion joint.
2. Nonmetallic Pipe: Teflon bellows expansion joint.
3. Screwed and Soldered Piping Systems: Copper or galvanized and black steel pipe expansion compensator, as applicable.

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4. Air and Water Service above 120 Degrees F: Metal bellows expansion joint.
5. Pipe Run Offset: Flexible metal hose.

- C. Anchors and Anchor Walls: Install as specified in Section 40 05 15, Piping Support Systems, to withstand expansion joint thrust loads and to direct and control thermal expansion.

3.05 SERVICE SADDLES

- A. Ferrous Metal Piping (except stainless steel): Double-strap iron.
- B. Plastic Piping: Nylon-coated iron.

3.06 OUTLET/TAPPING SADDLE

- A. Install in accordance with manufacturer's written instructions.

3.07 COUPLINGS

- A. General:
  1. Install in accordance with manufacturer's written instructions.
  2. Before coupling, clean pipe holdback area of oil, scale, rust, and dirt.
  3. Do not remove shop applied pipe coating. If damaged, repair before joint is made.
  4. Application:
    - a. Metallic Piping Systems: Flexible couplings, transition couplings, and flanged coupling adapters.
    - b. Concrete Encased Couplings: Flexible coupling.

3.08 FLEXIBLE PIPE CONNECTIONS TO EQUIPMENT

- A. Install to prevent piping from being supported by equipment, for vibration isolation, and where shown.
- B. Product Applications Unless Shown Otherwise:
  1. Nonmetallic Piping: Teflon bellows connector.
  2. Copper Piping: Flexible metal hose connector.
  3. Compressor and Blower Discharge: Metal bellows connector.
  4. All Other Piping: Elastomer bellows connector.
- C. Limit Bolts and Control Rods: Tighten snug prior to applying pressure to system.

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3.09 PIPE SLEEVES

A. Application:

1. As specified in Section 40 27 00, Process Piping—General.
2. Abovegrade in Nonsubmerged Areas: Hot-dip galvanized after fabrication.
3. Belowgrade or in Submerged or Damp Environments: Shop-lined and coated.
4. Alternatively, Molded Polyethylene Pipe Sleeve as specified may be applied.

B. Installation:

1. Support noninsulating type securely in formwork to prevent contact with reinforcing steel and tie-wires.
2. Caulk joint with specified sealant in non-submerged applications and seal below-grade and submerged applications with wall penetration seal.

3.10 SLAB, FLOOR, WALL AND ROOF PENETRATIONS

A. Applications:

1. Watertight and Belowground Penetrations:
  - a. Wall pipes with thrust collars.
  - b. Provide taps for stud bolts in flanges to be set flush with wall face.
2. Nonwatertight Penetrations: Pipe sleeves with seep ring.
3. Existing Walls: Rotary drilled holes.
4. Fire-Rated or Smoke-Rated Walls, Floors or Ceilings: Insulated and encased pipe sleeves.

B. Wall Pipe Installation:

1. Isolate embedded metallic piping from concrete reinforcement using coated pipe penetrations as specified in Section 09 90 00, Painting and Coating.
2. Support wall pipes securely by formwork to prevent contact with reinforcing steel and tie-wires.

**END OF SECTION**

**SECTION 40 27 02**  
**PROCESS VALVES AND OPERATORS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Gas Association (AGA): 3, Orifice Metering of Natural Gas and Other Related Hydrocarbon Fluids.
  2. American National Standards Institute (ANSI): Z21.15, Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves.
  3. American Society of Mechanical Engineers (ASME):
    - a. B16.1, Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
    - b. B16.44, Manually Operated Metallic Gas Valves for Use in Above Ground Piping Systems up to 5 psi.
  4. American Society of Sanitary Engineers (ASSE): 1011, Performance Requirements for Hose Connection Vacuum Breakers.
  5. American Water Works Association (AWWA):
    - a. C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
    - b. C500, Metal-Seated Gate Valves for Water Supply Service.
    - c. C504, Rubber-Seated Butterfly Valves, 3 In. (75 mm) Through 72 In. (1,800 mm).
    - d. C508, Swing-Check Valves for Waterworks Service, 2-In. Through 24-In. (50-mm Through 600-mm) NPS.
    - e. C509, Resilient-Seated Gate Valves for Water Supply Service.
    - f. C510, Double Check Valve Backflow Prevention Assembly.
    - g. C511, Reduced-Pressure Principle Backflow Prevention Assembly.
    - h. C512, Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
    - i. C515, Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
    - j. C541, Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates.
    - k. C542, Electric Motor Actuators for Valves and Slide Gates.
    - l. C550, Protective Interior Coatings for Valves and Hydrants.
    - m. C606, Grooved and Shouldered Joints.
    - n. C800, Underground Service Line Valves and Fittings.



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6. ASTM International (ASTM):
  - a. A276, Standard Specification for Stainless Steel Bars and Shapes.
  - b. A351/A351M, Standard Specification for Castings, Austenitic, for Pressure-Containing Parts.
  - c. A380, Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.
  - d. A564/A564M, Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes.
  - e. B61, Standard Specification for Steam or Valve Bronze Castings.
  - f. B62, Standard Specification for Composition Bronze or Ounce Metal Castings.
  - g. B98/B98M, Standard Specification for Copper-Silicon Alloy Rod, Bar, and Shapes.
  - h. B127, Standard Specification for Nickel-Copper Alloy (UNS N04400) Plate, Sheet, and Strip.
  - i. B139/B139, Standard Specification for Phosphor Bronze Rod, Bar and Shapes.
  - j. B164, Standard Specification for Nickel-Copper Alloy Rod, Bar, and Wire.
  - k. B194, Standard Specification for Copper-Beryllium Alloy Plate, Sheet, Strip, and Rolled Bar.
  - l. B584, Standard Specification for Copper Alloy Sand Castings for General Applications.
  - m. D429, Standard Test Methods for Rubber Property-Adhesion to Rigid Substrates.
  - n. D1784, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
7. Canadian Standards Association, Inc. (CSA): 9.1, Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves.
8. Chlorine Institute (CI): Pamphlet 6, Piping Systems for Dry Chlorine.
9. FM Global (FM).
10. Food and Drug Administration (FDA).
11. International Association of Plumbing and Mechanical Officials (IAPMO).
12. Manufacturers Standardization Society (MSS):
  - a. SP-80, Bronze Gate, Globe, Angle, and Check Valves.
  - b. SP-81, Stainless Steel, Bonnetless, Flanged Knife Gate Valves.
  - c. SP-85, Gray Iron Globe and Angle Valves, Flanged and Threaded Ends.
  - d. SP-88, Diaphragm Valves.
  - e. SP-110, Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

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13. National Electrical Manufacturers Association (NEMA): 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
14. NSF International (NSF):
  - a. NSF/ANSI 61, Drinking Water System Components - Health Effects.
  - b. NSF/ANSI 372, Drinking Water System Components - Lead Content.
15. UL.
16. USC Foundation for Cross-Connection Control and Hydraulic Research.

1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
  - a. Product data sheets for each make and model. Indicate valve type number, applicable tag number, and facility name/number or service where used.
  - b. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
  - c. Certification for compliance to NSF/ANSI 61 for valves used for drinking water service.
  - d. Power and control wiring diagrams, including terminals and numbers.
  - e. For each power actuator provided, manufacturer's standard data sheet, with application specific features and options clearly identified.
  - f. Sizing calculations for open-close/throttle and modulating valves.
  - g. Anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

1. Anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
2. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements, for:
  - a. Electric actuators; full compliance with AWWA C542.
  - b. Butterfly valves; full compliance with AWWA C504.
3. Component and attachment testing seismic certificate of compliance as required by Section 01 45 33, Special Inspection, Observation, and Testing.
4. Tests and inspection data.
5. Operation and Maintenance Data as specified in Section 01 78 23, Operation and Maintenance Data.

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6. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. Valves to include operator, actuator, handwheel, chain wheel, extension stem, floor stand, operating nut, chain, wrench, and accessories to allow a complete operation from the intended operating level.
- B. Valve to be suitable for intended service. Renewable parts not to be of a lower quality than specified.
- C. Valve same size as adjoining pipe, unless otherwise called out on Drawings or in Supplements.
- D. Valve ends to suit adjacent piping.
- E. Resilient seated valves shall have no leakage (drip-tight) in either direction at valve rated design pressure. All other valves shall have no leakage (drip-tight) in either direction at valve rated design pressure, unless otherwise allowed for in this section or in stated valve standard.
- F. Size operators and actuators to operate valve for full range of pressures and velocities.
- G. Valve to open by turning counterclockwise, unless otherwise specified.
- H. Factory mount operator, actuator, and accessories.
- I. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
  - 1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 SCHEDULE

- A. Additional requirements relative to this section are shown on Electrically Actuated Valve Schedule, Manual Valve Schedule and Self-Regulated Valve Schedule located on Drawings.

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2.03 MATERIALS

- A. Bronze and brass valve components and accessories that have surfaces in contact with water to be alloys containing less than 16 percent zinc and 2 percent aluminum.
  - 1. Approved alloys are of the following ASTM designations: B61, B62, B98/B98M (Alloy UNS No. C65100, C65500, or C66100), B139/B139M (Alloy UNS No. C51000), B584 (Alloy UNS No. C90300 or C94700), B164, B194, and B127.
  - 2. Stainless steel Alloy 18-8 may be substituted for bronze.
- B. Valve materials in contact with or intended for drinking water service to meet the following requirements:
  - 1. Materials to comply with requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements.
  - 2. Coatings materials to be formulated from materials deemed acceptable to NSF/ANSI 61.
  - 3. Supply certification product is certified as suitable for contact with drinking water by an accredited certification organization in accordance with NSF/ANSI 61. Provide certification for each valve type used for drinking water service.

2.04 FACTORY FINISHING

- A. General:
  - 1. Interior coatings for valves and hydrants shall be in accordance with AWWA C550, unless otherwise specified.
  - 2. Exterior coating for valves and hydrants shall be in accordance with Section 09 90 00, Painting and Coating.
  - 3. Material in contact with potable water shall conform to NSF/ANSI 61.
  - 4. Exposed safety isolation valves and lockout valves with handles, handwheels, or chain wheels shall be “safety yellow.”
- B. Where epoxy lining and coating are specified, factory finishing shall be as follows:
  - 1. In accordance with AWWA C550.
  - 2. Either two-part liquid material or heat-activated (fusion) material except only heat-activated material if specified as “fusion” or “fusion bonded” epoxy.
  - 3. Minimum 7-mil dry film thickness except where limited by valve operating tolerances.

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2.05 VALVES

A. Gate Valves:

1. General:
  - a. AWWA gate valves to be in full compliance with stated AWWA standard and the following requirements:
    - 1) Provide 2-inch operating nut and handwheel for AWWA gate valves 12 inches and smaller.
    - 2) Provide totally enclosed spur or bevel gear operator with indicator for AWWA gate valves 14 inches and larger.
    - 3) Provide Affidavit of Compliance in accordance with the applicable AWWA standard for AWWA gate valves.
    - 4) Mark AWWA gate valves with manufacturer's name or mark, year of valve casting, valve size, and working water pressure.
    - 5) Repaired AWWA gate valves shall not be submitted or supplied.
    - 6) AWWA C509 and AWWA C515 valves may be substituted for each other.
2. Type V100 Gate Valve 3 Inches and Smaller:
  - a. All-bronze, screwed bonnet, packed gland, single solid wedge gate, nonrising stem, Class 125 rated 200 psi CWP, complies with MSS SP-80 Type 1.
  - b. Manufacturers and Products:
    - 1) Crane; Figure 438, NPT threaded ends.
    - 2) Stockham; Figure B103, NPT threaded ends.
    - 3) Crane; Figure 1324, soldered ends.
    - 4) Stockham; Figure B104, soldered ends.
    - 5) Or approved equal.
3. Type V130 Resilient Seated Gate Valve 3 Inches to 12 Inches:
  - a. Iron body, resilient seat, bronze stem and stem nut, ASME B16.1, Class 125 flanged ends, nonrising stem, in accordance with AWWA C509, minimum design working water pressure 250 psig, full port, fusion-epoxy coated inside and outside per AWWA C550, NSF/ANSI 61 certified.
  - b. Manufacturers and Products:
    - 1) M&H Valve; AWWA C509.
    - 2) U.S. Pipe; A-USPO.
    - 3) Or approved equal.
4. Type V150 Knife Gate Valve 24 Inches and Smaller:
  - a. Bonnetless wafer body type, outside stem and yoke, rated for 150 psi cold water, ASME B16.1 flanged ends, self-cleaning, nonclogging, with round port, resilient neoprene seat, drip-tight shutoff.

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- b. Wetted metal parts and stem, Type 316 stainless steel, yoke sleeve bronze, gate finish ground both sides with a sharp knife edge.
- c. Packing system leak-tight seal around gate, valve superstructure and yoke designed for full peripheral access to gland bolts when valve is equipped with manual or power actuator.
- d. In compliance with MSS SP-81.
- e. Manufacturers and Products:
  - 1) DeZurik; Series L.
  - 2) Rovang; Model L17.
  - 3) ITT Fabri-Valve; Figure C67R.
  - 4) Or approved equal.

B. Globe Valves:

- 1. Type V200 Globe Valve 3 Inches and Smaller:
  - a. All-bronze, union bonnet, packed gland, inside screw, rising stem, TFE disc, Class 150 rated 150 psi SWP/300 psi CWP, complies with MSS SP-80 Type 2.
  - b. Manufacturers and Products:
    - 1) Stockham; Figure B-22T, NPT threaded end.
    - 2) Crane Co.; Figure 7TF, NPT threaded end.
    - 3) Milwaukee; Model 1590T, soldered ends.
    - 4) NIBCO; Figure S-235-Y, soldered ends.
    - 5) Or approved equal.
- 2. Type V205 Angle Pattern Valve 2 Inches and Smaller:
  - a. All-bronze, NPT threaded ends, union bonnet, packed gland, inside screw, rising stem, replaceable stainless steel tapered plug type disc and seat ring, Class 300 rated 300 psi SWP/1,000 psi CWP, complies with MSS SP-80 Type 3.
  - b. Manufacturers and Products:
    - 1) Stockham; Figure B-274.
    - 2) Crane; Figure 384P.
    - 3) Or approved equal.
- 3. Type V208 Needle Disc Type Globe Valve 1/8 Inch to 3/4 Inch:
  - a. All-bronze, threaded bonnet, packed gland, rising stem, bronze body and stem, Class 200 rated 200 psi SWP/400 psi CWP, complies with MSS SP-80.
  - b. Manufacturers and Products:
    - 1) Crane Cat.; No. 88.
    - 2) Stockham; B-64.
    - 3) Or approved equal.
- 4. Type V210 Globe Valve 2 Inches to 10 Inches:
  - a. Iron body, bronze mounted, flanged ends, bronze seat, outside screw and yoke, bolted bonnet, Class 125 rated 125 psi SWP/200 psi CWP, complies with MSS SP-85 Type 1.

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- b. Manufacturers and Products:
  - 1) Stockham; G-512.
  - 2) Crane; Figure 351.
  - 3) Or approved equal.
- 5. Type V234 Angle Type Hose Valve 1/2 Inch to 3/4 Inch:
  - a. Bronze or manufacturer's standard brass, angle sillcock type body, threaded or solder inlet as applicable, pressure rating 125 psi cold water.
  - b. Manufacturers and Products:
    - 1) Nibco; QTX Series.
    - 2) Or approved equal.
- 6. Type V235 Angle Type Hose Valve 3/4 Inch:
  - a. 3/4-inch NPT female inlet, 3/4-inch male hose thread outlet, heavy rough brass body rated 125 psi, lockshield bonnet, removable handle, atmospheric vacuum breaker conforming to ASSE 1011 and IAPMO code.
  - b. Manufacturers and Products:
    - 1) Acorn; 8126, surface pipe mount valve, bent nose without flange.
    - 2) Acorn; 8121, surface mount through wall valve, bent nose with flange.
    - 3) Acorn; 8131, pipe and pedestal mounted valve located above 6 inches, straightnose.
    - 4) Acorn; 8136, pedestal mounted valve located lower than 6 inches, inverted nose.
    - 5) Or approved equal.

C. Ball Valves:

- 1. Type V301 Ball Valve 2 Inches and Smaller for General Water and Air Service:
  - a. Two-piece, full port, NPT threaded ends, bronze body and end piece, hard chrome-plated solid bronze or brass ball, RTFE seats and packing, blowout-proof stem, adjustable packing gland, zinc-coated steel hand lever operator with vinyl grip, rated 600-pound WOG, 150-pound SWP, complies with MSS SP-110.
  - b. Manufacturers and Products:
    - 1) Threaded:
      - a) Conbraco Apollo; 77-100.
      - b) Nibco; T-585-70.
      - c) Or approved equal.
    - 2) Soldered:
      - a) Conbraco Apollo; 77-200.
      - b) Nibco; S-585-70.
      - c) Or approved equal.

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2. Type V305 Ball Valve 2 Inches and Smaller for Natural Gas Service:
  - a. Two-piece bronze or forged brass body and end piece, NPT threaded ends, hard chrome-plated solid brass ball, RTFE seats and seal, blowout-proof stem, zinc-plated hand lever operator with vinyl grip, UL Listed Guide YRPV for natural/manufactured gas, 600 WOG.
  - b. Manufacturers and Products:
    - 1) Conbraco Apollo; 80-100.
    - 2) Nibco; T-585-70-UL/T-580-70-UL.
    - 3) Or approved equal.
3. Type V306 Stainless Steel Ball Valve 2 Inches and Smaller:
  - a. Two-piece, full port, ASTM A276 GR 316 or ASTM A351/A351M GR CF8M stainless steel body and end piece, NPT threaded ends, ASTM A276 Type 316 stainless steel ball, reinforced PTFE seats, seals, and packing, adjustable packing gland, blowout proof stainless steel stem, stainless steel lever operator with vinyl grip, rated 1,000 psig CWP, complies with MSS SP-110.
  - b. Manufacturers and Products:
    - 1) Conbraco Apollo; 76F-100 Series.
    - 2) Nibco; T-585-S6-R-66-LL.
    - 3) Or approved equal.
4. Type V307 Stainless Steel Ball Valve 2 Inches and Smaller:
  - a. Three-piece, full port, ASTM A276 GR 316 or ASTM A351/A351M GR CF8M stainless steel body and end pieces, Type 316 stainless steel ball, NPT threaded ends, reinforced PTFE seats, seals, and packing, adjustable packing gland, blowout-proof stainless steel stem, stainless steel lever operator with vinyl grip, rated 800 psig to 1,000 psig CWP, complies with MSS SP-110.
  - b. Manufacturers and Products:
    - 1) Conbraco Apollo; 86R-100/86-500 Series.
    - 2) Nibco; T-595-S6-R-66-LL.
    - 3) Or approved equal.
5. Type V335 CPVC Ball Valve 2 Inches and Smaller:
  - a. Rated 150 psi at 100 degrees F, 80 psi at 140 degrees, with ASTM D1784, Type IV, Grade 1 chlorinated polyvinyl chloride (CPVC) body, ball, and stem, end entry, double union design, with solvent-weld socket ends or single union ball with flanged ends drilled to ASME B16.1, replaceable Teflon seat, Viton or Teflon O-ring stem seals, to block flow in both directions.
  - b. Manufacturers and Products:
    - 1) Nibco; Chemtrol Tru-Bloc.
    - 2) ASAHI/America; Type 21.
    - 3) Spears; True Union.
    - 4) Or approved equal.



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D. Plug Valves:

1. Type V400 Eccentric Plug Valve 2 Inches and Smaller:
  - a. Nonlubricated type rated 175 psig CWP, drip-tight shutoff with pressure from either direction, cast-iron body, threaded ends, lever operator, cast-iron plug with round or rectangular port, plug coated with Buna-N, stem bearing lubricated stainless steel or bronze, stem seal multiple V-rings, or U-cups with O-rings of nitrile rubber.
  - b. Manufacturers and Products:
    - 1) Pratt; Ballcentric.
    - 2) DeZurik; Style PEC.
    - 3) Milliken; Millcentric Series 603.
    - 4) Or approved equal.
2. Type V405 Eccentric Plug Valve 3 Inches to 12 Inches:
  - a. Nonlubricated type rated 175 psig CWP, drip-tight shutoff with pressure from either direction, cast-iron body, exposed service flanged ends in accordance with ASME B16.1 or grooved ends in accordance with AWWA C606 for rigid joints, buried service mechanical joint ends, unless otherwise shown.
  - b. Plug cast iron with round or rectangular port of no less than 80 percent of connecting pipe area and coated with Buna-N, seats welded nickel, stem bearings lubricated stainless steel or bronze, stem seal multiple V-rings, or U-cups with O-rings of nitrile rubber, grit seals on both upper and lower bearings.
  - c. For buried service, provide external epoxy coating.
  - d. Operators:
    - 1) 3-Inch to 4-Inch Valves: Wrench lever manual.
    - 2) 6-Inch to 12-Inch Valves: Totally enclosed, geared, manual operator with handwheel, 2-inch nut or chain wheel. Size operator for 1.5 times maximum operating shutoff pressure differential for direct and reverse pressure, whichever is higher. For exposed service, provide a Visual Valve Position Indicator. For buried service, provide completely sealed operator filled with heavy lubricant and 2-inch nut.
  - e. Manufacturers and Products:
    - 1) Pratt; Ballcentric.
    - 2) DeZurik; Style PEC.
    - 3) Milliken; Millcentric Series 600.
    - 4) Or approved equal.

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3. Type V406 Eccentric Plug Valve 14 Inches to 20 Inches:
  - a. Nonlubricated type rated 150 psig CWP, drip-tight shutoff with pressure from either direction, cast-iron body, exposed service flanged ends in accordance with ASME B16.1 or grooved ends in accordance with AWWA C606 for rigid joints, buried service mechanical joints ends, unless otherwise shown, plug cast iron with round or rectangular port of no less than 80 percent of connecting pipe area and coated with Buna-N, seats welded nickel, stem bearings lubricated stainless steel or bronze, stem seal multiple V-rings or U-cups with O-rings of nitrile rubber, grit seals on both upper and lower bearings.
  - b. Totally enclosed, geared, manual operator with handwheel, 2-inch nut or chain wheel. Size operator for 1.5 times maximum operating shutoff pressure differential for direct and reverse pressure, whichever is higher. For exposed service, provide a Visual Valve Position Indicator. For buried service, provide completely sealed operator filled with heavy lubricant and 2-inch nut.
  - c. For buried service, provide external epoxy coating.
  - d. Manufacturers and Products:
    - 1) Pratt; Ballcentric.
    - 2) DeZurik; Style PEC.
    - 3) Milliken; Millcentric Series 600.
    - 4) Or approved equal.
4. Type V408 Eccentric Plug Valve 3 Inches to 14 Inches for Digester Gas Service:
  - a. Nonlubricated type rated 150 psig minimum working pressure, bubble-tight shutoff with gas pressure from one direction, body cast iron with flanged ends, plug cast iron with round or rectangular port of no less than 80 percent of connecting pipe area and coated with Buna-N, seats welded nickel, stem bearing lubricated stainless steel, stem seal multiple V-rings or U-cups with O-rings of nitrile rubber.
  - b. Internal surfaces of valve body epoxy lined (except seat). For buried service, provide external epoxy coating.
  - c. Operators:
    - 1) 3-Inch and 4-Inch Valves: Wrench lever manual.
    - 2) 6-Inch through 12-Inch Valves: Totally enclosed, geared, manual operator, with handwheel, 2-inch nut, or chain wheel. Provide a Visual Valve Position Indicator.
  - d. Manufacturers and Products:
    - 1) Pratt; Ballcentric.
    - 2) DeZurik; Style PEC.
    - 3) Milliken; Millcentric Series 600.
    - 4) Or approved equal.

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5. Type V410 Three-Way, Nonlubricated, Tapered Plug Valve 3 Inches to 16 Inches:
  - a. Cast-iron body with Buna-N-coated plug, multiple V-rings or U-cups with O-ring seals, lubricated stainless steel bearings, and nickel- or epoxy-coated seat, rated 125 psi CWP minimum, flanged to ASME B16.1.
  - b. Operator: Gear type, totally enclosed and lubricated, with handwheel.
  - c. Manufacturers and Products:
    - 1) DeZurik; Style PTW.
    - 2) Milliken; Millcentric Series 600.
    - 3) Or approved equal.
6. Type V420 Nonlubricated Plug Valve 2 Inches and Smaller:
  - a. Ductile iron or carbon steel body, Type 316 stainless steel plug with straight-way rectangular ports, Teflon sleeves, screwed ends, wrench operator.
  - b. Class: 150.
  - c. Rating: 275 psi WOG.
  - d. Manufacturers and Products:
    - 1) Duriron Co.; Figure No. G432.
    - 2) Tuflin; Figure 066.
    - 3) Or approved equal.
7. Type V462 Gauge Cock 1/8 Inch to 1/4 Inch:
  - a. 1/4-inch bronze body, hexagon end pattern, tee head, male ends, rated 125-pound SWP.
  - b. Manufacturers and Products:
    - 1) United Brass Works; Figure 973.
    - 2) Or approved equal.
8. Type V464 Corporation Stop 1/2 Inch to 2 Inches:
  - a. AWWA C800 type, tapered threaded inlet, except when connecting to tapped fittings which require IPS tapered threads, outlet compression connection or IPS threads to suit connecting pipe, stops 1 inch and smaller rated 100 psi, larger stops rated 80 psi.
  - b. Manufacturers:
    - 1) Ford Meter Box Co.
    - 2) Mueller Co.
    - 3) Or approved equal.
9. Type V466 Buried Service Natural Gas Plug Valve 2 Inches and Smaller:
  - a. UL Listed, iron body type, rated 125 psi, screwed ends, drilled key head for permanent pinned operating rod.

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- b. Manufacturers and Products:
    - 1) DeZurik; Figure 425.
    - 2) Mueller; (Gas) Curb Stop H-11104.
    - 3) Or approved equal.
- E. Butterfly Valves:
- 1. General:
    - a. In full compliance with AWWA C504 and following requirements:
      - 1) Suitable for throttling operations and infrequent operation after periods of inactivity.
      - 2) Elastomer seats that are bonded or vulcanized to the body shall have adhesive integrity of bond between seat and body assured by testing, with minimum 75-pound pull in accordance with ASTM D429, Method B.
      - 3) Bubble-tight with rated pressure applied from either side. Test valves with pressure applied in both directions.
      - 4) No travel stops for disc on interior of body.
      - 5) Self-adjusting V-type or O-ring shaft seals.
      - 6) Isolate metal-to-metal thrust bearing surfaces from flow stream.
      - 7) Provide traveling nut or worm gear actuator with handwheel. Valve actuators to meet the requirements of AWWA C504.
      - 8) Buried service operators shall withstand 450 foot-pounds of input torque at fully open and fully closed positions.
      - 9) Provide linings and coatings in accordance with AWWA, unless otherwise indicated on Drawings or specified herein.
      - 10) Valves to be in full compliance with NSF/ANSI 61.
    - b. Non-AWWA butterfly valves to meet the following actuator requirements:
      - 1) For above ground installations, provide handle and notch plate for valves 6 inches and smaller and heavy-duty, totally enclosed gearbox type operators with handwheel, position indicator and travel stops for valves 8 inches and larger, unless otherwise indicated on Drawings or specified herein.
  - 2. Type V500 Butterfly Valve Water Works Service 3 Inches to 72 Inches:
    - a. AWWA C504, Class 150B.
    - b. Short body type, flanged ends.
    - c. Cast-iron body, cast or ductile iron disc, Type 304 stainless steel shafts, Buna-N rubber seat bonded or molded in body only, and stainless steel seating surface.
    - d. Provide epoxy lining and coating in compliance with AWWA C550.

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- e. Manufacturers and Products:
    - 1) Pratt; Model 2FII or Triton XR-70.
    - 2) DeZurik; AWWA Valve.
    - 3) Or approved equal.
  - 3. Type V512 Lug Butterfly Valve 2 Inches to 20 Inches for Digester Gas:
    - a. Lug style, two-piece cast-iron body, one-piece Type 316 stainless steel thin-profile disc and stem, heavy-duty stem bushing, NBR stem seal, FKM (Viton) replaceable resilient seat, 50 psi pressure bi-directional bubble-tight rating, suitable for temperatures up to 250 degrees F, valve body to fit between ASME B16.1, Class 125/150 flanges. Supply reduced disc diameter, if available.
    - b. Provide a Visual Valve Position Indicator.
    - c. Manufacturers and Products:
      - 1) Bray Controls; Model 21.
      - 2) Tyco/Keystone; Model 920.
      - 3) Or approved equal.
  - 4. Type V514 High Performance Butterfly Valve 2 Inches to 36 Inches:
    - a. ASME B16.1 Class 150 lug style, high performance type, Type 316 stainless steel body, Type 316 stainless steel single or double offset disc, Type 316 stainless steel shaft and taper pins, EPDM seat, PTFE stem packing, stainless steel with RTFE thrust washer.
    - b. Manufacturers and Products:
      - 1) Tyco/Keystone; K-Lok Series.
      - 2) DeZurik; BHP Series.
      - 3) Or approved equal.
- F. Check and Flap Valves:
- 1. Type V600 Check Valve 2 Inches and Smaller:
    - a. All bronze, threaded cap, threaded or soldered ends, swing type replaceable bronze disc, rated 125-pound SWP, 200-pound WOG.
    - b. Manufacturers and Products:
      - 1) Stockham; Figure B-319, threaded ends.
      - 2) Milwaukee; Figure 509, threaded ends.
      - 3) Stockham; Figure B-309, soldered ends.
      - 4) Milwaukee; Figure 1509, soldered ends.
      - 5) Or approved equal.
  - 2. Type V608 Swing Check Valve 2 Inches to 24 Inches:
    - a. AWWA C508, 125-pound flanged ends, cast-iron body, bronze body seat, bronze mounted cast-iron clapper with rubber facing, stainless steel hinge shaft.
    - b. Valves, 2 inches through 12 inches rated 175-pound WWP and 14 inches through 24 inches rated 150-pound WWP. Valves to be fitted with adjustable outside lever and weight, or fitted with

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- adjustable outside lever and spring. Increasing-pattern body valve may be used where increased outlet piping size is shown.
- c. Valve manufacturer shall furnish compatible limit switches for the following check valves:
    - 1) Check Valve, 73HV0020 on discharge of Raw Solids Feed Pumps No. 1.
    - 2) Check Valve, 73HV0021 on discharge of Raw Solids Feed Pumps No. 2.
    - 3) Check Valve, 73HV0022 on discharge of Raw Solids Feed Pumps No. 3.
  - d. Manufacturers and Products:
    - 1) M&H Valve; Style 59, 159, or 259.
    - 2) Mueller Co.; No. A-2600 Series.
    - 3) Or approved equal.
3. Type V612 Double Disc Swing Check Valve 2 Inches to 48 Inches:
- a. Wafer style, spring loaded, cast-iron body, aluminum-bronze or ductile iron discs, Buna-N resilient seats, and Type 316 stainless steel spring, hinge pin, and stop pin.
  - b. Valves 2 inches through 12 inches rated 200 psi nonshock working pressure and valves 14 inches through 48 inches rated 150 psi nonshock working pressure.
  - c. Manufacturers and Products:
    - 1) APCO; Series 9000.
    - 2) Val-Matic; Dual Disc.
    - 3) Crane/Stockham; WG-970.
    - 4) Tyco; Gulf MB Series.
    - 5) Or approved equal.
4. Type V631 CPVC Ball Check Valve 4 Inches and Smaller:
- a. ASTM D1784 Cell Class 23477B CPVC body, single or dual union socket weld ends, rated 150 psi at 73 degrees F, 110 psi at 140 degrees F, Viton seat and seal.
  - b. Manufacturers and Products:
    - 1) Nibco; Chemtrol Tru Union.
    - 2) ASAHI/America.
    - 3) Spears; True Union.
    - 4) Or approved equal.
- G. Self-Regulated Automatic Valves:
- 1. Type V710 Pressure-Reducing Valve 2-1/2 Inches and Smaller:
    - a. Direct diaphragm operated, spring controlled, bronze body, NPT threaded ends, 200-psig rated minimum.
    - b. Size/Rating: As shown in Valve Schedule.

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- c. Manufacturers and Products:
  - 1) Fisher; Type 75A.
  - 2) Watts; Series 223.
  - 3) Or approved equal.
- 2. Type V711 Pressure-Reducing Valve 2 Inches and Smaller:
  - a. Direct diaphragm, spring controlled, cast-iron body, spring case, composition seat and diaphragm, stainless steel valve stem, NPT threaded ends, 250-psig rated.
  - b. Size/Rating: As shown in Valve Schedule.
  - c. Manufacturers and Products:
    - 1) Fisher; 95 Series.
    - 2) Or approved equal.
- 3. Type V720 PVC Pressure Relief, By-Pass Relief, Back-Pressure Regulator, Back-Pressure, Anti-Siphon Valve 1/2 Inch to 2 Inches:
  - a. Direct acting diaphragm, spring controlled, in-line pattern, NPT threaded inlet and outlet, 150 psi design pressure.
  - b. PVC body, Teflon or Viton diaphragm, PVC or Teflon piston, high-density polyethylene or stainless steel adjusting bolt and locknut, stainless steel or coated steel spring, stainless steel fasteners.
  - c. Designed to open when upstream pressure reaches setpoint; set pressure adjustable from 10 psi to 100 psi, minimum. Pressure setpoint as shown in the Piping Schedule.
  - d. Manufacturers and Products:
    - 1) Plast-O-Matic; Series RVDT.
    - 2) Griffco; Series BPV.
    - 3) Primary Fluid Systems; TOP Valve.
    - 4) Or approved equal.
- 4. Type V731 Pressure-relief Valve 2 Inches and Smaller:
  - a. Spring controlled, stainless steel CF8M body, spring case, PTFE body gasket, Type 316 stainless steel valve stem, NPT threaded ends, 400 psi rated.
  - b. Opens when upstream pressure reaches a maximum setpoint.
  - c. Size/Rating: As shown on Drawings.
  - d. Manufacturers and Products:
    - 1) Kunkle Valve; Model 171S.
    - 2) Or approved equal.
- 5. Type V733 Pressure-Relief Valve, Back-pressure regulator for Digester Gas Service in a Municipal Wastewater Treatment Plant:
  - a. Pneumatically operated, diaphragm actuated, pilot controlled globe valve, ductile iron or cast steel body, ASME B16.1 Class 150 flanged ends, rated 250 psi, stainless steel stem, nickel coated on sealing surfaces plug, rubberized canvas diaphragm, steel and vulcanized rubber seat with nitrile rubber seals, to open

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- when upstream pressure reaches a maximum set point and to close when upstream pressure falls below the set point.
- b. Fusion-bonded epoxy lining and coating installed in accordance with specification Section 09 90 00 Painting and Coating.
  - c. Size/Rating: 10 inch, set point of 2.5 psig (field adjustable).
  - d. Manufacturers and Products:
    - 1) Pietro Fiorentini; Reval 182.
    - 2) Or approved equal.
6. Type V740 Air and Vacuum Valve 1/2 Inch to 16 Inches:
- a. 1/2-inch through 3-inch NPT inlets and outlets, 4-inch and larger ASME B16.1 Class 125 flanged inlet with plain outlet and protective hood.
  - b. Rated 150 psi (250 psi for RWHP service) working pressure, cast-iron or ductile iron body and cover, stainless steel float and trim, built and tested to AWWA C512. Operating pressure as shown on the Valve Schedule.
  - c. Manufacturers and Products:
    - 1) APCO Valve and Primer Corp.; Series 140 or Series 150.
    - 2) Val-Matic Valve; Series 100.
    - 3) Or approved equal.
7. Type V741 Air and Vacuum Valve 4 Inches to 16 Inches with Anti-slam Device:
- a. Equipped with anti-slam device to throttle flow of water into air valve. Design anti-slam device to permit full, unrestricted flow of air into and out of air valve but reduce flow area for water to approximately 10 percent.
  - b. Rated 150 psi working pressure, cast-iron or ductile iron body and cover, stainless steel float and trim, built and tested to AWWA C512, ASME B16.1 Class 125 flanged inlet and plain outlet with protective hood.
  - c. Provide air release valve and isolation gate valve to meet rated working pressure. Operating pressure is shown on the Valve Schedule.
  - d. Manufacturers and Products:
    - 1) ARI; Series D-23NS.
    - 2) Vent-O-Mat; Series RGXII.
    - 3) Or approved equal.
8. Type V744 Air Release Valve 1/2 Inch to 2 Inches:
- a. Suitable for water service, automatically exhaust small amounts of entrained air that accumulates in a system. In CLOSED position, seat against resilient seat to prevent water leakage.
  - b. Rated 150 psi working pressure (250 psi for RWHP/UWHP service), cast-iron or ductile iron body and cover, stainless steel float and trim, NPT threaded inlet and outlet, built and tested to



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- AWWA C512. Operating pressure is shown on the Valve Schedule.
- c. Manufacturers and Products:
    - 1) APCO Valve and Primer Corp.; Series 50, 200, and 200A.
    - 2) Val-Matic Valve; Series 15A to 45.6.
    - 3) Or approved equal.
9. Type V746 Combination Air Release Valve 1 Inch to 16 Inches:
- a. Suitable for water service, combines operating features of air and vacuum valve and air release valve. Air and vacuum portion to automatically exhaust air during filling of system and allow air to re-enter during draining or when vacuum occurs. Air release portion to automatically exhaust entrained air that accumulates in system.
  - b. Valve single body or dual body, air release valve mounted on air and vacuum valve, isolation valve mounted between the dual valves. 1-inch through 3-inch valves with NPT threaded inlet and outlet, 4-inch and larger valves with ASME B16.1 Class 125 flanged inlet and cover outlet.
  - c. Rated 150 psi working pressure, cast-iron or ductile iron body and cover, stainless steel float and trim, built and tested to AWWA C512.
  - d. Manufacturers and Products:
    - 1) APCO Valve and Primer Corp.; Series 143C to 147C or 1804 to 1816.
    - 2) Val-Matic Valve; Series 201C to 203C or 104/22 to 116/38.
    - 3) Or approved equal.
10. Type V750 Sewage Air and Vacuum Valve 2 Inches to 14 Inches:
- a. Suitable for sewage service; automatically exhausts air during system filling and allows air to re-enter during draining or when vacuum occurs.
  - b. Rated working pressure of 150 psi, 1-inch through 3-inch valves with NPT threaded inlet and outlet, 4-inch and larger valves with ASME B16.1 Class 125 flanged inlet and threaded cover outlet, built and tested to AWWA C512.
  - c. Materials: Cast-iron or ductile iron body and cover, concave or skirted stainless steel float and trim, Buna-N seat.
  - d. Sewage air and vacuum valve fitted with blowoff valve, flushing valve with quick disconnect couplings, and a minimum 5 feet of hose with quick disconnect couplings to permit backflushing after installation without dismantling valve.
  - e. Manufacturers and Products:
    - 1) APCO Valve and Primer Corp.; Series 401 SAVV to 414 SAVV.
    - 2) Val-Matic Valve; Series 301 to 306.
    - 3) Or approved equal.

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11. Type V752 Sewage Air Release Valve 2 Inches to 4 Inches:
  - a. Suitable for sewage service; automatically exhausts entrained air that accumulates in a system.
  - b. Rated working pressure of 150 psi, operating pressure as shown on the Valve Schedule, built and tested to AWWA C512.
  - c. Materials: Cast-iron or ductile iron body and cover with NPT threaded inlet and 1-inch NPT threaded outlet, concave or skirted stainless steel float and trim; Buna-N resilient seat.
  - d. Sewage air release valve fitted with blowoff valve, flushing valve with quick disconnect couplings, and a minimum 5 feet of hose with quick disconnect couplings to permit backflushing after installation without dismantling valve.
  - e. Manufacturers and Products:
    - 1) APCO Valve and Primer Corp.; Series 400 SARV or 450 SARV.
    - 2) Val-Matic Valve; Series 48 or 49.
    - 3) Or approved equal.
12. Type V754 Sewage Combination Air Valve 2 Inches to 6 Inches:
  - a. Suitable for sewage service; combines operating functions of air and vacuum valve and an air release valve. Air and vacuum portion shall automatically exhaust air during filling of a system and allow air to re-enter during draining or when a vacuum occurs. Air release portion to automatically exhaust entrained air that accumulates in system. Single body unit with air and vacuum valve and an air release valve in a single housing.
  - b. Rated working pressure of 150 psi; built and tested to AWWA C512.
  - c. Materials: Cast-iron or ductile iron body and covers, NTP threaded inlet and outlet, with concave or skirted stainless steel float and trim.
  - d. Sewage air release valve fitted with blowoff valve, flushing valve with quick disconnect couplings, and a minimum 5 feet of hose with quick disconnect couplings to permit backflushing after installation without dismantling valve.
  - e. Manufacturers and Products:
    - 1) APCO Valve and Primer Corp.; Series 440 SCAV.
    - 2) Val-Matic Valve; Series 800.
    - 3) Or approved equal.

H. Miscellaneous Valves:

1. Type V900 Diaphragm Valve 1/2 Inch to 12 Inches:
  - a. Weir type, polypropylene-lined cast-iron body, ASME B16.1 flanged ends, manual operator indicating, rising stem type with

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- handwheel, diaphragm ethylene propylene, in accordance with MSS SP-88 Category B.
- b. Manufacturers:
    - 1) ITT Engineered Valves.
    - 2) Saunders Valve, Inc.
    - 3) Or approved equal.
  2. Type V901 Diaphragm Valve 1/2 Inch to 12 Inches:
    - a. Straight-through type, polypropylene-lined cast-iron body, ASME B16.1 flanged ends, manual operator indicating, rising stem type with handwheel, diaphragm ethylene propylene, in accordance with MSS SP-88, Category B.
    - b. Manufacturers:
      - 1) ITT Engineered Valves.
      - 2) Saunders Valve, Inc.
      - 3) Or approved equal.
  3. Type V903 Diaphragm Valve, 1/2 Inch to 4 Inches:
    - a. Weir type with CPVC Type 4, Grade 1 body, PTFE with EPDM backing diaphragm, double union design, solvent weld socket ends for valves smaller than 2 inch, flanged ends for valve 2 inch and larger, handwheel operator, position indicator, adjustable travel stop, clear molded acrylic stem cap.
    - b. Manufacturers and Products:
      - 1) ASAHI/AMERICA; Diaphragm Valve Type 14.
      - 2) ITT Engineered Valves; Dia-Flo.
      - 3) Saunders Valve; Diaphragm Valve.
      - 4) Or approved equal.
  4. Type V925 Sampling Valve:
    - a. Type 316 stainless steel wetted parts, hand operated iron crank, piston to extend to inner surface of vessel or pipe, sealed by two compressible replaceable Teflon rings, one above discharge port and other below discharge port, 1-inch NPT inlet and 1-inch NPT outlet.
    - b. Manufacturers and Products:
      - 1) Strahman Valves, Inc.; Piston Type Sampling Valve.
      - 2) Fetterolf Corporation; Rod-Seal Sampling Valve.
      - 3) Or approved equal.
  5. Type V940 Solenoid Valve 1/4 Inch to 2 Inches:
    - a. Two-way internal pilot operated diaphragm type, brass body, resilient seat suitable for air or water, solenoid coil molded epoxy, NEMA insulation Class F, 120V ac, 60-Hz, unless otherwise indicated. Solenoid enclosure NEMA 250, Type 4 unless otherwise indicated. Size and normal position (when de-energized) as indicated on the Valve Schedule.
    - b. Minimum operating pressure differential no greater than 5 psig, maximum operating pressure differential not less than 125 psig.

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- c. Manufacturers:
  - 1) ASCO.
  - 2) Skinner.
  - 3) Or approved equal.
- 6. Type V960 Flow Regulator Valve 3/8 Inch to 3 Inches:
  - a. Designed to deliver a constant volume of water flow over a wide pressure drop range with the use of a flexible orifice. The flow rate shall be maintained to within 15 percent between 15 psi and 125 psi.
  - b. ASTM A276 GR 316 or ASTM A351/A351M GR CF8M stainless steel body and end piece, NPT threaded ends, EPDM orifice, 175-psig rated minimum.
  - c. Flow Rate: 50 gpm.
  - d. Manufacturers and Products:
    - 1) Eddington Industries; Model FR-250-S.
    - 2) Or approved equal.

2.06 OPERATORS AND ACTUATORS

A. Manual Operators:

- 1. General:
  - a. For AWWA valves, operator force not to exceed requirements of applicable valve standard. Provide gear reduction operator when force exceeds requirements.
  - b. For non-AWWA valves, operator force not to exceed applicable industry standard or 80 pounds, whichever is less, under operating condition, including initial breakaway. Provide gear reduction operator when force exceeds requirements.
  - c. Operator self-locking type or equipped with self-locking device.
  - d. Position indicator on quarter-turn valves.
  - e. Worm and gear operators one-piece design, worm-gears of gear bronze material. Worm of hardened alloy steel with thread ground and polished. Traveling nut type operator's threaded steel reach rod with internally threaded bronze or ductile iron nut.
- 2. Exposed Operator:
  - a. Galvanized and painted handwheel.
  - b. Cranks on gear type operator.
  - c. Chain wheel operator with tieback, extension stem, floor stand, and other accessories to permit operation from normal operation level.
  - d. Valve handles to take a padlock, and wheels a chain and padlock.
- 3. Buried Operator:
  - a. Buried service operators on valves larger than 2-1/2 inches shall have a 2-inch AWWA operating nut. Buried operators on valves

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2 inches and smaller shall have cross handle for operation by forked key. Enclose moving parts of valve and operator in housing to prevent contact with the soil.

- b. Buried service operators to be grease packed and gasketed to withstand submersion in water to 20 feet minimum.
- c. Buried valves shall have extension stems, bonnets, and valve boxes.

B. Electric Operators, 120 Volts:

- 1. General:
  - a. Comply with latest version of AWWA C542. Size to 1-1/2 times required operating torque. Motor stall torque not to exceed torque capacity of the valve.
  - b. Controls integral with actuator and fully equipped as specified in AWWA C542.
  - c. There are various proprietary valve communication protocols adopted in the plant. Contractor shall provide operators that are compatible with the existing proprietary valve communication protocols, as applicable.
- 2. Operator Operation, General:
  - a. Suitable for full 90-degree rotation of quarter-turn valves.
  - b. Manually override handwheel.
  - c. Mechanical valve position indication.
- 3. Electronic Control:
  - a. Torque Limiting Switches: Two single pole, double throw mechanical switches. Switches operate at any point in valve travel.
  - b. Jammed-valve detection and protection.
  - c. Motor over-temperature detection and protection.
  - d. Travel limit switches, single pole double throw.
  - e. 24 volts control.
- 4. Open-Close (O/C) Service:
  - a. Duty cycle for intermittent ON-OFF operation shall be 25 percent.
  - b. Operator shall power to OPEN and power to CLOSE.
  - c. Local Indication and Control:
    - 1) Integral mechanical valve POSITION indication, 0 percent to 100 percent OPENED.
    - 2) Integral OPENED and CLOSED indication lights.
    - 3) Integral LOCAL-OFF-REMOTE (L-O-R).
    - 4) Integral OPEN maintained switch which causes the valve to stroke full OPENED, even if OPEN switch is released, while L-O-R switch is in LOCAL.

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- 5) Integral CLOSE maintained switch which causes valve to stroke full CLOSED, even if CLOSED switch is released, while L-O-R switch is in LOCAL.
- d. Remote Indication and Control:
  - 1) Relay contact that closes when valve is capable of being controlled remotely (L-O-R switch in REMOTE) for connection to and monitoring by plant control system.
  - 2) Limit switch that closes when valve is fully OPENED for connection to and monitoring by plant control system.
  - 3) Limit switch that closes when valve is fully CLOSED for connection to and monitoring by plant control system.
5. Modulating (M) Service:
  - a. Operator rated for modulating duty.
  - b. Operator shall modulate based on an externally applied 4 mA to 20 mA dc signal.
  - c. Ac motor with solid state reversing starter or dc motor with solid state reversing controller, and built-in overload protection.
  - d. Local Indication and Control:
    - 1) Integral mechanical valve POSITION indication, 0 percent to 100 percent OPENED.
    - 2) Integral OPENED and CLOSED indication lights.
    - 3) Integral LOCAL-OFF-REMOTE (L-O-R).
    - 4) Integral OPEN momentary switch which causes valve to stroke towards OPENED, as long as OPEN switch is held, while L-O-R switch is in LOCAL.
    - 5) Integral CLOSE momentary switch which causes valve to stroke towards CLOSED, as long as CLOSED switch is held, while L-O-R switch is in LOCAL.
    - 6) Position valve proportionally 0 percent to 100 percent OPEN with external 4 mA to 20 mA dc signal while in REMOTE.
  - e. Remote Indication and Control:
    - 1) Relay contact that closes when valve is capable of being controlled remotely (L-O-R switch in REMOTE) for connection to and monitoring by plant control system.
    - 2) Limit switch that closes when valve is fully OPENED for connection to and monitoring by plant control system.
    - 3) Limit switch that closes when valve is fully CLOSED for connection to and monitoring by plant control system.
    - 4) Current Position Transmitter, 4 mA to 20 mA dc signal in proportion to 0 percent to 100 percent OPENED, with 0.5 percent accuracy and 0.5 percent repeatability, capable of driving a 750-ohm load, for connection to and monitoring by plant control system.

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6. Control Features: Electric motor actuators with features as noted above, and as modified/supplemented in Electric Actuated Valve Schedule.
  7. Manufacturers:
    - a. Rotork Controls.
    - b. Flowserve Limitorque.
    - c. AUMA.
    - d. Or approved equal.
- C. Electric Motor Actuators, 480 Volts:
1. General:
    - a. Comply with latest version of AWWA C542.
    - b. Size to 1-1/2 times required operating torque. Motor stall torque not to exceed torque capacity of valve.
    - c. Controls integral with actuator and fully equipped as specified in AWWA C542.
    - d. Stem protection for rising stem valves.
    - e. There are various proprietary valve communication protocols adopted in the plant. Contractor shall provide operators that are compatible with the existing proprietary valve communication protocols as applicable.
  2. Actuator Operation—General:
    - a. Suitable for full 90-degree rotation of quarter-turn valves or for use on multiturn valves, as applicable.
    - b. Manual override handwheel.
    - c. Valve position indication.
    - d. Operate from FULL CLOSED to FULL OPEN positions or the reverse in the number of seconds given in Electric Actuated Valve Schedule.
    - e. Nonintrusive Electronic Control: Local controls, diagnostics, and calibration, including limit and torque settings, shall be accomplished nonintrusively. Electronic valve position display with capability to show continuous torque output. If applicable, provide two hand-held configuration units for every 10 actuators provided, two minimum.
  3. Open-Close(O/C)/Throttling(T) Service:
    - a. Size motors for one complete OPEN-CLOSE-OPEN cycle no less than once every 10 minutes.
    - b. Actuator suitable for throttling operation of valve at intermediate positions.
    - c. LOCAL-OFF-REMOTE Selector Switch, padlockable in each position:
      - 1) Integral OPEN-STOP-CLOSE momentary pushbuttons with seal-in circuits to control valve in LOCAL position.

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- 2) Remote OPEN-STOP-CLOSE momentary control dry contact inputs in REMOTE position. Integral seal-in circuits for remote OPEN and CLOSE commands; valve travel stops when remote STOP contact opens.
    - 3) Auxiliary contact that closes in REMOTE position.
  - d. OPEN and CLOSED indicating lights.
  - e. Integral reversing motor starter with built-in overload protection.
4. Modulating (M) Service:
  - a. Size actuators for modulating duty.
  - b. Feedback potentiometer, or equivalent, and integral electronic positioner/comparator circuit to maintain valve position.
  - c. HAND-OFF-AUTO (Local-Off-Remote) Selector Switch, padlockable in each position:
    - 1) Integral OPEN-STOP-CLOSE momentary pushbuttons with seal-in circuits to control valve in HAND (Local) position.
    - 2) 4 mA to 20 mA dc input signal to control valve in AUTO (Remote) position.
    - 3) Auxiliary contact that closes in AUTO (Remote) position.
  - d. OPEN and CLOSED indicating lights.
  - e. Ac motor with solid state reversing starter or dc motor with solid state reversing controller, and built-in overload protection. Controller capable of 1,200 starts per hour.
  - f. Duty cycle limit timer and adjustable band width, or equivalent, to prevent actuator hunting.
  - g. Valve position output converter that generates isolated 4 mA to 20 mA dc signal in proportion to valve position, and is capable of driving into loads of up to 500 ohms at 24V dc.
5. Limit Switch:
  - a. Single-pole, double-throw (SPDT) type, field adjustable, with contacts rated for 5 amps at 120V ac.
  - b. Each valve actuator to have a minimum of two auxiliary transfer contacts at end position, one for valve FULL OPEN and one for valve FULL CLOSED.
  - c. Housed in actuator control enclosure.
6. Control Features: Electric motor actuators with features as noted above, and as modified/supplemented in Electric Actuated Valve Schedule.
7. Manufacturers:
  - a. Rotork Controls.
  - b. Flowserve Limatorque.
  - c. AUMA.
  - d. Or approved equal.



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2.07 ACCESSORIES

- A. Tagging: 1-1/2-inch diameter heavy brass or stainless steel tag attached with No. 16 solid brass or stainless steel jack chain for each valve bearing valve tag number shown on Electric Actuated Valve Schedule, Pneumatic Actuated Valve Schedule, and Self-Regulated Valve Schedule.
- B. Limit Switch:
  - 1. Factory installed NEMA 4X limit switch by valve or actuator manufacturer.
  - 2. SPST, rated at 5 amps, 120V ac.
- C. Visual Valve Position Indicator:
  - 1. Visual position indicators showing valve position, OPEN or CLOSED, shall be provided as shown on Drawings for instant recognition of valve position from all vantage points.
  - 2. The color code shall be Green (CLOSED) and Red (OPEN). When valve is in a CLOSED position, operating personnel shall view a highly visible green cylinder. The green cylinder is transformed in a red cylinder when the valve is OPEN. Provide stainless steel fabricated mounting hardware and drive guide as required for mounting position indicator on the valve.
  - 3. Manually operated valves that require limit switches shall be equipped with SolaR Indicator by StoneL Corporation, or approved equal.
  - 4. Manually operated valves and electrically actuated valves that require visual position indication, only, shall be equipped with Stand Alone Visual Indicators by StoneL Corporation, or approved equal.
- D. Extension Bonnet for Valve Operator: Complete with enclosed stem, extension, support brackets, and accessories for valve and operator.
  - 1. Manufacturers:
    - a. Pratt.
    - b. DeZurik.
    - c. Or approved equal.
- E. Floor Stand:
  - 1. Nonrising, heavy pattern, indicating type.
  - 2. Complete with solid extension stem, coupling, handwheel, stem guide brackets, and yoke attachment. Stem length as required to connect valve operating nut and floor stand.
  - 3. Stem Guide: Space such that stem L/R ratio does not exceed 200.
  - 4. Anchor Bolts: Type 304 stainless steel.

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5. Manufacturers and Products:
    - a. Clow; Figure F-5515.
    - b. Mueller, Figure A-26426.
    - c. Or approved equal.
- F. Floor Box:
1. Plain type, for support of nonrising type stem.
  2. Complete with solid extension stem, operating nut, and stem guide brackets. Stem length as required to extend valve operating nut to within 3 inches of finish floor.
  3. Stem Guide: Space such that stem L/R ratio does not exceed 200.
  4. Anchor Bolts: Type 304 stainless steel.
  5. Manufacturers and Products:
    - a. Neenah Foundry; R 7506.
    - b. Clow; No. F5690.
    - c. Or approved equal.
- G. Chain Wheel and Guide:
1. Handwheel direct-mount type.
  2. Complete with chain.
  3. Galvanized or cadmium-plated.
  4. Manufacturers and Products:
    - a. Clow Corp.; Figure F-5680.
    - b. Walworth Co.; Figure 804.
    - c. DeZurik Corp.; Series W or LWG.
    - d. Or approved equal.
- H. Cast-Iron Valve Box: Designed for traffic loads, sliding type, with minimum of 5-1/4-inch ID shaft.
1. Box: Cast iron with minimum depth of 9 inches.
  2. Lid: Cast iron, minimum depth 3 inches, locking type, marked with appropriate service.
  3. Extensions: Cast iron.
  4. Two-piece box and lid for valves 4 inches through 12 inches, three-piece box and lid for valves larger than 12 inches with base sized for valve.
  5. Valve extension stem for valves with operating nuts 3 feet or greater below finish grade.
  6. Manufacturers and Products:
    - a. East Jordan Iron Works; Cast-Iron Valve Boxes.
    - b. Bingham & Taylor; Cast-Iron Valve Boxes.
    - c. Or approved equal.

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- I. Concrete Valve Box: Designed for traffic loads, sliding type, with minimum of 10-inch ID shaft.
  1. Box: High-density, reinforced concrete, minimum depth 12 inches, cast-iron ring seat.
  2. Lid: Cast iron, minimum depth 3 inches, marked with appropriate service.
  3. Extensions: Concrete.
  4. Manufacturers and Products:
    - a. Christy Concrete Products; G Series.
    - b. BES Concrete Products; G Series.
    - c. Or approved equal.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Flange Ends:
  1. Flanged valve bolt holes shall straddle vertical centerline of pipe.
  2. Clean flanged faces, insert gasket and bolts, and tighten nuts progressively and uniformly.
- B. Screwed Ends:
  1. Clean threads by wire brushing or swabbing.
  2. Apply joint compound.
- C. PVC and CPVC Valves: Install using solvents approved for valve service conditions.
- D. Valve Installation and Orientation:
  1. General:
    - a. Install valves so handles operate from fully open to fully closed without encountering obstructions.
    - b. Install valves in location for easy access for routine operation and maintenance.
    - c. Install valves per manufacturer's recommendations.
  2. Gate, Globe, and Ball Valves:
    - a. Install operating stem vertical when valve is installed in horizontal runs of pipe having centerline elevations 4 feet 6 inches or less above finished floor, unless otherwise shown.
    - b. Install operating stem horizontal in horizontal runs of pipe having centerline elevations greater than 4 feet 6 inches above finish floor, unless otherwise shown.

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3. Eccentric Plug Valves:
    - a. Unless otherwise restricted or shown on Drawings, install valve as follows:
      - 1) Liquids with suspended solids service with horizontal flow: Install valve with stem in horizontal position with plug up when valve is open. Install valve with seat end upstream (flow to produce unseating pressure).
      - 2) Liquids with suspended solids service with vertical flow: Install valve with seat in highest portion of valve (seat up).
      - 3) Clean Liquids and Gas Service: Install valve with seat end downstream of higher pressure when valve is closed (higher pressure forces plug into seat).
  4. Butterfly Valves:
    - a. Unless otherwise restricted or shown on Drawings, install valve a minimum of 8 diameters downstream of a horizontal elbow or branch tee with shaft in horizontal position.
    - b. For vertical elbow or branch tee immediately upstream of valve, install valve with shaft in vertical position.
    - c. For horizontal elbow or branch tee immediately upstream of valve, install valve with shaft in horizontal position.
    - d. When installed immediately downstream of swing check, install valve with shaft perpendicular to swing check shaft.
    - e. For free inlet or discharge into basins and tanks, install valve with shaft in vertical position.
  5. Check Valves:
    - a. Install valve in accordance with manufacturer's instructions and provide required distance from immediate upstream fitting.
    - b. Install valve in vertical flow (up) piping only for gas services.
    - c. Install swing check valve with shaft in horizontal position.
    - d. Install double disc swing check valve to be perpendicular to flow pattern when discs are open.
  6. Solenoid Valves: Install in accordance with manufacturer's instructions.
- E. Install line size ball valve and union upstream of each solenoid valve, in-line flow switch, or other in-line electrical device, excluding magnetic flowmeters, for isolation during maintenance.
- F. Locate valve to provide accessibility for control and maintenance. Install access doors in finished walls and plaster ceilings for valve access.
- G. Extension Stem for Operator: Where depth of valve operating nut is 3 feet or greater below finish grade, furnish operating extension stem with 2-inch operating nut to bring operating nut to a point within 6 inches of finish grade.

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- H. Torque Tube: Where operator for quarter-turn valve is located on floor stand, furnish extension stem torque tube of a type properly sized for maximum torque capacity of valve.
- I. Floor Box and Stem: Steel extension stem length shall locate operating nut in floor box.
- J. Chain Wheel and Guide: Install chain wheel and guide assemblies or chain lever assemblies on manually operated valves over 6 feet 9 inches above finish floor. Install chain to within 3 feet of finish floor. Where chains hang in normally traveled areas, use appropriate “L” type tie-back anchors. Install chains to within operator horizontal reach of 2 feet 6 inches maximum, measured from normal operator standing location or station.
- K. Actuators with Network Communications Protocols:
  - 1. Actuators as defined in Power Operated Valve Schedule or P&IDs as having communications protocol.
  - 2. Programming Services:
    - a. Integration of the new valve(s) into the existing valve network via the Master Station and redundant Master Station.
    - b. Removal of any networked valves deleted in this project from the Master Station(s) to ensure error free communications on the valve network and communications to the Distributed Control System (DCS).
    - c. Setup and confirm communications to the DCS with the DCS Provider (DCSP).
  - 3. Actuators networked communications are called as:
    - a. Pakscan (Rotork).
    - b. Flowserve (Limitorque).

3.02 TESTS AND INSPECTION

- A. Valve may be either tested while testing pipelines, or as a separate step.
- B. Test that valves open and close smoothly under operating pressure conditions. Test that two-way valves open and close smoothly under operating pressure conditions from both directions.
- C. Inspect air and vacuum valves as pipe is being filled to verify venting and seating is fully functional.
- D. Count and record number of turns to open and close valve; account for discrepancies with manufacturer’s data.
- E. Set, verify, and record set pressures for relief and regulating valves.

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- F. Automatic valves to be tested in conjunction with control system testing. Set opening and closing speeds, limit switches, as required or recommended by Engineer.
- G. Test hydrostatic relief valve seating; record leakage. Adjust and retest to maximum leakage of 0.1 gpm per foot of seat periphery.

3.03 MANUFACTURER'S SERVICES

- A. Manufacturer's Representative:
  - 1. Present at Site for minimum person-days listed below, travel time excluded:
    - a. 1 person-day for installation assistance and inspection.
    - b. 1 person-day for functional and performance testing and completion of Manufacturer's Certificate of Proper Installation.
- B. See Section 01 43 33, Manufacturers' Field Services, and Section 01 91 14, Testing, Integration, and Startup.

**END OF SECTION**

**SECTION 40 80 01**  
**PROCESS PIPING LEAKAGE TESTING**

**PART 1 GENERAL**

1.01 SUBMITTALS

A. Informational Submittals:

1. Testing Plan:
  - a. Submit prior to testing and include at least the information that follows.
    - 1) Testing dates.
    - 2) Piping systems and section(s) to be tested.
    - 3) Test type.
    - 4) Method of isolation from existing piping and equipment.
    - 5) Method of isolation from instrumentation and other items not to be tested.
    - 6) Provisions for supporting and providing thrust restraint for buried piping during preliminary visual test.
    - 7) Method to remove all air from piping prior to testing.
    - 8) Method of filling and removing water.
    - 9) Calculation of maximum allowable leakage for piping section(s) to be tested.
2. Certifications of Calibration: Testing equipment.
3. Certified Test Report.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 PREPARATION

- A. Notify Engineer in writing 5 work days in advance of testing. Perform testing in presence of Engineer.
- B. Pressure Piping:
  1. Install temporary thrust blocking or other restraint as necessary to protect adjacent piping or equipment and make taps in piping prior to testing.
  2. Wait 5 days minimum after concrete thrust blocking is installed to perform pressure tests. If high-early strength cement is used for thrust blocking, wait may be reduced to 2 days.

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3. Prior to test, remove or suitably isolate appurtenant instruments or devices that could be damaged by pressure testing.
  4. New Piping Connected to Existing Piping:
    - a. Isolate new piping with grooved-end pipe caps, spectacle blinds, blind flanges, or as acceptable to Engineer.
    - b. Test joint between new piping and existing piping by methods that do not place entire existing system under test load, as approved by Engineer.
  5. Items that do not require testing to be coordinated with Engineer.
  6. Test Pressure: As indicated on Piping Schedule.
- C. Test section may be filled with water and allowed to stand under low pressure prior to testing.
- D. Gravity Piping:
1. Perform testing after service connections, manholes, and backfilling have been completed between stations to be tested.
  2. Determine groundwater level at time of testing by exploratory holes or other method acceptable to Engineer.
  3. Pipe 42 Inches Diameter and Larger: Joint testing device may be used to isolate and test individual joints.

### 3.02 HYDROSTATIC TEST FOR PRESSURE PIPING

- A. Fluid: Clean water of such quality to prevent corrosion of materials in piping system.
- B. Exposed Piping:
1. Perform testing on installed piping prior to application of insulation.
  2. Maximum Filling Velocity: 0.25 foot per second, applied over full area of pipe.
  3. Vent piping during filling. Open vents at high points of piping system or loosen flanges, using at least four bolts, or use equipment vents to purge air pockets.
  4. Maintain hydrostatic test pressure continuously for 60 minutes, minimum, and for such additional time as necessary to conduct examinations for leakage.
  5. Examine joints and connections for leakage.
  6. Correct visible leakage and retest as specified.
  7. Leave pipe full of water after repair of leaks or empty pipe of water prior to final cleaning or disinfection per direction of Engineer.



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C. Buried Piping:

1. Perform preliminary visual test on piping prior to backfilling. Provisions to support piping and thrust restraint must be completed prior to filling pipe with water. Final testing for approval to be completed after backfilling.
2. Expel air from piping system during filling.
3. Apply and maintain specified test pressure with hydraulic force pump. Valve off piping system when test pressure is reached.
4. Maintain hydrostatic test pressure continuously for 2 hours minimum, reopening isolation valve only as necessary to restore test pressure.
5. Determine actual leakage by measuring quantity of water necessary to maintain specified test pressure for duration of test.
6. Maximum Allowable Leakage:

$$L = \frac{SD(P)^{1/2}}{148,000}$$

where:

- L = Allowable leakage, in gallons per hour.  
S = Length of pipe tested, in feet.  
D = Nominal diameter of pipe, in inches.  
P = Test pressure during leakage test, in pounds per square inch.

7. Correct leakage greater than allowable, and retest as specified.

3.03 PNEUMATIC TEST FOR PRESSURE PIPING

- A. Do not perform on:
1. PVC or CPVC pipe.
  2. Piping larger than 18 inches.
  3. Buried and other non-exposed piping.
- B. Fluid: Oil-free, dry air.
- C. Procedure:
1. Apply preliminary pneumatic test pressure of 25 psig maximum to piping system prior to final leak testing, to locate visible leaks. Apply soap bubble mixture to joints and connections; examine for leakage.
  2. Correct visible leaks and repeat preliminary test until visible leaks are corrected.

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3. Gradually increase pressure in system to half of specified test pressure. Thereafter, increase pressure in steps of approximately one-tenth of specified test pressure until required test pressure is reached.
  4. Maintain pneumatic test pressure continuously for minimum of 10 minutes and for such additional time as necessary to conduct soap bubble examination for leakage.
  5. Correct visible leakage and retest as specified.
- D. Allowable Leakage: Piping system, exclusive of possible localized instances at pump or valve packing, shall show no visual evidence of leakage.
- E. After testing and final cleaning, purge with nitrogen those lines that will carry flammable gases to assure no explosive mixtures will be present in system during filling process.

3.04 HYDROSTATIC TEST FOR GRAVITY PIPING

- A. Testing Equipment Accuracy: Plus or minus 1/2-gallon water leakage under specified conditions.
- B. Maximum Allowable Leakage: 0.16 gallon(s) per hour per inch diameter per 100 feet. Include service connection footage in test section, subjected to minimum head specified.
- C. Gravity Sanitary and Roof Drain Piping: Test with 15 feet of water to include highest horizontal vent in filled piping. Where vertical drain and vent systems exceed 15 feet in height, test systems in 15-foot vertical sections as piping is installed.
- D. Exfiltration Test:
1. Hydrostatic Head:
    - a. At least 6 feet above maximum estimated groundwater level in section being tested.
    - b. No less than 6 feet above inside top of highest section of pipe in test section, including service connections.
  2. Length of Pipe Tested: Limit length such that pressure on invert of lower end of section does not exceed 30 feet of water column.
- E. Infiltration Test:
1. Groundwater Level: At least 6 feet above inside top of highest section of pipe in test section, including service connections.

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- F. Piping with groundwater infiltration rate greater than allowable leakage rate for exfiltration will be considered defective even if pipe previously passed a pressure test.
- G. Defective Piping Sections: Replace and retest as specified.

3.05 PNEUMATIC TEST FOR GRAVITY PIPING

A. Equipment:

- 1. Calibrate gauges with standardized test gauge provided by Engineer at start of each testing day. Engineer will witness calibration.
- 2. Install gauges, air piping manifolds, and valves at ground surface.
- 3. Provide pressure release device, such as rupture disc or pressure relief valve, to relieve pressure at 6 psi or less.
- 4. Restrain plugs used to close sewer lines to prevent blowoff.

B. Procedure:

- 1. Require that no person enter manhole where pipe is under pressure.
- 2. Slowly introduce air into pipe section until internal air pressure reaches 4 psi greater than average back pressure of groundwater submerging pipe.
- 3. Allow 2 minutes minimum for air temperature to stabilize.

C. Allowable Leakage: Test section will be considered defective when time required for pressure to decrease from 3.5 psi to 2.5 psi greater than average back pressure of groundwater submerging pipe is less than that computed using values from following table:

<b>Table 1*</b>					
<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
<b>Pipe Diameter (Inches)</b>	<b>Time per Foot up to Length in Col C (Seconds)</b>	<b>Test Length (Feet)</b>	<b>Test Time for any Length Between Col C &amp; E (Min:Sec)</b>	<b>Length at Which Time in Col F Applies (Feet)</b>	<b>Time per Foot for Total Length (Seconds)</b>
4	0.18	636	1:54	1,114	0.10
6	0.40	424	2:50	743	0.23
8	0.71	318	3:47	557	0.41
10	1.11	255	4:43	446	0.63
12	1.60	212	5:40	371	0.91

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<b>Table 1*</b>					
<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
<b>Pipe Diameter (Inches)</b>	<b>Time per Foot up to Length in Col C (Seconds)</b>	<b>Test Length (Feet)</b>	<b>Test Time for any Length Between Col C &amp; E (Min:Sec)</b>	<b>Length at Which Time in Col F Applies (Feet)</b>	<b>Time per Foot for Total Length (Seconds)</b>
15	2.50	170	7:05	297	1.42
18	3.62	141	8:30	248	2.06
21	4.92	121	9:55	212	2.81
24	6.42	106	11:20	187	3.67
<p>Example: 15-inch diameter pipe:                      For 150 feet, T = 2.50 sec (Col B) x 150 ft = 375 sec = 6:15                      For 250 feet, T = 7:05 (Col D)                      For 500 feet, T = 1.42 sec (Col F) x 500 ft = 710 sec = 11:50</p> <p>*Based on 0.003 cfm per square foot with a minimum significant loss of 2 cfm and a maximum loss of 3.5 cfm.</p>					

- D. Piping with groundwater infiltration rate greater than allowable leakage rate for exfiltration will be considered defective even if pipe previously passed a pressure test.
- E. Defective Piping Sections: Replace and retest as specified.

3.06 FIELD QUALITY CONTROL

- A. Test Report Documentation:
  - 1. Test date.
  - 2. Description and identification of piping tested.
  - 3. Test fluid.
  - 4. Test pressure.
  - 5. Remarks, including:
    - a. Leaks (type, location).
    - b. Repair/replacement performed to remedy excessive leakage.
  - 6. Signed by Contractor and Engineer to represent that test has been satisfactorily completed.

**END OF SECTION**

PURE WATER PROGRAM  
FOR  
THE CITY OF SAN DIEGO, CALIFORNIA

BIDDING REQUIREMENTS  
AND  
CONTRACT DOCUMENTS

for the construction of the

SAN DIEGO NORTH CITY METROPOLITAN  
BIOSOLIDS CENTER IMPROVEMENTS

VOLUME 3  
SPECIFICATIONS  
SECTION 40 90 00 AND SUPPLEMENTS

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*Issued for Construction*

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**SECTION 00 01 07**  
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SPECIFICATIONS



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CITY OF SAN DIEGO  
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July 26, 2019

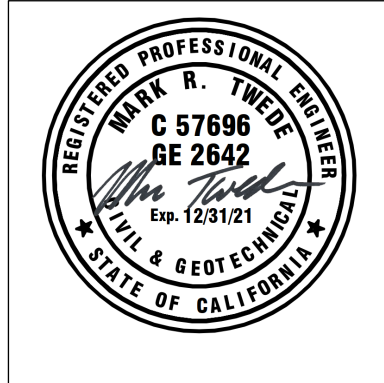
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October 30, 2020

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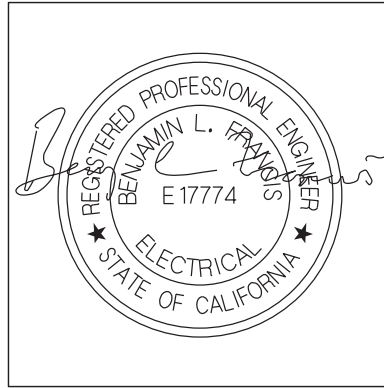
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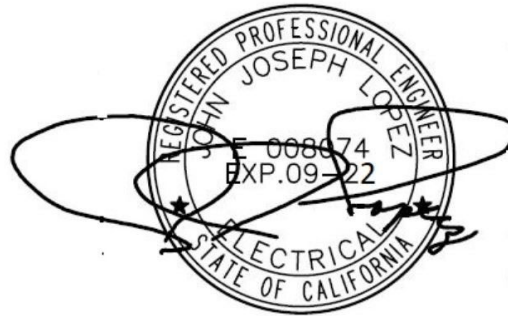
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**END OF SECTION**

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**SECTION 40 90 00**  
**INSTRUMENTATION AND CONTROL**

**PART 1 GENERAL**

1.01 WORK OF THIS SECTION

- A. The Work of the following Divisions and Sections applies to the Work of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this Work.
  - 1. Section 01 33 00, Submittal Procedures.
  - 2. Division 26, Electrical.
  - 3. Division 40, Process Interconnections.
- B. The Work of this Section includes the general specification and requirements for the Instrumentation and Control (I&C) Work under this, and other applicable Specifications, including providing instrumentation and all related wiring as shown in these Contract Documents and Drawings. Detailed scope, and quantities are shown in Section 40 90 03, General Requirements, and Section 40 90 07, Scope of Work.
- C. The Contractor shall be responsible for the design, procurement, installation, testing, training, and documentation for I&C systems provided under this Contract in accordance with this Section and Section 40 90 07, Scope of Work. A Distributed Control System (DCS), when applicable, as specified in Section 40 90 03, General Requirements, will be provided by the City's DCS provider, Emerson Process Management (EPM). The Contractor shall be responsible for terminating and integrating all I&C equipment with the EPM DCS systems.

1.02 SCOPE

- A. The intent of this Section is that the Contractor will provide a complete and operational, turn-key, integrated I&C system, including all instrumentation and equipment as shown on Drawings, and as specified herein.
- B. The Contractor shall furnish all materials, tools, equipment, consumables and supplies and shall perform all labor required to complete the work in this Specification.

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1.03 REFERENCES

- A. The following is a list of standards which may be referenced in this Section:
1. American Petroleum Institute (API): API RP-550, Manual on Installation of Refinery Instruments and Control Systems, Part 1 - Process Instrumentation and Control Sections 1 Through 13.
  2. American National Standards Institute (ANSI):
    - a. ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800.
    - b. ANSI/ASME B16.5, Pipe Flanges and Flanged Fittings.
    - c. ANSI/AWWA C207, Steel Pipe Flanges for Waterworks Service - Sizes 4 In Through 144 In.
    - d. ANSI/AWWA C701, Cold-Water Meters - Turbine Type for Customer Service.
    - e. ANSI/AWWA C702, Cold-Water Meters - Compound Type.
    - f. AWWA C704, Cold-Water Meters - Propeller Type for Main Line Applications.
    - g. ANSI/AWWA, Ductile-Iron and Gray-Iron Fittings, 3-In Through C110/A21.10 48-In for Water and Other Liquids.
  3. American Society of Mechanical Engineers: ASME Report Fluid Meters, Sixth Edition, 1971.
  4. ASTM International (ASTM):
    - a. ASTM A105, Specification for Forgings, Carbon Steel for Piping Components.
    - b. ASTM A193, Specification for Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service.
    - c. ASTM A194, Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service.
    - d. ASTM A283, Specification for Low and Intermediate Tensile Strength Carbon Steel Plates, Shapes, and Bars.
    - e. ASTM A312, Stainless Steel Piping.
    - f. ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
    - g. ASTM B61, Specification for Steam or Valve Bronze Castings.
  5. International Society of Automation (ISA):
    - a. ISA-RP60.6, Nameplates, Labels, and Tags for Control Centers.
    - b. ISA-RP7.1, Pneumatic Control Circuit Pressure Test.
    - c. ISA-RP12.6, Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations.
    - d. ISA-S5.1, Instrument Symbols and Identification.
    - e. ISA-S5.4, Instrument Loop Diagrams.
    - f. ISA-S12.4, Instrument Purging for Reduction of Hazardous Area Classification.

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- g. ISA-S20, Specification Forms for Process Measurement and Control Instrumentation; Primary Elements and Control Valves.
- B. Work of this Section shall comply with the current editions of the following codes as adopted by the City of San Diego Municipal Code:
  - 1. Uniform Fire Code.
  - 2. National Electrical Code: NFPA70.
  - 3. National Fire Protection Association: NFPA 70E.
- C. UL: All I&C and instrument equipment furnished in this Section shall be listed by and shall bear the label of UL or of an independent testing laboratory acceptable to the City of San Diego (City).
- D. No exposed voltage that would require PPE or work permits will be allowed.

1.04 SUBMITTALS

- A. General:
  - 1. All submittals shall be provided in accordance with Section 01 33 00, Submittal Procedures, as a minimum, and in accordance with specialty submittal requirements below.
  - 2. All submittal of this section shall be provided with six hard copy and one soft copy CD.
  - 3. Submittals of this section shall be in Adobe Acrobat PDF format, unless otherwise specified. Vendor and Contractor Shop Drawings developed under this section shall be in Bentley MicroStation (.dgn) format, utilizing monochrome.
    - a. Documents not available in electronic format shall be scanned at 600 dpi, black and white) for documents without graphics, or color for documents with graphics and converted to Adobe Acrobat (PDF).
  - 4. Operations and Maintenance (O&M) Submittal Requirements of this Section:
    - a. Preliminary Submittal: Where required by Specification, two hard copies and one PDF of the preliminary submittals shall be provided to the City's representative for review.
    - b. Final Submittal: All Submittal documents in this section, including design and O&M documents, shall be provided on two CD's; One CD shall provide documents in native format (e.g. MicroStation, MS Word, MS Excel, etc.), and the other CD shall provide documents in PDF format. Both CD shall use the same file naming convention, except that the suffixes shall be different (e.g. PDF, XLS, etc.).



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- c. Each document shall be indexed, and a database table in Excel shall be provided, which includes the following data for each document:
- 1) Document file name.
  - 2) Document description.
  - 3) Hard Copy Catalog No. (used by facility document coordinator).
  - 4) Document Type:
    - a) Shop Drawings:
      - (1) P&IDs.
      - (2) Loop Drawings.
      - (3) Instrument Data Sheets.
      - (4) Other.
    - b) Manufacturer's data.
    - c) Maintenance instructions.
    - d) Training.
  - 5) Facility Name.
  - 6) Specification Number.
  - 7) Process Name.
  - 8) Unit Process Number.

B. Presubmittal Conference:

1. The Contractor shall arrange and conduct a Presubmittal Conference within 60 days after award of the Contract. The purpose of the Presubmittal Conference is to review and approve the manner in which the Contractor intends to carry out his responsibilities for shop drawing submittal on the Work to be provided under this Section. The Contractor and the City Representative shall attend. Both the Contractor and the City Representative may invite additional parties at their discretion.
2. The Contractor shall allot a minimum of two 8-hour days for the Conference.
3. The Contractor shall prepare the following for discussion at the Conference:
  - a. List of equipment and materials for the instrumentation and I&C systems, including proposed manufacturer names and model numbers.
  - b. List of proposed clarifications to the indicated requirements plus a brief written explanation of each exception. Review and acceptance of proposed clarifications will be according to Section 01 33 00, Submittal Procedures.
  - c. One complete example of each type of submittal proposed.
  - d. A flow chart showing the steps the Contractor will take in preparing and coordinating each submittal to the City's Representative.

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- e. A Gantt-Chart type schedule for the Work provided under this section, covering the time period beginning with the conference and ending after startup and acceptance. Dates for the beginning and ending of submittal preparation, submittal review periods, design, fabrication, programming, factory testing, delivery to the site, installation, field testing, and training shall be scheduled. The schedule shall be subdivided into major items or groups of items which are on the same schedule.
  4. The Contractor shall take formal minutes of the Pre-submittal Conference, including all events, questions, and resolutions. Minutes shall be distributed to the City's Representative within 48 hours after the meeting.
  5. The Contractor shall prepare a formal 'sign-in sheet for the pre-submittal meeting that captures the name, telephone number, affiliation/title and email address for each participant. Contractor shall deliver a copy of the sign-n sheet with the 'Minutes' as required above.
- C. Informational Submittals:
1. Submittal List: The Contractor shall develop and deliver a detailed list of all submittals required by the specification, as well as all additional submittals he/she envisions. This should be inclusive of Instruments and I&C hardware, software, reports, plans, status of schedules, testing documents and relevant maintenance documentation and forms.
  2. I&C Schedule: Within 60 days of Contract NTP the Contractor shall develop and deliver a detailed base-line schedule for the Instrumentation and I&C disciplines of the Project. The base-line schedule shall reference each submittal shown on the 'Submittal List', as well as all design, engineering, fabrication, delivery, installation, testing and acceptance elements related to Instrumentation and I&C Work.
    - a. The base-line schedule shall be prepared utilizing Primavera P6, or other project controls software standards that the city may direct.
    - b. The base-line schedule shall ensure that each activity is tied to all appropriate predecessor(s) and successor(s) activities.
    - c. 'Float' contained within the schedule shall be 'owned' by the City. Contractor utilization of schedule float is at the discretion of the City and the City may, at its sole discretion, require 'schedule recovery' efforts to regain float, to maintain Project delivery, if the City deems Contractor use of the float as deleterious to the Project.
    - d. Contractor shall allocate a minimum of 1 day to present and explain the baseline schedule to the City's representative.

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- e. The City will review, and approve, the Contractor's baseline schedule, and Contractor shall not proceed with any of the Work of this section until he has obtained Instrumentation and I&C schedule approval.
- f. The 'approved' base-line schedule shall be 'stated' and submitted to the City, no later than the fifth workday of each month, following the Work status period.
- 3. Shop Drawings: The Contractor shall submit a sample of each 'type' of Shop Drawing the Contractor anticipates for the Project.
- 4. Loop Drawings: The Contractor shall submit a sample for each 'type', Analog, Discrete and Foreign Device Interface (Data link), Loop Drawings.
  - a. The Sample Loop Drawings will utilize a City Standard format which will be provided to the Contractor after Contract NTP. The loop drawing and DCS standards are available on the City's website under the Clean Water Operations Management Network (COMNET) Project Standards and Procedures Manual webpage. The purpose of this is to prove that the Contractor understands the various steps necessary to deliver a final, as- constructed, set of Loop Drawings to the City.
- 5. Training Submittal: The Contractor shall submit a sample of a training syllabus, and his training Plan for each piece of Instrumentation and I&C and DCS system components and software.

D. Action Submittals:

- 1. General: The Contractor shall be responsible for providing instrument and I&C Submittals to be used in the generation of control-panel wiring diagrams and Loop Drawings which depict the interconnection between instruments, panels, valve actuators, MCCs, and the DCS.
- 2. Shop Drawings:
  - a. Preparation of Shop Drawings shall not commence until completion of the Presubmittal Conference.
  - b. Preliminary Shop Drawings shall be submitted as a single package at one time not later than 90 days after NTP.
  - c. All systems, meters, instruments, and other elements shall be represented by symbology derived from the latest version of ANSI/ISA S5.1 and in accordance with Contract Documents and Drawings. The ISA nomenclature and numbers indicated herein shall be used exclusively in all Shop Drawings. No manufacturer's standard symbology or nomenclature shall replace those indicated in the Contract Documents.
  - d. During Shop Drawing development, the Contractor shall maintain a direct, informal liaison with the City's Representative, identified at the presubmittal conference, for exchange of technical

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- information. As a result, certain minor refinements and revisions to the indicated systems may be authorized informally by the City's Representative. However, these shall not alter the Work of this section and shall not cause increase or decrease in the Contract Price. No statement or direction by the City's Representative shall be construed as approval of any component or method, or exception to, or deviation from these Contract Documents.
- e. All Shop Drawings shall include the letterhead or title block of the Contractor. The title block shall include, as a minimum, the Contractor registered business name and address, project name, drawing name, revision level, and personnel responsible for drawing development and the name of the QA/QC reviewer.
- 1) Shop drawing copies shall be submitted as standard size 3-ring, loose-leaf, vinyl plastic binders suitable for bookshelf storage.
  - 2) A complete index shall be placed at the front of each binder. All sections indexed shall be separated by Alpha-Numeric Tabs that match the index.
  - 3) A separate technical brochure or bulletin shall be included for each instrument, meter system, and other element. The brochures shall be indexed by systems or loops. If, within a single system or loop, a single item is employed more than once, one brochure may cover all identical uses of that item in the system. Each brochure shall include a list of tag numbers to which it applies. System groups shall be separated by labeled tags.
3. Loop Drawings:
- a. Contractor is responsible for the overall development, coordination efforts and final delivery of Loop Drawings. Special requirements are outlined below.
  - b. Loop Diagrams: Loop diagrams shall be submitted in accordance with Section 01 33 00, Submittal Procedures, and the special requirements of this section. All Loop Drawings will conform to ISA 5.4 to verify DCS interface with all instrumentation and devices provided or installed under the project. The loop diagrams shall also define all interfaces with equipment provided by skid-mounted for Foreign Device interfaces.
  - c. Loop Drawings shall be developed utilizing a three-sheet format. A sample of the City's Standard three-sheet format will be provided to the Contractor after NTP. The following three-sheet format is required:
    - 1) Sheet 1:
      - a) Provide a device schedule developed from an electronic spreadsheet or database file, which will be

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submitted with the loop diagrams. The table will show the following:

- (1) Device tag number, with Prefix, Unit Process, ISA Tag Prefix, Tag No. (a three or four-digit number based on the loop number) and Tag suffix.
  - (2) Equipment Service.
  - (3) Device Type.
  - (4) Location.
  - (5) Device Manufacturer.
  - (6) Model No.
  - (7) Spec. No.
  - (8) Area Contractor (if applicable).
  - (9) Submittal No.
  - (10) Calibrated Range/Remarks.
  - (11) Data Sheet No.
  - (12) I/O Signal type (AI, AO, DI, or DO).
  - (13) Signal Level.
  - (14) Device Range (full available instrument range).
  - (15) Engineering Units.
  - (16) Process Set Point.
  - (17) Loop Diagram No., reflecting the field instrument tag number.
  - (18) Loop Drawing File Name.
  - (19) Interconnect Drawing File Name.
- 2) Sheet 2: Loop Drawing meeting the Requirements of ANSI/ISA S5.4, except that intermediate terminal junction boxes may be omitted, and shall be shown on Page 3 for clarity. Butt splices and wire nuts shall be shown on as-builts, with the corresponding termination housing (JB, LB, etc. shown on Sheet 3. Datalinks, third-party I/O and bus connections shall also be shown.
- 3) Sheet 3: (Expansion sheet - required if the number of intermediate devices or terminal junction boxes exceeds what can be legibly shown on Sheet 2). Abbreviated diagram showing instrument, wire and cable numbers, intermediate terminal junction boxes, and PCM terminations. Wire identification numbers will reflect the field instrument tag number, and not the DCS I/O number.

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- 4) DCS I/O tag numbers will generally reflect the device tag number. Each I/O tag number will be unique. The tag prefix will be based on ISA-5.4, with the following additional special acronyms:

Acronym	Signal Use
RI	Ready Signals/Status
QI	In Computer Status
ZD	Device Open
ZB	Device Closed
MI	Motor Run
HS	Equipment Start/Stop

- d. The Contractor in concert with his I&C subcontractor shall be responsible for the preliminary development of all Loop Drawings, in the format specified. The Contractor will develop a ‘draft’ of each Loop Drawing.
- e. The Contractor will then coordinate with the DCS Controls Programmer (DCSCP), delivering draft Loop Drawings to the DCSP, who shall be responsible to filling out all the DCS-related addressing, software- level Information, DCS termination numbering, etc.
- f. The Contractor will then receive the draft Loop Drawings from the DCSP, and the Contractor shall finalize all Loop Drawings in Microstation. Contractor shall ensure that all ‘as- constructed’ information (such as I/O wiring being re-addressed at the DCS) has been incorporated onto the finalized Loop Drawings.
- g. The Contractor shall deliver the finalized Loop Drawings to the project Design Engineer. The Design Engineer is responsible for Quality Assurance/Quality Control of the final loop drawings, and shall check all Loop Drawings against design P&IDs, electrical design, and Contractor’s field as-constructed drawings. Contractor is responsible for all coordination with the Design Engineers and shall incorporate all changes and corrections required by the Design engineer.

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- h. Contractor shall prepare and deliver all loop drawing packages in accordance with these specifications. Note: All Loop Drawings shall be submitted to the City’s representative, prior to the start of any DCS cutover.
  - i. The City’s representative will review and approve the Loop Drawing Submittal in accordance with Section 01 33 00, Submittal Procedures. The Contractor is responsible for making all changes and annotation to the final Loop Drawings, as may be dictated during the various testing procedures. Red-line mark-up of all annotated Loop Drawings shall be delivered to the City’s representative at the conclusion of DCS testing activities.
4. Instruments and I&C Devices: For all Instruments and I&C devices provided under this section Contractor shall submit Technical brochures, bulletins and data sheets containing:
- a. Fully completed ISA S20 data sheets.
  - b. Component functional descriptions.
  - c. Locations or assembly at which component is to be installed.
  - d. Materials of a component's parts which will be in contact with process fluids or gases.
  - e. Instrument Factory Calibration Sheets: Where an instrument is of necessity, precalibrated at the factory, the Contractor shall submit all Factory Calibration Sheets to the City’s representative immediately upon arrival.
  - f. Instrument Bench Calibration Sheets: Contractor shall submit the calibration plan for bench calibration of each type of instruments. Upon approval of the Bench Calibration Plant by the City, Contractor shall coordinate and commence Bench Calibration of all instruments, other than those containing Factory Calibration. Bench Calibration of Instruments will be witnessed by the City’s representative, who may at his sole discretion, provide Contractor a waiver of witnessing. Upon completion of bench calibration Contractor shall submit Calibration Sheet documentation and shall affix calibration stickers to each instrument, indicating date of calibration and initials of person performing calibration.
5. Panels, Local Control Panels:
- a. Contractor shall supply:
    - 1) Schematic and wiring diagrams for control circuits shall be submitted in two stages. Initially, schematic control diagrams shall show complete details on the circuit interrelationships of all devices within and outside each Control Panel. Subsequent to acceptance of all schematic control diagrams, by the City’s representative, piping and wiring diagrams shall be submitted. The diagrams shall consist of component layout drawings to scale, showing

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- numbered terminals on components together with the unique number of the wire to be connected to each terminal.
- 2) Piping and wiring diagrams shall show terminal assignments from all primary measurement devices, such as flow meters, and to all final control devices, such as pumps, valves, chemical feeders and local control panels. Wiring diagrams shall include MCC Panel, circuit, and breaker number for each power feed.
  - 3) Assembly and construction drawings for each Panel and Local Control Panel type. These drawings shall include dimensions, identification of all components, surface preparation and finish data, and nameplates. These drawings also shall include enough other details, including prototype photographs, to define exactly the style and overall appearance of the assembly; a finish treatment sample shall be included.
  - 4) Installation, mounting, and anchoring details for all components and assemblies to be field-mounted, including conduit connection or entry details. Where applicable and required by Code, Contractor shall include seismic calculations for the panel assembly and mounting, which shall be stamped by a California registered structural engineer.
  - 5) Complete control panel layouts, all drawn to a 1-1/2 inch equals 1 foot scale showing.
    - a) Physical arrangements which define and quantify the physical groupings of annunciators, hand-stations, recorders, indicators, pilot lights and all other instrumentation devices associated with control panel sections, auxiliary panels, subpanels and racks.
    - b) All cutout locations fully dimensioned. All outside panel dimensions shall be shown.
    - c) Locations of back-of-panel stiffeners.
    - d) Terminal point locations for all panel and back-of-panel piping and wiring connections. Terminations shall be coded with identifiers for wiring and piping connections for all electric, hydraulic and pneumatic terminations.
  - 6) Contractor shall submit a complete Nameplate engraving list, annotating the size of each engraved plate, the material, font size, color and attaching methodology. [Note: Adhesive-backed mount is to be avoided, except in those cases where screw mounting is not possible.]



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- 7) A complete and detailed bill of material list shall be submitted for each field mounted device or assembly as well as cabinet assemblies and subassemblies. Bills of material shall include all items within an enclosure. An incomplete submittal shall be rejected and no further evaluation performed until a complete and detailed bill of material is submitted.

1.05 OWNER'S MANUAL

- A. The Owner's Manual shall be submitted in both paper and electronic format. Electronic format shall conform to the Electronic Document Submittal Requirements for Shop Drawings.
- B. Information included in the Owner's Manual shall comply with the requirements of Section 01 33 00, Submittal Procedures, with the following exceptions:
  1. Two copies of the Owner's Manual shall be submitted after acceptance of all submittals. One set will be returned to the Contractor with comments.
  2. Final copies of the Owner's Manual, after revision, shall be submitted to the City's representative 15 days prior to startup.
- C. The following shall be included in the Owner's Manual in accordance with Section 01 33 00, Submittal Procedures.
  1. Installation, connection, operating, troubleshooting, maintenance, and overhaul instructions from the manufacturer.
  2. Exploded or details views of all instruments, assemblies, and accessory components.
  3. Parts lists and ordering instructions.
  4. Wiring diagrams.
  5. A list of spare parts for 1 year operation recommended by the manufacturers of all DCS and analog equipment.
  6. As-built drawings.

1.06 AS-BUILT DRAWINGS

- A. As-built drawings shall be prepared in accordance with Section 01 33 00, Submittal Procedures, with the following exceptions and changes:
  1. The Contractor shall keep current an approved set of complete loop diagrams and schematic diagrams which shall include all field and panel wiring, all piping and tubing runs, all routing, all mounting details, all point-to-point diagrams with cable, wire, tube and termination numbers.

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These drawings shall include all instruments and all instrument elements for the complete instrument loop as provided under equipment and electrical requirements of this Contract.

2. Two copies of each as-built drawing under this Section shall be submitted to the City's representative after completion of field checkout but before placing the systems in service for the Owner's use.
3. Drawings shall also be submitted in electronic format (MicroStation) and in PDF.

1.07 SERVICES OF MANUFACTURER

- A. Calibration, Testing and Startup: A technical service representative of the manufacturer shall visit the site and perform the following on all flow meters and analyzers.
  1. Inspection, checking and calibrating the equipment.
  2. Startup and field testing for proper operation.
  3. Performing field adjustments to ensure that installation and operation comply with the Specifications.
- B. Instruction of Owner's Personnel: The manufacturer's technical service representative shall instruct the Owner's personnel as indicated in Article Installation, Calibration, Testing, Functional Testing, Startup, and Instruction.

1.08 SPECIAL GUARANTEE

- A. The Contractor shall guarantee the Work of this section for 2 years following final acceptance of the Work. In making any warranty repairs, the Contractor shall utilize technical service personnel designated by the manufacturer of the failed device. Repairs shall be completed within 5 days after written notification by the Owner.

1.09 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Delivery of Materials: Products delivered to the site for incorporation into the Work of this Section shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.
- B. Storage: Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.

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1.10 ENVIRONMENTAL CONDITIONS

- A. General: All instrumentation and control system components and associated wiring shall be suitable for use in a treatment facility environment where there may be high energy ac fields, dc control pulses, and varying ground potentials between transducers and system components. The system design shall be adequate to provide proper protection against interferences from all such possible situations.
  
- B. Field Situated Equipment:
  - 1. The instrumentation and control system shall be installed on a wastewater treatment plant site. All devices shall be designed to exist in environments rated (G2)(G3)(GX) per ISA S71.04. The system design shall be adequate to provide proper protection the environment typically associated with these facilities. As a minimum, the instrumentation and control systems shall be designed and constructed for satisfactory operation and low maintenance requirements under the following environmental conditions:
    - a. Temperature Range: 0 degrees C through 50 degrees C (32 degrees F through 122 degrees F).
    - b. Thermal Shock: 0.55 degrees C per minute (1.0 degrees F per minute).
    - c. Relative Humidity: 20 percent through 95 percent (noncondensing).
  
- C. Control Room Situated Equipment: Control rooms shall be air conditioned to achieve the environmental noted in item B herein. (No positive control of relative humidity is provided.) In the event of a failure of the air conditioning system, all components of the instrumentation and control system shall be rated to operate in an environment where the ambient temperature is 15 degrees C through 35 degrees C (59 degrees F through 95 degrees F) and the relative humidity is 20 percent to 95 percent (noncondensing).
  
- D. Noise Tolerance: The instrumentation and control system components shall not exceed a dB level of 55 when monitored 3 feet away from the devices. If upon testing it is found that this limit is exceeded at the option of the City's representative and at no additional cost to the Owner, devices shall be replaced in order to achieve a maximum level of 55 dB or sound absorption materials shall be added.

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1.11 CABLE NUMBERING

- A. The first two characters denote the facility or area number.
- B. The second group of characters identifies the device being served (field device).
- C. The third section uses one of the four suffixes in the table below. Where multiple circuits of the same type are routed to the same endpoint, the suffix will be P1, P2, as required.
- D. At each device or termination point, the circuit identification number is appended with the individual wire number. For Direct-Current (DC) circuits only, wire polarity is shown in parentheses as (+) or (-).
- E. Spaces are not allowed, and letters are case-sensitive, written in upper case.

Suffix	Circuit Type	Example
(A)	24V dc analog (4 to 20 mA)	76FIT2152(A)-1(+)
(C)	120V ac control	05P320(C)-2
(D)	24V dc digital status or control	76LSH2151A(D)-1(+)
(P)	Power (120-volt, 480V, 5 kV, 15 kV, etc.)	01MCC6101(P)-2

**PART 2 PRODUCTS**

2.01 GENERAL

- A. All meters, all instruments, and all other components shall be of the most recent field-proven models marketed by their manufacturers at the time of submittal of the Shop Drawings unless otherwise indicated.
- B. Panel mounted instruments shall have matching style and general appearance. Instruments performing similar functions shall be of the same type, model, or class, and shall be of one manufacturer.
- C. Outdoor instrumentation shall be suitable for operation in the ambient conditions at the equipment installation locations. Heating, cooling, and dehumidifying devices shall be incorporated with the outdoor instrumentation in order to maintain it within its rated environmental operating ranges. The Contractor shall provide all power wiring for these devices. Outdoor enclosures suitable for the environment shall be provided.

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- D. All instrumentation in hazardous areas shall be intrinsically safe or be approved for use in the particular hazardous classification in which it is to be installed.
- E. Mercury switches and components containing liquid mercury shall not be used.
- F. Analog measurements and control signals shall be electrical and shall vary in direct linear proportion to the measured variable, except as indicated. Electrical signals outside control board(s) shall be 4 mA to 20 mA dc except as noted. Analog instruments shall be provided with Highway Addressable Remote Transducer (HART) Protocol.
- G. The accuracy of each instrumentation system or loop shall be expressed as a probable maximum error; this shall be the square-root of the sum of the squares of certified "accuracies" of the designated components in each system, expressed as a percentage of the actual span or value of the measured variable. Each individual instrument shall have a minimum accuracy of plus or minus 0.5 percent of full scale and a minimum repeatability of plus or minus 0.25 percent of full scale unless otherwise indicated. Instruments which do not conform to or improve upon these criteria are not acceptable.
- H. Control panels shall be provided with redundant power supplies which are configured in a fault-tolerant manner to prevent interruption of service upon failure and interruption of service necessitated by the replacement of a power supply. All power supplies shall have an excess rated capacity of 40 percent. The failure of a power supply shall be annunciated locally and shall generate an alarm to the DCS.

2.02 CONTROL PANELS

- A. General: Control Panels shall minimize the use of PLC's as it is the intent of the City to maximize the use of the DCS as the primary control system. PLC's may be used where 'package system' vendors require PLC use to provide warranty and support of their system. Where PLC's are utilized they shall conform to the Allen Bradley ControlLogix or CompactLogix standards of the City.
  - 1. When PLCs are utilized the Contractor shall interface the 'Package system' PLC to the DCS via TCP/IP using the Ethernet I/P protocol network interface, or Modbus protocol.

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- B. Control Panels shall be provided in accordance with Section 40 95 13, Field Cabinetry.

2.03 GENERAL INSTRUMENTATION ENCLOSURE COMPONENTS

- A. Signal Isolators, Converters, and Power Supplies: Signal isolators shall be provided in each measurement and control loop, wherever required, to match adjacent component impedances, or where feedback paths may be generated or to maintain loop integrity when the removal of a component of a loop is required. Signal converters shall be provided where required to resolve any signal incompatibilities. Signal power supplies shall be provided to supply sufficient power to each loop component.
- B. General Purpose Relays: General purpose relays in the Control Panels shall be plug-in type with contacts rated 10 amperes at 120V ac; quantity and type of contacts shall be as indicated. Each relay shall be enclosed in a clear plastic heat and shock resistant dust cover. Sockets for relays shall have screw type terminals.
- C. Time Delay Relays: Time delay relays shall be electronic on-delay or off-delay type with contacts rated 10 amperes at 120V ac. Units shall include adjustable dials with graduated scales covering the indicated time range.
- D. Slave Relays: Slave relays shall be provided when the number or type of contacts indicated exceed the contact capacity of the indicated relays and timers.
- E. Circuit Breakers: Circuit breakers shall be single pole, 120-volt, 15-ampere rating or as required to protect wiring and equipment. Circuit breakers shall be mounted inside the panels as shown.

2.04 FIELD INSTRUMENTATION

- A. Provide components that are listed in the Instrument List in Article Supplements at the end of this Section. Specific component requirements are defined in the Instrument Data Sheets at the end of this Section.

2.05 CONTROL PANEL INSTRUMENTATION

- A. Bar Graph Indicators: Indicators shall be the electronic gas-discharge type suitable for installation in flush panel mounting shelves. Indicator shall provide for two non-isolated input circuits. Input signal level shall be 4 mA to 20 mA dc through a shelf-mounted 250-ohm resistor. The units shall contain an integral power supply suitable to energize two 4 mA to 20 mA dc, two-wire transmitters. Unit power supply shall be 24V dc. Indicator accuracy

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shall be plus or minus 0.5 percent of span with a repeatability of 0.1 percent of span. Indicator scales shall be in engineering units.

B. Digital Indicators:

1. Digital indicators shall be self-contained instruments that display process signals directly in engineering units. The unit shall be suitable for panel mounting and shall utilize an LED display where numerals are no less than 0.5-inch height.
2. The input signal to the digital process indicator shall be 4 mA to 20 mA dc or 1 to 5V dc. The input sample rate of the unit shall be a minimum of 2 per second. The unit shall have an auto-zeroing feature and shall have provisions for field adjustable scaling and offset. Accuracy shall be plus or minus 1 least significant digit. Input power to the digital indicator shall be 120V ac, 60-Hz.

C. Current Alarm Trip Switches: Current alarm trips shall be single or dual type as indicated. Units shall accept voltage or current input signals. Dead bands shall be factory set at 1.0 percent of full span for dual trips and adjustable over 100 percent of span for single trips. Alarm trips shall be equipped with 10A DPDT contacts. Alarm trips shall include setpoint dials calibrated 0 percent to 100 percent for each trip point. Single alarm trips shall include a dead band adjustment dial calibrated 0 percent to 100 percent.

D. Selector and Pushbutton Switches: Selector and pushbutton switches shall be rated 10A at 600 volts, shall be heavy-duty, oil-tight, and shall have the number of positions and poles indicated. Operators shall be corrosion resistant.

E. Indicating Lights: Indication lights shall be incandescent push-to-test type and shall be heavy-duty, oil-tight. Each light shall have a screwed-on glass prismatic lens approximately 1-inch in diameter. Each light shall have a factory-engraved legend plate as indicated. Indicating lights shall be 120V ac type with transformers for use with 6.3-volt lamps.

2.06 PROGRAMMABLE LOGIC CONTROLLER (PLC)

- A. Where required, the Contractor shall furnish, install, program, test, calibrate, fully configure and place into operation Programmable Logic Controllers (PLCs) as specified herein. These requirements also pertain to all PLCs provided under package system specifications and within the electrical specifications.
- B. The PLC's shall be in compliance with Section 40 94 43, Programmable Logic Controllers.

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- C. General: The Contractor shall furnish all necessary interconnecting cables, all accessories, and all appurtenances as indicated herein or as required for proper operation of the system. All major PLC components of the system shall be of the same manufacturer and PLC family product line. All equipment shall be housed in an enclosure or control panel suitable for the intended operation and location. The PLC system shall be capable of tolerating and capable of riding through a power interruption of 8 milliseconds or less without interruption of normal operation. The PLC system shall be Allen Bradley ControlLogix or CompactLogix to match existing.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. The Contractor shall employ installers who are skilled and experienced in the installation and connection of all elements, all instruments, all accessories, and all assemblies provided under this Contract.
- B. The Contractor shall install all instruments according to the manufacturer's installation instructions and the following:
1. Perform field engineering as required for mounting and supporting all field mounted components.
  2. Prepare any additional schematic and interconnection diagrams required for installation.
  3. Assemble and interconnect instrument components disconnected for shipping purposes.
  4. Remove all temporary supports, bracing, and padding inserted in instrument control panels and other equipment to prevent damage during shipping, storage, or installation.
  5. All piping shall be field measured prior to fabrication and erection. Any significant discrepancies between drawings and field conditions shall be reported to the City's representative. The Owner will not be responsible for any costs to the Contractor for rework because of Contractor failure to take measurements prior to fabrication.
  6. Adequately support and protect capillary tubing. All extra tubing shall be carefully coiled, tied, and protected at the instrument location.
- C. The Contractor shall install pneumatic instrument air systems according to the manufacturer's installation instructions and the following:
1. Install all pneumatic tubing and make all connections at control panels, instruments, and control valves.
  2. Perform field engineering as required for instrument air supply headers and individual air supply taps and lines.



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3. Check all air supply branch headers by blowing with clean air and checking for tightness.
  4. Clean all transmission and control tubing by blowing with dried and filtered air prior to connecting to instrument components.
  5. Leak test all pneumatic control circuits in accordance with ISA Recommended Practice RP-7.1.
  6. Set all instrument air regulators at manufacturer's recommended supply pressures.
- D. It is the intent of the Contract Documents that all wiring external to Control Panels be provided under the requirements of Division 26, Electrical. Further, it is the general intent that all 4 mA to 20 mA signal circuits, process equipment control wiring, signal wiring to field instruments, and Control Panel input and output wiring, be provided under Division 26, Electrical and be terminated and identified under Division 40, Process Interconnections.
- E. The Contractor's attention is directed to the electrical and mechanical schematics and details of this project. Referral to these portions of the Contract Documents shall be required in order to understand the full intent and scope of work required.
- F. Monitoring and control system configurations are diagrammatic only. Locations of equipment are approximate unless dimensioned on Drawings. Exact locations and routing of wiring and cables shall be governed by structural conditions, physical interferences, and locations of electrical terminations on equipment.
- G. Where job conditions require minor changes in approximated locations and arrangements, the Contractor shall make such changes without additional cost to the Owner.
- H. All instruments shall be located and installed for ready access by the Owner's operation and maintenance staff. The Owner reserves the right to require minor changes in location of equipment prior to roughing without any additional cost to the Owner.
- I. Meters shall be installed in easily accessible locations and orientated for ease of reading and maintenance, and where shown, for balancing flow. Wherever possible, meters shall be inserted in such a way to comply with the manufacturer's recommendations. Meters, shut-off and balancing valves shall be properly supported. In-line meters shall be installed to ensure full-line flow and not less than the manufacturer's recommended head at all times.

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3.02 CONTROL PANEL SIGNAL AND CONTROL CIRCUIT WIRING

- A. Wiring Installation: All wires shall be in plastic wireways except (1) field wiring, (2) wiring between mating blocks in adjacent sections, (3) wiring from components on a swing-out panel to components on the fixed structure, and (4) wiring to panel-mounted components. Wiring from components on a swing-out panel to other components on fixed panels shall be tied into bundles with nylon wire ties, and shall be secured to panels at both sides of the "hinge loop" so that conductors are not strained at the terminals.
- B. Wiring to control devices on the front panels shall be tied together at short intervals with nylon wire ties and secured to the inside face of the panel using adhesive mounts.
- C. Wiring to rear terminals on panel-mount instruments shall be in plastic wireways secured to horizontal brackets above or below the instruments in about the same plane as the rear of the instruments.
- D. Wire Marking: Each signal, control, alarm, and indicating circuit conductor connected to a given electrical point shall be designated by a single unique number which shall be shown on all Shop Drawings. These numbers shall be marked on all conductors at every terminal using white numbered wire markers which shall be permanently marked heat-shrink plastic.

3.03 INSTRUMENT CABLE TESTS

- A. General: The following tests shall be performed on each instrumentation and control system cable. All tests shall be end-to-end tests of installed cables with the ends supported in free air, not adjacent to any grounded object. All test data shall be recorded on forms which are available from the City's representative. Complete records of all tests shall be made and delivered to the City's representative. Each form shall be signed by the City's Representative who witnessed the testing.
- B. Continuity tests shall be performed by measuring wire/shield loop resistance of each signal cable as the wires, taken one at a time, are shorted to the channel shield. No loop resistance measurement shall vary by more than plus or minus 2 ohms from the calculated average loop resistance value.
- C. Insulation resistance tests shall be performed by using a 500-volt megometer to measure the insulation resistance between each channel wire, between each channel wire and the channel shield, between individual channel shields in a multichannel cable, between each individual channel shield and the overall cable shield in a multi-channel cable, between each wire and ground, and between each shield and ground. Values of resistance less than 1 megohms shall be unacceptable.

3.04 INSTALLATION, CALIBRATION, TESTING, FUNCTIONAL TESTING,  
STARTUP, AND INSTRUCTION

- A. Installation and Connection: The Contractor shall install and connect all field-mounted components and assemblies under the following criteria:
1. Process sensing lines and air signal tubing shall be installed to the installation of conduit indicated under Section 26 05 33, Raceways and Boxes. Individual tubes shall be run parallel and near the surfaces from which they are supported. Supports shall be used at intervals not longer than 3 feet of tubing.
  2. Bends shall be formed with the proper tool and to uniform radii and shall be made without deforming or thinning the walls of the tubing. Plastic clips shall be used to hold individual plastic tubes parallel. Ends of tubing shall be square-cut and cleaned before insertion into fittings. Bulkhead fittings shall be provided at all panels requiring pipe or tubing entries.
  3. All flexible cables and all capillary tubing shall be provided in flexible conduits. Lengths shall be sufficient to withdraw the cables and tubing for periodic maintenance.
  4. Thermocouple lead wire shall be provided in dedicated conduit or wireway from the thermocouple to the control panel. Conduit or wireway shall be sized in accordance with the capacity of the instrument.
  5. All power and all signal wires shall be terminated with spade type lugs.
  6. All connectors shall be, as a minimum, watertight.
  7. After all installation and connections have been completed, a technical field representative of the Contractor shall check the Work for polarity of electric power and signal connections, leaks at all process connections, and conformance with requirements. The technical field representative shall certify in writing to the Contractor that each loop and system meets requirements.
  8. All wire and all cable shall be connected from terminal to terminal without splices, arranged in a neat manner and securely supported in cable groups. All wiring shall be protected from sharp edges and corners.
- B. Calibration: All analog instrumentation and all control system equipment shall be calibrated and tested after installation to verify that requirements are satisfied. The Contractor shall provide all necessary labor, tools, and equipment to calibrate and test each instrument in accordance with the manufacturer's instructions. Each instrument shall be calibrated at a minimum of three points using test equipment to simulate inputs and read outputs. All test equipment and all instruments used to simulate inputs and read outputs shall be suitable for the purpose intended and shall have an accuracy better

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than the required accuracy of the instrument being calibrated. Test equipment shall have accuracies traceable to the NIST as applicable. All analog instruments shall be calibrated and tested in place without removal. Test data, applicable accuracy requirements, all instrument manufacturer published performance specifications and all permissible tolerances at each point of calibration shall be entered on test forms available from the City's representative. These test forms shall verify compliance with all. A report shall be delivered to the City's representative for each instrument, certifying that the instrument has been calibrated in the presence of the City's Representative and meets Contract and system requirements.

- C. Analog Loop Tests: The Contractor shall be responsible for loop checking and testing all instrumentation loops with this project. The Contractor shall coordinate all loop check functions with the CSP to ensure that a single total loop check is conducted for each device. The intent of the loop checks is to confirm and document each loop's component specification conformance up to and including all field-situated CSP devices. The CSP will have all control room personnel present to witness and confirm loop check results at the CRT level. The Contractor shall provide all necessary labor, tools, and equipment to field test, inspect and adjust each instrument to its indicated performance requirement in accordance with manufacturer's specifications and instructions. Any instrument which fails to meet any Contract requirement, or any published manufacturer performance specification for functional and operational parameters, whether or not indicated in the Contract Documents, shall be repaired or replaced, at the discretion of the City's representative at no additional cost to the Owner.
1. At least 15 working days before installation testing begins, the Contractor shall submit to the City's representative a detailed description, in duplicate, of the installation tests to be conducted to demonstrate correct installation of the instrumentation and control system and the anticipated dates the testing will occur.
  2. Controllers and electronic function modules, shall be tested and exercised by the Contractor to demonstrate correct operation, first individually and then collectively as functional analog networks. Each hardwired analog control network shall be tested to verify proper performance within indicated accuracy tolerances. Accuracy tolerances for each analog network are defined as the root-mean-square-summation of individual component accuracy tolerances. Individual component accuracy tolerances shall be as indicated by contract requirements, or by published manufacturer accuracy specifications, whenever contract accuracy tolerances are not indicated.
  3. Each analog network shall be tested by applying simulated inputs to the first element(s). Simulated sensor inputs corresponding to 10 percent, 50 percent, and 90 percent of span shall be applied, and the resulting

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outputs read to verify compliance to network accuracy tolerance requirements. All analog test equipment used to simulate or measure current/voltage signals shall be certified accurate within the previous 6 months by a recognized/certified testing facility. Actual equipment listed as customer spares or test equipment may not be used for these tests. Continuously variable analog inputs shall be applied to verify the proper operation of discrete devices. Temporary settings shall be made on controllers, alarms, etc., during analog loop tests. All analog loop test data shall be recorded on test forms, which include calculated root-mean-square-summation system accuracy tolerance requirements for each output.

4. Air systems shall be tested for leaks in compliance with ISA RP7.1.
5. When installation tests have been successfully completed for all individual instruments and all separate analog control networks, a certified copy of all test forms signed by the City's Representative as a witness, with test data entered, shall be submitted together with a clear and unequivocal statement that all instrumentation has been successfully calibrated, fully inspected, and fully tested.

D. Functional Testing: During the DCS Operational Readiness Testing (ORT), the Contractor shall be responsible for demonstrating the operability of all systems provided under this specification. The City will assist and coordinate the operability assessment with the Contractor. Functional Testing shall commence after acceptance of all wire, all calibrating and loop tests, all inspections have been conducted, and DCS ORT has been started. Functional Testing shall demonstrate proper operation of all systems with process equipment operating over full operating ranges under actual operating conditions.

1. The Contractor shall develop and submit to the City's representative for approval a Functional Testing Plan which describes detailed test procedures, checklists, blank forms and data to be recorded, test equipment to be used and calculated tolerance limits.
2. Functional Testing activities shall include the use of water to establish service conditions that simulate, to the greatest extent possible, normal final control element operating conditions in terms of applied process loads, operating ranges and environmental conditions. Final control elements, control panels, and ancillary equipment shall be tested under start-up and steady-state operating conditions to verify that proper and stable control is achieved using motor control center and local field mounted control circuits. All hardwired and software control circuit interlocks and alarms shall be operational. The control of final control elements and ancillary equipment shall be tested using both manual and automatic (where provided) control circuits. The stable steady-state operation of final control elements running under the control of field

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- mounted automatic analog controllers or software based controllers shall be assured by adjusting the controllers, as required, to eliminate oscillatory final control element operation. The transient stability of final control elements operating under the control of field mounted, and software based automatic analog controllers shall be verified by applying control signal disturbances, monitoring the amplitude and decay rate of control parameter oscillations (if any) and making necessary controller adjustments, as required, to eliminate excessive oscillatory amplitudes and decay rates.
3. All control stations incorporating proportional, integral and/or differential (P&ID) control circuits shall be initially tuned using mathematical methods such as Ziegler-Nichols or Tyreus-Luyben rules in order to establish the initial parameters for closed loop control. The tuning parameters shall be refined experimentally, by applying control signal disturbances and adjusting the gain, reset and/or rate setting(s) as required to achieve a proper response. Measured final control element variable position/speed set-point settings shall be compared to measured final control element position/speed values at 10 percent, 50 percent and 90 percent of span and the results checked against specified accuracy tolerances. Specified accuracy tolerances are defined as the root-mean-square-summation of individual component accuracy requirements. Individual component accuracy requirements shall be as specified in the contract or as specified by published manufacturer accuracy specifications whenever contract accuracy requirements are not specified.
  4. Individual component accuracy tolerances shall be as indicated in the Contract Documents or as specified by published manufacturer accuracy specifications whenever not indicated.
  5. The Contractor shall submit an instrumentation and control system Functional Testing completion report which shall state that all Contract requirements have been met and which shall include a listing of all instrumentation and all control system maintenance and repair activities conducted during the Functional Testing. The City's representative must accept the instrumentation and control system Functional Testing before the 30-day operational testing may begin. Final acceptance of the control system shall coincide with final acceptance of the Work.
- E. 30-Day Operational Testing: The Contractor shall furnish his own personnel, electrical personnel, and any instrument manufacturers' representatives as required during the testing period required in Section 01 91 14, Testing, Integration, and Startup, to produce a fully operational system.

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- F. Instruction: The Contractor shall train the Owner's maintenance personnel in the maintenance, calibration and repair of all instruments provided under this Contract.
1. The training shall be scheduled a minimum of 3 weeks in advance of the first session. The training shall be performed concurrent with the Functional Testing in subparagraph D above.
  2. The training shall be performed by qualified representatives of the instrument manufacturers' and shall be specific to each instrument model provided.
  3. Each training class shall be a minimum of 8 hours in duration and shall cover Operational Theory, Maintenance, Trouble Shooting/Repair, and Calibration of the instrument.
  4. Proposed training material, including resumes for the proposed instructors and a detailed outline of each lesson shall be submitted to the City's representative at least 30 days in advance of when the lesson is to be given. The City's representative shall review the submitted data for suitability and provide comments which shall be incorporated into the course.
  5. Within 10 days after the completion of each lesson the Contractor shall present to the City's representative the following:
    - a. A list of all Owner personnel that attended the lesson.
    - b. An evaluation of Owner personnel knowledge through written testing or equivalent.
    - c. A copy of text utilized during the lesson with all notes, diagrams, and comments.

3.05 INSTRUMENT SUMMARY

- A. General: The Instrument Summary (IS) shown in Supplements itemizes the instrumentation devices to be furnished under this Contract.
- B. Each column on the Instrument Summary is defined as follows:
1. Tag Number: The identifier assigned to a device which performs a function in the control system. The Contractor shall use this identifier in tagging devices in the field.
  2. Loop Number: The number assigned to the control loop associated with the device.
  3. Description: A process-oriented functional description which defines the measured/monitored/controlled parameter and the associated process/process equipment.
  4. P&ID Drawing Number: The Process and Instrumentation drawing upon which the device appears.

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5. Component Code: The number associated with the technical specification which describes the requirements associated with the device.
6. Installation Detail Number: The designation of the installation detail defining the installation requirements associated with the device.

3.06 INSTRUMENT DATA SHEETS

- A. General: The Instrument Data Sheets shown in Supplements provides specific device requirements for the instrumentation referenced in Appendix C, Instrument Summary such as meter size, ranges, scales, set points, NEMA ratings, flange sizes, pipe connection sizes, material types, probe types, etc.

3.07 CONTROL PANEL SUMMARY

- A. General: The Instrument Summary (IS) shown in Supplements itemizes the control panels to be furnished under this Contract.
- B. Each column on the Instrument Summary is defined as follows:
  1. Control Panel Number: The designation of the control panel where the device resides.
  2. Control Panel Description: A process-oriented functional description.
  3. Control Panel Rating: NEMA rating for control panel.
  4. Electrical Drawing Number: The electrical drawing upon which the device appears.

3.08 DCS INPUT/OUTPUT (I/O) SUMMARY

- A. General: The DCS I/O List contained in Section 40 94 24, Process Inputs/Outputs (I/O), Supplements, itemizes all inputs and outputs to and from the DCS, both hardwired and data linked, which are furnished by the Contractor.
  1. Highlighted I/O on the DCS Input/Output Summary are new I/O. Items shown in normal text are existing I/O.
- B. Each column on the I/O List is defined as follows:
  1. DCU: Distributed Control Unit number.
  2. Cabinet: PCM where I/O resides.
  3. Card Type: DCS module number.
  4. Tag Number: The ISA identifier assigned to a device which performs a function in the control system. The Contractor shall use this identifier in tagging devices in the DCS.



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5. Description: A 30-character process-oriented functional description which defines the measured/monitored/controlled parameter and the associated process/process equipment.
6. Zero State: The status to be displayed on the alarm summary when a digital point is not activated or returns to its normal state.
7. One State: The status to be displayed on the alarm summary when a digital point is activated.
8. I/O Type: The type of I/O required for current and future monitoring and control activities.
  - a. Analog Input (AI): If the tag number generates an AI, the quantity of AIs are listed in Section 40 94 24, Process Inputs/Outputs (I/O), Supplements.
  - b. Analog Output (AO): If the tag number generates an AO, the quantity of AOs are listed in Section 40 94 24, Process Inputs/Outputs (I/O), Supplements.
  - c. Discrete Input (DI): If the tag number generates a DI, the quantity of DIs are listed in Section 40 94 24, Process Inputs/Outputs (I/O), Supplements.
  - d. Discrete Output (DO): If the tag number generates a DO, the quantity of DOs are listed in Specification Section 40 94 24, Process Inputs/Outputs (I/O), Supplements.
9. Location: DCS address.

### 3.09 PROCESS CONTROL STRATEGIES

- A. The control strategies, shown in Supplements, complement of the Process and Instrumentation Diagrams (P&IDs). All materials and components shall be furnished, whether explicitly indicated or not, to affect the functional requirements defined on the P&IDs and in the process control strategy descriptions. The Contractor shall utilize the control strategies as a resource in generating control narratives to be included in the analog hardware submittal.
- B. Common functions that are generally applicable to all strategies or to similar strategies are described under the heading “General DCS Functions”. These functions are not repeated in the descriptions for each strategy.
- C. Each strategy is described as follows:
  1. Overview: A brief description of the mission of the related strategy including the roles of logic, monitoring and control stations located/associated with MCCs, field situated, and DCS -based.
  2. Detailed Strategy Functions: A detailed description of each and every monitoring and control function associated with the associated strategy. This description addresses the strategies reaction to sensor failures, process equipment failures, control device failures, DCS malfunctions,

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and power interruptions. All control modes (MCC, local hand station, local control panel, DCS keyboard) are fully described. These descriptions are augmented by a listing of all instruments, valves, control devices, process equipment, and DCS equipment associated with the noted strategy. All control sequences associated with equipment activation, deactivation, process startup and process shutdown are defined along with all required time delays.

3. Preface to Control Strategy Section:
  - a. Tag numbering system definitions and terms.
  - b. Controls and control functions provided for all equipment, unless otherwise noted Local control station at equipment.
  - c. Local/DCS switch.
  - d. Alarms Logic: Open contact for alarms (fail-safe).
4. Format for Each Strategy:
  - a. General Description:
    - 1) An overall description of the process.
    - 2) Major control components (PCM, PLC, annunciator, panels).
    - 3) General function of each major control component.
    - 4) P&ID references for this strategy.
    - 5) Reference to I/O listing.
  - b. Related equipment.
  - c. Overview of strategy.
  - d. Non-DCS Control:
    - 1) Local Manual Control: Description of monitoring and control from each equipment item. If this is covered by the general statement in the Preface, describe any deviations. Example: "Because of inaccessibility location of this valve in the sump, a local control station is not provided."
    - 2) Remote Manual Control: Description of control from any local or area control panels. Other Control: Package system, PLC, etc.
  - e. DCS Alarm, Monitoring and Control Functions:
    - 1) DCS Manual Control.
    - 2) DCS Automatic Control.
    - 3) Alarms: Define alarms and alarm priorities. Define level (1, 2, 3, or 4) for each alarm.
  - f. Failure modes.
  - g. Communications Interfaces: Third party devices and connections to DCS, including any details that may not be present on Loop Drawings or other sources of documentation.
  - h. In-Service/Out of Service Algorithm: Description of devices which determine in/out of service status for each piece of equipment. (In- service (I/S)/out of service (OOS) algorithms mask or block out all or selected alarms associated with the OOS

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device (i.e., if a wet well is declared OSS, low level alarms shall be inhibited). Additionally, if a device has been designated OOS, all control routines shall declare the equipment as being unavailable for service.

- i. See Supplements for detailed descriptions of the process control strategies.

3.10 SUPPLEMENTS

A. The supplements listed below, following “End of Section,” are part of this Specification.

1. Instrument List.
2. Instrument Data Sheets.
3. Control Panel Summary.
4. Control Strategies.

**END OF SECTION**

## INSTRUMENT LIST

Loop	Tag Number	Loop Title	Code	Code Description	P+ID	Design Detail
76FT2152	76FIT2152	Thickening Centrifuge Feed Pump No. 1 Flow	F04	Flow Element & Transmitter, Electromagnetic	76-I-31	4091-219
76FT2156	76FIT2156	Thickening Centrifuge Feed Pump No. 2 Flow	F04	Flow Element & Transmitter, Electromagnetic	76-I-32	4091-219
76FT2161	76FIT2161	Thickening Centrifuge Feed Pump No. 3 Flow	F04	Flow Element & Transmitter, Electromagnetic	76-I-33	4091-219
76FT2166	76FIT2166	Thickening Centrifuge Feed Pump No. 4 Flow	F04	Flow Element & Transmitter, Electromagnetic	76-I-34	4091-219
76FT2171	76FIT2171	Thickening Centrifuge Feed Pump No. 5 Flow	F04	Flow Element & Transmitter, Electromagnetic	76-I-35	4091-219
80FT2180	80FIT2180	Digester Complex Digester No. 1 Thickened Sludge Feed Line Flow	F04	Flow Element & Transmitter, Electromagnetic	80-I-4	4091-219
80FT2280	80FIT2280	Digester Complex Digester No. 2 Thickened Sludge Feed Line Flow	F04	Flow Element & Transmitter, Electromagnetic	80-I-54	4091-219
80FT2380	80FIT2380	Digester Complex Digester No. 3 Thickened Sludge Feed Line Flow	F04	Flow Element & Transmitter, Electromagnetic	80-I-104	4091-219
80FT2600	80FIT2600	Digester No. 1 Biogas Flow	F51	Flow Element & Transmitter, Thermo Mass	80-I-250	4091-217A
80FT2610	80FIT2610	Digester No. 2 Biogas Flow	F51	Flow Element & Transmitter, Thermo Mass	80-I-251	4091-217A
80FT2620	80FIT2620	Digester No. 3 Biogas Flow	F51	Flow Element & Transmitter, Thermo Mass	80-I-252	4091-217A
80FT2630	80FIT2630	Biogas Collection System Flow Transmitter	F51	Flow Element & Transmitter, Thermo Mass	80-I-253	4091-217A
80FT26240	80FIT2640	Emergency Biogas Collection System Flow Transmitter	F51	Flow Element & Transmitter, Thermo Mass	80-I-254	4091-217A
80FT2673	80FIT2673	Digester Complex Biogas Compressors Flow	F51	Flow Element & Transmitter, Thermo Mass	80-I-272	4091-217A
80FT2692	80FIT2692	Digester Biogas Flares Inlet Header Flow	F51	Flow Element & Transmitter, Thermo Mass	80-I-275	4091-217A
73PI2021A	73PI2021A	Raw Solids Pump No. 1 Suction Pressure	P04	Pressure Gauge	73-I-32	4091-304C
73PI2021B	73PI2021B	Raw Solids Pump No. 1 Discharge Pressure	P04	Pressure Gauge	73-I-32	4091-304C
73PI2022A	73PI2022A	Raw Solids Pump No. 2 Suction Pressure	P04	Pressure Gauge	73-I-32	4091-304C
73PI2022B	73PI2022B	Raw Solids Pump No. 2 Discharge Pressure	P04	Pressure Gauge	73-I-32	4091-304C
73PI2023A	73PI2023A	Raw Solids Pump No. 3 Suction Pressure	P04	Pressure Gauge	73-I-33	4091-304C
73PI2023B	73PI2023B	Raw Solids Pump No. 3 Discharge Pressure	P04	Pressure Gauge	73-I-33	4091-304C
76PI2151A	76PI2151A	Thickening Centrifuge Feed Pump No. 1 Suction Pressure	P04	Pressure Gauge	76-I-31	4091-304C
76PI2155A	76PI2155A	Thickening Centrifuge Feed Pump No. 2 Suction Pressure	P04	Pressure Gauge	76-I-32	4091-304C
76PI2160A	76PI2160A	Thickening Centrifuge Feed Pump No. 3 Suction Pressure	P04	Pressure Gauge	76-I-33	4091-304C
76PI2165A	76PI2165A	Thickening Centrifuge Feed Pump No. 4 Suction Pressure	P04	Pressure Gauge	76-I-34	4091-304C
76PI2170A	76PI2170A	Thickening Centrifuge Feed Pump No. 5 Suction Pressure	P04	Pressure Gauge	76-I-35	4091-304C
76PI2287A	76PI2287A	Thickened Solids Transfer Pump No. 1 Suction Pressure	P04	Pressure Gauge	76-I-52	4091-304C
76PI2292A	76PI2292A	Thickened Solids Transfer Pump No. 2 Suction Pressure	P04	Pressure Gauge	76-I-53	4091-304C
76PI2297A	76PI2297A	Thickened Solids Transfer Pump No. 3 Suction Pressure	P04	Pressure Gauge	76-I-54	4091-304C
76PI2505A	76PI2505A	Dewatering Centrifuge Feed Pump No. 1 Suction Pressure	P04	Pressure Gauge	76-I-101	4091-304C
76PI2510A	76PI2510A	Dewatering Centrifuge Feed Pump No. 2 Suction Pressure	P04	Pressure Gauge	76-I-102	4091-304C
76PI2515A	76PI2515A	Dewatering Centrifuge Feed Pump No. 3 Suction Pressure	P04	Pressure Gauge	76-I-103	4091-304C
76PI2520A	76PI2520A	Dewatering Centrifuge Feed Pump No. 4 Suction Pressure	P04	Pressure Gauge	76-I-104	4091-304C
76PI2525A	76PI2525A	Dewatering Centrifuge Feed Pump No. 5 Suction Pressure	P04	Pressure Gauge	76-I-105	4091-304C
76PI2530A	76PI2530A	Dewatering Centrifuge Feed Pump No. 6 Suction Pressure	P04	Pressure Gauge	76-I-106	4091-304C
76PI2535A	76PI2535A	Dewatering Centrifuge Feed Pump No. 7 Suction Pressure	P04	Pressure Gauge	76-I-107	4091-304C
76PI2540A	76PI2540A	Dewatering Centrifuge Feed Pump No. 8 Suction Pressure	P04	Pressure Gauge	76-I-108	4091-304C
76PI2737A	76PI2737A	Thickening Centrifuge Polymer Feed Pump No. 1 Suction Pressure	P04	Pressure Gauge	76-I-211	4091-304C
76PI2742A	76PI2742A	Thickening Centrifuge Polymer Feed Pump No. 2 Suction Pressure	P04	Pressure Gauge	76-I-212	4091-304C
76PI2747A	76PI2747A	Thickening Centrifuge Polymer Feed Pump No. 3 Suction Pressure	P04	Pressure Gauge	76-I-213	4091-304C

## INSTRUMENT LIST

Loop	Tag Number	Loop Title	Code	Code Description	P+ID	Design Detail
76PI2752A	76PI2752A	Thickening Centrifuge Polymer Feed Pump No. 4 Suction Pressure	P04	Pressure Gauge	76-I-214	4091-304C
76PI2757A	76PI2757A	Thickening Centrifuge Polymer Feed Pump No. 5 Suction Pressure	P04	Pressure Gauge	76-I-215	4091-304C
76PI2772A	76PI2772A	Dewatering Centrifuge Polymer Feed Pump No. 1 Suction Pressure	P04	Pressure Gauge	76-I-221	4091-304C
76PI2777A	76PI2777A	Dewatering Centrifuge Polymer Feed Pump No. 2 Suction Pressure	P04	Pressure Gauge	76-I-222	4091-304C
76PI2782A	76PI2782A	Dewatering Centrifuge Polymer Feed Pump No. 3 Suction Pressure	P04	Pressure Gauge	76-I-223	4091-304C
76PI2787A	76PI2787A	Dewatering Centrifuge Polymer Feed Pump No. 4 Suction Pressure	P04	Pressure Gauge	76-I-224	4091-304C
76PI2792A	76PI2792A	Dewatering Centrifuge Polymer Feed Pump No. 5 Suction Pressure	P04	Pressure Gauge	76-I-225	4091-304C
76PI2797A	76PI2797A	Dewatering Centrifuge Polymer Feed Pump No. 6 Suction Pressure	P04	Pressure Gauge	76-I-226	4091-304C
76PI2802A	76PI2802A	Dewatering Centrifuge Polymer Feed Pump No. 7 Suction Pressure	P04	Pressure Gauge	76-I-227	4091-304C
76PI2807A	76PI2807A	Dewatering Centrifuge Polymer Feed Pump No. 8 Suction Pressure	P04	Pressure Gauge	76-I-228	4091-304C
80PI2110A	80PI2110A	Digester No. 1 Recirculation Pump No. 1 Suction Pressure	P04	Pressure Gauge	80-I-2	4091-304B
80PI2110B	80PI2110B	Digester No. 1 Recirculation Pump No. 1 Discharge Pressure	P04	Pressure Gauge	80-I-2	4091-304B
80PI2110C	80PI2110C	Digester No. 1 Recirculation Pump No. 2 Suction Pressure	P04	Pressure Gauge	80-I-2	4091-304B
80PI2110D	80PI2110D	Digester No. 1 Recirculation Pump No. 2 Discharge Pressure	P04	Pressure Gauge	80-I-2	4091-304B
80PI2141A	80PI2141A	Digester No. 1 Mix Pump No. 1 Suction Pressure	P04	Pressure Gauge	80-I-11	4091-304B
80PI2141B	80PI2141B	Digester No. 1 Mix Pump No. 1 Discharge Pressure	P04	Pressure Gauge	80-I-11	4091-304B
80PI2142A	80PI2142A	Digester No. 1 Mix Pump No. 2 Suction Pressure	P04	Pressure Gauge	80-I-11	4091-304B
80PI2142B	80PI2142B	Digester No. 1 Mix Pump No. 2 Discharge Pressure	P04	Pressure Gauge	80-I-11	4091-304B
80PI2143A	80PI2143A	Digester No. 1 Mix Pump No. 3 Suction Pressure	P04	Pressure Gauge	80-I-12	4091-304B
80PI2143B	80PI2143B	Digester No. 1 Mix Pump No. 3 Discharge Pressure	P04	Pressure Gauge	80-I-12	4091-304B
80PI2150A	80PI2150A	Digester No. 1 Axial Pump No. 1 Suction Pressure	P04	Pressure Gauge	80-I-20	4091-304B
80PI2150B	80PI2150B	Digester No. 1 Axial Pump No. 1 Discharge Pressure	P04	Pressure Gauge	80-I-20	4091-304B
80PI2160A	80PI2160A	Digester No. 1 Axial Pump No. 2 Suction Pressure	P04	Pressure Gauge	80-I-21	4091-304B
80PI2160B	80PI2160B	Digester No. 1 Axial Pump No. 2 Discharge Pressure	P04	Pressure Gauge	80-I-21	4091-304B
80PI2170A	80PI2170A	Digester No. 1 Axial Pump No. 3 Suction Pressure	P04	Pressure Gauge	80-I-22	4091-304B
80PI2170B	80PI2170B	Digester No. 1 Axial Pump No. 3 Discharge Pressure	P04	Pressure Gauge	80-I-22	4091-304B
80PI2210A	80PI2210A	Digester No. 2 Recirculation Pump No. 1 Suction Pressure	P04	Pressure Gauge	80-I-52	4091-304B
80PI2210B	80PI2210B	Digester No. 2 Recirculation Pump No. 1 Discharge Pressure	P04	Pressure Gauge	80-I-52	4091-304B
80PI2210C	80PI2210C	Digester No. 2 Recirculation Pump No. 2 Suction Pressure	P04	Pressure Gauge	80-I-52	4091-304B
80PI2210D	80PI2210D	Digester No. 2 Recirculation Pump No. 2 Discharge Pressure	P04	Pressure Gauge	80-I-52	4091-304B
80PI2241A	80PI2241A	Digester No. 2 Mix Pump No. 1 Suction Pressure	P04	Pressure Gauge	80-I-61	4091-304B
80PI2241B	80PI2241B	Digester No. 2 Mix Pump No. 1 Discharge Pressure	P04	Pressure Gauge	80-I-61	4091-304B
80PI2242A	80PI2242A	Digester No. 2 Mix Pump No. 2 Suction Pressure	P04	Pressure Gauge	80-I-61	4091-304B
80PI2242B	80PI2242B	Digester No. 2 Mix Pump No. 2 Discharge Pressure	P04	Pressure Gauge	80-I-61	4091-304B
80PI2243A	80PI2243A	Digester No. 2 Mix Pump No. 3 Suction Pressure	P04	Pressure Gauge	80-I-62	4091-304B
80PI2243B	80PI2243B	Digester No. 2 Mix Pump No. 3 Discharge Pressure	P04	Pressure Gauge	80-I-62	4091-304B
80PI2250A	80PI2250A	Digester No. 2 Axial Pump No. 1 Suction Pressure	P04	Pressure Gauge	80-I-70	4091-304B
80PI2250B	80PI2250B	Digester No. 2 Axial Pump No. 1 Discharge Pressure	P04	Pressure Gauge	80-I-70	4091-304B
80PI2260A	80PI2260A	Digester No. 2 Axial Pump No. 2 Suction Pressure	P04	Pressure Gauge	80-I-71	4091-304B
80PI2260B	80PI2260B	Digester No. 2 Axial Pump No. 2 Discharge Pressure	P04	Pressure Gauge	80-I-71	4091-304B
80PI2270A	80PI2270A	Digester No. 2 Axial Pump No. 3 Suction Pressure	P04	Pressure Gauge	80-I-72	4091-304B
80PI2270B	80PI2270B	Digester No. 2 Axial Pump No. 3 Discharge Pressure	P04	Pressure Gauge	80-I-72	4091-304B
80PI2310A	80PI2310A	Digester No. 3 Recirculation Pump No. 1 Suction Pressure	P04	Pressure Gauge	80-I-102	4091-304B

## INSTRUMENT LIST

Loop	Tag Number	Loop Title	Code	Code Description	P+ID	Design Detail
80PI2310B	80PI2310B	Digester No. 3 Recirculation Pump No. 1 Discharge Pressure	P04	Pressure Gauge	80-I-102	4091-304B
80PI2310C	80PI2310C	Digester No. 3 Recirculation Pump No. 2 Suction Pressure	P04	Pressure Gauge	80-I-102	4091-304B
80PI2310D	80PI2310D	Digester No. 3 Recirculation Pump No. 2 Discharge Pressure	P04	Pressure Gauge	80-I-102	4091-304B
80PI2341A	80PI2341A	Digester No. 3 Mix Pump No. 1 Suction Pressure	P04	Pressure Gauge	80-I-111	4091-304B
80PI2341B	80PI2341B	Digester No. 3 Mix Pump No. 1 Discharge Pressure	P04	Pressure Gauge	80-I-111	4091-304B
80PI2342A	80PI2342A	Digester No. 3 Mix Pump No. 2 Suction Pressure	P04	Pressure Gauge	80-I-111	4091-304B
80PI2342B	80PI2342B	Digester No. 3 Mix Pump No. 2 Discharge Pressure	P04	Pressure Gauge	80-I-111	4091-304B
80PI2343A	80PI2343A	Digester No. 3 Mix Pump No. 3 Suction Pressure	P04	Pressure Gauge	80-I-112	4091-304B
80PI2343B	80PI2343B	Digester No. 3 Mix Pump No. 3 Discharge Pressure	P04	Pressure Gauge	80-I-112	4091-304B
80PI2350A	80PI2350A	Digester No. 3 Axial Pump No. 1 Suction Pressure	P04	Pressure Gauge	80-I-120	4091-304B
80PI2350B	80PI2350B	Digester No. 3 Axial Pump No. 1 Discharge Pressure	P04	Pressure Gauge	80-I-120	4091-304B
80PI2360A	80PI2360A	Digester No. 3 Axial Pump No. 2 Suction Pressure	P04	Pressure Gauge	80-I-121	4091-304B
80PI2360B	80PI2360B	Digester No. 3 Axial Pump No. 2 Discharge Pressure	P04	Pressure Gauge	80-I-121	4091-304B
80PI2370A	80PI2370A	Digester No. 3 Axial Pump No. 3 Suction Pressure	P04	Pressure Gauge	80-I-122	4091-304B
80PI2370B	80PI2370B	Digester No. 3 Axial Pump No. 3 Discharge Pressure	P04	Pressure Gauge	80-I-122	4091-304B
94PI2025A	94PI2025A	Odor Control System Centrate Pump No. 1 Suction Pressure	P04	Pressure Gauge	94-I-15	4091-304B
94PI2025B	94PI2025B	Odor Control System Centrate Pump No. 1 Discharge Pressure	P04	Pressure Gauge	94-I-15	4091-304B
94PI2030A	94PI2030A	Odor Control System Centrate Pump No. 2 Suction Pressure	P04	Pressure Gauge	94-I-16	4091-304B
94PI2030B	94PI2030B	Odor Control System Centrate Pump No. 2 Discharge Pressure	P04	Pressure Gauge	94-I-16	4091-304B
94PI2035A	94PI2035A	Odor Control System Centrate Pump No. 3 Suction Pressure	P04	Pressure Gauge	94-I-17	4091-304B
94PI2035B	94PI2035B	Odor Control System Centrate Pump No. 3 Discharge Pressure	P04	Pressure Gauge	94-I-17	4091-304B
76PAL2151A	76PSL2151A	Thickening Centrifuge Feed Pump No. 1 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-31	4091-304C
76PAL2151B	76PSL2151B	Thickening Centrifuge Feed Pump No. 1 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-31	4091-304C
76PAH2151	76PSH2151	Thickening Centrifuge Feed Pump No. 1 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-31	4091-304C
76PAL2155A	76PSL2155A	Thickening Centrifuge Feed Pump No. 2 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-32	4091-304C
76PAL2155B	76PSL2155B	Thickening Centrifuge Feed Pump No. 2 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-32	4091-304C
76PAH2155	76PSH2155	Thickening Centrifuge Feed Pump No. 2 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-32	4091-304C
76PAL2160A	76PSL2160A	Thickening Centrifuge Feed Pump No. 3 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-33	4091-304C
76PAL2160B	76PSL2160B	Thickening Centrifuge Feed Pump No. 3 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-33	4091-304C
76PAH2160	76PSH2160	Thickening Centrifuge Feed Pump No. 3 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-33	4091-304C
76PAL2165A	76PSL2165A	Thickening Centrifuge Feed Pump No. 4 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-34	4091-304C
76PAL2165B	76PSL2165B	Thickening Centrifuge Feed Pump No. 4 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-34	4091-304C
76PAH2165	76PSH2165	Thickening Centrifuge Feed Pump No. 4 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-34	4091-304C
76PAL2170A	76PSL2170A	Thickening Centrifuge Feed Pump No. 5 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-35	4091-304C
76PAL2170B	76PSL2170B	Thickening Centrifuge Feed Pump No. 5 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-35	4091-304C
76PAH2170	76PSH2170	Thickening Centrifuge Feed Pump No. 5 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-35	4091-304C
76PAL2287A	76PSL2287A	Thickened Solids Transfer Pump No. 1 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-52	4091-304C
76PAL2287B	76PSL2287B	Thickened Solids Transfer Pump No. 1 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-52	4091-304C
76PAH2287	76PSH2287	Thickened Solids Transfer Pump No. 1 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-52	4091-304C
76PAL2292A	76PSL2292A	Thickened Solids Transfer Pump No. 2 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-53	4091-304C
76PAL2292B	76PSL2292B	Thickened Solids Transfer Pump No. 2 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-53	4091-304C
76PAH2292	76PSH2292	Thickened Solids Transfer Pump No. 2 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-53	4091-304C
76PAL2297A	76PSL2297A	Thickened Solids Transfer Pump No. 3 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-54	4091-304C
76PAL2297B	76PSL2297B	Thickened Solids Transfer Pump No. 3 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-54	4091-304C
76PAH2297	76PSH2297	Thickened Solids Transfer Pump No. 3 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-54	4091-304C

## INSTRUMENT LIST

Loop	Tag Number	Loop Title	Code	Code Description	P+ID	Design Detail
76PAL2505	76PSL2505	Dewatering Centrifuge Feed Pump No. 1 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-101	4091-304C
76PAL2505B	76PSL2505B	Dewatering Centrifuge Feed Pump No. 1 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-101	4091-304C
76PAH2505	76PSH2505					
76PAL2510A	76PSL2510A	Dewatering Centrifuge Feed Pump No. 2 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-102	4091-304C
76PAL2510B	76PSL2510B	Dewatering Centrifuge Feed Pump No. 2 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-102	4091-304C
76PAH2510	76PSH2510					
76PAL2515A	76PSL2515A	Dewatering Centrifuge Feed Pump No. 3 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-103	4091-304C
76PAL2515B	76PSL2515B	Dewatering Centrifuge Feed Pump No. 3 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-103	4091-304C
76PAH2515	76PSH2515					
76PAL2520A	76PSL2520A	Dewatering Centrifuge Feed Pump No. 4 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-104	4091-304C
76PAL2520B	76PSL2520B	Dewatering Centrifuge Feed Pump No. 4 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-104	4091-304C
76PAH2520	76PSH2520					
76PAL2525A	76PSL2525A	Dewatering Centrifuge Feed Pump No. 5 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-105	4091-304C
76PAL2525B	76PSL2525B	Dewatering Centrifuge Feed Pump No. 5 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-105	4091-304C
76PAH2525	76PSH2525					
76PAL2530A	76PSL2530A	Dewatering Centrifuge Feed Pump No. 6 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-106	4091-304C
76PAL2530B	76PSL2530B	Dewatering Centrifuge Feed Pump No. 6 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-106	4091-304C
76PAH2530	76PSH2530					
76PAL2535A	76PSL2535A	Dewatering Centrifuge Feed Pump No. 7 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-107	4091-304C
76PAL2535B	76PSL2535B	Dewatering Centrifuge Feed Pump No. 7 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-107	4091-304C
76PAH2535	76PSH2535					
76PAL2540A	76PSL2540A	Dewatering Centrifuge Feed Pump No. 8 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-108	4091-304C
76PAL2540B	76PSL2540B	Dewatering Centrifuge Feed Pump No. 8 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-108	4091-304C
76PAH2540	76PSH2540					
76PAL2737A	76PSL2737A	Thickening Centrifuge Polymer Feed Pump No. 1 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-211	4091-304C
76PAL2737B	76PSL2737B	Thickening Centrifuge Polymer Feed Pump No. 1 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-211	4091-304C
76PAH2737	76PSH2737					
76PAL2742A	76PSL2742A	Thickening Centrifuge Polymer Feed Pump No. 2 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-212	4091-304C
76PAL2742B	76PSL2742B	Thickening Centrifuge Polymer Feed Pump No. 2 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-212	4091-304C
76PAH2742	76PSH2742					
76PAL2747A	76PSL2747A	Thickening Centrifuge Polymer Feed Pump No. 3 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-213	4091-304C
76PAL2747B	76PSL2747B	Thickening Centrifuge Polymer Feed Pump No. 3 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-213	4091-304C
76PAH2747	76PSH2747					
76PAL2752A	76PSL2752A	Thickening Centrifuge Polymer Feed Pump No. 4 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-214	4091-304C
76PAL2752B	76PSL2752B	Thickening Centrifuge Polymer Feed Pump No. 4 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-214	4091-304C
76PAH2752	76PSH2752					
76PAL2757A	76PSL2757A	Thickening Centrifuge Polymer Feed Pump No. 5 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-215	4091-304C
76PAL2757B	76PSL2757B	Thickening Centrifuge Polymer Feed Pump No. 5 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-215	4091-304C
76PAH2757	76PSH2757					
76PAL2772A	76PSL2772A	Dewatering Centrifuge Polymer Feed Pump No. 1 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-221	4091-304C
76PAL2772B	76PSL2772B	Dewatering Centrifuge Polymer Feed Pump No. 1 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-221	4091-304C
76PAH2772	76PSH2772					
76PAL2777A	76PSL2777A	Dewatering Centrifuge Polymer Feed Pump No. 2 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-222	4091-304C
76PAL2777B	76PSL2777B	Dewatering Centrifuge Polymer Feed Pump No. 2 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-222	4091-304C
76PAH2777	76PSH2777					
76PAL2782A	76PSL2782A	Dewatering Centrifuge Polymer Feed Pump No. 3 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-223	4091-304C
76PAL2782B	76PSL2782B	Dewatering Centrifuge Polymer Feed Pump No. 3 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-223	4091-304C
76PAH2782	76PSH2782					
76PAL2787A	76PSL2787A	Dewatering Centrifuge Polymer Feed Pump No. 4 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-224	4091-304C

PWIDEN001\050020-695037

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Pure Water Program: Metro Biosolids Center Improvements  
Attachment E – Technicals

INSTRUMENTATION AND  
CONTROL COMPONENTS  
40 90 00 SUPPLEMENT 1 - 4



## INSTRUMENT LIST

Loop	Tag Number	Loop Title	Code	Code Description	P+ID	Design Detail
76PAL2787B 76PAH2787	76PSL2787B 76PSH2787	Dewatering Centrifuge Polymer Feed Pump No. 4 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-224	4091-304C
76PAL2792A 76PAL2792B 76PAH2792	76PSL2792A 76PSL2792B 76PSH2792	Dewatering Centrifuge Polymer Feed Pump No. 5 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-225	4091-304C
76PAL2797A 76PAL2797B 76PAH2797	76PSL2797A 76PSL2797B 76PSH2797	Dewatering Centrifuge Polymer Feed Pump No. 5 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-225	4091-304C
76PAL2802A 76PAL2802B 76PAH2802	76PSL2802A 76PSL2802B 76PSH2802	Dewatering Centrifuge Polymer Feed Pump No. 6 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-226	4091-304C
76PAL2807A 76PAL2807B 76PAH2807	76PSL2807A 76PSL2807B 76PSH2807	Dewatering Centrifuge Polymer Feed Pump No. 6 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-226	4091-304C
76PAL2802A 76PAL2802B 76PAH2802	76PSL2802A 76PSL2802B 76PSH2802	Dewatering Centrifuge Polymer Feed Pump No. 7 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-227	4091-304C
76PAL2807A 76PAL2807B 76PAH2807	76PSL2807A 76PSL2807B 76PSH2807	Dewatering Centrifuge Polymer Feed Pump No. 7 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-227	4091-304C
76PAL2807A 76PAL2807B 76PAH2807	76PSL2807A 76PSL2807B 76PSH2807	Dewatering Centrifuge Polymer Feed Pump No. 8 Suction Pressure	P08	Pressure Switch, Fixed Deadband	76-I-228	4091-304C
76PAL2807A 76PAL2807B 76PAH2807	76PSL2807A 76PSL2807B 76PSH2807	Dewatering Centrifuge Polymer Feed Pump No. 8 Discharge Pressure	P08	Pressure Switch, Fixed Deadband	76-I-228	4091-304C
76PT1104A 76PT1104B	76PIT1104A 76PIT1104B	Grit Separator No. 1 Flow Controller Differential Pressure	P09	Pressure Transmitter	76-I-11	4091-304C
76PT1109A 76PT1109B	76PIT1109A 76PIT1109B	Grit Separator No. 1 Differential Pressure	P09	Pressure Transmitter	76-I-11	4091-304C
76PT1114A 76PT1114B	76PIT1114A 76PIT1114B	Grit Separator No. 2 Flow Controller Differential Pressure	P09	Pressure Transmitter	76-I-12	4091-304C
76PT2123 76PT2126	76PIT2123 76PIT2126	Grit Separator No. 2 Differential Pressure	P09	Pressure Transmitter	76-I-12	4091-304C
76PT2153 76PT2157	76PIT2153 76PIT2157	Grit Separator No. 3 Flow Controller Differential Pressure	P09	Pressure Transmitter	76-I-13	4091-304C
76PT2162 76PT2167	76PIT2162 76PIT2167	Grit Separator No. 3 Differential Pressure	P09	Pressure Transmitter	76-I-13	4091-304C
76PT2172 76PT2289	76PIT2172 76PIT2289	Grit Separator No. 4 Flow Controller Differential Pressure	P09	Pressure Transmitter	76-I-14	4091-304C
76PT2294 76PT2299	76PIT2294 76PIT2299	Grit Separator No. 4 Differential Pressure	P09	Pressure Transmitter	76-I-14	4091-304C
76PT2507 76PT2512	76PIT2507 76PIT2512	Thickening Centrifuge Feed Pump No. 1 Discharge Pressure	P09	Pressure Transmitter	76-I-31	4091-304C
76PT2517 76PT2522	76PIT2517 76PIT2522	Thickening Centrifuge Feed Pump No. 2 Discharge Pressure	P09	Pressure Transmitter	76-I-32	4091-304C
76PT2527 76PT2532	76PIT2527 76PIT2532	Thickening Centrifuge Feed Pump No. 3 Discharge Pressure	P09	Pressure Transmitter	76-I-33	4091-304C
76PT2537 76PT2542	76PIT2537 76PIT2542	Thickening Centrifuge Feed Pump No. 4 Discharge Pressure	P09	Pressure Transmitter	76-I-34	4091-304C
76PT2735 76PT2740	76PIT2735 76PIT2740	Thickened Solids Transfer Pump No. 1 Discharge Pressure	P09	Pressure Transmitter	76-I-52	4091-304C
76PT2745 76PT2750	76PIT2745 76PIT2750	Thickened Solids Transfer Pump No. 2 Discharge Pressure	P09	Pressure Transmitter	76-I-53	4091-304C
76PT2755 76PT2755	76PIT2755 76PIT2755	Thickened Solids Transfer Pump No. 3 Discharge Pressure	P09	Pressure Transmitter	76-I-54	4091-304C
76PT2507 76PT2512	76PIT2507 76PIT2512	Dewatering Centrifuge Feed Pump No. 1 Discharge Pressure	P09	Pressure Transmitter	76-I-101	4091-304C
76PT2517 76PT2522	76PIT2517 76PIT2522	Dewatering Centrifuge Feed Pump No. 2 Discharge Pressure	P09	Pressure Transmitter	76-I-102	4091-304C
76PT2527 76PT2532	76PIT2527 76PIT2532	Dewatering Centrifuge Feed Pump No. 3 Discharge Pressure	P09	Pressure Transmitter	76-I-103	4091-304C
76PT2537 76PT2542	76PIT2537 76PIT2542	Dewatering Centrifuge Feed Pump No. 4 Discharge Pressure	P09	Pressure Transmitter	76-I-104	4091-304C
76PT2547 76PT2552	76PIT2547 76PIT2552	Dewatering Centrifuge Feed Pump No. 5 Discharge Pressure	P09	Pressure Transmitter	76-I-105	4091-304C
76PT2557 76PT2562	76PIT2557 76PIT2562	Dewatering Centrifuge Feed Pump No. 6 Discharge Pressure	P09	Pressure Transmitter	76-I-106	4091-304C
76PT2567 76PT2572	76PIT2567 76PIT2572	Dewatering Centrifuge Feed Pump No. 7 Discharge Pressure	P09	Pressure Transmitter	76-I-107	4091-304C
76PT2577 76PT2582	76PIT2577 76PIT2582	Dewatering Centrifuge Feed Pump No. 8 Discharge Pressure	P09	Pressure Transmitter	76-I-108	4091-304C
76PT2735 76PT2740	76PIT2735 76PIT2740	Thickening Centrifuge Polymer Feed Pump No. 1 Discharge Pressure	P09	Pressure Transmitter	76-I-211	4091-304C
76PT2745 76PT2750	76PIT2745 76PIT2750	Thickening Centrifuge Polymer Feed Pump No. 2 Discharge Pressure	P09	Pressure Transmitter	76-I-212	4091-304C
76PT2755 76PT2755	76PIT2755 76PIT2755	Thickening Centrifuge Polymer Feed Pump No. 3 Discharge Pressure	P09	Pressure Transmitter	76-I-213	4091-304C
76PT2755 76PT2755	76PIT2755 76PIT2755	Thickening Centrifuge Polymer Feed Pump No. 4 Discharge Pressure	P09	Pressure Transmitter	76-I-214	4091-304C
76PT2755 76PT2755	76PIT2755 76PIT2755	Thickening Centrifuge Polymer Feed Pump No. 5 Discharge Pressure	P09	Pressure Transmitter	76-I-215	4091-304C



## INSTRUMENT LIST

Loop	Tag Number	Loop Title	Code	Code Description	P+ID	Design Detail
76PT2770	76PIT2770	Dewatering Centrifuge Polymer Feed Pump No. 1 Discharge Pressure	P09	Pressure Transmitter	76-I-221	4091-304C
76PT2775	76PIT2775	Dewatering Centrifuge Polymer Feed Pump No. 2 Discharge Pressure	P09	Pressure Transmitter	76-I-222	4091-304C
76PT2780	76PIT2780	Dewatering Centrifuge Polymer Feed Pump No. 3 Discharge Pressure	P09	Pressure Transmitter	76-I-223	4091-304C
76PT2785	76PIT2785	Dewatering Centrifuge Polymer Feed Pump No. 4 Discharge Pressure	P09	Pressure Transmitter	76-I-224	4091-304C
76PT2790	76PIT2790	Dewatering Centrifuge Polymer Feed Pump No. 5 Discharge Pressure	P09	Pressure Transmitter	76-I-225	4091-304C
76PT2795	76PIT2795	Dewatering Centrifuge Polymer Feed Pump No. 6 Discharge Pressure	P09	Pressure Transmitter	76-I-226	4091-304C
76PT2800	76PIT2800	Dewatering Centrifuge Polymer Feed Pump No. 7 Discharge Pressure	P09	Pressure Transmitter	76-I-227	4091-304C
76PT2805	76PIT2805	Dewatering Centrifuge Polymer Feed Pump No. 8 Discharge Pressure	P09	Pressure Transmitter	76-I-228	4091-304C
80PT2671	80PIT2671	Digester Biogas Compressors Pressure	P09	Pressure Transmitter	80-I-272	4091-308
80TT2672	80TIT2672	Digester Biogas Compressors Temperature Transmitter	T03	Temperature Element & Transmitter, Resistance	80-I-272	4091-362

# **F04 FLOW ELEMENT & TRANSMITTER, ELECTROMAGNETIC**

GENERAL	1	Tag Number	P&ID	76FIT2152	76-I-31	
	2	Loop Title		Thickening Centrifuge Feed Pump No. 1 Flow		
	3	Area Classification		Unclassified		
	4					
	5	Line Number	Equipment Number			
	6	Line Size	Line Schedule	8 inch	Ductile Iron	
PROCESS CONDITIONS	7	Fluid		Raw Solids		
	8					
	9	Min Flow	Max Flow	0	1200 gpm	
	10	Nominal Pressure		100 psi		
	11	Nominal Temperature		75 degF		
	12	Specific Gravity	Viscosity	1.0		
	13	Conductivity	Density			
	14	Vapor Pressure	Critical Pressure			
	15					
	16	Vacuum Possibility		No		
METERING ELEMENT	18	Element Tag		76FE2152		
	19	Element Size		8"		
	20	Process Connection/Material		316 Stainless Steel		
	21	Electrical Connection		0.5 inch NPT		
	22	Tube Material		Stainless Steel		
	23	Liner Material		Teflon		
	24	Electrode Type		Flush or Bullet Nose		
	25	Electrode Material		316 Stainless Steel		
	26	Range		0-40 ft/sec		
	27	Element Cable Length		As required to accommodate device locations		
	28	Grounding Rings	Material	Two	316 Stainless Steel	
	29	Enclosure NEMA Rating		NEMA 4X		
	30	Minimum Measurable Velocity		0.033 Feet/Sec		
	31	Minimum Conductivity		5 microS/cm		
	32	Ambient Temperature Limits		-5 degF to 140 degF		
	33	Process Temperature Limits		32 degF to 180 degF		
	34	Options				
TRANSMITTER	36	Mounting		Wall		
	37	Enclosure NEMA Rating		NEMA 4X		
	38	Power Supply	Voltage	4 - Wire	120 VAC	
	39	Output Signal		Isolated 4 to 20 mA dc		
	40	Communication Protocol		HART		
	41	Calibrated Range		0 - 1500 gpm		
	42	Low Flow Cutoff				
	43	Ambient Temperature Limits		-5 degF to 140 degF		
	44					
OPTIONS	45	Accuracy	Repeatability	+/- 0.5 percent of rate		
	46	Vendor Calibration		Factory calibrate with calibration certificate		
	47	Tagging		Stainless steel tag with Tag Number		
	48	Element Mounting Bracket				
	49					
PURCHASE	50	Manufacturer		Endress+Hauser	Krohne	
	51	Model Number		Promag L400	Optiflux 2000	
	52					
	53	Purchase Note		1 year warranty		
<b>F04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>			
<b>FLOW ELEMENT &amp; TRANSMITTER, ELECTROMAGNETIC</b>			<b>76FIT2152</b>			

GENERAL	1	Tag Number	P&ID	76FIT2156	76-I-32	
	2	Loop Title		Thickening Centrifuge Feed Pump No. 2 Flow		
	3	Area Classification		Unclassified		
	4					
	5	Line Number	Equipment Number			
	6	Line Size	Line Schedule	8 inch	Ductile Iron	
PROCESS CONDITIONS	7	Fluid		Raw Solids		
	8					
	9	Min Flow	Max Flow	0	1200 gpm	
	10	Nominal Pressure		100 psi		
	11	Nominal Temperature		75 degF		
	12	Specific Gravity	Viscosity	1.0		
	13	Conductivity	Density			
	14	Vapor Pressure	Critical Pressure			
	15					
	16	Vacuum Possibility		No		
METERING ELEMENT	18	Element Tag		76FE2156		
	19	Element Size		8"		
	20	Process Connection/Material		316 Stainless Steel		
	21	Electrical Connection		0.5 inch NPT		
	22	Tube Material		Stainless Steel		
	23	Liner Material		Teflon		
	24	Electrode Type		Flush or Bullet Nose		
	25	Electrode Material		316 Stainless Steel		
	26	Range		0-40 ft/sec		
	27	Element Cable Length		As required to accommodate device locations		
	28	Grounding Rings	Material	Two	316 Stainless Steel	
	29	Enclosure NEMA Rating		NEMA 4X		
	30	Minimum Measurable Velocity		0.033 Feet/Sec		
	31	Minimum Conductivity		5 microS/cm		
	32	Ambient Temperature Limits		-5 degF to 140 degF		
	33	Process Temperature Limits		32 degF to 180 degF		
	34	Options				
35						
TRANSMITTER	36	Mounting		Wall		
	37	Enclosure NEMA Rating		NEMA 4X		
	38	Power Supply	Voltage	4 - Wire	120 VAC	
	39	Output Signal		Isolated 4 to 20 mA dc		
	40	Communication Protocol		HART		
	41	Calibrated Range		0 - 1500 gpm		
	42	Low Flow Cutoff				
	43	Ambient Temperature Limits		-5 degF to 140 degF		
	44					
OPTIONS	45	Accuracy	Repeatability	+/- 0.5 percent of rate		
	46	Vendor Calibration		Factory calibrate with calibration certificate		
	47	Tagging		Stainless steel tag with Tag Number		
	48	Element Mounting Bracket				
	49					
PURCHASE	50	Manufacturer		Endress+Hauser	Krohne	
	51	Model Number		Promag L400	Optiflux 2000	
	52					
	53	Purchase Note		1 year warranty		
<b>F04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>			
<b>FLOW ELEMENT &amp; TRANSMITTER, ELECTROMAGNETIC</b>			<b>76FIT2156</b>			

GENERAL	1	Tag Number	P&ID	76FIT2161	76-I-33	
	2	Loop Title		Thickening Centrifuge Feed Pump No. 3 Flow		
	3	Area Classification		Unclassified		
	4					
	5	Line Number	Equipment Number			
	6	Line Size	Line Schedule	8 inch	Ductile Iron	
PROCESS CONDITIONS	7	Fluid		Raw Solids		
	8					
	9	Min Flow	Max Flow	0	1200 gpm	
	10	Nominal Pressure		100 psi		
	11	Nominal Temperature		75 degF		
	12	Specific Gravity	Viscosity	1.0		
	13	Conductivity	Density			
	14	Vapor Pressure	Critical Pressure			
	15					
	16	Vacuum Possibility		No		
METERING ELEMENT	18	Element Tag		76FE2161		
	19	Element Size		8"		
	20	Process Connection/Material		316 Stainless Steel		
	21	Electrical Connection		0.5 inch NPT		
	22	Tube Material		Stainless Steel		
	23	Liner Material		Teflon		
	24	Electrode Type		Flush or Bullet Nose		
	25	Electrode Material		316 Stainless Steel		
	26	Range		0-40 ft/sec		
	27	Element Cable Length		As required to accommodate device locations		
	28	Grounding Rings	Material	Two	316 Stainless Steel	
	29	Enclosure NEMA Rating		NEMA 4X		
	30	Minimum Measurable Velocity		0.033 Feet/Sec		
	31	Minimum Conductivity		5 microS/cm		
	32	Ambient Temperature Limits		-5 degF to 140 degF		
	33	Process Temperature Limits		32 degF to 180 degF		
	34	Options				
35						
TRANSMITTER	36	Mounting		Wall		
	37	Enclosure NEMA Rating		NEMA 4X		
	38	Power Supply	Voltage	4 - Wire	120 VAC	
	39	Output Signal		Isolated 4 to 20 mA dc		
	40	Communication Protocol		HART		
	41	Calibrated Range		0 - 1500 gpm		
	42	Low Flow Cutoff				
	43	Ambient Temperature Limits		-5 degF to 140 degF		
	44					
45	Accuracy	Repeatability	+/- 0.5 percent of rate			
OPTIONS	46	Vendor Calibration		Factory calibrate with calibration certificate		
	47	Tagging		Stainless steel tag with Tag Number		
	48	Element Mounting Bracket				
	49					
PURCHASE	50	Manufacturer		Endress+Hauser	Krohne	
	51	Model Number		Promag L400	Optiflux 2000	
	52					
	53	Purchase Note		1 year warranty		
<b>F04</b>			<b>City of San Diego</b>			
			<b>Metropolitan Biosolids Center Improvements</b>			
<b>FLOW ELEMENT &amp; TRANSMITTER, ELECTROMAGNETIC</b>			<b>76FIT2161</b>			

GENERAL	1	Tag Number	P&ID	76FIT2166	76-I-34	
	2	Loop Title		Thickening Centrifuge Feed Pump No. 4 Flow		
	3	Area Classification		Unclassified		
	4					
	5	Line Number	Equipment Number			
	6	Line Size	Line Schedule	8 inch	Ductile Iron	
PROCESS CONDITIONS	7	Fluid		Raw Solids		
	8					
	9	Min Flow	Max Flow	0	1200 gpm	
	10	Nominal Pressure		100 psi		
	11	Nominal Temperature		75 degF		
	12	Specific Gravity	Viscosity	1.0		
	13	Conductivity	Density			
	14	Vapor Pressure	Critical Pressure			
	15					
	16	Vacuum Possibility		No		
METERING ELEMENT	18	Element Tag		76FE2166		
	19	Element Size		8"		
	20	Process Connection/Material		316 Stainless Steel		
	21	Electrical Connection		0.5 inch NPT		
	22	Tube Material		Stainless Steel		
	23	Liner Material		Teflon		
	24	Electrode Type		Flush or Bullet Nose		
	25	Electrode Material		316 Stainless Steel		
	26	Range		0-40 ft/sec		
	27	Element Cable Length		As required to accommodate device locations		
	28	Grounding Rings	Material	Two	316 Stainless Steel	
	29	Enclosure NEMA Rating		NEMA 4X		
	30	Minimum Measurable Velocity		0.033 Feet/Sec		
	31	Minimum Conductivity		5 microS/cm		
	32	Ambient Temperature Limits		-5 degF to 140 degF		
	33	Process Temperature Limits		32 degF to 180 degF		
	TRANSMITTER	34	Options			
35						
36		Mounting		Wall		
37		Enclosure NEMA Rating		NEMA 4X		
38		Power Supply	Voltage	4 - Wire	120 VAC	
39		Output Signal		Isolated 4 to 20 mA dc		
40		Communication Protocol		HART		
41		Calibrated Range		0 - 1500 gpm		
42		Low Flow Cutoff				
43	Ambient Temperature Limits		-5 degF to 140 degF			
OPTIONS	44					
	45	Accuracy	Repeatability	+/- 0.5 percent of rate		
	46	Vendor Calibration		Factory calibrate with calibration certificate		
	47	Tagging		Stainless steel tag with Tag Number		
PURCHASE	48	Element Mounting Bracket				
	49					
	50	Manufacturer		Endress+Hauser	Krohne	
	51	Model Number		Promag L400	Optiflux 2000	
52						
53	Purchase Note		1 year warranty			
<b>F04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>			
			<b>76FIT2166</b>			
<b>FLOW ELEMENT &amp; TRANSMITTER, ELECTROMAGNETIC</b>						

GENERAL	1	Tag Number	P&ID	76FIT2171	76-I-35	
	2	Loop Title		Thickening Centrifuge Feed Pump No. 5 Flow		
	3	Area Classification		Unclassified		
	4					
	5	Line Number	Equipment Number			
	6	Line Size	Line Schedule	8 inch	Ductile Iron	
PROCESS CONDITIONS	7	Fluid		Raw Solids		
	8					
	9	Min Flow	Max Flow	0	1200 gpm	
	10	Nominal Pressure			100 psi	
	11	Nominal Temperature			75 degF	
	12	Specific Gravity	Viscosity	1.0		
	13	Conductivity	Density			
	14	Vapor Pressure	Critical Pressure			
	15					
	16	Vacuum Possibility			No	
METERING ELEMENT	18	Element Tag		76FE2171		
	19	Element Size		8"		
	20	Process Connection/Material		316 Stainless Steel		
	21	Electrical Connection		0.5 inch NPT		
	22	Tube Material		Stainless Steel		
	23	Liner Material		Teflon		
	24	Electrode Type		Flush or Bullet Nose		
	25	Electrode Material		316 Stainless Steel		
	26	Range		0-40 ft/sec		
	27	Element Cable Length		As required to accommodate device locations		
	28	Grounding Rings	Material	Two	316 Stainless Steel	
	29	Enclosure NEMA Rating		NEMA 4X		
	30	Minimum Measurable Velocity		0.033 Feet/Sec		
	31	Minimum Conductivity		5 microS/cm		
	32	Ambient Temperature Limits		-5 degF to 140 degF		
	33	Process Temperature Limits		32 degF to 180 degF		
	34	Options				
TRANSMITTER	36	Mounting		Wall		
	37	Enclosure NEMA Rating		NEMA 4X		
	38	Power Supply	Voltage	4 - Wire	120 VAC	
	39	Output Signal		Isolated 4 to 20 mA dc		
	40	Communication Protocol		HART		
	41	Calibrated Range		0 - 1500 gpm		
	42	Low Flow Cutoff				
	43	Ambient Temperature Limits		-5 degF to 140 degF		
	44					
OPTIONS	45	Accuracy	Repeatability	+/- 0.5 percent of rate		
	46	Vendor Calibration		Factory calibrate with calibration certificate		
	47	Tagging		Stainless steel tag with Tag Number		
	48	Element Mounting Bracket				
PURCHASE	49					
	50	Manufacturer		Endress+Hauser	Krohne	
	51	Model Number		Promag L400	Optiflux 2000	
	52					
53	Purchase Note		1 year warranty			
<b>F04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>			
<b>FLOW ELEMENT &amp; TRANSMITTER, ELECTROMAGNETIC</b>			<b>76FIT2171</b>			

GENERAL	1	Tag Number	P&ID	76FIT2121	80-I-3	
	2	Loop Title		Digester No. 1 Thickened Sludge Feed Line Flow		
	3	Area Classification		Unclassified		
	4					
	5	Line Number	Equipment Number			
	6	Line Size	Line Schedule	6 inch	Ductile Iron Glass Lined	
PROCESS CONDITIONS	7	Fluid		Thickened Solids		
	8					
	9	Min Flow	Max Flow	0	400 gpm	
	10	Nominal Pressure			130 psi	
	11	Nominal Temperature			75 degF	
	12	Specific Gravity	Viscosity	1.0		
	13	Conductivity	Density			
	14	Vapor Pressure	Critical Pressure			
	15					
	16	Vacuum Possibility			No	
METERING ELEMENT	18	Element Tag		76FE2180		
	19	Element Size		6 inch		
	20	Process Connection/Material		316 Stainless Steel		
	21	Electrical Connection		0.5 inch NPT		
	22	Tube Material		Stainless Steel		
	23	Liner Material		Teflon		
	24	Electrode Type		Flush or Bullet Nose		
	25	Electrode Material		316 Stainless Steel		
	26	Range		0-40 ft/sec		
	27	Element Cable Length		As required to accommodate device locations		
	28	Grounding Rings	Material	Two	316 Stainless Steel	
	29	Enclosure NEMA Rating		NEMA 4X		
	30	Minimum Measurable Velocity		0.033 Feet/Sec		
	31	Minimum Conductivity		5 microS/cm		
	32	Ambient Temperature Limits		-5 degF to 140 degF		
	33	Process Temperature Limits		32 degF to 180 degF		
	34	Options				
35						
TRANSMITTER	36	Mounting		Wall		
	37	Enclosure NEMA Rating		NEMA 4X		
	38	Power Supply	Voltage	4 - Wire	120 VAC	
	39	Output Signal		Isolated 4 to 20 mA dc		
	40	Communication Protocol		HART		
	41	Calibrated Range		0 - 500 gpm		
	42	Low Flow Cutoff				
	43	Ambient Temperature Limits		-5 degF to 140 degF		
	44					
45	Accuracy	Repeatability	+/- 0.5 percent of rate			
OPTIONS	46	Vendor Calibration		Factory calibrate with calibration certificate		
	47	Tagging		Stainless steel tag with Tag Number		
	48	Element Mounting Bracket				
	49					
PURCHASE	50	Manufacturer		Endress+Hauser	Krohne	
	51	Model Number		Promag L400	Optiflux 2000	
	52					
	53	Purchase Note		1 year warranty		
<b>F04</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>FLOW ELEMENT &amp; TRANSMITTER, ELECTROMAGNETIC</b>				<b>76FIT2121</b>		



GENERAL	1	Tag Number	P&ID	76FIT2280	80-I-54	
	2	Loop Title		Digester No. 2 Thickened Sludge Feed Line Flow		
	3	Area Classification		Unclassified		
	4					
	5	Line Number	Equipment Number			
	6	Line Size	Line Schedule	6 inch	Ductile Iron Glass Lined	
PROCESS CONDITIONS	7	Fluid		Thickened Solids		
	8					
	9	Min Flow	Max Flow	0	400 gpm	
	10	Nominal Pressure			130 psi	
	11	Nominal Temperature			75 degF	
	12	Specific Gravity	Viscosity	1.0		
	13	Conductivity	Density			
	14	Vapor Pressure	Critical Pressure			
	15					
	16	Vacuum Possibility			No	
METERING ELEMENT	18	Element Tag		76FE2180		
	19	Element Size		6 inch		
	20	Process Connection/Material		316 Stainless Steel		
	21	Electrical Connection		0.5 inch NPT		
	22	Tube Material		Stainless Steel		
	23	Liner Material		Teflon		
	24	Electrode Type		Flush or Bullet Nose		
	25	Electrode Material		316 Stainless Steel		
	26	Range		0-40 ft/sec		
	27	Element Cable Length		As required to accommodate device locations		
	28	Grounding Rings	Material	Two	316 Stainless Steel	
	29	Enclosure NEMA Rating		NEMA 4X		
	30	Minimum Measurable Velocity		0.033 Feet/Sec		
	31	Minimum Conductivity		5 microS/cm		
	32	Ambient Temperature Limits		-5 degF to 140 degF		
	33	Process Temperature Limits		32 degF to 180 degF		
	34	Options				
TRANSMITTER	35					
	36	Mounting		Wall		
	37	Enclosure NEMA Rating		NEMA 4X		
	38	Power Supply	Voltage	4 - Wire	120 VAC	
	39	Output Signal		Isolated 4 to 20 mA dc		
	40	Communication Protocol		HART		
	41	Calibrated Range		0 - 500 gpm		
	42	Low Flow Cutoff				
	43	Ambient Temperature Limits		-5 degF to 140 degF		
OPTIONS	44					
	45	Accuracy	Repeatability	+/- 0.5 percent of rate		
	46	Vendor Calibration		Factory calibrate with calibration certificate		
	47	Tagging		Stainless steel tag with Tag Number		
	48	Element Mounting Bracket				
PURCHASE	49					
	50	Manufacturer		Endress+Hauser	Krohne	
	51	Model Number		Promag L400	Optiflux 2000	
	52					
	53	Purchase Note		1 year warranty		
<b>F04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>			
<b>FLOW ELEMENT &amp; TRANSMITTER, ELECTROMAGNETIC</b>			<b>76FIT2280</b>			

GENERAL	1	Tag Number	P&ID	76FIT2380	80-I-104	
	2	Loop Title		Digester No. 3 Thickened Sludge Feed Line Flow		
	3	Area Classification		Unclassified		
	4					
	5	Line Number	Equipment Number			
	6	Line Size	Line Schedule	6 inch	Ductile Iron Glass Lined	
PROCESS CONDITIONS	7	Fluid		Thickened Solids		
	8					
	9	Min Flow	Max Flow	0	400 gpm	
	10	Nominal Pressure			130 psi	
	11	Nominal Temperature			75 degF	
	12	Specific Gravity	Viscosity	1.0		
	13	Conductivity	Density			
	14	Vapor Pressure	Critical Pressure			
	15					
	16	Vacuum Possibility			No	
METERING ELEMENT	18	Element Tag		76FE2180		
	19	Element Size		6 inch		
	20	Process Connection/Material		316 Stainless Steel		
	21	Electrical Connection		0.5 inch NPT		
	22	Tube Material		Stainless Steel		
	23	Liner Material		Teflon		
	24	Electrode Type		Flush or Bullet Nose		
	25	Electrode Material		316 Stainless Steel		
	26	Range		0-40 ft/sec		
	27	Element Cable Length		As required to accommodate device locations		
	28	Grounding Rings	Material	Two	316 Stainless Steel	
	29	Enclosure NEMA Rating		NEMA 4X		
	30	Minimum Measurable Velocity		0.033 Feet/Sec		
	31	Minimum Conductivity		5 microS/cm		
	32	Ambient Temperature Limits		-5 degF to 140 degF		
	33	Process Temperature Limits		32 degF to 180 degF		
	34	Options				
35						
TRANSMITTER	36	Mounting		Wall		
	37	Enclosure NEMA Rating		NEMA 4X		
	38	Power Supply	Voltage	4 - Wire	120 VAC	
	39	Output Signal		Isolated 4 to 20 mA dc		
	40	Communication Protocol		HART		
	41	Calibrated Range		0 - 500 gpm		
	42	Low Flow Cutoff				
	43	Ambient Temperature Limits		-5 degF to 140 degF		
	44					
45	Accuracy	Repeatability	+/- 0.5 percent of rate			
OPTIONS	46	Vendor Calibration		Factory calibrate with calibration certificate		
	47	Tagging		Stainless steel tag with Tag Number		
	48	Element Mounting Bracket				
	49					
PURCHASE	50	Manufacturer		Endress+Hauser	Krohne	
	51	Model Number		Promag L400	Optiflux 2000	
	52					
	53	Purchase Note		1 year warranty		
<b>F04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>			
<b>FLOW ELEMENT &amp; TRANSMITTER, ELECTROMAGNETIC</b>			<b>76FIT2380</b>			

# **F51**

## **FLOW ELEMENT AND TRANSMITTER, THERMAL MASS FLOW**

GENERAL	1	Tag Number	P&ID	80FIT2600	80-I-250
	2	Loop Title		Digester No. 1 Biogas Flow Transmitter	
	3	Area Classification		Class I - Division I	
	4				
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	14 inch	SST
	7				
PROCESS CONDITIONS	8	Fluid		Biogas	
	9				
	10	Min Flow	Max Flow	0 scfm	1000 scfm
	11	Pressure		15 inches WC	
	12	Temperature		90 Deg F	
	13	Specific Gravity	Viscosity		
	14	Conductivity	Density		
	15	Vapor Pressure	Critical Pressure		
	16				
	17	Vacuum Possibility		No	
ELEMENT	19	Element Tag		80FE2600	
	20	Meter Size			
	21	Insertion Length		24 inches max	
	22	Process Connection		1 inch NPT	
	23	Wetted Material		316 Stainless Steel	
	24				
	25	Mounting Orientation		5 O'Clock	
	26	Element Cable Length		N/A	
	27	Element Range		36.5 - 5700 scfm	
	28				
	29	Process Temperature Limits		-50 degrees F to 350 degrees F	
TRANSMITTER	31	Transmitter Tag		80FIT2600	
	32	Mounting		Wall	
	33	Enclosure NEMA Rating		NEMA 4X	
	34	Power Supply	Voltage	4 - Wire	120 VAC
	35	Output Signal		Isolated 4 to 20 mA dc	
	36	Communication Protocol		HART	
	37				
	38	Ambient Temperature Limits		0 degF to 150 degF	
CALIBRATION	40	Calibrated Range		0-1200 scfm	
	41	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	42				
	43	Accuracy	Repeatability	1.5 Pct of Full Scale	0.4 Percent
	44				
OPTIONS	45				
	46	Tagging		Affix stainless steel tag with Tag Number	
	47				
PURCHASE	48	Flow Conditioner			
	49	Manufacturer		Endress + Hauser	Kurz
	50	Model Number		65I	454FTB-WGF
	51				
	52	Purchase Note		1 year warranty	
	53				
<b>F51</b>				<b>City of San Diego</b>	
<b>FLOW ELEMENT &amp; TRANSMITTER, THERMAL MASS FLOW</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80FIT2600</b>	

GENERAL	1	Tag Number	P&ID	80FIT2610	80-I-251
	2	Loop Title		Digester No. 2 Biogas Flow Transmitter	
	3	Area Classification		Class I - Division I	
	4				
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	14 inch	SST
	7				
PROCESS CONDITIONS	8	Fluid		Biogas	
	9				
	10	Min Flow	Max Flow	0 scfm	1000 scfm
	11	Pressure		15 inches WC	
	12	Temperature		90 Deg F	
	13	Specific Gravity	Viscosity		
	14	Conductivity	Density		
	15	Vapor Pressure	Critical Pressure		
	16				
	17	Vacuum Possibility		No	
ELEMENT	19	Element Tag		80FE2610	
	20	Meter Size			
	21	Insertion Length		24 inches max	
	22	Process Connection		1 inch NPT	
	23	Wetted Material		316 Stainless Steel	
	24				
	25	Mounting Orientation		5 O'Clock	
	26	Element Cable Length		N/A	
	27	Element Range		36.5 - 5700 scfm	
	28				
	29	Process Temperature Limits		-50 degrees F to 350 degrees F	
TRANSMITTER	31	Transmitter Tag		80FIT2610	
	32	Mounting		Wall	
	33	Enclosure NEMA Rating		NEMA 4X	
	34	Power Supply	Voltage	4 - Wire	120 VAC
	35	Output Signal		Isolated 4 to 20 mA dc	
	36	Communication Protocol		HART	
	37				
	38	Ambient Temperature Limits		0 degF to 150 degF	
CALIBRATION	40	Calibrated Range		0-1200 scfm	
	41	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	42				
	43	Accuracy	Repeatability	1.5 Pct of Full Scale	0.4 Percent
	44				
OPTIONS	45				
	46	Tagging		Affix stainless steel tag with Tag Number	
	47				
PURCHASE	48	Flow Conditioner			
	49	Manufacturer		Endress + Hauser	Kurz
	50	Model Number		65I	454FTB-WGF
	51				
	52	Purchase Note		1 year warranty	
	53				
<b>F51</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>FLOW ELEMENT &amp; TRANSMITTER, THERMAL MASS FLOW</b>			<b>80FIT2610</b>		

GENERAL	1	Tag Number	P&ID	80FIT2620	80-I-252
	2	Loop Title		Digester No. 3 Biogas Flow Transmitter	
	3	Area Classification		Class I - Division I	
	4				
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	14 inch	SST
	7				
PROCESS CONDITIONS	8	Fluid		Biogas	
	9				
	10	Min Flow	Max Flow	0 scfm	1000 scfm
	11	Pressure		15 inches WC	
	12	Temperature		90 Deg F	
	13	Specific Gravity	Viscosity		
	14	Conductivity	Density		
	15	Vapor Pressure	Critical Pressure		
	16				
	17	Vacuum Possibility		No	
ELEMENT	19	Element Tag		80FE2620	
	20	Meter Size			
	21	Insertion Length		24 inches max	
	22	Process Connection		1 inch NPT	
	23	Wetted Material		316 Stainless Steel	
	24				
	25	Mounting Orientation		5 O'Clock	
	26	Element Cable Length		N/A	
	27	Element Range		36.5 - 5700 scfm	
	28				
TRANSMITTER	29	Process Temperature Limits		-50 degrees F to 350 degrees F	
	30				
	31	Transmitter Tag		80FIT2620	
	32	Mounting		Wall	
	33	Enclosure NEMA Rating		NEMA 4X	
	34	Power Supply	Voltage	4 - Wire	120 VAC
	35	Output Signal		Isolated 4 to 20 mA dc	
	36	Communication Protocol		HART	
37					
CALIBRATION	38	Ambient Temperature Limits		0 degF to 150 degF	
	39				
	40	Calibrated Range		0-1200 scfm	
	41	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	42				
	43	Accuracy	Repeatability	1.5 Pct of Full Scale	0.4 Percent
	44				
PURCHASE	45				
	46	Tagging		Affix stainless steel tag with Tag Number	
PURCHASE	47				
	48	Flow Conditioner			
	49	Manufacturer		Endress + Hauser	Kurz
	50	Model Number		65I	454FTB-WGF
	51				
	52	Purchase Note		1 year warranty	
	53				

<b>F51</b>  <b>FLOW ELEMENT &amp; TRANSMITTER, THERMAL MASS FLOW</b>	<b>City of San Diego</b> <b>Metropolitan Biosolids Center Improvements</b>
	<b>80FIT2620</b>

GENERAL	1	Tag Number	P&ID	80FIT2630	80-I-253
	2	Loop Title		Biogas Collection System Flow Transmitter	
	3	Area Classification		Class I - Division I	
	4				
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	SST
	7				
PROCESS CONDITIONS	8	Fluid		Biogas	
	9				
	10	Min Flow	Max Flow	0 scfm	1000 scfm
	11	Pressure		15 inches WC	
	12	Temperature		90 Deg F	
	13	Specific Gravity	Viscosity		
	14	Conductivity	Density		
	15	Vapor Pressure	Critical Pressure		
	16				
	17	Vacuum Possibility		No	
ELEMENT	19	Element Tag		80FE2630	
	20	Meter Size			
	21	Insertion Length		17 inches max	
	22	Process Connection		1 inch NPT	
	23	Wetted Material		316 Stainless Steel	
	24				
	25	Mounting Orientation		5 O'Clock	
	26	Element Cable Length		N/A	
	27	Element Range		36.5 - 5700 scfm	
	28				
	29	Process Temperature Limits		-50 degrees F to 350 degrees F	
TRANSMITTER	31	Transmitter Tag		80FIT2630	
	32	Mounting		Wall	
	33	Enclosure NEMA Rating		NEMA 4X	
	34	Power Supply	Voltage	4 - Wire	120 VAC
	35	Output Signal		Isolated 4 to 20 mA dc	
	36	Communication Protocol		HART	
	37				
	38	Ambient Temperature Limits		0 degF to 150 degF	
CALIBRATION	40	Calibrated Range		0-1200 scfm	
	41	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	42				
	43	Accuracy	Repeatability	1.5 Pct of Full Scale	0.4 Percent
	44				
OPTIONS	45				
	46	Tagging		Affix stainless steel tag with Tag Number	
	47				
PURCHASE	48	Flow Conditioner			
	49	Manufacturer		Endress + Hauser	Kurz
	50	Model Number		65I	454FTB-WGF
	51				
	52	Purchase Note		1 year warranty	
	53				
<b>F51</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>FLOW ELEMENT &amp; TRANSMITTER, THERMAL MASS FLOW</b>			<b>80FIT2630</b>		

GENERAL	1	Tag Number	P&ID	80FIT2640	80-I-254
	2	Loop Title		Emergency Biogas Collection System Flow Transmitter	
	3	Area Classification		Class I - Division I	
	4				
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	SST
	7				
PROCESS CONDITIONS	8	Fluid		Biogas	
	9				
	10	Min Flow	Max Flow	0 scfm	1000 scfm
	11	Pressure		15 inches WC	
	12	Temperature		90 Deg F	
	13	Specific Gravity	Viscosity		
	14	Conductivity	Density		
	15	Vapor Pressure	Critical Pressure		
	16				
	17	Vacuum Possibility		No	
ELEMENT	19	Element Tag		80FE2640	
	20	Meter Size			
	21	Insertion Length		17 inches max	
	22	Process Connection		1 inch NPT	
	23	Wetted Material		316 Stainless Steel	
	24				
	25	Mounting Orientation		5 O'Clock	
	26	Element Cable Length		N/A	
	27	Element Range		36.5 - 5700 scfm	
	28				
	29	Process Temperature Limits		-50 degrees F to 350 degrees F	
TRANSMITTER	31	Transmitter Tag		80FIT2640	
	32	Mounting		Wall	
	33	Enclosure NEMA Rating		NEMA 4X	
	34	Power Supply	Voltage	4 - Wire	120 VAC
	35	Output Signal		Isolated 4 to 20 mA dc	
	36	Communication Protocol		HART	
	37				
	38	Ambient Temperature Limits		0 degF to 150 degF	
CALIBRATION	40	Calibrated Range		0-1200 scfm	
	41	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	42				
	43	Accuracy	Repeatability	1.5 Pct of Full Scale	0.4 Percent
	44				
OPTIONS	45				
	46	Tagging		Affix stainless steel tag with Tag Number	
	47				
PURCHASE	48	Flow Conditioner			
	49	Manufacturer		Endress + Hauser	Kurz
	50	Model Number		65I	454FTB-WGF
	51				
	52	Purchase Note		1 year warranty	
	53				
<b>F51</b>				<b>City of San Diego</b>	
<b>FLOW ELEMENT &amp; TRANSMITTER, THERMAL MASS FLOW</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80FIT2640</b>	



GENERAL	1	Tag Number	P&ID	80FIT2673	80-I-272
	2	Loop Title		Digester Complex Biogas Compressors Flow Transmitter	
	3	Area Classification		Class I - Division I	
	4				
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	SST
	7				
PROCESS CONDITIONS	8	Fluid		Biogas	
	9				
	10	Min Flow	Max Flow	0 scfm	3000 scfm
	11	Pressure		5 psig	
	12	Temperature		90 Deg F	
	13	Specific Gravity	Viscosity		
	14	Conductivity	Density		
	15	Vapor Pressure	Critical Pressure		
	16				
	17	Vacuum Possibility		No	
ELEMENT	19	Element Tag			
	20	Meter Size			
	21	Insertion Length		17 inches max	
	22	Process Connection		1 inch NPT	
	23	Wetted Material		316 Stainless Steel	
	24				
	25	Mounting Orientation		5 O'Clock	
	26	Element Cable Length		N/A	
	27	Element Range		36.5 - 5700 scfm	
	28				
	29	Process Temperature Limits		-50 degrees F to 350 degrees F	
TRANSMITTER	31	Transmitter Tag		80FIT2673	
	32	Mounting		Wall	
	33	Enclosure NEMA Rating		NEMA 4X	
	34	Power Supply	Voltage	4 - Wire	120 VAC
	35	Output Signal		Isolated 4 to 20 mA dc	
	36	Communication Protocol		HART	
	37				
	38	Ambient Temperature Limits		0 degF to 150 degF	
CALIBRATION	40	Calibrated Range		0-3200 scfm	
	41	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	42				
	43	Accuracy	Repeatability	1.5 Pct of Full Scale	0.4 Percent
	44				
OPTIONS	45				
	46	Tagging		Affix stainless steel tag with Tag Number	
	47				
PURCHASE	48	Flow Conditioner		Yes	
	49	Manufacturer		Endress + Hauser	Kurz
	50	Model Number		65I	454FTB-WGF
	51				
	52	Purchase Note		1 year warranty	
53					

<b>F51</b>  <b>FLOW ELEMENT &amp; TRANSMITTER, THERMAL MASS FLOW</b>	<b>City of San Diego</b> <b>Metropolitan Biosolids Center Improvements</b>
	<b>80FIT2673</b>

GENERAL	1	Tag Number	P&ID	80FIT2692	80-I-275
	2	Loop Title		Digester Biogas Flares Inlet Header Flow Transmitter	
	3	Area Classification		Class I - Division I	
	4				
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	16 inch	SST
	7				
PROCESS CONDITIONS	8	Fluid		Biogas	
	9				
	10	Min Flow	Max Flow	0 scfm	1000 scfm
	11	Pressure		15 inches WC	
	12	Temperature		90 Deg F	
	13	Specific Gravity	Viscosity		
	14	Conductivity	Density		
	15	Vapor Pressure	Critical Pressure		
	16				
	17	Vacuum Possibility		No	
ELEMENT	19	Element Tag		80FE2692	
	20	Meter Size			
	21	Insertion Length		24 inches max	
	22	Process Connection		1 inch NPT	
	23	Wetted Material		316 Stainless Steel	
	24				
	25	Mounting Orientation		5 O'Clock	
	26	Element Cable Length		N/A	
	27	Element Range		36.5 - 5700 scfm	
	28				
29	Process Temperature Limits		-50 degrees F to 350 degrees F		
TRANSMITTER	31	Transmitter Tag		80FIT2692	
	32	Mounting		Wall	
	33	Enclosure NEMA Rating		NEMA 4X	
	34	Power Supply	Voltage	4 - Wire	120 VAC
	35	Output Signal		Isolated 4 to 20 mA dc	
	36	Communication Protocol		HART	
	37				
	38	Ambient Temperature Limits		0 degF to 150 degF	
CALIBRATION	40	Calibrated Range		0-1200 scfm	
	41	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	42				
	43	Accuracy	Repeatability	1.5 Pct of Full Scale	0.4 Percent
	44				
OPTIONS	45				
	46	Tagging		Affix stainless steel tag with Tag Number	
	47				
PURCHASE	48	Flow Conditioner		Yes	
	49	Manufacturer		Endress + Hauser	Kurz
	50	Model Number		65I	454FTB-WGF
	51				
	52	Purchase Note		1 year warranty	
53					
<b>F51</b>				<b>City of San Diego</b>	
<b>FLOW ELEMENT &amp; TRANSMITTER, THERMAL MASS FLOW</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80FIT2692</b>	

# **P03**

## **PRESSURE DIFFERENTIAL TRANSMITTER**

GENERAL	1	Tag Number	P&ID	76DPIT1104B	76-I-11
	2	Loop Title		Grit Separator No. 1 Differential Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	0.25 Inch	SST
PROCESS CONDITIONS	6	Fluid		Utility Water Low Pressure	
	7	Min Pressure	Max Pressure	0 in. H2O	700 in. H2O
	8	Temperature		Ambient	
	9	Specific Gravity	Viscosity	1.0	
	10	Conductivity	Density		
	11	Vapor Pressure	Critical Prssure		
ELEMENT	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
DIAPHRAGM SEAL - ANNULAR SEAL	22	Type		N/A	
	23	Process Connection			
	24	Body Material			
	25	Diaphragm / Sleeve Material			
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid			
	30	Flushing Connection			
	31				
	32	Manufacturer			
	33	Model Number			
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 700 in. H2O	
	40				
CALIBRATION	41	Calibrated Range		0 - 700 in. H2O	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold		N/A	
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
PURCHASE	51	Model Number		PMD75	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		Provided by Raw Solids Degritting System Vendor	
<b>P03</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE DIFFERENTIAL TRANSMITTER</b>			<b>76DPIT1104B</b>		

GENERAL	1	Tag Number	P&ID	76DPIT1109B	76-I-12
	2	Loop Title		Grit Separator No. 2 Differential Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	0.25 Inch	SST
PROCESS CONDITIONS	6	Fluid		Utility Water Low Pressure	
	7	Min Pressure	Max Pressure	0 in. H2O	700 in. H2O
	8	Temperature		Ambient	
	9	Specific Gravity	Viscosity	1.0	
	10	Conductivity	Density		
	11	Vapor Pressure	Critical Prssure		
ELEMENT	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
DIAPHRAGM SEAL - ANNULAR SEAL	22	Type		N/A	
	23	Process Connection			
	24	Body Material			
	25	Diaphragm / Sleeve Material			
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid			
	30	Flushing Connection			
	31				
	32	Manufacturer			
	33	Model Number			
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 700 in. H2O	
	40				
CALIBRATION	41	Calibrated Range		0 - 700 in. H2O	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold		N/A	
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMD75	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		Provided by Raw Solids Degrating System Vendor	
<b>P03</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE DIFFERENTIAL TRANSMITTER</b>			<b>76DPIT1109B</b>		

GENERAL	1	Tag Number	P&ID	76DPIT1114B	76-I-13
	2	Loop Title		Grit Separator No. 3 Differential Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	0.25 Inch	SST
PROCESS CONDITIONS	6	Fluid		Utility Water Low Pressure	
	7	Min Pressure	Max Pressure	0 in. H2O	700 in. H2O
	8	Temperature		Ambient	
	9	Specific Gravity	Viscosity	1.0	
	10	Conductivity	Density		
	11	Vapor Pressure	Critical Prssure		
ELEMENT	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
DIAPHRAGM SEAL - ANNULAR SEAL	22	Type		N/A	
	23	Process Connection			
	24	Body Material			
	25	Diaphragm / Sleeve Material			
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid			
	30	Flushing Connection			
	31				
	32	Manufacturer			
	33	Model Number			
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 700 in. H2O	
	40				
CALIBRATION	41	Calibrated Range		0 - 700 in. H2O	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold		N/A	
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMD75	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		Provided by Raw Solids Degrating System Vendor	
<b>P03</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE DIFFERENTIAL TRANSMITTER</b>			<b>76DPIT1114B</b>		

GENERAL	1	Tag Number	P&ID	76DPIT2126	76-I-14
	2	Loop Title		Grit Separator No. 4 Differential Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	1.5 inch	Ductile Iron
PROCESS CONDITIONS	6	Fluid		Utility Water Low Pressure	
	7	Min Pressure	Max Pressure	0 in. H2O	700 in. H2O
	8	Temperature		Ambient	
	9	Specific Gravity	Viscosity	1.0	
	10	Conductivity	Density		
	11	Vapor Pressure	Critical Prssure		
ELEMENT	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
DIAPHRAGM SEAL - ANNULAR SEAL	22	Type		N/A	
	23	Process Connection			
	24	Body Material			
	25	Diaphragm / Sleeve Material			
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid			
	30	Flushing Connection			
	31				
	32	Manufacturer			
	33	Model Number			
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 700 in. H2O	
	40				
CALIBRATION	41	Calibrated Range		0 - 700 in. H2O	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold		N/A	
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMD75	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		Provided by Raw Solids Degrating System Vendor	
<b>P03</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE DIFFERENTIAL TRANSMITTER</b>			<b>76DPIT2126</b>		

# P04 PRESSURE GAUGE



GENERAL	1	Tag Number	P&ID	73PI2021A	73-I-32
	2	Loop Title		Raw Solids Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>73PI2021A</b>	

GENERAL	1	Tag Number	P&ID	73PI2021B	73-I-32
	2	Loop Title		Raw Solids Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	40 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		8 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50			Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>73PI2021B</b>	

GENERAL	1	Tag Number	P&ID	73PI2022A	73-I-32
	2	Loop Title		Raw Solids Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>73PI2022A</b>	

GENERAL	1	Tag Number	P&ID	73PI2022B	73-I-32
	2	Loop Title		Raw Solids Pump No. 2 Discharge Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	40 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		8 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>73PI2022B</b>	

GENERAL	1	Tag Number	P&ID	73PI2023A	73-I-33
	2	Loop Title		Raw Solids Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>73PI2023A</b>	

GENERAL	1	Tag Number	P&ID	73PI2023B	73-I-33
	2	Loop Title		Raw Solids Pump No. 3 Discharge Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	40 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		8 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>73PI2023B</b>	

GENERAL	1	Tag Number	P&ID	76PI1104C	76-I-11
	2	Loop Title	Grit Separator No. 1 Utility Water		
	3				
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid	Thickened Solids		
	9	Min Pressure	Max Pressure	0 psi	7.5 psi
	10	Temperature			
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type	Bourdon Tube		
	16	Range	0-15 psig		
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening			
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection			
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type	Annular Seal		
	33	Process Connection	10 inch Class 150 ANSI Flange		
	34	Body Material	Carbon Steel		
	35	Diaphragm / Sleeve Material	Viton		
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid	Glycerin		
	39	Flushing Connection	No		
	40				
	41	Manufacturer	Ashcroft		
42	Model Number	81			
CALIBRATION	43	Calibrated Range	0-15 psig		
	44	Vendor Calibration			
	45	Accuracy	Repeatability	Factory calibrate - Provide calibration certificate	
	46	+/- 0.5 Pct of Range			
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	WIKA	
	51	Model Number	1279	233.34	
	52	Purchase Note			
	53	1 year warranty			
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI1104C</b>	

GENERAL	1	Tag Number	P&ID	76PI1109C	76-I-12
	2	Loop Title	Grit Separator No. 2 Utility Water		
	3				
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid	Thickened Solids		
	9	Min Pressure	Max Pressure	0 psi	7.5 psi
	10	Temperature			
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type	Bourdon Tube		
	16	Range	0-15 psig		
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening			
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection			
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type	Annular Seal		
	33	Process Connection	10 inch Class 150 ANSI Flange		
	34	Body Material	Carbon Steel		
	35	Diaphragm / Sleeve Material	Viton		
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid	Glycerin		
	39	Flushing Connection	No		
	40				
	41	Manufacturer	Ashcroft		
42	Model Number	81			
CALIBRATION	43	Calibrated Range	0-15 psig		
	44	Vendor Calibration			
	45	Accuracy	Repeatability	Factory calibrate - Provide calibration certificate	
	46	+/- 0.5 Pct of Range			
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	WIKA	
	51	Model Number	1279	233.34	
	52	Purchase Note			
	53	1 year warranty			
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI1109C</b>	



GENERAL	1	Tag Number	P&ID	76PI1114C	76-I-13
	2	Loop Title	Grit Separator No. 3 Utility Water		
	3				
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid	Thickened Solids		
	9	Min Pressure	Max Pressure	0 psi	7.5 psi
	10	Temperature			
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type	Bourdon Tube		
	16	Range	0-15 psig		
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening			
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection			
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type	Annular Seal		
	33	Process Connection	10 inch Class 150 ANSI Flange		
	34	Body Material	Carbon Steel		
	35	Diaphragm / Sleeve Material	Viton		
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid	Glycerin		
	39	Flushing Connection	No		
	40				
	41	Manufacturer	Ashcroft		
42	Model Number	81			
CALIBRATION	43	Calibrated Range	0-15 psig		
	44	Vendor Calibration			
	45	Accuracy	Repeatability	Factory calibrate - Provide calibration certificate	
	46	+/- 0.5 Pct of Range			
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	WIKA	
	51	Model Number	1279	233.34	
	52	Purchase Note			
	53	1 year warranty			
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI1114C</b>	

GENERAL	1	Tag Number	P&ID	76PI2126C	76-I-14
	2	Loop Title	Grit Separator No. 4 Utility Water		
	3				
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid	Thickened Solids		
	9	Min Pressure	Max Pressure	0 psi	7.5 psi
	10	Temperature			
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type	Bourdon Tube		
	16	Range	0-15 psig		
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening			
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection			
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type	Annular Seal		
	33	Process Connection	10 inch Class 150 ANSI Flange		
	34	Body Material	Carbon Steel		
	35	Diaphragm / Sleeve Material	Viton		
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid	Glycerin		
	39	Flushing Connection	No		
	40				
	41	Manufacturer	Ashcroft		
42	Model Number	81			
CALIBRATION	43	Calibrated Range	0-15 psig		
	44	Vendor Calibration			
	45	Accuracy	Repeatability	Factory calibrate - Provide calibration certificate	
	46	+/- 0.5 Pct of Range			
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	WIKA	
	51	Model Number	1279	233.34	
	52	Purchase Note			
	53	1 year warranty			
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2126C</b>	

GENERAL	1	Tag Number	P&ID	76PI2151A	76-I-31
	2	Loop Title		Thickening Centrifuge Feed Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2151A</b>	

GENERAL	1	Tag Number	P&ID	76PI2155A	76-I-32
	2	Loop Title		Thickening Centrifuge Feed Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2155A</b>	

GENERAL	1	Tag Number	P&ID	76PI2160A	76-I-33
	2	Loop Title		Thickening Centrifuge Feed Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2160A</b>	

GENERAL	1	Tag Number	P&ID	76PI2165A	76-I-34
	2	Loop Title		Thickening Centrifuge Feed Pump No. 4 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2165A</b>	

GENERAL	1	Tag Number	P&ID	76PI2170A	76-I-35
	2	Loop Title		Thickening Centrifuge Feed Pump No. 5 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2170A</b>	

GENERAL	1	Tag Number	P&ID	76PI2287A	76-I-52
	2	Loop Title		Thickened Solids Transfer Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Thickened Solids	
	9	Min Pressure	Max Pressure	0 psi	7.5 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2287A</b>	



GENERAL	1	Tag Number	P&ID	76PI2292A	76-I-53
	2	Loop Title		Thickened Solids Transfer Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Thickened Solids	
	9	Min Pressure	Max Pressure	0 psi	7.5 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2292A</b>	

GENERAL	1	Tag Number	P&ID	76PI2297A	76-I-54
	2	Loop Title		Thickened Solids Transfer Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Thickened Solids	
	9	Min Pressure	Max Pressure	0 psi	7.5 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>	
<b>PRESSURE GAUGE</b>				<b>76PI2297A</b>	

GENERAL	1	Tag Number	P&ID	76PI2505A	76-I-101
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2505A</b>	

GENERAL	1	Tag Number	P&ID	76PI2510A	76-I-102
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 2 Suction Pressure	
	3			Unclassified	
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2510A</b>	

GENERAL	1	Tag Number	P&ID	76PI2515A	76-I-103
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 3 Suction Pressure	
	3			Unclassified	
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2515A</b>	

GENERAL	1	Tag Number	P&ID	76PI2520A	76-I-104
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 4 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2520A</b>	

GENERAL	1	Tag Number	P&ID	76PI2525A	76-I-105
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 5 Suction Pressure	
	3			Unclassified	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2525A</b>	

GENERAL	1	Tag Number	P&ID	76PI2530A	76-I-106
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 6 Suction Pressure	
	3			Unclassified	
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2530A</b>	



GENERAL	1	Tag Number	P&ID	76PI2535A	76-I-107
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 7 Suction Pressure	
	3			Unclassified	
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2535A</b>	

GENERAL	1	Tag Number	P&ID	76PI2540A	76-I-108
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 8 Suction Pressure	
	3			Unclassified	
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2540A</b>	

GENERAL	1	Tag Number	P&ID	76PI2737A	76-I-211
	2	Loop Title		Thickening Centrifuge Polymer Feed Pump No. 1 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
INDICATOR	14				
	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
DIAPHRAGM SEAL - ANNULAR SEAL	30	Range			
	31				
	32	Type		Annular Seal	
	33	Process Connection		1.5 inch Class 150 ANSI Flange	
	34	Body Material		CPVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
CALIBRATION	40				
	41	Manufacturer		Ashcroft	
	42	Model Number		81	
	43	Calibrated Range		0 - 15 psig	
OPTIONS	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
PURCHASE	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2737A</b>	

GENERAL	1	Tag Number	P&ID	76PI2742A	76-I-212
	2	Loop Title		Thickening Centrifuge Polymer Feed Pump No. 2 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	5.5 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
INDICATOR	14				
	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
DIAPHRAGM SEAL - ANNULAR SEAL	30	Range			
	31				
	32	Type		Annular Seal	
	33	Process Connection		1.5 inch Class 150 ANSI Flange	
	34	Body Material		CPVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
CALIBRATION	40				
	41	Manufacturer		Ashcroft	
	42	Model Number		81	
	43	Calibrated Range		0 - 15 psig	
OPTIONS	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48				
	49				
	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2742A</b>	

GENERAL	1	Tag Number	P&ID	76PI2747A	76-I-213
	2	Loop Title		Thickening Centrifuge Polymer Feed Pump No. 3 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		1.5 inch Class 150 ANSI Flange	
	34	Body Material		CPVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2747A</b>	

GENERAL	1	Tag Number	P&ID	76PI2752A	76-I-214
	2	Loop Title		Thickening Centrifuge Polymer Feed Pump No. 4 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	5.5 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
INDICATOR	14				
	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
DIAPHRAGM SEAL - ANNULAR SEAL	30	Range			
	31				
	32	Type		Annular Seal	
	33	Process Connection		1.5 inch Class 150 ANSI Flange	
	34	Body Material		CPVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
CALIBRATION	40				
	41	Manufacturer		Ashcroft	
	42	Model Number		81	
	43	Calibrated Range		0 - 15 psig	
OPTIONS	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48				
	49				
	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2752A</b>	

GENERAL	1	Tag Number	P&ID	76PI2757A	76-I-215
	2	Loop Title		Thickening Centrifuge Polymer Feed Pump No. 5 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		1.5 inch Class 150 ANSI Flange	
	34	Body Material		CPVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2757A</b>	

GENERAL	1	Tag Number	P&ID	76PI2772A	76-I-221
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 1 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	5.5 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		2.5 inch Class 150 ANSI Flange	
	34	Body Material		PVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		RedValve	
42	Model Number		Series 40		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2772A</b>	



GENERAL	1	Tag Number	P&ID	76PI2777A	76-I-222
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 2 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		2.5 inch Class 150 ANSI Flange	
	34	Body Material		PVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		RedValve	
42	Model Number		Series 40		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2777A</b>	

GENERAL	1	Tag Number	P&ID	76PI2782A	76-I-223
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 3 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	5.5 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		2.5 inch Class 150 ANSI Flange	
	34	Body Material		PVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		RedValve	
42	Model Number		Series 40		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2782A</b>	

GENERAL	1	Tag Number	P&ID	76PI2787A	76-I-224
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 4 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		2.5 inch Class 150 ANSI Flange	
	34	Body Material		PVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		RedValve	
42	Model Number		Series 40		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2787A</b>	

GENERAL	1	Tag Number	P&ID	76PI2792A	76-I-225
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 5 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		2.5 inch Class 150 ANSI Flange	
	34	Body Material		PVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		RedValve	
42	Model Number		Series 40		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2792A</b>	

GENERAL	1	Tag Number	P&ID	76PI2797A	76-I-226
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 6 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	5.5 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		2.5 inch Class 150 ANSI Flange	
	34	Body Material		PVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		RedValve	
42	Model Number		Series 40		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2797A</b>	

GENERAL	1	Tag Number	P&ID	76PI2802A	76-I-227
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 7 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	5.5 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		2.5 inch Class 150 ANSI Flange	
	34	Body Material		PVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		RedValve	
42	Model Number		Series 40		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2802A</b>	

GENERAL	1	Tag Number	P&ID	76PI2807A	76-I-228
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 8 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	5.5 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		2.5 inch Class 150 ANSI Flange	
	34	Body Material		PVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		RedValve	
42	Model Number		Series 40		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PI2807A</b>	

GENERAL	1	Tag Number	P&ID	80PI2110A	80-I-2	
	2	Loop Title		Digester No. 1 Recirculation Pump No. 1 Suction Pressure		
	3			As Noted		
	4	Area Classification				
	5	Line Number	Equipment Number			
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined	
	7					
PROCESS CONDITIONS	8	Fluid		Digested Sludge		
	9	Min Pressure	Max Pressure	0 psi	30 psi	
	10	Temperature		Ambient		
	11	Specific Gravity	Viscosity	1.0		
	12	Conductivity	Density			
	13	Vapor Pressure	Critical Prssure			
	14					
INDICATOR	15	Type		Bourdon Tube		
	16	Range		0 - 30 psig		
	17	Dial Size	Dial Color	4.5 Inches	White	
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem	
	19	Movement Dampening		Glycerine		
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic	
	21					
	22	Blowout Protection		Case Back		
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
	24					
TRANSMITTER	25	Mounting				
	26	Enclosure NEMA Rating				
	27	Power Supply	Voltage			
	28	Output Signal				
	29	Communication Protocol				
	30	Range				
	31					
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm		
	33	Process Connection		0.75 Inch NPT		
	34	Body Material		316L Stainless Steel		
	35	Diaphragm / Sleeve Material		316L Stainless Steel		
	36	Capillary Material				
	37	Capillary Length				
	38	Fill Fluid		Glycerine		
	39	Flushing Connection		Yes		
	40					
	41	Manufacturer		Ashcroft		
42	Model Number		101			
CALIBRATION	43	Calibrated Range		0 - 30 psig		
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate		
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range		
	46					
OPTIONS	47	Tagging		Stainless steel tag with Tag Number		
	48					
	49					
PURCHASE	50	Manufacturer		Ashcroft	WIKA	
	51	Model Number		1279	233.34	
	52	Purchase Note		1 year warranty		
	53					
<b>P04</b>				<b>City of San Diego</b>		
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>		
				<b>80PI2110A</b>		



GENERAL	1	Tag Number	P&ID	80PI2110B	80-I-2
	2	Loop Title		Digester No. 1 Recirculation Pump No. 1 Discharge	
	3			Pressure	
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2110B</b>	

GENERAL	1	Tag Number	P&ID	80PI2110C	80-I-2	
	2	Loop Title		Digester No. 1 Recirculation Pump No. 2 Suction Pressure		
	3			As Noted		
	4	Area Classification				
	5	Line Number	Equipment Number			
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined	
	7					
PROCESS CONDITIONS	8	Fluid		Digested Sludge		
	9	Min Pressure	Max Pressure	0 psi	30 psi	
	10	Temperature		Ambient		
	11	Specific Gravity	Viscosity	1.0		
	12	Conductivity	Density			
	13	Vapor Pressure	Critical Prssure			
	14					
INDICATOR	15	Type		Bourdon Tube		
	16	Range		0 - 30 psig		
	17	Dial Size	Dial Color	4.5 Inches	White	
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem	
	19	Movement Dampening		Glycerine		
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic	
	21					
	22	Blowout Protection		Case Back		
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
	24					
TRANSMITTER	25	Mounting				
	26	Enclosure NEMA Rating				
	27	Power Supply	Voltage			
	28	Output Signal				
	29	Communication Protocol				
	30	Range				
	31					
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm		
	33	Process Connection		0.75 Inch NPT		
	34	Body Material		316L Stainless Steel		
	35	Diaphragm / Sleeve Material		316L Stainless Steel		
	36	Capillary Material				
	37	Capillary Length				
	38	Fill Fluid		Glycerine		
	39	Flushing Connection		Yes		
	40					
	41	Manufacturer		Ashcroft		
42	Model Number		101			
CALIBRATION	43	Calibrated Range		0 - 30 psig		
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate		
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range		
	46					
OPTIONS	47	Tagging		Stainless steel tag with Tag Number		
	48					
	49					
PURCHASE	50	Manufacturer		Ashcroft	WIKA	
	51	Model Number		1279	233.34	
	52	Purchase Note		1 year warranty		
	53					
<b>P04</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>				<b>80PI2110C</b>		

GENERAL	1	Tag Number	P&ID	80PI2110D	80-I-2
	2	Loop Title		Digester No. 1 Recirculation Pump No. 2 Discharge	
	3			Pressure	
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2110D</b>	

GENERAL	1	Tag Number	P&ID	80PI2141A	80-I-11
	2	Loop Title		Digester No. 1 Mix Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0 - 30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2141A</b>	

GENERAL	1	Tag Number	P&ID	80PI2141B	80-I-11
	2	Loop Title		Digester No. 1 Mix Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2141B</b>	

GENERAL	1	Tag Number	P&ID	80PI2142A	80-I-11
	2	Loop Title		Digester No. 1 Mix Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0 - 30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2142A</b>	

GENERAL	1	Tag Number	P&ID	80PI2142B	80-I-11
	2	Loop Title		Digester No. 1 Mix Pump No. 2 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2142B</b>	

GENERAL	1	Tag Number	P&ID	80PI2143A	80-I-12
	2	Loop Title		Digester No. 1 Mix Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0 - 30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2143A</b>	



GENERAL	1	Tag Number	P&ID	80PI2143B	80-I-12
	2	Loop Title		Digester No. 1 Mix Pump No. 3 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2143B</b>		

GENERAL	1	Tag Number	P&ID	80PI2150A	80-I-20
	2	Loop Title		Digester No. 1 Axial Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2150A</b>		

GENERAL	1	Tag Number	P&ID	80PI2150B	80-I-20
	2	Loop Title		Digester No. 1 Axial Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2150B</b>	

GENERAL	1	Tag Number	P&ID	80PI2160A	80-I-21
	2	Loop Title		Digester No. 1 Axial Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2160A</b>		

GENERAL	1	Tag Number	P&ID	80PI2160B	80-I-21
	2	Loop Title		Digester No. 1 Axial Pump No. 2 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
DIAPHRAGM SEAL - ANNULAR SEAL	31				
	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2160B</b>	

GENERAL	1	Tag Number	P&ID	80PI2170A	80-I-22
	2	Loop Title		Digester No. 1 Axial Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2170A</b>		

GENERAL	1	Tag Number	P&ID	80PI2170B	80-I-22
	2	Loop Title		Digester No. 1 Axial Pump No. 3 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2170B</b>		

GENERAL	1	Tag Number	P&ID	80PI2210A	80-I-52	
	2	Loop Title		Digester No. 2 Recirculation Pump No. 1 Suction Pressure		
	3			As Noted		
	4	Area Classification				
	5	Line Number	Equipment Number			
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined	
	7					
PROCESS CONDITIONS	8	Fluid		Digested Sludge		
	9	Min Pressure	Max Pressure	0 psi	30 psi	
	10			Ambient		
	11	Specific Gravity	Viscosity	1.0		
	12	Conductivity	Density			
	13	Vapor Pressure	Critical Prssure			
	14					
INDICATOR	15	Type		Bourdon Tube		
	16	Range		0-30 psig		
	17	Dial Size	Dial Color	4.5 Inches	White	
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem	
	19	Movement Dampening		Glycerine		
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic	
	21					
	22	Blowout Protection		Case Back		
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
	24					
TRANSMITTER	25	Mounting				
	26	Enclosure NEMA Rating				
	27	Power Supply	Voltage			
	28	Output Signal				
	29	Communication Protocol				
	30	Range				
	31					
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm		
	33	Process Connection		0.75 Inch NPT		
	34	Body Material		316L Stainless Steel		
	35	Diaphragm / Sleeve Material		316L Stainless Steel		
	36	Capillary Material				
	37	Capillary Length				
	38	Fill Fluid		Glycerine		
	39	Flushing Connection		Yes		
	40					
	41	Manufacturer		Ashcroft		
42	Model Number		101			
CALIBRATION	43	Calibrated Range		0-30 psig		
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate		
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range		
	46					
OPTIONS	47	Tagging		Stainless steel tag with Tag Number		
	48					
	49					
PURCHASE	50	Manufacturer		Ashcroft	WIKA	
	51	Model Number		1279	233.34	
	52	Purchase Note		1 year warranty		
	53					
<b>P04</b>				<b>City of San Diego</b>		
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>		
				<b>80PI2210A</b>		



GENERAL	1	Tag Number	P&ID	80PI2210B	80-I-52
	2	Loop Title		Digester No. 2 Recirculation Pump No. 1 Discharge	
	3			Pressure	
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2210B</b>	

GENERAL	1	Tag Number	P&ID	80PI2210C	80-I-52
	2	Loop Title		Digester No. 2 Recirculation Pump No. 2 Suction Pressure	
	3			As Noted	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2210C</b>	

GENERAL	1	Tag Number	P&ID	80PI2210D	80-I-52
	2	Loop Title		Digester No. 2 Recirculation Pump No. 2 Discharge	
	3			Pressure	
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10			Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2210D</b>	

GENERAL	1	Tag Number	P&ID	80PI2241A	80-I-61
	2	Loop Title		Digester No. 2 Mix Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2241A</b>	

GENERAL	1	Tag Number	P&ID	80PI2241B	80-I-61
	2	Loop Title		Digester No. 2 Mix Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2241B</b>	

GENERAL	1	Tag Number	P&ID	80PI2242A	80-I-61
	2	Loop Title		Digester No. 2 Mix Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2242A</b>	

GENERAL	1	Tag Number	P&ID	80PI2242B	80-I-61	
	2	Loop Title		Digester No. 2 Mix Pump No. 2 Pressure Pressure		
	3					
	4	Area Classification		As Noted		
	5	Line Number	Equipment Number			
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined	
	7					
PROCESS CONDITIONS	8	Fluid		Digested Sludge		
	9	Min Pressure	Max Pressure	0 psi	25 psi	
	10	Temperature		Ambient		
	11	Specific Gravity	Viscosity	1.0		
	12	Conductivity	Density			
	13	Vapor Pressure	Critical Prssure			
	14					
INDICATOR	15	Type		Bourdon Tube		
	16	Range		0-60 psig		
	17	Dial Size	Dial Color	4.5 Inches	White	
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem	
	19	Movement Dampening		Glycerine		
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic	
	21					
	22	Blowout Protection		Case Back		
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
	24					
TRANSMITTER	25	Mounting				
	26	Enclosure NEMA Rating				
	27	Power Supply	Voltage			
	28	Output Signal				
	29	Communication Protocol				
	30	Range				
	31					
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm		
	33	Process Connection		0.75 Inch NPT		
	34	Body Material		316L Stainless Steel		
	35	Diaphragm / Sleeve Material		316L Stainless Steel		
	36	Capillary Material				
	37	Capillary Length				
	38	Fill Fluid		Glycerine		
	39	Flushing Connection		Yes		
	40					
	41	Manufacturer		Ashcroft		
42	Model Number		101			
CALIBRATION	43	Calibrated Range		0-60 psig		
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate		
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range		
	46					
OPTIONS	47	Tagging		Stainless steel tag with Tag Number		
	48					
	49					
PURCHASE	50	Manufacturer		Ashcroft	WIKA	
	51	Model Number		1279	233.34	
	52	Purchase Note		1 year warranty		
	53					
<b>P04</b>				<b>City of San Diego</b>		
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>		
				<b>80PI2242B</b>		

GENERAL	1	Tag Number	P&ID	80PI2243A	80-I-62
	2	Loop Title		Digester No. 2 Mix Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2243A</b>	



GENERAL	1	Tag Number	P&ID	80PI2243B	80-I-62
	2	Loop Title		Digester No. 2 Mix Pump No. 3 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2243B</b>	

GENERAL	1	Tag Number	P&ID	80PI2250A	80-I-70
	2	Loop Title		Digester No. 2 Axial Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2250A</b>		

GENERAL	1	Tag Number	P&ID	80PI2250B	80-I-70
	2	Loop Title		Digester No. 2 Axial Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2250B</b>	

GENERAL	1	Tag Number	P&ID	80PI2260A	80-I-71
	2	Loop Title		Digester No. 2 Axial Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2260A</b>		

GENERAL	1	Tag Number	P&ID	80PI2260B	80-I-71
	2	Loop Title		Digester No. 2 Axial Pump No. 2 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2260B</b>	

GENERAL	1	Tag Number	P&ID	80PI2270A	80-I-72
	2	Loop Title		Digester No. 2 Axial Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2270A</b>	

GENERAL	1	Tag Number	P&ID	80PI2270B	80-I-72
	2	Loop Title		Digester No. 2 Axial Pump No. 3 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2270B</b>	

GENERAL	1	Tag Number	P&ID	80PI2310A	80-I-102
	2	Loop Title		Digester No.3 Recirculation Pump No.1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2310A</b>		



GENERAL	1	Tag Number	P&ID	80PI2310B	80-I-102
	2	Loop Title		Digester No.3 Recirculation Pump No.1 Discharge	
	3			Pressure	
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2310B</b>	

GENERAL	1	Tag Number	P&ID	80PI2310C	80-I-102
	2	Loop Title		Digester No.3 Recirculation Pump No.2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2310C</b>	

GENERAL	1	Tag Number	P&ID	80PI2310D	80-I-102
	2	Loop Title		Digester No.3 Recirculation Pump No.2 Discharge Pressure	
	3			As Noted	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2310D</b>	

GENERAL	1	Tag Number	P&ID	80PI2341A	80-I-111
	2	Loop Title		Digester No. 3 Mix Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2341A</b>	

GENERAL	1	Tag Number	P&ID	80PI2341B	80-I-111
	2	Loop Title		Digester No. 3 Mix Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density	q	
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2341B</b>	

GENERAL	1	Tag Number	P&ID	80PI2342A	80-I-111
	2	Loop Title		Digester No. 3 Mix Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2342A</b>	

GENERAL	1	Tag Number	P&ID	80PI2342B	80-I-111
	2	Loop Title		Digester No. 3 Mix Pump No. 2 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2342B</b>		

GENERAL	1	Tag Number	P&ID	80PI2343A	80-I-112
	2	Loop Title		Digester No. 3 Mix Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2343A</b>	



GENERAL	1	Tag Number	P&ID	80PI2343B	80-I-112
	2	Loop Title		Digester No. 3 Mix Pump No. 3 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2343B</b>	

GENERAL	1	Tag Number	P&ID	80PI2350A	80-I-120
	2	Loop Title		Digester No. 3 Axial Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2350A</b>	

GENERAL	1	Tag Number	P&ID	80PI2350B	80-I-120
	2	Loop Title		Digester No. 3 Axial Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2350B</b>	

GENERAL	1	Tag Number	P&ID	80PI2360A	80-I-121
	2	Loop Title		Digester No. 3 Axial Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2360A</b>		

GENERAL	1	Tag Number	P&ID	80PI2360B	80-I-121
	2	Loop Title		Digester No. 3 Axial Pump No. 2 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2360B</b>	

GENERAL	1	Tag Number	P&ID	80PI2370A	80-I-122
	2	Loop Title		Digester No. 3 Axial Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2370A</b>		

GENERAL	1	Tag Number	P&ID	80PI2370B	80-I-122
	2	Loop Title		Digester No. 3 Axial Pump No. 3 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PI2370B</b>	

GENERAL	1	Tag Number	P&ID	94PI2025A	94-I-15
	2	Loop Title		Centrate Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0	78 psig
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-100 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-100 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>94PI2025A</b>	



GENERAL	1	Tag Number	P&ID	94PI2025B	94-I-15
	2	Loop Title		Centrate Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0	78 psig
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-100 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-100 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>	
<b>PRESSURE GAUGE</b>				<b>94PI2025B</b>	

GENERAL	1	Tag Number	P&ID	94PI2030A	94-I-16
	2	Loop Title		Centrate Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0	78 psig
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-100 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-100 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>94PI2030A</b>	

GENERAL	1	Tag Number	P&ID	94PI2130B	94-I-16
	2	Loop Title		Centrate Pump No. 2 Discharge Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0	78 psig
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-100 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-100 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>	
<b>PRESSURE GAUGE</b>				<b>94PI2130B</b>	

GENERAL	1	Tag Number	P&ID	94PI2035A	94-I-17
	2	Loop Title		Centrate Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0	78 psig
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-100 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-100 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego</b>	
<b>PRESSURE GAUGE</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>94PI2035A</b>	

GENERAL	1	Tag Number	P&ID	94PI2035B	94-I-17
	2	Loop Title		Centrate Pump No. 3 Discharge Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0	78 psig
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-100 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-100 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>94PI2035B</b>		

# **P08 PRESSURE SWITCH, FIXED DEADBAND**

GENERAL	1	Tag Number	P&ID	76PSL2151A	76-I-31
	2	Loop Title		Thickening Centrifuge Feed Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
	20	Mounting		Surface	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2151A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		8 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2151A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2151B / 76PSH2151	76-I-31
	2	Loop Title	Thickening Centrifuge Feed Pump No.1 Discharge		
	3		Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid	Raw Solids		
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10		Temperature		
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
	20	Mounting	Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2153		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	15 psi	40 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2151B / 76PSH2151</b>	



GENERAL	1	Tag Number	P&ID	76PSL2155A	76-I-32
	2	Loop Title		Thickening Centrifuge Feed Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2155A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		8 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
42					
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
46					
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2155A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2155B / 76PSH2155	76-I-32
	2	Loop Title	Thickening Centrifuge Feed Pump No. 2 Discharge		
	3		Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid	Raw Solids		
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature	Ambient		
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
	20	Mounting	Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2157		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	15 psi	40 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2155B / 76PSH2155</b>	

GENERAL	1	Tag Number	P&ID	76PSL2160A	76-I-33
	2	Loop Title		Thickening Centrifuge Feed Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2160A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		8 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
42					
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
46					
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2160A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2160B / 76PSH2160	76-I-33
	2	Loop Title		Thickening Centrifuge Feed Pump No. 3 Discharge	
	3			Pressure	
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PIT2162	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		15 psi	40 psi
	35	Set Point Direction		Decreasing	Increasing
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPD-N4	J402
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2160B / 76PSH2160</b>	

GENERAL	1	Tag Number	P&ID	76PSL2165A	76-I-34
	2	Loop Title	Thickening Centrifuge Feed Pump No. 4 Suction Pressure		
	3				
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid	Raw Solids		
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature			
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PI2165A		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	8 psi		
	35	Set Point Direction	Decreasing		
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
42					
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
46					
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPS-N4	J400	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2165A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2165B / 76PSH2165	76-I-34
	2	Loop Title	Thickening Centrifuge Feed Pump No. 4 Discharge		
	3		Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid	Raw Solids		
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature	Ambient		
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2167		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	15 psi	40 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
46					
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2165B / 76PSH2165</b>	

GENERAL	1	Tag Number	P&ID	76PSL2170A	76-I-35
	2	Loop Title		Thickening Centrifuge Feed Pump No. 5 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2170A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		8 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
42					
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
46					
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2170A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2170B / 76PSH2170	76-I-35
	2	Loop Title		Thickening Centrifuge Feed Pump No. 5 Discharge	
	3			Pressure	
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PIT2172	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		15 psi	40 psi
	35	Set Point Direction		Decreasing	Increasing
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPD-N4	J402
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2170B / 76PSH2170</b>	



GENERAL	1	Tag Number	P&ID	76PSL2287A	76-I-52
	2	Loop Title		Thickened Solids Transfer Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Thickened Solids	
	9	Min Pressure	Max Pressure	0 psi	7.5 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
	20	Mounting		Surface	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2287A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		4 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2287A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2287B / 76PSH2287	76-I-52
	2	Loop Title		Thickened Solids Transfer Pump No. 1 Discharge	
	3			Pressure	
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Thickened Solids	
	9	Min Pressure	Max Pressure	0 psi	180 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PIT2289	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		95 psi	126 psi
	35	Set Point Direction		Decreasing	Increasing
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPD-N4	J402
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2287B / 76PSH2287</b>	

GENERAL	1	Tag Number	P&ID	76PSL2292A	76-I-53
	2	Loop Title		Thickened Solids Transfer Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Thickened Solids	
	9	Min Pressure	Max Pressure	0 psi	7.5 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
	20	Mounting		Surface	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2292A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		4 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2292A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2292B / 76PSH2292	76-I-53
	2	Loop Title		Thickened Solids Transfer Pump No. 2 Discharge	
	3			Pressure	
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Thickened Solids	
	9	Min Pressure	Max Pressure	0 psi	180 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PIT2294	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		95 psi	126 psi
	35	Set Point Direction		Decreasing	Increasing
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
46					
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPD-N4	J402
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2292B / 76PSH2292</b>	

GENERAL	1	Tag Number	P&ID	76PSL2297A	76-I-54
	2	Loop Title		Thickened Solids Transfer Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Thickened Solids	
	9	Min Pressure	Max Pressure	0 psi	7.5 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
	20	Mounting		Surface	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2297A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		4 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2297A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2297B / 76PSH2297	76-I-54
	2	Loop Title		Thickened Solids Transfer Pump No. 3 Discharge	
	3			Pressure	
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Thickened Solids	
	9	Min Pressure	Max Pressure	0 psi	180 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
	20	Mounting		Surface	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PIT2297	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		95 psi	126 psi
	35	Set Point Direction		Decreasing	Increasing
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPD-N4	J402
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2297B / 76PSH2297</b>	

GENERAL	1	Tag Number	P&ID	76PSL2505A	76-I-101
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
	20	Mounting		Surface	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2505A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2505A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2505B / 76PSH2505	76-I-101
	2	Loop Title	Dewatering Centrifuge Feed Pump No. 1 Discharge		
	3		Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid	Digested Sludge		
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
	20	Mounting	Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2507		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	35 psi	55 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2505B / 76PSH2505</b>	



GENERAL	1	Tag Number	P&ID	76PSL2510A	76-I-102
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
	20	Mounting		Surface	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2510A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2510A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2510B / 76PSH2510	76-I-102
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 2 Discharge Pressure	
	3			Unclassified	
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PIT2512	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		35 psi	55 psi
	35	Set Point Direction		Decreasing	Increasing
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPD-N4	J402
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2510B / 76PSH2510</b>	

GENERAL	1	Tag Number	P&ID	76PSL2515A	76-I-103
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
	20	Mounting		Surface	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2515A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2515A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2515B / 76PSH2515	76-I-103
	2	Loop Title	Dewatering Centrifuge Feed Pump No. 3 Discharge		
	3		Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid	Digested Sludge		
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
	20	Mounting	Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2517		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	35 psi	55 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2515B / 76PSH2515</b>	

GENERAL	1	Tag Number	P&ID	76PSL2520A	76-I-104
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 4 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
	20	Mounting		Surface	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2520A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2520A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2520B / 76PSH2520	76-I-104
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 4 Discharge Pressure	
	3			Unclassified	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PIT2522	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		35 psi	55 psi
	35	Set Point Direction		Decreasing	Increasing
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
46					
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPD-N4	J402
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2520B / 76PSH2520</b>	

GENERAL	1	Tag Number	P&ID	76PSL2525A	76-I-105
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 5 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2525A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
42					
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
46					
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2525A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2525B / 76PSH2525	76-I-105
	2	Loop Title	Dewatering Centrifuge Feed Pump No. 5 Discharge		
	3		Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid	Digested Sludge		
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
	20	Mounting	Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2527		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	35 psi	55 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2525B / 76PSH2525</b>	



GENERAL	1	Tag Number	P&ID	76PSL2530A	76-I-106
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 6 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
	20	Mounting		Surface	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2530A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2530A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2530B / 76PSH2530	76-I-106
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 6 Discharge Pressure	
	3			Unclassified	
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
	20	Mounting		Surface	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PIT2532	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		35 psi	55 psi
	35	Set Point Direction		Decreasing	Increasing
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPD-N4	J402
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2530B / 76PSH2530</b>	

GENERAL	1	Tag Number	P&ID	76PSL2535A	76-I-107
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 7 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
	20	Mounting		Surface	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2535A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2535A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2535B / 76PSH2535	76-I-107
	2	Loop Title	Dewatering Centrifuge Feed Pump No. 7 Discharge Pressure		
	3				
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid	Digested Sludge		
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
	20	Mounting	Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2537		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	35 psi	55 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2535B / 76PSH2535</b>	

GENERAL	1	Tag Number	P&ID	76PSL2540A	76-I-108
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 8 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
	20	Mounting		Surface	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2540A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2540A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2540B / 76PSH2540	76-I-108
	2	Loop Title	Dewatering Centrifuge Feed Pump No. 8 Discharge Pressure		
	3				
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid	Digested Sludge		
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
	20	Mounting	Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2542		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	35 psi	55 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2540B / 76PSH2540</b>	

GENERAL	1	Tag Number	P&ID	76PSL2737A	76-I-211
	2	Loop Title		Thickening Centrifuge Polymer Feed Pump No. 1 Suction Pressure	
	3			Unclassified	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2737A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		0.2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2737A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2737B / 76PSH2737	76-I-211
	2	Loop Title	Thickening Centrifuge Polymer Feed Pump No. 1		
	3		Discharge Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	90 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2735		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	72 psi	78 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2737B / 76PSH2737</b>	



GENERAL	1	Tag Number	P&ID	76PSL2742A	76-I-212
	2	Loop Title		Thickening Centrifuge Polymer Feed Pump No. 2 Suction Pressure	
	3			Unclassified	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2742A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		0.2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE SWITCH</b>			<b>76PSL2742A</b>		

GENERAL	1	Tag Number	P&ID	76PSL2742B / 76PSH2742	76-I-212
	2	Loop Title	Thickening Centrifuge Polymer Feed Pump No. 2		
	3		Discharge Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	90 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2740		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	72 psi	78 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2742B / 76PSH2742</b>	

GENERAL	1	Tag Number	P&ID	76PSL2747A	76-I-213
	2	Loop Title		Thickening Centrifuge Polymer Feed Pump No. 3 Suction Pressure	
	3			Unclassified	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2747A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		0.2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2747A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2747B / 76PSH2747	76-I-213
	2	Loop Title	Thickening Centrifuge Polymer Feed Pump No. 3		
	3		Discharge Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	90 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2745		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	72 psi	78 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2747B / 76PSH2747</b>	

GENERAL	1	Tag Number	P&ID	76PSL2752A	76-I-214
	2	Loop Title		Thickening Centrifuge Polymer Feed Pump No. 4 Suction Pressure	
	3			Unclassified	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2752A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		0.2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2752A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2752B / 76PSH2752	76-I-214
	2	Loop Title	Thickening Centrifuge Polymer Feed Pump No. 4		
	3		Discharge Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	90 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2750		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	72 psi	78 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2752B / 76PSH2752</b>	

GENERAL	1	Tag Number	P&ID	76PSL2757A	76-I-215
	2	Loop Title		Thickening Centrifuge Polymer Feed Pump No. 5 Suction Pressure	
	3			Unclassified	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2757A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		0.2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2757A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2757B / 76PSH2757	76-I-215
	2	Loop Title	Thickening Centrifuge Polymer Feed Pump No. 5		
	3		Discharge Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	90 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
SENSOR	14				
	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
DIAPHRAGM SEAL - ANNULAR SEAL	20	Mounting	Surface		
	21	Type	See DS for 76PIT2755		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
SWITCH	31	Manufacturer			
	32	Model Number			
	33	Switch Type	Snap-Action		
	34	Set Point	72 psi		78 psi
	35	Set Point Direction	Decreasing		Increasing
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2757B / 76PSH2757</b>	



GENERAL	1	Tag Number	P&ID	76PSL2772A	76-I-221
	2	Loop Title	Dewatering Centrifuge Polymer Feed Pump No. 1 Suction Pressure		
	3				
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PI2772A		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	0.2 psi		
	35	Set Point Direction	Decreasing		
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPS-N4	J400	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2772A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2772B / 76PSH2772	76-I-221
	2	Loop Title	Dewatering Centrifuge Polymer Feed Pump No. 1		
	3		Discharge Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	90 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2770		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	80 psi		85 psi
	35	Set Point Direction	Decreasing		Increasing
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2772B / 76PSH2772</b>	

GENERAL	1	Tag Number	P&ID	76PSL2777A	76-I-222
	2	Loop Title	Dewatering Centrifuge Polymer Feed Pump No. 2 Suction Pressure		
	3				
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PI2777A		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	0.2 psi		
	35	Set Point Direction	Decreasing		
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPS-N4	J400	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2777A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2777B / 76PSH2777	76-I-222
	2	Loop Title	Dewatering Centrifuge Polymer Feed Pump No. 2		
	3		Discharge Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	90 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2775		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	80 psi		85 psi
	35	Set Point Direction	Decreasing		Increasing
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2777B / 76PSH2777</b>	

GENERAL	1	Tag Number	P&ID	76PSL2782A	76-I-223
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 3 Suction Pressure	
	3			Unclassified	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2782A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		0.2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2782A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2782B / 76PSH2782	76-I-223
	2	Loop Title	Dewatering Centrifuge Polymer Feed Pump No. 3		
	3		Discharge Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	90 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2782		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	80 psi	85 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
46					
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2782B / 76PSH2782</b>	

GENERAL	1	Tag Number	P&ID	76PSL2787A	76-I-224
	2	Loop Title	Dewatering Centrifuge Polymer Feed Pump No. 4 Suction Pressure		
	3				
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PI2787A		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	0.2 psi		
	35	Set Point Direction	Decreasing		
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPS-N4	J400	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2787A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2787B / 76PSH2787	76-I-224
	2	Loop Title	Dewatering Centrifuge Polymer Feed Pump No. 4		
	3		Discharge Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	90 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2785		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	80 psi		85 psi
	35	Set Point Direction	Decreasing		Increasing
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2787B / 76PSH2787</b>	



GENERAL	1	Tag Number	P&ID	76PSL2792A	76-I-225
	2	Loop Title	Dewatering Centrifuge Polymer Feed Pump No. 5 Suction Pressure		
	3				
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PI2792A		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	0.2 psi		
	35	Set Point Direction	Decreasing		
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPS-N4	J400	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2792A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2792B / 76PSH2792	76-I-225
	2	Loop Title	Dewatering Centrifuge Polymer Feed Pump No. 5		
	3		Discharge Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	90 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2790		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	80 psi	85 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2792B / 76PSH2792</b>	

GENERAL	1	Tag Number	P&ID	76PSL2797A	76-I-226
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 6 Suction Pressure	
	3			Unclassified	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2797A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		0.2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
42					
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2797A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2797B / 76PSH2797	76-I-226
	2	Loop Title	Dewatering Centrifuge Polymer Feed Pump No. 6		
	3		Discharge Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	90 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2795		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	80 psi	85 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2797B / 76PSH2797</b>	

GENERAL	1	Tag Number	P&ID	76PSL2802A	76-I-227
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 7 Suction Pressure	
	3			Unclassified	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2802A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		0.2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2802A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2802B / 76PSH2802	76-I-227
	2	Loop Title	Dewatering Centrifuge Polymer Feed Pump No. 7		
	3		Discharge Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	90 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2800		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	80 psi	85 psi	
	35	Set Point Direction	Decreasing	Increasing	
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability	+/- 1.0 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2802B / 76PSH2802</b>	

GENERAL	1	Tag Number	P&ID	76PSL2807A	76-I-228
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 8 Suction Pressure	
	3			Unclassified	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type		Diaphragm sealed piston	
	16	Body Rating		NEMA 4X	
	17	Body Material		Epoxy-Coated Aluminum	
	18	Process Connection		0.5-inch NPT; Nickel-plated brass	
	19	Wetted Materials (Actuator seal)		Buna-N	
20	Mounting		Surface		
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type		See DS for 76PI2807A	
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
	32	Model Number			
SWITCH	33	Switch Type		Snap-Action	
	34	Set Point		0.2 psi	
	35	Set Point Direction		Decreasing	
	36	Deadband		Fixed	
	37	Reset		Automatic	
	38	Voltage		120 VAC	
	39	Contact Arrangement		SPDT	
	40	Contact Rating		15 Amps	
	41	Communication Protocol			
42					
CALIBRATION	43	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	United Electric Controls
	51	Model Number		LPS-N4	J400
	52	Purchase Note		1 year warranty	
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2807A</b>	

GENERAL	1	Tag Number	P&ID	76PSL2807B / 76PSH2807	76-I-228
	2	Loop Title	Dewatering Centrifuge Polymer Feed Pump No. 8		
	3		Discharge Pressure		
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	90 psi
	10	Temperature			
	11	Specific Gravity	Viscosity		
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
14					
SENSOR	15	Type	Diaphragm sealed piston		
	16	Body Rating	NEMA 4X		
	17	Body Material	Epoxy-Coated Aluminum		
	18	Process Connection	0.5-inch NPT; Nickel-plated brass		
	19	Wetted Materials (Actuator seal)	Buna-N		
20	Mounting	Surface			
DIAPHRAGM SEAL - ANNULAR SEAL	21	Type	See DS for 76PIT2805		
	22	Process Connection			
	23	Body Material			
	24	Diaphragm / Sleeve Material			
	25				
	26	Capillary Material			
	27	Capillary Length			
	28	Fill Fluid			
	29	Flushing Connection			
	30				
	31	Manufacturer			
32	Model Number				
SWITCH	33	Switch Type	Snap-Action		
	34	Set Point	80 psi		85 psi
	35	Set Point Direction	Decreasing		Increasing
	36	Deadband	Fixed		
	37	Reset	Automatic		
	38	Voltage	120 VAC		
	39	Contact Arrangement	SPDT		
	40	Contact Rating	15 Amps		
	41	Communication Protocol			
	42				
CALIBRATION	43	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	44				
	45	Accuracy	Repeatability		+/- 1.0 Pct of Range
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	United Electric Controls	
	51	Model Number	LPD-N4	J402	
	52	Purchase Note	1 year warranty		
	53				
<b>P08</b>				<b>City of San Diego</b>	
<b>PRESSURE SWITCH</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PSL2807B / 76PSH2807</b>	



# **P09 PRESSURE TRANSMITTER**

GENERAL	1	Tag Number	P&ID	76PIT1104A	76-I-11
	2	Loop Title		Grit Separator No. 1 Flow Controller Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	0.25 Inch	SST
PROCESS CONDITIONS	6	Fluid		Grit	
	7	Min Pressure	Max Pressure	0 psi	25 psi
	8	Temperature		Ambient	
	9	Specific Gravity	Viscosity	1.0	
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Diaphragm Seal	
	23	Process Connection		0.25 Inch NPT	
	24	Body Material		316L Stainless Steel	
	25	Diaphragm / Sleeve Material		316L Stainless Steel	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		101	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 25 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		Provided by Raw Solids Degritting System Vendor	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT1104A</b>		

GENERAL	1	Tag Number	P&ID	76PIT1109A	76-I-12
	2	Loop Title		Grit Separator No. 2 Flow Controller Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	0.25 Inch	SST
PROCESS CONDITIONS	6	Fluid		Grit	
	7	Min Pressure	Max Pressure	0 psi	25 psi
	8	Temperature		Ambient	
	9	Specific Gravity	Viscosity	1.0	
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Diaphragm Seal	
	23	Process Connection		0.25 Inch NPT	
	24	Body Material		316L Stainless Steel	
	25	Diaphragm / Sleeve Material		316L Stainless Steel	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		101	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 25 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		Provided by Raw Solids Degritting System Vendor	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT1109A</b>		

GENERAL	1	Tag Number	P&ID	76PIT1114A	76-I-13
	2	Loop Title		Grit Separator No. 3 Flow Controller Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	0.25 Inch	SST
PROCESS CONDITIONS	6	Fluid		Grit	
	7	Min Pressure	Max Pressure	0 psi	25 psi
	8	Temperature		Ambient	
	9	Specific Gravity	Viscosity	1.0	
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Wetted O-Ring Material			
	22	Type		Diaphragm Seal	
	23	Process Connection		0.25 Inch NPT	
	24	Body Material		316L Stainless Steel	
	25	Diaphragm / Sleeve Material		316L Stainless Steel	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		101	
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 300 psi	
	40				
CALIBRATION	41	Calibrated Range		0 - 25 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		Provided by Raw Solids Degriting System Vendor	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT1114A</b>		

GENERAL	1	Tag Number	P&ID	76PIT2123	76-I-14
	2	Loop Title		Grit Separator No. 4 Flow Controller Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	0.25 Inch	SST
PROCESS CONDITIONS	6	Fluid		Grit	
	7	Min Pressure	Max Pressure	0 psi	25 psi
	8	Temperature		Ambient	
	9	Specific Gravity	Viscosity	1.0	
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Wetted O-Ring Material			
	22	Type		Diaphragm Seal	
	23	Process Connection		0.25 Inch NPT	
	24	Body Material		316L Stainless Steel	
	25	Diaphragm / Sleeve Material		316L Stainless Steel	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		101	
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 300 psi	
	40				
CALIBRATION	41	Calibrated Range		0 - 25 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		Provided by Raw Solids Degriting System Vendor	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2123</b>		

GENERAL	1	Tag Number	P&ID	76PIT2153	76-I-31
	2	Loop Title		TC Feed Pump No. 1 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	8 inch	Ductile Iron
PROCESS CONDITIONS	6	Fluid		Raw Solids	
	7	Min Pressure	Max Pressure	0 psi	60 psi
	8	Temperature		Ambient	
	9	Specific Gravity	Viscosity	1.0	
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		8 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 60 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2153</b>		

GENERAL	1	Tag Number	P&ID	76PIT2157	76-I-32
	2	Loop Title		TC Feed Pump No. 2 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	8 inch	Ductile Iron
PROCESS CONDITIONS	6	Fluid		Raw Solids	
	7	Min Pressure	Max Pressure	0 psi	60 psi
	8	Temperature		Ambient	
	9	Specific Gravity	Viscosity	1.0	
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		8 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 300 psi	
	40				
CALIBRATION	41	Calibrated Range		0 - 60 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2157</b>		

GENERAL	1	Tag Number	P&ID	76PIT2162	76-I-33
	2	Loop Title		TC Feed Pump No. 3 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	8 inch	Ductile Iron
PROCESS CONDITIONS	6	Fluid		Raw Solids	
	7	Min Pressure	Max Pressure	0 psi	60 psi
	8	Temperature		Ambient	
	9	Specific Gravity	Viscosity	1.0	
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		8 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 300 psi	
	40				
CALIBRATION	41	Calibrated Range		0 - 60 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>				<b>City of San Diego</b>	
<b>PRESSURE TRANSMITTER</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PIT2162</b>	



GENERAL	1	Tag Number	P&ID	76PIT2167	76-I-34
	2	Loop Title		TC Feed Pump No. 4 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	8 inch	Ductile Iron
PROCESS CONDITIONS	6	Fluid		Raw Solids	
	7	Min Pressure	Max Pressure	0 psi	60 psi
	8	Temperature		Ambient	
	9	Specific Gravity	Viscosity	1.0	
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		8 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 300 psi	
	40				
CALIBRATION	41	Calibrated Range		0 - 60 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>				<b>City of San Diego</b>	
<b>PRESSURE TRANSMITTER</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PIT2167</b>	

GENERAL	1	Tag Number	P&ID	76PIT2172	76-I-35
	2	Loop Title		TC Feed Pump No. 5 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	8 inch	Ductile Iron
PROCESS CONDITIONS	6	Fluid		Raw Solids	
	7	Min Pressure	Max Pressure	0 psi	60 psi
	8	Temperature		Ambient	
	9	Specific Gravity	Viscosity	1.0	
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		8 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 60 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2172</b>		

GENERAL	1	Tag Number	P&ID	76PIT2289	76-I-52
	2	Loop Title		Thickened Solids Pump No. 1 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
PROCESS CONDITIONS	6	Fluid		Thickened Solids	
	7	Min Pressure	Max Pressure	0 psi	180 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		10 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 180 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2289</b>		

GENERAL	1	Tag Number	P&ID	76PIT2294	76-I-53
	2	Loop Title		Thickened Solids Pump No. 2 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
PROCESS CONDITIONS	6	Fluid		Thickened Solids	
	7	Min Pressure	Max Pressure	0 psi	180 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		10 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 180 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2294</b>		

GENERAL	1	Tag Number	P&ID	76PIT2299	76-I-54
	2	Loop Title		Thickened Solids Pump No. 3 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
PROCESS CONDITIONS	6	Fluid		Thickened Solids	
	7	Min Pressure	Max Pressure	0 psi	180 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		10 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 180 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2299</b>		

GENERAL	1	Tag Number	P&ID	76PIT2507	76-I-101
	2	Loop Title		DC Feed Pump No. 1 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	6 inch	Ductile Iron
PROCESS CONDITIONS	6	Fluid		Digested Solids	
	7	Min Pressure	Max Pressure	0 psi	60 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		8 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 300 psi	
	40				
CALIBRATION	41	Calibrated Range		0 - 60 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2507</b>		

GENERAL	1	Tag Number	P&ID	76PIT2512	76-I-102
	2	Loop Title		DC Feed Pump No. 2 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	6 inch	Ductile Iron
PROCESS CONDITIONS	6	Fluid		Digested Solids	
	7	Min Pressure	Max Pressure	0 psi	60 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		8 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 300 psi	
	40				
CALIBRATION	41	Calibrated Range		0 - 60 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2512</b>		

GENERAL	1	Tag Number	P&ID	76PIT2517	76-I-103
	2	Loop Title		DC Feed Pump No. 3 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	6 inch	Ductile Iron
PROCESS CONDITIONS	6	Fluid		Digested Solids	
	7	Min Pressure	Max Pressure	0 psi	60 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		8 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 300 psi	
	40				
CALIBRATION	41	Calibrated Range		0 - 60 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>				<b>City of San Diego</b>	
<b>PRESSURE TRANSMITTER</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PIT2517</b>	



GENERAL	1	Tag Number	P&ID	76PIT2522	76-I-104
	2	Loop Title		DC Feed Pump No. 4 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	6 inch	Ductile Iron
PROCESS CONDITIONS	6	Fluid		Digested Solids	
	7	Min Pressure	Max Pressure	0 psi	60 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		8 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 300 psi	
	40				
CALIBRATION	41	Calibrated Range		0 - 60 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>	
<b>PRESSURE TRANSMITTER</b>				<b>76PIT2522</b>	

GENERAL	1	Tag Number	P&ID	76PIT2527	76-I-105
	2	Loop Title		DC Feed Pump No. 5 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	6 inch	Ductile Iron
PROCESS CONDITIONS	6	Fluid		Digested Solids	
	7	Min Pressure	Max Pressure	0 psi	60 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		8 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 300 psi	
	40				
CALIBRATION	41	Calibrated Range		0 - 60 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>	
<b>PRESSURE TRANSMITTER</b>				<b>76PIT2527</b>	

GENERAL	1	Tag Number	P&ID	76PIT2532	76-I-106
	2	Loop Title		DC Feed Pump No. 6 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	6 inch	Ductile Iron
PROCESS CONDITIONS	6	Fluid		Digested Solids	
	7	Min Pressure	Max Pressure	0 psi	60 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		8 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 300 psi	
	40				
CALIBRATION	41	Calibrated Range		0 - 60 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2532</b>		

GENERAL	1	Tag Number	P&ID	76PIT2537	76-I-107
	2	Loop Title		DC Feed Pump No. 7 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	6 inch	Ductile Iron
PROCESS CONDITIONS	6	Fluid		Digested Solids	
	7	Min Pressure	Max Pressure	0 psi	60 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		8 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 300 psi	
	40				
CALIBRATION	41	Calibrated Range		0 - 60 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>				<b>City of San Diego</b>	
<b>PRESSURE TRANSMITTER</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PIT2537</b>	

GENERAL	1	Tag Number	P&ID	76PIT2542	76-I-108
	2	Loop Title		DC Feed Pump No. 8 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	6 inch	Ductile Iron
PROCESS CONDITIONS	6	Fluid		Digested Solids	
	7	Min Pressure	Max Pressure	0 psi	60 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		8 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 60 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2542</b>		

GENERAL	1	Tag Number	P&ID	76PIT2735	76-I-211
	2	Loop Title		TC Polymer Feed Pump No. 1 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	1.5 inch	CPVC
PROCESS CONDITIONS	6	Fluid		Polymer	
	7	Min Pressure	Max Pressure	0 psi	90 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		1.5 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 90 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2735</b>		

GENERAL	1	Tag Number	P&ID	76PIT2740	76-I-212
	2	Loop Title		TC Polymer Feed Pump No. 2 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	1.5 inch	CPVC
PROCESS CONDITIONS	6	Fluid		Polymer	
	7	Min Pressure	Max Pressure	0 psi	90 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		1.5 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 90 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2740</b>		

GENERAL	1	Tag Number	P&ID	76PIT2745	76-I-213
	2	Loop Title		TC Polymer Feed Pump No. 3 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	1.5 inch	CPVC
PROCESS CONDITIONS	6	Fluid		Polymer	
	7	Min Pressure	Max Pressure	0 psi	90 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		1.5 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 300 psi	
	40				
CALIBRATION	41	Calibrated Range		0 - 90 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2745</b>		



GENERAL	1	Tag Number	P&ID	76PIT2750	76-I-214
	2	Loop Title		TC Polymer Feed Pump No. 4 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	1.5 inch	CPVC
PROCESS CONDITIONS	6	Fluid		Polymer	
	7	Min Pressure	Max Pressure	0 psi	90 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		1.5 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 90 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2750</b>		

GENERAL	1	Tag Number	P&ID	76PIT2755	76-I-215
	2	Loop Title		TC Polymer Feed Pump No. 5 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	1.5 inch	CPVC
PROCESS CONDITIONS	6	Fluid		Polymer	
	7	Min Pressure	Max Pressure	0 psi	90 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		1.5 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 90 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2755</b>		

GENERAL	1	Tag Number	P&ID	76PIT2770	76-I-221
	2	Loop Title		DC Polymer Feed Pump No. 1 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	2.5 inch	CPVC
PROCESS CONDITIONS	6	Fluid		Polymer	
	7	Min Pressure	Max Pressure	0 psi	90 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		2.5 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 90 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2770</b>		

GENERAL	1	Tag Number	P&ID	76PIT2775	76-I-222
	2	Loop Title		DC Polymer Feed Pump No. 2 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	2.5 inch	CPVC
PROCESS CONDITIONS	6	Fluid		Polymer	
	7	Min Pressure	Max Pressure	0 psi	90 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		2.5 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 90 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2775</b>		

GENERAL	1	Tag Number	P&ID	76PIT2780	76-I-223
	2	Loop Title		DC Polymer Feed Pump No. 3 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	2.5 inch	CPVC
PROCESS CONDITIONS	6	Fluid		Polymer	
	7	Min Pressure	Max Pressure	0 psi	90 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		2.5 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 90 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>				<b>City of San Diego</b>	
<b>PRESSURE TRANSMITTER</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PIT2780</b>	

GENERAL	1	Tag Number	P&ID	76PIT2785	76-I-224
	2	Loop Title		DC Polymer Feed Pump No. 4 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	2.5 inch	CPVC
PROCESS CONDITIONS	6	Fluid		Polymer	
	7	Min Pressure	Max Pressure	0 psi	90 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		2.5 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 90 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2785</b>		

GENERAL	1	Tag Number	P&ID	76PIT2790	76-I-225
	2	Loop Title		DC Polymer Feed Pump No. 5 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	2.5 inch	CPVC
PROCESS CONDITIONS	6	Fluid		Polymer	
	7	Min Pressure	Max Pressure	0 psi	90 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		2.5 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 300 psi	
	40				
CALIBRATION	41	Calibrated Range		0 - 90 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>				<b>City of San Diego</b>	
<b>PRESSURE TRANSMITTER</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PIT2790</b>	

GENERAL	1	Tag Number	P&ID	76PIT2795	76-I-226
	2	Loop Title		DC Polymer Feed Pump No. 6 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	2.5 inch	CPVC
PROCESS CONDITIONS	6	Fluid		Polymer	
	7	Min Pressure	Max Pressure	0 psi	90 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		2.5 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 90 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2795</b>		



GENERAL	1	Tag Number	P&ID	76PIT2800	76-I-227
	2	Loop Title		DC Polymer Feed Pump No. 7 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	2.5 inch	CPVC
PROCESS CONDITIONS	6	Fluid		Polymer	
	7	Min Pressure	Max Pressure	0 psi	90 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
	20	Process Temperature Limits		-40 degF to 250 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		2.5 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
TRANSMITTER	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
	38	Communication Protocol		HART	
	39	Range		0 - 300 psi	
	40				
CALIBRATION	41	Calibrated Range		0 - 90 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
OPTIONS	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket			
	49				
PURCHASE	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>				<b>City of San Diego</b>	
<b>PRESSURE TRANSMITTER</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>76PIT2800</b>	

GENERAL	1	Tag Number	P&ID	76PIT2805	76-I-228
	2	Loop Title		DC Polymer Feed Pump No. 8 Discharge Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	2.5 inch	CPVC
PROCESS CONDITIONS	6	Fluid		Polymer	
	7	Min Pressure	Max Pressure	0 psi	90 psi
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type		Annular Seal	
	23	Process Connection		2.5 inch Class 150 ANSI Flange	
	24	Body Material		Carbon Steel	
	25	Diaphragm / Sleeve Material		Viton	
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid		Glycerin	
	30	Flushing Connection		No	
TRANSMITTER	31				
	32	Manufacturer		Ashcroft	
	33	Model Number		81	
	34	Mounting		Integral	
	35	Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
	36	Power Supply	Voltage	2 - Wire	24 VDC
	37	Output Signal		4 to 20 madc	
38	Communication Protocol		HART		
CALIBRATION	39	Range		0 - 300 psi	
	40				
	41	Calibrated Range		0 - 90 psi	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	43	Zero Elevated or Suppressed			
	44	Zero Reference			
	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48	Mounting Bracket			
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE TRANSMITTER</b>			<b>76PIT2805</b>		

GENERAL	1	Tag Number	P&ID	80PIT2671	80-I-272
	2	Loop Title		Digester Biogas Compressors Pressure	
	3	Area Classification		Class 1 Div 1	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	12 inch	SST
PROCESS CONDITIONS	6	Fluid		Biogas	
	7	Min Pressure	Max Pressure	0 inch WC	15 inch WC
	8	Temperature			
	9	Specific Gravity	Viscosity		
	10	Conductivity	Density		
ELEMENT	11	Vapor Pressure	Critical Prssure		
	12	Element Type		Ceramic Diaphragm	
	13	Element Material			
	14	Body Rating			
	15	Instrument Body Material		AISI 316L	
	16	Wetted Materials		AISI 316L	
	17	Process Connection		0.5 inch NPT	
	18	Measurable Limits			
	19	Ambient Temperature Limits		-40 degF to 175 degF	
DIAPHRAGM SEAL - ANNULAR SEAL	20	Process Temperature Limits		-40 degF to 250 degF	
	21	Wetted O-Ring Material			
	22	Type			
	23	Process Connection			
	24	Body Material			
	25	Diaphragm / Sleeve Material			
	26				
	27	Calillary Material			
	28	Capillary Length			
	29	Fill Fluid			
	30	Flushing Connection			
	31				
	TRANSMITTER	32	Manufacturer		
33		Model Number			
34		Mounting		Wall	
35		Enclosure NEMA Rating		NEMA 4X; Coated Aluminum	
36		Power Supply	Voltage	2 - Wire	24 VDC
37		Output Signal		4 to 20 madc	
38		Communication Protocol		HART	
39		Range		0 - 25 inch WC	
CALIBRATION	40				
	41	Calibrated Range		0 - 20 inch WC	
	42	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	43	Zero Elevated or Suppressed			
	44	Zero Reference			
OPTIONS	45	Accuracy	Repeatability	+/- 0.1 Pct of Span	
	46	Multi-Valve Manifold			
	47	Tagging		Stainless steel tag with Tag Number	
	48	Mounting Bracket		2 inch pipe	
PURCHASE	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		PMP71	3051
	52	3-valve SS Manifolds mounted			
	53	Purchase Note		1 year warranty	
<b>P09</b>				<b>City of San Diego</b>	
<b>PRESSURE TRANSMITTER</b>				<b>Metropolitan Biosolids Center Improvements</b>	
				<b>80PIT2671</b>	

# **T03 TEMPERATURE ELEMENT AND TRANSMITTER, RESISTANCE**

GENERAL	1	Tag Number	P&ID	80TIT2672	80-I-272
	2	Loop Title		Digester Biogas Compressors Temperature	
	3	Area Classification		Class I - Division I	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	12 inch	SST
	6				
PROCESS CONDITIONS	7	Fluid		Biogas	
	8	Nominal Pressure		0-6 psig	
	9	Min Temperature	Max Temperature	60 degF	120 degF
	10	Specific Gravity	Viscosity		
	11	Conductivity	Density		
	12	Vapor Pressure	Critical Prssure		
ELEMENT	13				
	14	Element Tag		80TE2672	
	15	Element Type		Single - Three Wire RTD	
	16	Element Material		Platinum - 100 ohms	
	17	Element Length			
	18	Head Type			
	19	Process Connection			
	20	Spring Loaded		Yes	
THERMOWELL	21				
	22	Manufacturer	Model Number		
	23	Construction Type		Stepped	
	24	Material		316 Stainless Steel	
	25	Bore Diameter			
	26	Insertion Length - "U"		6 inch	
	27	Lag Extension Length - "T"		3 inches	
	28	Insulation Length			
	29	Total Length			
	30	Process Connection		1 inch NPT	
	31				
TRANSMITTER	32	Mounting		Integral	
	33	Enclosure NEMA Rating		NEMA 4X	
	34	Power Supply	Voltage	2 - Wire	24 VDC
	35	Output Signal		4 to 20 mdc	
	36	Communication Protocol		HART	
	37	Range			
	38	Failsafe Mode			
	39	Display		Three-line LCD	
	40	Ambient Temperature Limits		-20 degF to 158 degF	
	41	Process Temperature Limits			
CALIBRATION	42				
	43	Calibrated Range		32 - 200 degF	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45				
OPTIONS	46	Accuracy		+/- 0.5 deg F or +/- 0.25% of reading	
	47				
PURCHASE	48	Tagging		Affix stainless steel tag with Tag Number	
	49				
	50	Manufacturer		Endress+Hauser	Rosemount
	51	Model Number		TMT162R	3144P
	52	Purchase Note		1 year warranty	
	53				
<b>T03</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>TEMPERATURE ELEMENT AND TRANSMITTER - RTD</b>			<b>80TIT2672</b>		

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**CONTROL PANEL SCHEDULE**

ITEM	NAME	DESCRIPTION	PANEL RATING	PANEL ASSEMBLY DRAWINGS		
1	76LCP01A	GRIT SEPARATOR NO. 4	NEMA 12			
2	80HS0203	BIOGAS COMPRESSOR NO. 3	NEMA 7			
3						
4						
5						
6						
7						
8						
9						
10						

**CONTROL STRATEGIES**

**RECEIVING TANK COMPLEX**

**1.01 RAW SOLIDS FEED PUMPS**

- A. Reference P&ID: 73-I-30, 32, 33.
- B. Loop Mission: There are three variable speed raw solids feed pumps. The pumps will transfer raw solids from the raw solids receiving tanks through the grit separators to the thickening centrifuge feed pump feed loop and will be connected to 76LCP01. The raw solids Feed Pumps can be automatically controlled by the DCS. The raw solids Feed Pumps can be manually controlled by the operator via the DCS.
- C. DCS Manual Control Mode: Start/Stop and adjust speed of each pump. Pump will start if valve is open. Open/Close all pump routing and isolation valves.
- D. DCS Automatic Control Mode:
  - 1. Operator to select raw solids Feed Pump Strategy.
  - 2. Operator to select tank(s) from which to pump.
  - 3. Operator to select lead/lag/standby status for pumps (123/231/312).
  - 4. Operator to input desired minimum recycle flow rate setpoint (adjustable 100 gpm to 200 gpm), initial 200 gpm).
  - 5. DCS will scan all I/O associated with the strategy and will indicate ready or not ready.
  - 6. If ready, operator will initiate strategy start up which will:
    - a. Check for open status on selected tank(s) outlet hand valve; upon confirmation,
    - b. Open appropriate main pump header valves to allow flow from selected tank(s) to all pumps; upon confirmation.
    - c. Open selected tank(s) recycle line valve; upon confirmation,
    - d. Confirm operational status of degritting system; upon confirmation,
    - e. Determine the flow setpoint for pump control; upon confirmation or bypassed,
    - f. Flow setpoint will be determined as follows:
      - 1)  $x = \text{sum of the feed pump flow rate setpoints for the operating Centrifuges (Centrifuge is considered operating once the centrifuge LCP issues the Centrifuge operational speed signal) and the minimum recycle flow rate setpoint (100 gpm 200 gpm, normally 200 gpm).}$
      - 2) If  $x$  is less than 1,042 gpm then setpoint is 1.5 mgd.

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- 3) If x is greater than 1,042 gpm but less than 2,083 gpm then setpoint is 3.0 mgd.
- 4) If x is greater than 2,083 gpm then setpoint is 4.5 mgd.
- 5) During operation strategy recalculates x as follows:
  - a) When a Centrifuge reaches operational speed (Centrifuge PLC issues Centrifuge operational speed signal), strategy calculates x including all operating Centrifuges.
  - b) When a centrifuge stops issuing operational speed signal (Centrifuge PLC stops issuing centrifuge operational speed signal), strategy will recalculate x without the centrifuge that has stopped issuing the operational signal.
  - c) When a centrifuge experiences high-high torque conditions and/or high vibration conditions, strategy recalculates x without including the centrifuge that is experiencing high-high torque or high vibration.
  - d) When the operator changes the minimum recycle rate setpoint, strategy recalculates x using the new recycle setpoint value.
  - e) When the thickening Centrifuge Feed Pump Strategy overrides the operator inputted raw solids feed rate setpoint, (see process interlocks in the Thickening Centrifuge Feed Pump Strategy), strategy recalculates x excluding those Centrifuges for which a zero flow rate setpoint has been entered.
  - f) When a Centrifuge experiences high torque conditions, strategy recalculates x using either a zero flow rate setpoint or the minimum flow rate setpoint (as recommended by the Centrifuge manufacturer) for that Centrifuge.
- g. Initiate operation of the software controllers:
  - 1) Control pumps to maintain flow setpoint calculated by DCS or input by the operator. Adjust pump speed in accordance with following variables: Setpoint - 1.5 mgd, 3.0 mgd, or 4.5 mgd, Primary Process Variable - actual raw solids flow in the main discharge header. Controller output will be pump speed. Start the lead pump when the setpoint flow rate equals 1.5 mgd. Start the lead and lag pump when the setpoint flow rate equals 3.0 mgd or 4.5 mgd.



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7. During operation, if a pump fails, strategy switches the lead/lag/standby status of the pumps so that the failed pump is in the standby position. Strategy will issue an alarm and indicate which pump failed and limit flow rate to 3.0 mgd.
8. During operation, to facilitate a bump less transfer from DCS control to local FIC control, if the DCS fails, strategy continuously outputs the lead/lag/standby status to the LCP hand switch until failure. FIC is programmed to assume control with same pump sequence prior to failure of DCS.
9. Process Interlocks: Pumps are stopped upon any of the following events:
  - a. Low sludge level in selected receiving tank(s) (adjustable x-x, initial x).
  - b. Thickening Centrifuge feed loop influent flow rate equals recycle flow rate for time period (adjustable 5 minutes to 15 minutes, initial 10 minutes).
  - c. No Thickening Centrifuge PLC issuing operational speed signal.
  - d. If the following valves are all closed - grit system inlet and/or outlet valve(s), grit separator system bypass valve and emergency storage tank valve.
10. Failure Responses: Upon loss of centrifuge flow signals from other PCMs, continue pumping at the same rate.

**END OF SECTION**

**CONTROL STRATEGIES**

**GRIT REMOVAL**

1.01 GRIT SEPARATORS

- A. Reference P&ID: 76-I-10, 11, 12, 13, 14.
- B. Loop Mission: There are four Grit Separators. Each Grit Separator has a maximum flow rate of 1,040 gpm. The Grit Separator removes grit from the raw solids being fed to the Thickening Centrifuges. The grit is then fed to the Grit Dewatering unit(s). The Grit Separators can be brought in and out of use via DCS control. The Grit Separators will operate in a Lead/Lag-1/Lag-2/Standby operation. To get the most efficiency out of the Grit Separator the separator should be run in a continuous manner.
- C. DCS Manual Control Mode:
  - 1. Open / Close all grit separator isolation and routing valves.
  - 2. Operator to select the Grit Dewatering to be used by opening either 76MV1102 for Grit Dewatering Unit No. 1 or 76MV1107 for Grit Dewatering Unit No. 2.
  - 3. Provide operator selectable IN SERVICE and OUT OF SERVICE status for each grit separator.
- D. DCS Automatic Control Mode:
  - 1. Operator to select Lead/Lag-1/Lag-2/Standby status for grit separators.
  - 2. Lead/Lag-1/Lag-2/Standby operation:
    - a. If the Raw Solids flow setpoint is less than 1,042 gpm then call the Lead unit online.
    - b. If the Raw Solids flow setpoint is greater than 1,042 less than 2,084 gpm then call the Lead and Lag-1 units online.
    - c. If the Raw Solids flow setpoint is greater than 2,084 then call the Lead, Lag-1, and Lag-2 units online.
    - d. If either Lead, Lag-1, and Lag-2 units fails to come online after 0 minutes to 5 minutes (operator adjustable), call the Standby unit online.

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1.02 GRIT DEWATERING

- A. Reference P&ID: 76-I-20, 21.
- B. Loop Mission: There are 2 Grit Dewatering units. The grit is fed from the Grit Separators to the Grit Dewatering unit(s), where the dewatered grit is then deposited on the Screw Conveyor(s). The dewatered grit is dumped into the roll off container(s) as selected by operations. The Grit Dewatering unit(s) is started by the opening of the associated underflow plug valve. Grit Dewatering Unit No. 1 (76-GS-01) is always run in conjunction with Screw Conveyor No. 1 (76-GO-01). Grit Dewatering Unit No. 2 (76-GS-02) is always run in conjunction with Screw Conveyor No. 2 (76-GO-02).
- C. General DCS Functions:
  - 1. Monitor Grit Dewatering Unit(s) for loss of control power.
  - 2. Monitor Screw Conveyor(s) for loss of control power.
  - 3. Monitor Roll Off Container level(s), alarm on High level.
- D. DCS Manual Control Mode:
  - 1. Operator to select Roll Off Container(s) IN SERVICE.
  - 2. Open / Close screw conveyor discharge valves.
- E. DCS Automatic Control Mode: (None).

**END OF SECTION**

**CONTROL STRATEGIES**

**CENTRIFUGE BUILDING**

1.01 THICKENING CENTRIFUGE POLYMER FEED PUMPS

- A. Reference P&ID 76-I-210, 211, 212, 213, 214, 215.
- B. Loop Mission: The thickening polymer system consists of two polymer day tanks and five variable speed thickening polymer feed pumps. There will be one pump for each thickening centrifuge. The thickening polymer system will be used to inject polymer into the raw biosolids flow prior to thickening the bio solids using the thickening centrifuges. The thickening polymer system can be automatically controlled by the DCS. The thickening polymer system can be manually controlled by the operator via the DCS.
- C. DCS Manual Control Mode:
  - 1. Open/Close all polymer system routing valves.
  - 2. Start/Stop polymer day tank mixers.
  - 3. Open/Close all polymer pump isolation valves.
- D. DCS Automatic Control Mode:
  - 1. When the DCS is operating, automatic control of each polymer feed pump will be performed by a software flow controller. Each pump will be controlled to maintain a dosage setpoint (input by the operator). For each feed pump the controller will operate as follows:
    - a. Software ratio module will calculate the polymer flow setpoint: (dosage rate) (biosolids flow to the associated centrifuge).
    - b. Adjust pump speed in accordance with the following variable: Setpoint - calculated polymer flow setpoint, Primary Process Variable - actual polymer flow,
    - c. Controller will output a speed setpoint to the associated pump through a hard wired signal.
  - 2. When the DCS is operating, for standby operation (Pump No. 1 to pump to a centrifuge other than Centrifuge No. 1), control of Pump No. 1 will be performed by a software controller in the DCS. The software controller will operate as follows:
    - a. Software ratio module will calculate the polymer flow setpoint: (polymer dosage rate) (sludge flow to the centrifuge to which Pump No. 1 is to pump)

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- b. Adjust pump speed in accordance with the following variable:  
Setpoint - calculated polymer flow setpoint, Primary Process  
Variable - actual polymer flow.
  - c. DCS will input the speed setpoint to Pump No. 1.
  - d. Start / Stop signal from the centrifuge to which Pump No. 1 is  
pumping will enable/disable the setpoint transfer.
  - e. During operation, strategy will pump from the first polymer  
day tank until the tank reaches low level, strategy will then  
open the second day tanks outlet valves, close the first day  
tank's outlet valves and open its' inlet valve (When the inlet  
valve is open the tank can be filled. Filling of the day tank will  
be performed by another strategy). Day tank inlet valve will  
close on high level. When the second day tank reaches low  
level, strategy will open the outlet valves of the first day tank,  
close the outlet valves of the second day tank and open its'  
inlet valve. This will be a continuous cycle.
  - f. If a day tank is selected to be taken OUT OF SERVICE,  
strategy will close the inlet and outlet valves from the tank,  
stop the mixer of the tank, inhibit control of the valves and the  
mixer from the DCS and indicate that the tank is OUT OF  
SERVICE. When the tank is selected to be placed back IN  
SERVICE, strategy will reestablish control of the valves and  
the mixer from the DCS.
3. Process Interlocks: Thickening centrifuge polymer feed pumps to  
shut down when both polymer day tanks are at low level alarm.  
Strategy will perform this shut - down by inputting a zero dosage  
setpoint in place of the operator inputted values. Zero setpoint will  
not become the default. Strategy will issue an alarm message to the  
operator indicating that the thickening centrifuge polymer day tanks  
are at low level.
4. Failure response:
- a. Upon loss of DCS the thickening polymer feed pump(s) will  
shut down.
  - b. Upon loss of thickening feed pump flow signal polymer feed  
rate to stay the same.

**END OF SECTION**

**CONTROL STRATEGIES**

**CENTRIFUGE BUILDING**

1.01 THICKENING CENTRIFUGE FEED PUMPS

- A. Reference P&ID: 76-I-30, 31, 32, 33, 34, 35.
- B. Loop Mission: There are five variable speed Thickening Centrifuge (TC) feed pumps. There is one pump for each of the five TCs. The feed pumps transfer raw sludge from the TC feed pump feed loop to the centrifuges. The feed pumps can be automatically controlled by the DCS. The feed pumps can be manually controlled by the operator via the DCS.
- C. DCS Manual Control Mode: Open/Close all feed pump isolation and routing valves. Start/Stop control of each feed pump.
- D. DCS Automatic Control Mode:
  - 1. When the DCS is operating, automatic control of each raw solids pump will be performed by a software flow controller. Each pump will be controlled to maintain a flow setpoint (adjustable 500 gpm to 1,200 gpm).
  - 2. Adjust pump speed in accordance with the following variable:  
Setpoint - flow setpoint, Primary Process Variable - actual flow.
  - 3. If the centrifuge experiences a high torque condition, strategy will stop the pump by energizing a normally closed disable / enable discrete output to the feed pump drive. This output will remain in the disable state until the alarm condition is cleared and the operator initiates a reset.
  - 4. When the DCS is operating, in standby operations (feed pump to pump to a centrifuge other than the centrifuge of the same number), control of the feed pump will be performed by a software flow controller in the DCS. The software flow controller will operate as follows:
    - a. DCS will input the speed setpoint to the standby pump.
    - b. Start/stop signal from the centrifuge to which the standby pump is pumping will start/stop the standby feed pump.
    - c. When the standby TC feed pump is being used to pump to a centrifuge other than the centrifuge of the same number, if that centrifuge experiences high torque conditions, strategy will stop the pump. This will remain in the disable state until the alarm condition is cleared and the operator initiates a reset.

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5. Process Interlocks:
  - a. Strategy will stop the pumps if the solids level in the thickened solids wetwell reaches the high level switch.
  - b. Strategy will stop the pumps. This output will remain in the disable state until the alarm condition is cleared and the operator initiates a reset.
6. Failure Response: Upon loss of PCM the thickening centrifuge feed pump will stop pumping.

**END OF SECTION**

**CONTROL STRATEGIES**

**CENTRIFUGE BUILDING**

1.01 THICKENING CENTRIFUGES

- A. Reference P&ID: 76-I-41, 42, 43, 44, 45.
- B. Loop Mission: There are five thickening centrifuges. The thickening centrifuges receive raw sludge in a concentration of 0.5 percent to 1.3 percent solids and thicken the sludge to 6.5 percent solids. The thickened sludge will be discharged to the thickened solids wetwell. The centrate will be discharged to the wastewater pump station. The thickening centrifuges can be automatically controlled by the DCS. The thickening centrifuges can be manually controlled by the operator via the DCS.
- C. General DCS Function:
  - 1. Use Ethernet communications to allow for DCS control and interaction with the thickening centrifuge(s).
    - a. Display thickening centrifuge status.
    - b. Display and notify operations of thickening centrifuge alarms.
    - c. Display operator adjustable thickening centrifuge setpoints.
- D. DCS Manual Control Mode:
  - 1. Set thickening centrifuge control mode.
    - a. Differential speed mode.
    - b. Auto torque mode.
  - 2. Start / Stop each thickening centrifuge.
  - 3. Open/Close motor operated routing valves.
  - 4. Start / Stop each thickening centrifuge feed pump.
  - 5. Reset a thickening centrifuge.
- E. DCS Automatic Control Mode:
  - 1. Operator to select thickening centrifuge strategy.
    - a. Operator to select centrifuge(s) to operate from the Thickening Centrifuge Control Strategy.
    - b. For each centrifuge selected for operation, operator to input polymer dosage rate of 0.01 and raw solids flow setpoint (adjustable 500 gpm to 1,200 gpm). A setpoint below 500 gpm will cause the thickening centrifuge sludge feed pump to be disabled.



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- c. If polymer is to be used, operator to select first polymer day tank to operate.
- d. If Polymer Pump No. 1 or Thickening Centrifuge No. 1 Sludge Feed Pump is to be used to pump to a centrifuge other than Centrifuge No. 1, then the operator is to select standby operation which will prompt operator to select if Polymer Pump No. 1 and/or Thickening Sludge Feed Pump No. 1 is to be used to feed a centrifuge other than Centrifuge No. 1.
- e. If Polymer Pump No. 1 is to be used to pump to a centrifuge other than Centrifuge No. 1 then operator to select centrifuge to which Pump No. 1 is to pump.
- f. If any of Thickening Centrifuge Sludge Feed Pumps Nos. 1 through 5 is to be used to feed a centrifuge other than the centrifuge with the same number, then the operator is to select standby operation which will prompt operator to select which Thickening Sludge Feed Pump is to be used to feed a centrifuge other than the centrifuge of the same number.
- g. If one of the Thickening Centrifuge Sludge Feed Pump Nos. 1 through 5 is to be used to pump to a centrifuge other than the centrifuge of the same number, the operator will verify that all relevant manual valves have been adjusted in the field to allow the thickening centrifuge sludge feed pump to pump to a different numbered centrifuge.
- h. Operator to adjust back drive DIFFERENTIAL SPEED setpoint (0.1 rpm to 10.0 rpm).
- i. DCS to scan all I/O associated within the strategy and indicate ready or not ready. The centrifuge sludge feed pump DCS AUTO/MANUAL mode selection will not be a factor in determining if the strategy is ready or not ready.
- j. If Polymer Pump No. 1 is to pump to a centrifuge other than Centrifuge No. 1 then strategy will:
  - 1) Open the Pump No. 1 discharge line valve that goes to the discharge line of the pump that Pump No 1 is replacing.
  - 2) Close the discharge isolation valve of the pump that Pump No. 1 is replacing.
  - 3) (Strategy for control of this pump in this mode of operation is described in the thickening polymer system strategy).
- k. If Thickening Centrifuge Sludge Feed Pump Nos. 1 through 5 is selected to pump to a centrifuge other than a centrifuge of the same number then strategy will:
  - 1) Operations to verify that the manual valves have been configured for standby operation.
  - 2) Open the selected pump's discharge valve and bypass valve so that the sludge feed will be fed into the bypass header.

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- 3) Close the discharge isolation valve of the pump that the selected pump is replacing and open the bypass valve.
- 4) (Strategy for control of this pump in this mode of operation is described in the thickening centrifuge sludge feed pumps strategy).
- l. When the operator initiates startup the strategy will:
  - 1) Open first polymer day tank's outlet valves; upon confirmation.
  - 2) Check for open status of polymer injection line hand valves for each selected centrifuge. There are two injection lines, each with a hand valve. If at least one valve is not open, strategy will initiate an alarm to the operator, upon confirmation.
  - 3) Initiate control of pumps.
- m. After the strategy has started the operator will have the option to select a standby sludge feed pump and/or Thickening Centrifuge Polymer Feed Pump No. 1 for standby operation or remove them from standby operation without stopping the strategy.
  - 1) Operations will pause the centrifuge operation by placing the centrifuge in suspend mode. Stopping the sludge and polymer feeds without stopping the centrifuge.
  - 2) Operations will select the centrifuge to which the centrifuge sludge feed and/or polymer feed is to pump.
  - 3) Strategy will stop (disable) the centrifuge sludge feed pump for the selected centrifuge and position valves as described above to place the standby pump(s) into operation.
  - 4) After verification, the strategy will resume operations.
  - 5) When the Operator stops the Thickening Centrifuge Strategy, upon confirmation of the Stop signal, the strategy will stop the centrifuge sludge and polymer feed pumps and the centrifuge will begin its flushing sequence. When the flushing sequence is complete the Centrifuge will shut down.
- n. When the operator selects to place a centrifuge OUT OF SERVICE, strategy will inhibit control of the centrifuge. When selected to be placed back IN SERVICE, strategy will reestablish control of the centrifuge from the DCS.
2. Failure Responses: Upon failure of Process Control Module (PCM) centrifuge control will shut down the centrifuge.

**END OF SECTION**

**CONTROL STRATEGIES**

**CENTRIFUGE BUILDING**

**1.01 THICKENED SOLIDS TRANSFER PUMPS**

- A. Reference P&ID: 76-I-51, 52, 53, 54.
- B. Loop Mission: There are three constant speed thickened solids transfer pumps are to operate in a two-pump program (lead/lag) with one pump in standby. The pumps will transfer the thickened solids from the thickened solids wetwell to the digesters. The thickened solids transfer pumps can be automatically controlled by the DCS. The thickened solids transfer pumps can be manually controlled by the operator via the DCS.
- C. DCS Manual Control Mode:
  - 1. Open / Close all thickened solids transfer pump isolation valves.
  - 2. Start / Stop of each pump.
- D. DCS Automatic Control Mode:
  - 1. Operator to select thickened solids transfer pump strategy.
    - a. Operator to enter wetwell level setpoint.
    - b. Operator to select lead/lag/standby status for pumps (123/231/312).
    - c. DCS to scan all I/O associated with the strategy and indicate ready or not ready.
    - d. If ready, operator to initiate control of pumps.
    - e. Pumps will be controlled as follows:
      - 1) Start the lead pump at the level setpoint.
      - 2) Start the lag pump at level equal to: (level setpoint + 5 feet).
      - 3) Stop the lag pump at level equal to: (level setpoint + 1 feet).
      - 4) Stop the lead pump at level equal to: (level setpoint – 2 feet).
    - f. During operation, if a pump fails, strategy will switch the lead/lag/standby status of the pumps so that the failed pump is in the standby position. Strategy will issue an alarm and indicate which pump failed.

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- g. During operation, to facilitate a bump less transfer from DCS control to local LIC control if the DCS fails, strategy will continuously output the lead/lag/standby status to the LCP hand switch until failure. Level Indicating Controller (LIC), to be programmed to assume control with same pump sequence prior to failure of DCS.
- 2. Process interlocks.
- 3. Failure responses: Upon loss of thickened solids wetwell level 76LIT2260 use 76LSH2261 to stop all thickening centrifuge feed pumps leaving the centrifuge running and use 76LSL2261 to stop thickened solids transfer pumps.

**END OF SECTION**

**CONTROL STRATEGIES**

**CENTRIFUGE BUILDING**

**1.01 DEWATERING CENTRIFUGE FEED PUMPS**

- A. Reference P&ID: 76-I-100, 101, 102, 103, 104, 105, 106, 107, 108.
- B. Loop Mission: There are eight variable speed dewatering centrifuge (DC) feed pumps. There is one pump for each of the eight DCs. The feed pumps transfer digested biosolids from the DC feed pump feed loop to the centrifuges. The feed pumps can be automatically controlled by the DCS. The feed pumps can be manually controlled via the DCS.
- C. DCS Manual Control Mode:
  - 1. Open/Close all feed pump isolation and bypass valves.
  - 2. Add manual raising and lowering of pump speed output and setpoint.
- D. DCS Automatic Control Mode:
  - 1. In AUTO mode each pump can be used to pump to its designated centrifuge only.
  - 2. When the DCS is operating, and START/STOP control is selected by an operator to AUTO mode the pump will be started by DCS when a “Centrifuge Ready for Feed” signal is received from the corresponding centrifuge PLC via the Ethernet datalink.
  - 3. When the DCS is operating, and SPEED CONTROL is selected by an operator to AUTO mode control of each Dewatering Centrifuge feed pump speed will be performed by a software flow controller. Each pump will be controlled to maintain a flow setpoint entered by the operator as follows:
    - a. Adjust pump speed in accordance with the following variable: Setpoint - flow setpoint, Primary Process Variable - actual flow. Controller will modulate the speed demand output signal that is hardwired directly to the associated VFD.
    - b. If the “Centrifuge Ready for Feed” is set to 0 by the centrifuge PLC (NOT READY status) or if the datalink between the DCS and PLC is lost strategy will set the speed demand to a 0 and stop the feed pump.
  - 4. Process Interlocks:
    - a. Strategy will stop the centrifuge feed pump and issue an alarm, when a hopper level failure is detected for the hopper associated with that feed pump.

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- b. Strategy will stop the centrifuge feed pumps and issue an alarm - if the level of solids in the dewatering biosolids hopper associated with the centrifuge to which the pump is pumping reaches the high level setpoint of 50 percent (presently set to try to maintain a 35 percent level).
- c. Strategy will stop all running feed pumps when a High-High Level alarm is received from the Centrate Wetwel.
- d. After this event, Operator must reset the sludge pump disable once the centrifuge bin High-High level has been cleared.
- e. If the “Centrifuge Ready for Feed” is set to 0 by the corresponding centrifuge PLC (NOT READY status) or if the datalink between the DCS and PLC is lost the feed pumps will be commended to stop and prevented from starting until the datalink is restored AND “Centrifuge Ready for Feed” signal is received.

**END OF SECTION**

**CONTROL STRATEGIES**

**CENTRIFUGE BUILDING**

**1.01 DEWATERING CENTRIFUGE POLYMER FEED PUMPS**

- A. Reference P&ID: 76-I-220, 221, 222, 223, 224, 225, 226, 227, 228.
- B. Loop Mission: The dewatering polymer system consists of two polymer day tanks and eight variable speed dewatering polymer feed pumps. One pump for each dewatering centrifuge. The dewatering polymer system will be used to inject polymer into the digested biosolids flow prior to dewatering the biosolids using the dewatering centrifuges. The dewatering polymer system can be automatically controlled by the DCS. The dewatering polymer system can be manually controlled by the operator via the DCS.
- C. DCS Manual Control Mode:
  - 1. Open / Close all polymer system crossover valves.
  - 2. Start / Stop polymer day tank mixers.
  - 3. Open / Close all polymer pump isolation valves.
  - 4. Manual speed control of feed pump
- D. DCS Automatic Control Mode:
  - 1. When the DCS is operating, and START/STOP control is selected by an operator to AUTO mode the pump will be started by DCS when the same centrifuge's Sludge Feed Pump running signal is received and corresponding sludge flow is above a minimal value (exact value TBD).
  - 2. When the DCS is operating, and SPEED CONTROL is selected by an operator to AUTO mode control of each Dewatering Centrifuge polymer feed pump speed will be performed by a software flow controller. Each pump will be controlled to maintain a dosage setpoint (input by the operator). For each feed pump the controller will operate as follows: Initial condition is 0.06.
    - a. Software ratio module will calculate the polymer flow setpoint: (dosage rate) (Biosolids flow to the associated centrifuge). Set at 0.06.
    - b. Adjust pump speed in accordance with the following variable: Setpoint calculated polymer flow setpoint, Primary Process Variable - actual polymer flow.

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- c. Controller will output a speed setpoint to the associated hardwired controller in the centrifuge control panel (the speed setpoint will go through the hardwired flow controller when it's in the computer position) to the pump.
3. During operation, strategy will pump from the first polymer day tank until the tank reaches low level, strategy shall then open the second day tanks' outlet valves, close the first day tank's outlet valves and open its' inlet valve (When the inlet valve is open the tank can be filled. Filling of the day tank will be performed by another strategy). Day tank inlet valve will close on high level. When the second day tank reaches low level, strategy will open the outlet valves of the first day tank, close the outlet valves of the second day tank and open its' inlet valve. This will be a continuous cycle. Initial conditions – Low is 3.0, High is 8.0.
4. The day tank mixer will not normally be used for Mannich polymer. Its control will be switched to manual. It will be turned on at the discretion of the operator depending on the history of the original mixed batch of polymer.
5. If a day tank is selected to be taken OUT OF SERVICE, strategy will close the inlet and outlet valves from the tank, stop the mixer of the tank, inhibit control of the valves from the DCS and indicate that the tank is OUT OF SERVICE. When the tank is selected to be placed back IN SERVICE, strategy will re-establish control of the valves and the mixer from the DCS.
6. Process Interlocks:
  - a. Dewatering centrifuge polymer feed pumps to pause or standby when both polymer day tanks are at low level alarm. (Physical switches only.) Strategy will perform this step by inputting a zero dosage setpoint in place of the operator inputted values. Zero setpoint will not become the default. Strategy will issue an alarm message to the operator indicating that the dewatering centrifuge polymer day tanks are at low level.
  - b. One tank OUT OF SERVICE and other tank that is IN SERVICE can be refilled while tank is still in use.

**END OF SECTION**



**CONTROL STRATEGIES**

**DIGESTER COMPLEX**

**1.01 DIGESTER FEED LINES**

- A. Reference P&ID: 80-I-3, 53, 103.
- B. Loop Mission: Each digester that is ON-LINE to receive thickened biosolids or digested sludge will be fed thickened biosolids one at a time, in a repeating cycle. Each digester will be fed a set quantity of biosolids then the next digester will be fed a set quantity. The cycle will be controlled by opening and closing appropriate digester inlet header valves. In order to feed the selected digester, the digester mix pump(s) must be on.
- C. DCS Manual Control Mode: Open / Close all feed isolation and bypass valves.
- D. DCS Automatic Control:
  - 1. DCS to monitor and record the following:
    - a. Flow to each digester.
    - b. Open/close, thermal overload, valve torque and hand switch status of all routing and isolation valves.
    - c. Open/close status for all hand valves.
  - 2. If more than one digester is to be IN SERVICE ON-LINE, operator to select digester feeding cycle load (adjustable 1,000 gallons to 10,000 gallons) (The digesters will be fed in a cycle, one at a time. Each digester will be fed the entered cycle load then the next digester will be fed).
  - 3. Before feeding an IN SERVICE ON-LINE digester. Confirm the mix pumps are on. If the mix pumps are not on strategy will issue an alarm and indicate the pump status.

**END OF SECTION**

**CONTROL STRATEGIES**

**DIGESTER COMPLEX**

**1.01 DIGESTER MIX PUMPS**

- A. Reference P&ID: 80-I-1, 3, 10, 11, 12, 51, 53, 50, 61, 62, 101, 103, 110, 111, 112.
- B. Loop Mission: While in the digesters, the biosolids will be mixed using the mix pumps. The mix pumps can be automatically controlled by the DCS. The mix pumps can be manually controlled by the operator via the DCS.
- C. DCS Manual Control Mode:
  - 1. Open/close all routing and isolation valves.
  - 2. Start/stop of each digester mix pump.
- D. DCS Automatic Control Mode:
  - 1. For each digester to be put IN SERVICE ON-LINE, operator to:
    - a. Select two lead mix pumps (remaining pump become standby).

**END OF SECTION**

**CONTROL STRATEGIES**

**DIGESTER COMPLEX**

**1.01 DIGESTER RECIRCULATION PUMPS**

- A. Reference P&ID: 80-I-1, 2, 51, 52, 101, 102.
- B. Loop Mission: While in the digesters, the biosolids will be mixed using the recirculation pumps. The recirculation pumps can be automatically controlled by the DCS. The recirculation pumps can be manually controlled by the operator via the DCS.
- C. DCS Manual Control Mode:
  - 1. Open/close all routing and isolation valves.
  - 2. Start/stop of each recirculation pump.
- D. DCS Automatic Control Mode:
  - 1. For each digester to be put IN SERVICE ON-LINE, operator to:
    - a. Select lead recirculation pump (remaining pump to become standby).
    - b. Enter the setpoint for recirculation flow.
  - 2. While a digester Strategy is Running:
    - a. Start the lead recirculation pump and two lead mix pumps when the biosolids level in the digester is at or above El. 21.3 feet. Stop both recirculation pumps and all mix pumps when the biosolids level in the digester is below El. 20.3 feet. (Note: A 60 second delay timer will start before the valves are closed and the pump is stopped).
    - b. If the lead recirculation pump fails, the standby pump will start; upon confirmation, the failed pump will stop and an alarm will be issued.

**END OF SECTION**

**CONTROL STRATEGIES**

**DIGESTER COMPLEX**

1.01 DIGESTER AXIAL PUMPS

- A. Reference P&ID: 80-I-1, 20, 21, 22, 51, 70, 71, 72, 101, 120, 121, 122.
- B. Loop Mission: While in the digesters, the biosolids will be mixed using the axial flow pumps. The axial flow pumps can be automatically controlled by the DCS. The axial flow pumps can be manually controlled by the operator via the DCS.
- C. DCS Manual Control Mode:
  - 1. Open/close all routing and isolation valves.
  - 2. Start/stop of each axial pump
- D. DCS Automatic Control Mode:
  - 1. Start the axial pumps when the biosolids level in the digester is at or above 33.8 feet. with deadband of 0.05 feet. Stop the axial pumps when the biosolids level in the digester is below 33.0 feet. Note: 300 second delay before active pump can be restarted.
  - 2. If an axial pump discharge pressure exceeds the high pressure setpoint (as -20 psi DB=1 recommended by the pump manufacturer), strategy will issue alarm, indicate the axial flow pump that is experiencing high discharge pressure and stop that axial pump.
    - a. Note 1: 300 second restart delay on axial pump needs alarm reset, low pressure.
    - b. Note 2: 180 second delay on low flow, 500 gpm.
  - 3. If an axial pump discharge flow falls below the minimum setpoint flow set at 500 gpm, 2.00 DB and 180 second delay (adjustable 0 to 4,400, initial 3,000 gpm), strategy will issue alarm, indicate the axial pump that is experiencing low flow conditions and stop that axial flow pump.

**END OF SECTION**

**CONTROL STRATEGIES**

**DIGESTER COMPLEX**

1.01 BIogas COLLECTION SYSTEM

- A. Reference P&ID: 80-I-250, 251,252, 260, 262.
- B. Loop Mission: The biogas system consists of biogas collection headers, a biogas storage tank, three biogas Compressors (blowers), three biogas flares, five condensate sedimentation traps and three condensate sumps. The biogas will be collected from the three anaerobic digesters, the biosolids storage tanks and then be routed to either the biogas storage tank, the flares, or the Compressors (blowers). Biogas condensate will flow into condensate sedimentation traps, then to condensate collection sumps from which it will be pumped to the wastewater pump station. The biogas system valves can be automatically controlled by the DCS. The biogas system valves can be manually controlled by the operator via the DCS.
- C. General DCS Functions:
  - 1. DCS to monitor and record the following:
    - a. Each tank's biogas flow and pressure.
    - b. Open/close, ready and hand switch status of all routing, inlet and isolation valves.
    - c. Sediment trap low-low and high-high level switch status.
    - d. Total biogas flow and pressure.
    - e. Gas storage tank floating cover level and head space pressure
    - f. Condensate sump low-low and high-high level switch status.
    - g. Open/close status of storage tank outlet valve.
    - h. Open/close status of storage tank pressure relief valve isolation hand valve.
- D. DCS Manual Control Mode: Open/close all routing inlet and isolation valves.
- E. DCS Automatic Control Mode:
  - 1. DCS to monitor and record the following:
    - a. Each tank's biogas flow and pressure.
    - b. Open/close, ready and hand switch status of all routing, inlet and isolation valves.
    - c. Sediment trap low-low and high-high level switch status.
    - d. Total biogas flow and pressure.

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- e. Gas storage tank floating cover level and head space pressure.
- f. Condensate sump low-low and high-high level switch status.
- g. Open/close status of storage tank outlet valve.
- h. Open/close status of storage tank pressure relief valve  
isolation hand valve.

**END OF SECTION**

**CONTROL STRATEGIES**

**DIGESTER COMPLEX**

1.01 BIOGAS COMPRESSORS

- A. Reference P&ID: 80-I-272, 273.
- B. Loop Mission: To provide biogas to the cogeneration system. Changes in gas flow rate to the cogeneration system to not exceed 50 scfm in 15 minutes. Operate biogas recirculation valve to ensure the maximum flow rate of change is not exceeded and the desired flow setpoint is obtained.
- C. DCS Manual Control Mode:
  - 1. Open/close all routing and isolation valves.
  - 2. Start/stop/alternate biogas compressors (blowers). The Inlet valve must be open greater than 35 percent before the Compressor will start.
  - 3. Interlocks that will remain active in DCS Manual mode will include all interlocks that are in place in the DCS Automatic mode.
- D. DCS Automatic Control Mode:
  - 1. Operator to select Lead/Lag/Standby status for biogas compressors.
  - 2. Strategy will open a tank's biogas collection valve when that tank is tagged IN SERVICE from the DCS and close a tank's biogas collection valve when that tank is tagged OUT OF SERVICE from the DCS.
  - 3. When the Biogas Storage Tank Level Transmitter (80LT2681) indicates the following levels, provide the indicated action:

Level	Level Setpoint	Action	Action	Notes
	<i>80LT2681 (Feet)</i>	Rising level	Falling Level	
A	16.0	Open Biogas Discharge Valve to open and Position Biogas Compressor Inlet Valve to Full Open		1

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Level	Level Setpoint	Action	Action	Notes
	D<LEVEL>C	Modulate Biogas Compressor Inlet Valve between MINIMUM setting at "D" and full OPEN at "C" to maintain Biogas Storage Tank level within this range	Modulate Biogas Compressor Inlet Valve between MINIMUM setting at "D" and full OPEN at "C" to maintain Biogas Storage Tank level within this range	2,3,4
B	8.0	Open Biogas Compressor Inlet Valve to MINIMUM position and START Compressor	Position Biogas Compressor Inlet Valve to MINIMUM position	1
C	6.0		STOP Biogas Compressor and then close the Discharge Valve and position Inlet Valve to MINIMUM position	
D	4.0		Initiate Biogas Storage Tank LOW LEVEL ALARM	

Notes:

1. Level Setpoint listed for A, B and C are initial setpoints and shall be adjustable.
2. Provide an adjustable floating deadband for compressor inlet valve modulation (Range: 0.in. to plus/minus 12.in. WC, Initial setting: plus/minus 6.in. WC).
3. Limit amount of compressor inlet valve modulation such that the flow as indicated by 80FIT2673 does not change by more than 50 scfm per five (15) minute interval.
4. Set MINIMUM position of compressor inlet valve opening in the field to correspond to 120% of the compressor surge flow.

4. Provide the indicated action When the Biogas Storage Tank Pressure Transmitter (80PIT2680) indicates the following pressures:

Pressure	Pressure Setpoint	Action	Action	Notes
	80PIT2680 (Inches WC)	Rising Pressure	Falling Pressure	
E	9.0	ENABLE Biogas Compressors		1
F	8.7		Initiate LOW PRESSURE ALARM and DISABLE Biogas Compressors.	

Notes:

1. All Pressure Setpoints listed are initial Settings and shall be adjustable



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5. When Biogas Compressor Discharge Pressure Transmitter (80PIT2671) indicates pressure rising to the High-pressure setpoint (Range 5.0 psig to 6.0 psig, initial setting: 5.5 psig) initiate compressor HIGH DISCHARGE PRESSURE ALARM. Initiate a HIGH-HIGH DISCHARGE PRESSURE ALARM and initiate a compressor shutdown when 80PIT2671 indicates a pressure of 6.1 psig.
6. When Biogas Compressor Discharge Pressure Transmitter (80PIT2671) indicates pressure falling to allow pressure setpoint (Range: 2.0 psig to 3.0 psig; initial setting 2.5 psig) for more than an adjustable period of time (Range: 0 seconds to 30 seconds Initial setting: 10 seconds) while a compressor is operating, initiate a LOW DISCHARGE PRESSURE ALARM, STOP the compressor, close the compressor discharge valve and position the inlet valve at the Minimum position.
7. When Compressor Inlet Pressure Transmitter (80PIT2670) indicates pressure falling to a low pressure setpoint (Range: 8.5 inch WC to 9.5 inch WC, initial setting 8.7 inch WC) for more than an adjustable time period (Range: 0 seconds to 30 seconds. Initial setting 10 seconds) while compressor is operating, initiate a COMPRESSOR LOW INLET PRESSURE Alarm, STOP the compressor, close the compressor discharge valve and set the inlet valve to minimum setpoint.
8. When the Compressor Discharge Temperature Transmitter (80TIT 2672) indicates temperature rising to the high temperature setpoint (Range: 120 degrees F to 190 degrees F., initial setpoint 180 degrees F) initiate a HIGH COMPRESSOR DISCHARGE TEMPERATURE ALARM and inhibit further increases in the biogas flow by inhibiting the inlet valve from modulating further open until the HIGH COMPRESSOR TEMPERATURE ALARM has been cleared. When the Compressor Discharge Temperature Transmitter (80TIT2672) indicates temperature rising to the high-high temperature setpoint (Range: 200 degrees F to 210 degrees F, initial setting 200 degrees F) initiate a HIGH-HIGH COMPRESSOR DISCHARGE TEMPERATURE ALARM, initiate a staged compressor shutdown by modulating the inlet valve to reduce the Discharge Flow in 10 scfm increments every 5 minutes to the minimum Flow Position and then stop the compressor and close the discharge valve.
9. Alternate Lead Compressor on each start. Upon being stopped, lock out the Compressor for an adjustable time period (Range: 0 minutes to 60 minutes, initial setting: 15 minutes).

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10. When a compressor is given the command to START, the strategy shall OPEN and move the inlet valve to the Minimum Flow position. After confirmation that the valve is in the minimum flow position, start the compressor after an adjustable time delay (Range: 0 seconds to 60 seconds initial setting 15 seconds). Maintain this initial flow for 5 minutes before modulating the inlet valve as described above at paragraph B.
11. When the flow setpoint is greater than the Lead gas compressor can provide start the Lag gas compressor. Modulate the recirculation valve (80MV1679) to achieve desired setpoint while ensuring the flow rate doesn't exceed the system's allowable rate of change.

**END OF SECTION**

**CONTROL STRATEGIES**

**DIGESTER COMPLEX**

1.01 BIOGAS FLARES

- A. Reference P&ID: 80-I-275, 277, 279, 280.
- B. Loop Mission: The biogas flares will operate in a Lead/Lag-1/Lag-2 flare program with the Lag-2 flare acting as standby. The biogas flares will be monitored and controlled by the DCS. When not in operation, flares can be tested manually. The flares are controlled by either a start / stop signal from the DCS or when there is sufficient pressure meet the start pressure setpoint. Existing Flares 1 (80-GFL-01) and 2 (80-GFL-02) start and stop setpoints are set locally inside the flare control panel(s). Flare 3 (80-GFL-03) start / stop gas setpoint can be set from the DCS. By adjusting Flare 3 (80-GFL-03) start / stop pressure setpoints to be either above or below the manually set values for existing Flares 1 (80-GFL-01) and 2 (80-GFL-02) Flare 3 will be either the Lead or Lag 2 flare in the event of a DCS outage.
- C. DCS Manual Control Mode:
  - 1. Open/close biogas inlet valves.
  - 2. Manually test flare(s).
  - 3. Start/Stop Biogas flare local control panels.
  - 4. Reset Biogas flare local control panels.
- D. DCS Automatic Control Mode:
  - 1. Operator to select Lead/Lag-1/Lag-2 status for flares.
  - 2. Operator to set the Lag-1 and Lag-2 start delay setpoints.
  - 3. Operator to set the Lead/Lag-1/Lag-2 low level shutdown setpoints.
  - 4. With the H-O-C selector switch(s) on the flare local control panel and the flare master control panel in the computer position, the DCS will provide a start/stop signal.
  - 5. When the level in the gas storage tank reaches a high setpoint level, the DCS issues a start signal to the lead flare. If the high setpoint level persists for 30 seconds to 60 seconds (operator adjustable) then Lag-1 will start, If the high setpoint level continues to persist for an additional 30 seconds to 60 seconds (operator adjustable) then Lag-2 will start.
  - 6. The DCS will stop the flares when the gas level drops below the Lead/Lag-1/Lag-2 low level setpoint(s).

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7. When the Cogen system is not in operation the Lead/Lag-1/Lag-2 low level setpoints should be spaced much further apart allowing the Lead and Lag-1 flare(s) to stay on continuously as required by the biogas production.
8. When the Biogas Storage Tank Level Transmitter (80LT2681) indicates the following levels, provide the indicated action:

Level	Level Setpoint	Action	Action	Notes
	<i>80LT2681</i>	Rising level	Falling Level	
A	20.0	Initiate Biogas Storage Tank High Level Alarm And Start Lag-2 Biogas Flare		
B		START Lag-1 Biogas Flare		1
C	18.0	START Lead Biogas Flare		1
D			STOP Lag-2 Biogas Flare	1
E			STOP Lag-1 Biogas Flare	1
F	16.0		STOP Lead Biogas Flare	1
Notes:				
1. All Level Setpoints listed are initial Settings and shall be adjustable				

9. Provide the indicated action When the Biogas Storage Tank Pressure Transmitter (80PIT2680) indicates the following pressures:

Pressure	Pressure Setpoint	Action	Action	Notes
	<i>@ 80PIT2680 (Inches WC)</i>	Rising Pressure	Falling Pressure	
A	13.0	Initiate HIGH HIGH PRESSURE ALARM and START the Lag-2 Biogas Flares		
B	12.5	START the Lag-1 Biogas Flares		1
C	12.0	Initiate HIGH PRESSURE ALARM and START Lead Biogas Flare		1
D	11.1		STOP Lag-2 Biogas Flare	1

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Pressure	Pressure Setpoint	Action	Action	Notes
E	11.0		STOP Lag-1 Biogas Flare	1
F	10.0		STOP Lead Biogas Flare	1
Notes:				
1. All Pressure Setpoints listed are initial Settings and shall be adjustable				

**END OF SECTION**

**CONTROL STRATEGIES**

**CENTRATE PUMP STATION**

1.01 CENTRATE PUMPS

- A. Reference P&ID: 94-I-10, 15, 16, 17.
- B. Loop Mission: There are three variable speed centrate pumps. The pumps will transfer centrate from the centrate pump station wetwell to the centrate force main which discharges to NCWRP Influent Pump Station drop structure, from there the centrate flows by gravity to the Point Loma Wastewater Treatment Plant. The pumps can be automatically controlled by the DCS. The pumps can be controlled manually by the operator via the DCS. The Centrate Wetwell system matches the pump rate with the inflow rate which due to the small size wetwell. The wetwell becomes an extension of the centrate pipeline. Each pump has a maximum factory design capacity of 2,510 gpm.
- C. General DCS Functions:
  - 1. The Centrate Pumps VFD's have been provided with Modbus/TCP communications along with hardwired I/O. Provide the following VFD parameters to the DCS for each drive:
    - a. Motor Current.
    - b. Motor Voltage.
    - c. Motor Power (kW).
    - d. Power Factor Applied to Motor.
- D. DCS Manual Control Mode:
  - 1. Open/close centrate wetwell inlet sluice gate.
  - 2. Start/stop and adjust speed of each centrate pump. (To enable the operator to manually adjust the speed of a pump from the DCS, the DCS will have to issue a manual speed enable signal to the speed relay for that pump.)
  - 3. Open/close pump isolation valves.
- E. DCS Automatic Control Mode:
  - 1. Operator to select centrate pump station strategy.
    - a. Operator to select lead/lag/standby status for the pumps.

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- b. The operator will select one of six matrices 123 / 231 / 312, 1/3/2, 2/1/3, 3/2/1 for the lead, lag and standby operation of the Centrate Pumps. To enter the selection, click on the desired button, followed by the “Confirm” button. (Graphic No. 2627). Check that mode select is in DCS.
- c. Select level transmitter to use for level control, other level transmitter is then the automatic backup level. DCS is in control.
- d. DCS to scan all I/O associated with strategy and indicate ready or not ready.
- e. Once the Strategy Ready button is illuminated, the Start button becomes enabled and may be selected. Once the START button is selected, and initiates the strategy.
- f. If ready, operator to initiate startup strategy which will:
- g. Open the centrate wetwell inlet sluice gate.
- h. Upon open confirmation of the sluice gate, initiate centrate pump control.
- i. The DCS will control the centrate pumps by a software level controller. Control will be as follows:
  - 1) One Pump Operation:
    - a) At Invert elevation of 36-inch centrate pipe, set low level alarm at elevation 4.7 feet (adjustable).
    - b) Stop lead pump on falling level at elevation 4.9 feet (adjustable).
    - c) Start lead pump at minimum speed on rising level at elevation 5.03 feet (adjustable) and vary speed of lead pump to maximum speed at elevation 5.45 feet (adjustable).
  - 2) Two Pump Operation:
    - a) Start first lag pump on rising level at 5.62 feet (adjustable). Switch speed control to two pump operation. Both lead and first lag pumps to vary speed over new wetwell level range of 5.45 feet to 6.2 feet (adjustable). falling level at 5.35 feet (adjustable).
    - b) Stop first lag pump at 5.67 feet on falling level and return speed control to one pump operation.
    - c) Initially set high level alarm at 6.5 feet (adjustable), in future, when additional centrifuges are installed, reset to 6.3 feet (adjustable).
    - d) Note:
      - (1) Close Gate at 7.0 feet.
      - (2) Start lag at 5.92 feet.
      - (3) Stop Lag at 5.67 feet.

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- (4) Start Lead at 5.10 feet.
  - (5) Stop Lead at 4.90 feet.
- j. During operation, if a pump fails and the Standby pump is IN SERVICE, strategy will switch the lead/lag/standby status of the pumps so that failed pump is in the standby position. Strategy will issue an alarm and indicate which pump has failed.
- k. During operation, to facilitate a bump less transfer from DCS control to local Level Indicating Controller (LIC) control, if the DCS fails, strategy will continuously output the lead/lag/standby pump status to the centrate pump local control panel LIC.
- l. If the operator selects a pump to be taken OUT OF SERVICE, strategy will stop the pump, close the isolation valves for that pump, inhibit control of the pump and the valves from the DCS and indicate that the pump is OUT OF SERVICE. In addition, strategy will switch the lead/lag/standby status of the pumps so that the pump selected to be taken OUT OF SERVICE is in the standby position. When the pump is selected to be placed back IN SERVICE, strategy will re-establish control of the pump and the isolation valves.
- m. The operator will be able to take OUT OF SERVICE and place back IN SERVICE any pump that can be controlled from the DCS. A pump can be selected to be placed OUT OF SERVICE by clicking on the pump which accesses a faceplate providing IN or OUT OF SERVICE capabilities. (Graphic No. 2611).
- n. Any pump in alarm will be highlighted and flashing until the alarm is acknowledged; at which time the light stop flashing. When the alarm is cleared the alarm will be extinguished. Monitoring of mechanical devices related to this strategy is indicated at the bottom of the screen. Devices that are in a state of alarm will be highlighted. (Graphic No. 2627).
- o. At the present time, it is not practical to implement a leak detection system. This concern is presently being addressed with a view to finding a viable solution. The problem lies in the fact that sections of the pipeline flow downhill as well as uphill and the gravitational effect on varying flow has presented flow measurement difficulties.



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- p. During operation, if there is a power failure to the equipment in the pump station, the DCS will remain operational until the UPS Backup Power system is exhausted. In this condition, the DCS will continue to send the DCS 'Computer Ready' signal to the Pumps Local Control Panel. Even though this signal is present when power is restored to the Local Control Panel, the Local Panel always defaults to Local/Manual mode. This condition will persist until the Remote/Local Pushbutton on the Local Panel is pressed. This will require that an operator descend to the Local/Panel to perform this operation.

**END OF SECTION**

PURE WATER PROGRAM  
FOR  
THE CITY OF SAN DIEGO, CALIFORNIA

BIDDING REQUIREMENTS  
AND  
CONTRACT DOCUMENTS

for the construction of the

SAN DIEGO NORTH CITY METROPOLITAN  
BIOSOLIDS CENTER IMPROVEMENTS

VOLUME 4  
SPECIFICATIONS  
SECTION 40 90 03 THROUGH DIVISION 49

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*Issued for Construction*

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CH2M HILL

San Diego, CA

October 2020

Project No. PW\DEN001\050020\695037

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**SECTION 00 01 07**  
**SEALS PAGE**

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SPECIFICATIONS



October 30, 2020

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CITY OF SAN DIEGO  
METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

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July 26, 2019

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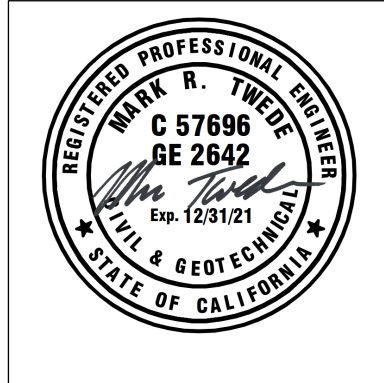
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October 30, 2020

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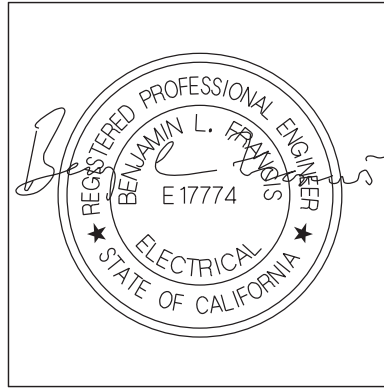
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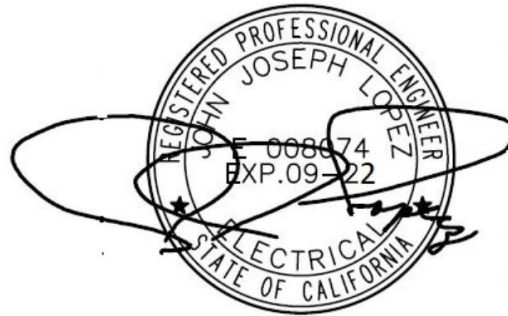
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CITY OF SAN DIEGO  
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October 30, 2020

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**END OF SECTION**

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**END OF SECTION**

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**VOLUME 4**

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**SECTION 40 90 03  
GENERAL REQUIREMENTS**

**PART 1 GENERAL**

**1.01 THE REQUIREMENT**

**A. General:**

1. The distributed control system provider (DCSP) shall furnish all equipment and provide all applicable engineering for a fully functional distributed control system, that complies with the technical requirements of the Contract Documents including, but not limited to, project management, design assistance, coordinate with on-site area contractors, detailed system design and integration, conducting graphic design workshops, equipment supply and shipment, storage, job site delivery, programming and configuration, installation oversight, testing, commissioning and startup, integration with the existing Cleanwater Operation and Management Network (COMNET), and training.
  - a. The DCS Work shall be as defined within Division 01, General Requirements, and these Specifications.
  - b. The Work covered by this section and all of its subparts shall include, but not be limited to, field verification of all existing conditions, engineering and design of system and components, manufacture and/or procurement of all necessary equipment, components, material, transportation, labor, special tools, factory testing, application programming, shipment, storage, and jobsite delivery, operational readiness testing, installation of equipment, system integration, startup operation, site testing, training and documentation, support, maintenance/warranty of a complete, integrated and operational distributed control system (DCS) for the City of San Diego.
  - c. The statements of Work contained herein are necessarily general in nature and should not be construed as an all-inclusive list of devices, equipment, software and services necessary for successful completion of the Work.
  - d. It shall be the responsibilities of the DCSP to coordinate and project manage the Work, as set forth in this section of the specifications, with work and equipment specified under other sections of the specifications, in order to provide a complete and satisfactory installation.

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- e. To ensure that the DCS shall be a standard system of Emerson Process Management, Ovation family, with a complete repertoire of pre-existing software modules running in a familiar hardware environment and free from hardware/software incompatibilities.
- f. This section is generic to all facilities and applicable sections shall be delivered for each process segment of the Work as defined in these Specifications and Project Contract Documents.
- g. The DCSP shall be responsible for coordination, installation, and testing of DCS. The Prime Contractor is responsible for termination of I/O signals, power and ground utilities for all DCS equipment. The DCSP shall review and inspect all current designs and all Contract Documents to assess space allocations, power allotments and available grounds. If the DCSP's requirements for power, grounding or spatial requirements differ from that shown within the Contract Documents, the DCSP shall include all required engineering, design and construction details to the Prime Contractor and City's representative immediately.
- h. The DCSP shall be responsible for providing all equipment, installation supervision, engineering, programming, configuration, management and services associated with integrating all instrumentation and control (I&C) devices, and special systems, including foreign device interfaces (FDIs), into the DCS in a transparent and seamless manner. The use of a third party, system house, or system integrators for the above service is not acceptable.
- i. DCSP shall be fully responsible for the implementation, installation, and integration of the DCS as outlined in this section.
- j. The provisions of this section shall apply to all items specified in the various sections of Division 40, Process Interconnections, and all other divisions.
- k. DCSP shall be responsible for interfacing to all existing instrumentation and all other input/output (I/O) devices.
- l. During field functional testing the DCSP shall verify the operation of all instruments and field devices and associated wiring (from instrument/device to DCS) and notify the City's representative and Prime Contractor of any deficiencies that exist.

B. Scope of Work:

- 1. The Work generally consists of the supply of all labor, tools, services and provision of all products required, for a complete, integrated, operational DCS control system in accordance with the Contract Specification and Drawings.

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2. Identify other ongoing projects/systems development that are not part of this Contract. Ensure other ongoing activities, in close proximity or otherwise, do not disturb or interrupt the operation of the existing systems or the work already commissioned or placed into operation. Should any such activity pose a risk to this work or to the system operation, advise the City immediately.
3. In general, the work involves the supply, installation and commissioning of the DCS control system as indicated on Drawings and Specifications, and as defined in the Matrix of Responsibilities below. The following is a summary of the major works:
  - a. Engineer to provide a high-level description of the Project-specific Work including provision of all instruments, hardware, software, network, cabling, and services such as testing, commissioning, training, documentation.
  - b. Following the instructions, provide, test and commission all field instrumentation including field wiring, instrument control panels, and control system hardware including all lightning and surge protection, and all peripheral devices necessary.
  - c. Conduits and Wires:
    - 1) All conduits, including those for the district information network (DIN), plant information network (PIN) and facility information network (FIN), will be furnished and installed by the Contractor. All conductors, including power and grounding for DCSP-furnished equipment will be furnished and installed by the Contractor. DCS grounding will use a special triad grounding system; specifications for this system are provided in the Contract Documents in accordance with the DCSP requirements. All signal conductors, except for PIN and FIN fiber optic and coaxial cables, will be provided and installed by the General Contractor (GC).
    - 2) The PIN and FIN fiber optic and coaxial cables will be furnished, installed, and terminated by the GC. DIN fiber optic cable will be furnished by the GC up to the first termination point within a facility.
    - 3) Cables and conduits for non-DCS communications systems, such as the telephone system, will be furnished and installed by the GC.
  - d. Provide all programming and microprocessor-based instrument configuration.

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- e. Provide all required testing, commissioning and startup services. Allow in the Contract Price, for any additional time deemed necessary to meet the testing and commission requirements.
  - f. Provide factory acceptance testing (FAT) to demonstrate the operational functionality of hardware and communications in accordance with the specifications.
  - g. Provide operational readiness testing (ORT) to demonstrate the correct operation of the control system with both hardware and software in place per specifications.
  - h. Provide performance acceptance test (PAT) to ensure entire system functions properly per specifications.
  - i. Provide all required training in accordance with Specifications.
  - j. Provide warranty services in accordance with contract requirements.
4. Interfacing and Responsibilities of GC and DCSP: The following Table 1 shows the procurement, installation, and labor responsibilities of the DCSP and the GC. All field instrumentation devices and final control elements which are needed to support DCS functionality will be wired to process control modules (PCMs). Table 2 and Table 3 define in greater detail of the responsibilities assigned to the GC and the DCSP.

<b>Table 1: Matrix of Responsibilities - Equipment/Devices/Materials</b>		
<b>Product</b>	<b>Supply</b>	<b>Install</b>
DCS process control modules (PCMs)	DCSP	GC
DCS PIN/FIN hubs and network equipment	DCSP	DCSP
All other communication cables that interconnect DCS equipment	DCSP	DCSP
Instrumentation panels and racks provided by DCSP	DCSP	GC
Panels (including PLCs) and racks provided by GCs	GC	GC
Instrumentation provided by GCs	GC	GC
Instrumentation provided by DCSP within panels (including specialized communications cables required)	DCSP	GC
Interposing relays to interface DCS control commands with equipment controls FIE	DCSP	DCSP
DCS isolated (reference) grounding cables and rods	GC	GC

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<b>Table 2: Matrix of Responsibilities - Wire/Conduit/Terminations</b>			
<b>Description</b>	<b>Supply</b>	<b>Install</b>	<b>Terminate</b>
Power conduits and wire to GC furnished equipment and devices	GC	GC	GC
Power conduits and wire to DCSP furnished equipment and devices	GC	GC	GC
Signal conduits from DCSP or GC furnished instruments to DCSP or GC furnished equipment and device	GC	GC	---
Signal wire/cable from DCSP or GC furnished instruments to DCSP or GC furnished equipment and devices	GC	GC	GC
All conduits associated with the PIN, FIN, DIN and other communication links	GC	GC	----
PIN and FIN fiber optic, unshielded twisted-pair and coaxial cables	GC	GC	GC
Other communications cables from GC-supplied equipment to the DCS	GC	GC	GC
All cable associated with the DIN	DCSP	GC	DCSP
Ground conduits and wire/cable from power panel to PCM or any other DCSP furnished equipment	GC	GC	GC

<b>Table 3: Matrix of Responsibilities - Submittals/Commissioning</b>	
<b>Task</b>	<b>Responsibility</b>
Prepare DCS hardware/installation submittals for PCM	DCSP
Prepare DCS software submittal	DCSP
Provide SAMA functional diagrams	DCSP
Prepare annotated software listings of all GC-furnished PLCs and other programmable equipment	GC

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<b>Table 3: Matrix of Responsibilities - Submittals/Commissioning</b>	
<b>Task</b>	<b>Responsibility</b>
Prepare instrument submittal	GC
Calibrate instruments	GC
Prepare GC panel submittals	GC
Prepare loop drawings to support the termination of all DCS I/O and the installation of all instruments	GC
Coordinate all control systems integration (instrumentation, PLCs, DCS, network, communications and data exchange) amongst various subcontractors	GC
Perform FAT of DCS	DCSP
Perform FAT of GC panels	GC
Perform ORT of DCS	DCSP
Perform ORT test of GC panels	DCSP/GC
Perform loop tests	DCSP/GC
Participate in plant startup	DCSP/GC
Provide DCS information to support GC development of loop drawings	DCSP

1.02 RELATED SECTIONS

- A. The Work described in the following sections also applies to the Work in this section. Other sections of the specifications not referenced below shall also apply to the extent required for proper performance of this Work.
1. Division 01, General Requirements.
  2. Division 26, Electrical.
  3. Division 40, Process Interconnections.
- B. Codes and Standards: The Work shall comply with the current editions of the publication and codes as adopted by the City of San Diego.



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1.03 SPECIFICATIONS, CODES AND STANDARDS

- A. The Work shall comply with the current editions of the publication and codes identified in Section 40 90 04, References, and herein.

1.04 DEFINITIONS

- A. Definitions of acronyms are identified in Section 40 90 05, Definitions.

1.05 SUBMITTALS

- A. The DCSP shall develop and submit within the first 45 days after NTP, a detailed list of submittals required by all Contract Documents for review and approval. The list shall contain the title of each submittal, detailed description of its contents and the applicable reference sections. Submittal shall be grouped, organized and sequenced logically such that it facilitates the City's representative's review process. This requirement extends to all Work required by all other Divisions.
- B. All submittals shall be executed in accordance with Section 01 33 00, Submittal Procedures.
- C. The DCSP shall conduct a pre-submittal conference. At a minimum, the following shall be presented at the conference:
  - 1. A list of equipment and materials required for the applicable submittal content.
  - 2. A list of proposed exceptions to the Specifications and Drawings, along with a brief explanation of each.
  - 3. An exact one-to-one sample of each type of document to be submitted.
  - 4. Any implementation and construction documentation associated with the submittal.
  - 5. A schedule or schedule fragment that applies to the submittal.
- D. The DCSP shall coordinate the Work of the DCS with the Contractor and its subcontractor so that a complete DCS package will be provided inclusive of accurate shop drawings and record drawings. The DCSP shall prepare and submit complete and organized shop drawings, as specified herein. Incomplete or partial submittals are not acceptable. All shop drawings and record drawings shall be submitted in accordance with Section 01 33 00, Submittal Procedures.
  - 1. Plant-wide loop drawing submittal (PLDS) to verify the DCS interfaces with all instrumentation and devices being provided or installed under this Project are to be developed by the Contractor or its subcontractor with the assistance of DCSP. Loop drawings shall define all interfaces

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with equipment provided by the DCSP and as such the DCSP is responsible for providing all necessary information to the Contractor on a timely basis. Loop drawings shall be developed in accordance with existing City Loop Drawing standards, as follows:

- a. The loop drawing shall be composed of three sections:
  - 1) Page 1: A device schedule with a table showing the following:
    - a) Device tag number, with prefix, unit process, ISA tag prefix, tag number, tag suffix.
    - b) Equipment service.
    - c) Device type.
    - d) Location.
    - e) Device manufacturer.
    - f) Model number.
    - g) Specification section number.
    - h) Area contractor (if applicable).
    - i) Submittal number.
    - j) Remarks.
    - k) Data sheet number.
    - l) I/O signal (AI, AO, DI, or DO).
    - m) Signal level.
    - n) Device range.
    - o) Engineering units.
    - p) Process setpoint.
    - q) Loop diagram number.
    - r) Loop drawing file name.
    - s) Interconnect drawing file name.
    - t) For third-party devices, should also include IP (if applicable), module addresses, data registers, I/O tag names (AB), protocols etc.
  - 2) Page 2: Loop drawing meeting the requirements of ANSI/ISA S5.4, except that intermediate terminal junction boxes may omitted and be shown on Page 3 for clarity.
  - 3) Page 3: Abbreviated diagram showing instrument, wire and cable numbers, intermediate terminal junction boxes, and PCM terminations.
2. The DCSP shall augment the content of the Loop Drawings by providing all of the requisite data relating to the DCS. For each DCS I/O, the DCSP shall note on the PLDS the following information:
  - a. PCM number, and physical location.
  - b. Controller number.
  - c. Type of input.
  - d. I/O card location and address.
  - e. All DCS-dependent displayed functions using ISA symbology.
  - f. Drawing reference for DCS software content.

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3. In these Contract Documents all systems, all meters, all instruments, and all other elements are represented schematically, and are designated by symbology as derived from International Society of Automation ISA S5.1 (latest revision). The nomenclature and numbers designated herein and on Drawings shall be employed exclusively throughout shop drawings, and similar materials. Any other symbols, designations, and nomenclature unique to any manufacturer's standard methods shall not replace those prescribed above, used herein, and on Drawings.
  4. All Shop Drawings shall include a City-approved title block. The title block shall include, as a minimum, business name and address, project name, drawing name, revision level, and personnel responsible for the content of the drawing. Loop Drawing submittals shall be submitted in accordance with Section 01 33 00, Submittal Procedures.
- E. The DCS hardware submittal (DCSHS) shall be singular and all inclusive, submitted in accordance with Section 01 33 00, Submittal Procedures. The DCSHS shall include, but not be limited to:
1. A complete set of system diagrams which depict:
    - a. All PCMs, FDIs communication devices, and communication links.
    - b. A one-line showing the designed conduit and wire required to support the power, ground, I/O, and communication requirements of the system.
    - c. A complete I/O database showing all I/Os, annotated in ISA format, which depicts all designed I/O, both external and internal hard-wired and data-linked, inclusive of DCS termination locations.
    - d. A complete one-line diagram showing all power wiring and ground wiring, including UPS power, utility (non-UPS) power and any other external dc or ac sources for each PCM.
  2. A complete set of factory data sheets for every DCS component. This shall include layout drawings that show enclosure details, including seismic mounting, as well as the location of each component within the DCS PCM enclosure. Drawings shall contain a scaled representation of the placement of all DCS equipment being provided under this contract and its spatial relationship to all other equipment (both new and existing) located in the abutting and adjoining areas. All acquired access and clearances associated with the DCS equipment and other equipment must be shown with a statement of compliance to DCSP requirements, NEC, NFPA and other applicable codes.
  3. Detailed installation, mounting and anchoring details for all components and assemblies to be field mounted, including access requirements, conduit connections or entry details shall be provided.

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4. DCSP shall provide seismic calculations for each DCS PCM enclosure, and UPS installation, or other anchored apparatus, based on the proposed mounting arrangement. Installation/mounting/anchoring drawings shall be stamped by a structural engineer registered with the State of California. Each individual anchoring drawing, as well as the seismic calculations drawings, shall be stamped by the structural engineer.
  5. A complete, and detailed, bill of material (BOM) shall be provided. The BOM shall show the factory model number for each component within the DCS.
- F. The DCS network submittal (DCSNS) shall be singular and all inclusive, submitted in accordance with Section 01 33 00, Submittal Procedures. The DCSNS shall include, but not be limited to:
1. A complete set of network diagrams which depict:
    - a. All PCMs, FDI communication devices, and communication links.
    - b. A one-line showing the designed conduit and wire required to support the power, ground, I/O, and communication requirements of the system.
    - c. A complete network design report including IP scheme, traffic planning and control, QoS, configuration of every network equipment including routers, switches and firewalls.
    - d. A complete, and detailed, bill of material (BOM) shall be provided. The BOM shall show the factory model number for each component within the DCS.
  2. A complete set of factory data sheets for every network component.
- G. The DCS software submittal (DCSSS) shall be singular and all inclusive, submitted in accordance with Section 01 33 00, Submittal Procedures. The DCSSS shall include, but not be limited to:
1. A complete set of all available software algorithms.
  2. A complete set of designer control strategies, with annotations provided by the DCSP depicting engineering details to show how all monitoring and control functions, on a loop-by-loop basis, will be accomplished, so operators can understand how the process will respond to their actions through DCS interfaces.
  3. An English narrative of each data acquisition or control loop mission and anticipated action. Narratives shall enumerate the signal point name, signal descriptor, associated PCM number, associated system template displays, system functions activated by signal (i.e., interlocks, alarms, logs, etc.).

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4. A complete set of PCM configuration sheets depicting each loop linkage. Each loop shall be on its own 11-inch by 17-inch sheet.
  5. A complete listing of the DCS data base listing for each data point's relevant parameters such as range, contact orientation, limits, incremental limits, I/O card type, I/O hardware address and assignment, including ALL macros used/created for the software.
- H. The DCS graphic submittal (DCSGS) shall be singular and all inclusive, submitted in accordance with Section 01 33 00, Submittal Procedures. The DCSGS shall include, but not be limited to:
1. One complete set of all WS-accessible displays unique to this Project (i.e., process global, system global, process regional, systems regional, process group, process loop, process component, integrated tutorials, integrated process tutorials, integrated documentation, user assistance).
  2. The DCSP shall ensure that all graphics development, and graphics submittal, conform to the existing graphics layouts, linkages and formats used throughout the COMNET Enterprise.
  3. The graphics submittals shall contain displays in full size color graphic format and replicate the proposed screen contents. All background colors shall be identical to that of the screen content. All displays shall be arranged in a hierarchical order with references to associated WSs.
  4. A system display linkage diagram which defines the hierarchical order and the linkages via page, down, left, right commands.
  5. A definition of each displays data fields by tag numbers, using the existing DCS COMNET standard.
  6. A definition of each displays dynamic elements which shall blink, change color, rotate or change shape in response to process changes, and conforms to the existing COMNET standard.
  7. A listing of all "help" text associated with each display screen, arranges in conformance to the COMNET standard.
- I. The DCSP shall prepare and submit plans for the FAT and ORT. FAT and ORT plans shall be submitted in accordance with Section 01 33 00, Submittal Procedures. The FAT and ORT plans shall each be a single-source document which shall encompasses means and methods for testing the complete DCS for this Project segment.
1. FAT and ORT plans shall provide testing of all DCS hardware, software, graphics, alarms, and network communications.
  2. FAT plan shall elaborate on the simulator to be used to provide proof of performance testing for I&C and DCS functions of the Project.
  3. FAT and ORT plans shall provide sample sheets depicting all I/O, hardware, data links, communication networking, and internally generated alarms and I/O points. Once approved conceptually by the

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City, these forms will be populated and used by the DCSP in the submission of each PCM individual FAT and ORT submittal.

- J. The DCSP shall prepare a complete training plan. The training plan shall be submitted in accordance with Section 01 33 00, Submittal Procedures. The DCS training plan will provide the structure and syllabus for training sessions as follows:
1. Operator Training: Shall provide instruction to operators already familiar with operation of the Enterprise DCS, and shall be tailored to the new I/O, process controls, P&ID schemes, and specialty consideration for the controls for this Project.
  2. Maintenance Training; Shall provide training to City DCS staff on all enhancements to the DCS, new-generation components and all other hardware, software or graphics maintenance requirements, not currently covered in the City's existing Enterprise DCS.
  3. The DCSP shall allow for a minimum of four sessions of each class outlined in the training plan to ensure staff availability and shift-differential considerations are facilitated.
  4. Resumes of all training instructors to be used in DCS training shall be included in the training plan submittal.
  5. After approval of the training plan, the DCSP is responsible for coordinating with City DCS staff, or the City's project representative, to schedule training classes at appropriate times in advance of cut-over and startup.

**PART 2 PRODUCTS**

**2.01 CURRENT TECHNOLOGY**

- A. All hardware and software shall be the product of Emerson Process Management (EPM) and shall be of the Ovation family of DCS.
- B. All products shall be the latest available version of a product or module.
- C. The DCS should use state-of-the-art products in the DCSP's product line. However, the DCSP must ensure that all products used for this Project are compatible, and will fully integrate into the City's existing enterprise-wide COMNET DCS.
- D. Successful operation and calculation shall be demonstrated during FAT, ORT, and functional testing phases.

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2.02 HARDWARE AND SOFTWARE COMMONALITY

- A. Where there is more than one item of similar equipment being furnished, all such similar equipment shall be the of the same Ovation family series.
- B. The DCSP shall submit a plan in case of a discontinued or upgraded product, or other cases where changing technology requires changes in equipment, the DCSP shall submit a Substitute Item Request Form.
- C. All equipment shall be of modular design to facilitate interchangeability of parts and to assure ease of servicing. This interchangeability shall apply to the following components, as a minimum, of the DCS.
  - 1. Processor modules.
  - 2. Bulk memory modules.
  - 3. Communication interface modules.
  - 4. Analog and discrete signal modules.
  - 5. Power supply modules, and UPS devices.
  - 6. Workstations (WSs) and operator interface devices.
  - 7. Software licenses.

2.03 DCS PRIMARY ARCHITECTURAL COMPONENTS

- A. The DCS supplied by the DCSP shall consist of, but not be limited to, the following primary architectural components:
  - 1. Copper communications network (at DCS PCMs, etc.).
  - 2. DCS OS software for alarms, events, monitoring and control, and configuration tools.
  - 3. Historian/historical data recording and reporting.
  - 4. System configuration (application software) of I/O database, displays, control loops, and human-machine interface (HMI) graphics.
  - 5. Process control modules (PCMs).
  - 6. I/O cards and devices, I/O racks, I/O units, remote I/O, and termination cabinets.
- B. In addition, components associated with the DCS are:
  - 1. Services related to DCS (including system maintenance, upgrading, and third party and enterprise integration).
  - 2. Enclosures, termination panels, power, UPS, and ground termination busses, etc.
  - 3. PLCs, RTUs, FDI modules for PCMs.

2.04 SUPPORTING COMPONENTS

- A. The supporting components and associated application software shall consist of DCSLAN switches.

**PART 3 EXECUTION**

3.01 PROJECT EXECUTION AND PROJECT MANAGEMENT SERVICES

- A. The DCSP shall prosecute all Work in strict accordance with the sequence and schedule of the Prime Contractor's Master Baseline Schedule.
- B. The DCSP'S attention is called to the Contract Documents and Division 40, Process Interconnections, for specific administrative and commercial requirements of the Work.
- C. The DCSP shall provide all project management services required to complete the Work of these documents. At a minimum project management services shall include:
  - 1. Progress review meetings.
  - 2. Meeting and workshops to develop project requirements and design details.
  - 3. Regular meetings on scheduling and invoicing.
  - 4. All required meetings for design and submittal reviews.
  - 5. Coordination of support and warranty.
  - 6. Coordination of training.
  - 7. Development and delivery of DCS project controls and document management that coordinates with that of the Prime Contractor.
  - 8. Attend coordination meetings with Prime Contractor, City's representative, plant staff, and other City entities as they relate to the delivery of DCS Work.
  - 9. Respond to City representative's requests for information and project documentation.
  - 10. Respond to RFI reviews, as requested by the Design Engineer through the City's representative.
  - 11. As defined in Section 40 98 00, Project Management Services.
- D. The DCSP shall provide all labor, equipment, and materials for tenant improvements required for the approved staging site at the sole expense of the DCSP.



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3.02 ENGINEERING AND DESIGN PHASE

- A. The DCSP shall provide all engineering, resources, equipment, and labor required to successfully:
1. Produce all submittals, in accordance with Section 01 33 00, Submittal Procedures, and Division 40, Process Interconnections requirements.
  2. Program, configure, and test of all hardware and software as required by these Specifications.
  3. Develop the classroom and computer-based-training for all system elements.
  4. Execute field verification and documentation of all conditions, and develop installation drawings and accurate as-constructed documents to successfully complete the Work.
  5. Setup, stage and test the Work of each process segment and perform FAT, witnessed by the City's representative at the approved staging area prior to any installation.
  6. Put into service all system elements by detailed I/O tests, loop checks, and commissioning. Develop and perform functional and performance testing.
  7. Develop and submit PCM-by-PCM cutover plans for approval by the City's representative.
  8. Document all system elements, software and custom applications.
  9. Maintain, upgrade, and warrant all Work required by the Prime Contract.
  10. Design, develop, program, and test Integration of DCS with other systems.
  11. The DCSP shall develop and submit a uniform and standardized I/O tag name convention, and follow the ISA tagging scheme standardly used by the COMNET DCS.

3.03 PROCUREMENT, STAGING, PROGRAMMING, AND TESTING PHASE

- A. The DCSP shall provide all engineering, resources, equipment, and labor required to:
1. Procure all goods and services required to conform to these Specifications.
  2. Perform all shipments required by the Work.
  3. Ship all equipment and software to the approved staging facility, including deliveries from approved staging site to Project site.

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- B. Assemble, stage and program each segment of Work at the approved staging area and perform FAT prior to delivery for installation. All tests shall be performed in accordance with Division 40, Process Interconnections, specifications and approved test procedures.
- C. The system elements (i.e., PCM, etc.) may be assembled at the DCSPS facility and shipped to the approved staging area for staging, programming and testing. However, the City reserves the right to inspect these system elements prior to shipment, and again prior to delivery from the staging site to the Project site.

3.04 FIELD CONSTRUCTION/ COMMISSIONING PHASE

- A. Provide all engineering, resources, equipment and labor required to:
  - 1. Oversee the physical install, by others, of all PCM and remote I/O (RIO) enclosures and electronics.
  - 2. Oversee termination, by others, of all field wiring in 'B' or PCM cabinets.
  - 3. Run new wires from cabinet to DCS IO where required.
  - 4. Design, install, and test foreign devices including serial or networked I/O.
  - 5. Oversee supply and termination of power and grounding of all devices, by others.
  - 6. Test all signal grounding and certify proper installation and function.
  - 7. Deliver Uninterruptible Power Supplies, for installation by others under Division 26, Electrical.
  - 8. Obtain and manage all required intra-plant permits.
  - 9. Install and test all DCS-related networking hardware and cabling.
  - 10. Test all PCM cabinetry and enclosures.
  - 11. The DCSP shall support as-built documentation including DCS loop diagram information and P&ID information, as specified.
  - 12. Conduct a functional test, and site acceptance test to verify DCS performance.
  - 13. Update and submit all specified documentation to reflect "as-built" or record conditions.
  - 14. Support the Integration Period Testing as specified.

3.05 MAINTENANCE AND UPGRADE SERVICES PHASE

- A. The DCSP shall warrant all parts and services for a period as specified for the Prime Contract, after final DCS acceptance.

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3.06 ENVIRONMENTAL SUITABILITY

- A. All DCS devices provided under this Contract shall be provided with enclosures which are suitable for use in a treatment facility environment where there are typically high energy ac fields, dc control pulses, and varying ground potentials between the transducers or process instrument locations and those occupied by DCS components.
- B. The system design shall be adequate to provide proper protection against interferences from all such possible situations.
- C. As a minimum, all DCS equipment shall be resistive to airborne contaminants commonly found in wastewater treatment facilities, and be suitable for installation in an environment which conforms to a G2 classification as defined by ISA S71.04.
- D. Field-Situated Equipment:
  - 1. DCS equipment being furnished under this Contract shall be suitable for use in wastewater treatment facilities, some of which are in an environment of air with traces of methane and hydrogen purging sulfide. The system design shall be adequate to provide proper protection against such an environment.
  - 2. All field-situated components including PCMs shall be UL-listed or approved by an independent certification agency acceptable to the City of San Diego.
  - 3. All DCS devices shall be housed in an enclosure suitable for its intended service and installation location.
  - 4. All DCS devices to be installed in motor control center or other protected areas shall be furnished in NEMA 12 rated enclosure.
  - 5. All DCS devices to be installed in indoor protected areas shall be furnished in NEMA 12 rated enclosures.
  - 6. All DCS devices to be installed in indoor unprotected or areas subject to hose-down conditions, or outdoor areas, shall be furnished in Type 316 stainless steel NEMA 4X rated enclosures.
  - 7. All DCS devices to be installed in Hazardous (classified) areas shall be furnished in Type 316 stainless steel or aluminum (rated for a corrosive environment), NEMA 7 or NEMA 4X (explosion proof) Class 1 Division 1 and Division 2, Class A, B, C, or D.

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8. At a minimum, the DCS shall be designed and constructed for satisfactory, long, and low maintenance operation under the following environmental conditions:
  - a. Temperature Range: 0 degrees to 50 degrees C (32 degrees to 122 degrees F).
  - b. Thermal Shock: 0.55 degrees C (1 degree F per minute maximum).
  - c. Relative Humidity: 5 percent to 95 percent (noncondensing).
9. The mounting of all enclosures shall meet the requirements as specified in Division 26, Electrical, and shall be seismically braced as required by code for this seismic zone.

**END OF SECTION**

**SECTION 40 90 04**  
**REFERENCES**

**PART 1 GENERAL**

1.01 GENERAL

- A. Comply with Greenbook precedence of the Contract Documents, 3-7.2.
- B. In the case of conflict between any mandatory requirements and the Contract Documents, the mandatory requirements shall be followed in each case, but only after submitting such proposed changes to the City's representative for approval.
- C. Nothing contained in the Contract Documents shall be so construed to conflict with any national state, municipal, or local laws or regulations governing the installation of Work specified herein, and all such acts, ordinance, and regulations, including the National Electrical Code, are hereby incorporated and made a part of the Contract Documents. All such requirements shall be satisfied by the DCSP at no additional expense to the City.

1.02 PERMITS

- A. Construction permits are the responsibility of the Contractor. However, the DCSP shall be responsible for obtaining any Plant permits, "outage requests," etc., imposed by the City and plant standard operating procedure.

1.03 REFERENCES

- A. The equipment materials, installation, and other Work shall conform to all the following applicable regulations, standards, Specifications, and codes unless a more current version is applicable:
  - 1. American National Standards Institute (ANSI):
    - a. INCITS 154, Office Machines and Supplies Alphanumeric Machines - Keyboard Arrangement.
    - b. ISO/IEC 17799, Information Technology Security Techniques Code of Practice for Information Security Management.
    - c. C80.1, Standard for Rigid Steel Electrical Conduit.
  - 2. American Society for Quality (ASQ): ASQ C1, Specification of General Requirements for a Quality Plan.
  - 3. ASTM International (ASTM):
    - a. D709, Standard Specification for Laminated Thermosetting Materials (Nameplates).

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- b. E814, Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
- c. F512, Standard Specification for Smooth-Wall Poly (Vinyl Chloride) (PVC) Conduit and Fittings for Underground Installation.
- 4. California State Codes:
  - a. California State Administrative Code, Title 24, State Building Standard.
  - b. (CAL/OSHA) California State Occupational Safety and Health Act.
  - c. California State Fire Marshal Standards.
- 5. City of San Diego:
  - a. Green Book, City of San Diego Standard Plans and Specifications.
  - b. City of San Diego Municipal Code.
  - c. City of San Diego Electrical Code as adopted from NEC.
  - d. Latest City of San Diego Electrical, Fire and Building Codes and U.B.C. Supplement.
- 6. Department of Homeland Security: “Cyber Security Procurement Language for Control Systems,” August 2008.
- 7. IEC/EN Standards Institution:
  - a. EN 55022, based on CISPR 22, is used in the EU and worldwide for measuring radiated and line conducted emissions from ITE (Information Technology Equipment).
  - b. BS EN 55011, Industrial, Scientific, and Medical (ISM) Radio-Frequency Equipment – Electromagnetic Disturbance Characteristics - Limits and Methods of Measurement.
  - c. IEC 61000-4-2, Electrostatic Discharge Immunity Test, supersedes/replaces IEC 801-2.
  - d. BS EN 61000-4-3, Electromagnetic Compatibility (EMC) Part 4-3: Testing and Measurement Techniques – Radiated, Radio-Frequency, Electromagnetic Field Immunity Test, supersedes/replaces IEC 801-3.
  - e. IEC 61000-4-4, Electrical Fast Transient/Burst Immunity Test, supersedes/replaces IEC 801-4.
  - f. IEC 61000-4-5, Surge Immunity Test, supersedes/replaces IEC 801-5.
  - g. BS EN 61000-4-6, Electromagnetic Compatibility (EMC) Part 4-6: Testing and Measurement Techniques - Immunity to Conducted Disturbances, Induced by Radio Frequency Fields, supersedes/replaces IEC 801-6.
  - h. BS EN 61000-4-11, Electromagnetic Compatibility (EMC) Part 4-11: Testing and Measurement Techniques - Voltage Dips, Short Interruptions, and Voltage Variations Immunity Tests.

REFERENCES

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- i. EN 61000-6-4, Electromagnetic compatibility (EMC) – Part 6-4: Generic standards - Emission standard for industrial environments.
- 8. International Electrotechnical Commission (IEC):
  - a. 60068-2-6, Swept Vibration.
  - b. 60068-2-27, Shock.
  - c. 60068-2-34, Random Vibration.
  - d. 61158, Foundation Fieldbus.
  - e. 61131-3, Deals with programming languages and defines three graphical and two textual PLC programming language standards.
  - f. 61131-8), Guidelines for the Application and Implementation of Programming Languages.
  - g. 61499, Function Block Standard.
- 9. Institute of Electrical and Electronics Engineers (IEEE):
  - a. C2, National Electrical Safety Code.
  - b. C37.90.1, Standard for SWC Tests for Relays and Relay Systems Associated with Electric Power Apparatus.
  - c. C57.13, Standard Requirements for Instrument Transformers.
  - d. C62.41.2, Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits.
  - e. 81, Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.
  - f. 100, The Authoritative Dictionary of IEEE Standards Terms.
  - g. 315, Graphic Symbols for Electrical and Electronics Diagrams.
  - h. 484, Recommended Practice for Installation Design and Implementation of Vented Lead-acid Batteries for Stationary Applications.
  - i. 485, Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications.
  - j. 754, Standard for Floating Point Arithmetic.
  - k. 802.1AB, Station and Media Access Control Connectivity Discovery.
  - l. 802.1D, Media Access Control Bridges.
  - m. 802.2, Standards for Local Area Networks: Logical Link Control.
  - n. 802.3, Carrier Sense Multiple Access with Collision Detection (CSMA/CD) (Ethernet).
  - o. 802.3z, Gigabit/s Ethernet Operation.
  - p. 802.3ae, 10 Gigabit/s Ethernet Operation.
  - q. 802.3af, Data Terminal Equipment (DTE) Power via MDI.
  - r. 802.1p, Traffic Classification/Prioritization.
  - s. 802.1q, Virtual Local Area Networks (LANs).
  - t. 802.1x, Comprehensive security framework.
  - u. 1100, Recommended Practice for Powering and Grounding Electronic Equipment.

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10. Instrumentation, Systems, and Automation Society (ISA):
  - a. S5.1, Instrumentation Symbols and Identification.
  - b. S5.2, Binary Logic Diagrams for Process Operations.
  - c. S5.4, most enhanced, Instrument Loop Diagrams.
  - d. S5.5, Graphic Symbols for Process Displays.
  - e. 77.20, Fossil Fuel Power Plant Simulators – Functional Requirements.
  - f. TR 99.00.01, Security Technologies for Manufacturing and Control Systems.
  - g. TR 99.00.02, Integrating Electronic Security into the Manufacturing and Control Systems.
11. The Internet Engineering Task Force (IETF):
  - a. RFC 1112, Host Extensions for Internet Protocol (IP) Multicasting.
  - b. RFC 768, User Datagram Protocol (UDP).
  - c. RFC 791, Internet Protocol (IP).
  - d. RFC 792, Internet Control Message Protocol (ICMP).
  - e. RFC 793, Transmission Control Protocol (TCP).
  - f. RFC 826, Ethernet Address Resolution Protocol (ARP).
  - g. RFCs 1155, 1157, and 1212, The SNMPv1 NMF.
  - h. RFCs 1441 through 1452, SNMPv2 NMF.
  - i. RFC 1812, Requirements for IP Version 4 Routers.
  - j. RFC 1918, Address Allocation for Private Internets.
  - k. RFC 2131, Dynamic Host Configuration Protocol (DHCP).
  - l. RFC 2784, Generic Routing Encapsulation (GRE).
  - m. RFC 2821, Simple Mail Transfer Protocol (SMTP).
12. International Organization for Standardization (ISO):
  - a. OSI Model, Open Systems Interconnection Reference Model.
  - b. IEC 9899, Programming Languages: C.
  - c. 11064-1, Ergonomic design of control centers -- Part 1: Principles for the design of control centers, Part 2: Principles for the arrangement of control suites, Part 3: Control room layout, Part 4: Layout and dimensions of workstations, Part 6: Environmental requirements for control centers.
  - d. IEC 11801, Information Technology – General Cabling for Customer Premises.
  - e. 15408-1, Security Techniques – Evaluation Criteria for IT Security.
  - f. IEC 15802-3, Information Technology – Telecommunications and Information Exchange between Systems – Media Access Control (MAC) Bridges.
  - g. 60300, Dependability Management.
  - h. 60409, Guide for the Inclusion of Reliability Clauses into Specifications for Components (or Parts) for Electronic Equipment.

REFERENCES

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- i. 60605, Equipment Reliability Testing.
- j. 60706, Maintainability of Equipment.
- 13. International Telecommunication Union: ITU-T G.652C & D Characteristics of single-mode optical fiber and cable.
- 14. Military Standards: Military Standard 810E, Laptop Shock/Vibration and drop requirements.
- 15. National Electrical Manufacturers Association (NEMA):
  - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
  - b. ICS 1, Standards for Industrial Control and Systems: General Requirements.
  - c. ICS 2, Standards for Industrial Control and Systems: Controllers, Contractors, and Overload Relays Rated Not More than 2000 Volts AC or 750 Volts DC: Part 8 - Disconnect Devices for Use in Industrial Control Equipment.
  - d. ICS 4, Standards for Industrial Control and Systems: Terminal Blocks.
  - e. ICS 6, Standards for Industrial Control and Systems Enclosures.
  - f. PE 1, Uninterruptible Power Systems – Specification and Performance Verification.
  - g. TC 2, Electrical Polyvinyl Chloride (PVC) Conduit.
  - h. WD 1, General Color Requirements for Wiring Devices.
  - i. WD 6, Wiring Devices – Dimensional Requirements.
- 16. National Fire Protection Association (NFPA): All applicable sections including, but not limited to NFPA 70, National Electrical Code.
  - a. 72, National Fire Alarm Code.
  - b. 70E, Standard for Electrical Safety in the Workplace.
  - c. 101, Life Safety Code.
  - d. 110, Standard for Emergency and Standby Power Systems.
  - e. 262, Test for Flame Travel and Smoke of Wires and Cables for Use in Air-handling Spaces.
  - f. 820, Standard for Fire Protection in Wastewater Treatment and Collection Facilities.
- 17. National Institute Standards Technology (NIST):
  - a. System Protection Profile, Industrial Control Systems, Version 1.0. Decisive Analytics.
  - b. SP 800-12, An Introduction to Computer Security: The NIST Handbook.
  - c. SP 800-14, Generally Accepted Principles and Practices for Securing Information Technology Systems.
  - d. SP 800-82-A, Engineering Principles for Information Technology Security (A Baseline for Achieving Security).

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18. Scientific Apparatus Makers Association (SAMA):
  - a. SAMA have taken their standards out of circulation and declared that they are out of date.
    - 1) PMC 32.1, A Guide for Process Measurement and Control Instrumentation Reliability Techniques is for reference only and can be obtained at [www.measure.org](http://www.measure.org), and was re-published in 1981.
    - 2) PMC 33.1 replaced by FCC and EN standards.
19. Telecommunications Industry Association (TIA):
  - a. 455-13-A, FOTP-13 Visual and Mechanical Inspection of Fiber Optic Components, Devices, and Assemblies.
  - b. 455-78-B, Optical Fibers Part 1-40: Measurement Methods and Text Procedures – Attenuation.
  - c. 455-133-A, Optical Fibers - Part 1-22: Measurement Methods and Test Procedures - Length Measurement.
  - d. EIA-568-B.1, Commercial Building Telecommunications Cabling Standard - Part 1: General Requirements.
  - e. EIA-568-B.2, Commercial Building Telecommunications Cabling Standard.
  - f. EIA-568-B.3, Optical Fiber Cabling Components Standard.
  - g. EIA-606-A, Administration Standard for the Telecommunications Infrastructure.
  - h. J-STD-607-A, Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.
20. U.S. Department of Defense (DOD): MIL-STD-2202A, Energy Monitoring and Control Systems, Factory Tests.
21. U.S. Federal Communications Commission (FCC), 47 CFR, Part 15, Radio Frequency Devices Electromagnetic Compliance Requirements.
22. Uniform Fire Code (UFC):
23. Occupational Safety and Health Act (OSHA).
24. UL:
  - a. 6, Standard for Safety Electrical Rigid Metal Conduit Steel.
  - b. 44, Standard for Safety Thermoset-Insulated Wires and Cables.
  - c. 467, Standard for Grounding and Bonding Equipment. Plant.
  - d. 651, Standard for Safety Schedule 40 and 80 Rigid PVC Conduit and Fittings.
  - e. 916, Energy Management Equipment.
  - f. 1479, Fire Tests of Through-Penetration Firestops.
  - g. 1778, Uninterruptible Power Systems.
  - h. 60950, Safety of Information Technology Equipment.
25. Web Service Standards:
  - a. WS-Policy.
  - b. WS-Security.
  - c. WS-Reliable Messaging.
  - d. WS-Addressing.

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- e. WSDL 1.1.
- f. SOAP 1.1.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END SECTION**

**SECTION 40 90 05**  
**DEFINITIONS**

**PART 1 GENERAL**

1.01 DEFINITIONS

A. Terms used in this section:

1. ACAD: AutoCAD, and City of San Diego approved software.
2. A/D: Analog to digital conversion.
3. AMS: Asset management system.
4. Analog Range: An analog range is the minimum to maximum value that a device is expected to have in the field.
5. AP: Access Point. A wireless access point (WAP or AP) is a device that “connects” wireless communication devices together to create a wireless network.
6. API: Application programming interface are a set of definitions of the ways in which one piece of computer software communicates with another. It is a method of achieving abstraction, usually (but not necessarily) between lower-level and higher-level software.
7. Authentication: Authentication is the process of verifying an identity claimed by or for a system entity.
8. Authorization: Authorization is a right or a permission that is granted to a system entity to access a system resource.
9. AWG: American wire gauge.
10. CCTV: Closed circuit television.
11. CFC: California Fire Code.
12. CMMS: Computerized maintenance management system.
13. COMC: Central control room.
14. COMNET: Cleanwater operations management network. COMNET is a dedicated term for City’s existing enterprise level of wastewater operation systems.
15. CoSD: City of San Diego.
16. COTS: Commercial off-the-shelf.
17. CPU: Central processing unit.
18. CSMA/CD: Carrier sense multiple access with collision detection.
19. CSU: Channel service unit.
20. D/A: Digital to analog conversion.
21. DCS: Distributed control system.
22. DCSP: Distributed control system provider.
23. DCSLAN: Distributed control system intra-plant local area network located within the plant to interconnect various controllers, workstations, printers and servers.

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24. DCS Tag: Tag assigned to a loop for identification purposes and reference inside DCS and on P&IDs (without plant identifier).
25. DCSWAN: Distributed control system wide area network, used to connect plant-based DCSs together.
26. DHCP: Dynamic host configuration protocol.
27. DIN: Department Information network. DIN is a dedicated term for City's COMNET system. The DIN shall provide connectivity between all Department facilities and resources by virtue of a network which incorporates high-speed fiber, telephone data links, and radio technology.
28. DIN: Deutsches Institut für Normung eV (German Institute for Standardization; similar to US ANSI).
29. DMZ: Demilitarized zone. Isolation zone between a protected control network (CN) and external users, such that all production traffic "flowing" between the CN and those external users actually flows through an access control device, such as a firewall.
30. DSU: Data service unit.
31. EHWS: Environmentally hardened workstation. The EHWS shall have a Type 316 stainless steel enclosure rated as NEMA 4X. The EHWS shall be configured in the range of 32 to 104 degrees F, and humidity of 95 percent noncondensing.
32. EMI: Electromagnetic interference.
33. ESD: Emergency shutdown.
34. Ethernet: Ethernet is a frame-based computer networking technology for local area networks (LANs). It defines wiring and signaling for the physical layer, and frame formats and protocols for the media access control (MAC)/data link layer of the OSI model. Ethernet is mostly standardized as IEEE 802.3.
35. EWS: Engineer's workstation(s).
36. FAT: Factory acceptance test. A test conducted at the DCSP or vendor premise to ensure operability of a system according to Specifications.
37. FCC: U.S. Federal Communications Commission.
38. FDDI: Fiber distributed data interface, a protocol used in early version of Emerson Ovation systems.
39. FIN: Facility information network. FIN is a dedicated term for City's COMNET system. The FIN shall provide connectivity between the DCS and plant facility management systems. The FIN shall specifically have connectivity to WS and HS devices.
40. FWS: Field workstation(s).
41. GFCI: Ground-fault circuit interrupting receptacle.
42. HART: Highway addressable remote transducer.

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43. HMI: Human-machine interface. A term that refers to the “layer” that separates a human that is operating a machine from the machine itself. One example of a HMI is the computer hardware and software that enables a single operator to monitor and control large machinery remotely.
44. HOR: Hand-Off-Remote.
45. HS: Historian server.
46. HSE: Health and safety equipment.
47. IEC: International Electro-technical Commission, is a European standards body which has developed IEC 60870-5 series of supervisory control and data acquisition (SCADA) protocols. IEC is now working on IEC 62351 a secure protocol envelope for DNP3 and IEC 60870-5.
48. IEEE: Institute of Electrical and Electronics Engineers.
49. I/O: Input and Output: I/O is used by the DCS for receiving and sending signals to and from the field to the DCS. I/O types are:
  - a. AI: Analog input.
  - b. AO: Analog output.
  - c. DI: Digital input.
  - d. DO: Digital output.
50. I/O Card: Input/output (I/O) cards refer to devices used by the DCS to communicate with field devices. I/O cards consist of digital-in (DI), for on/off detection, analog-in (AI), to measure a range of a device in the field, digital-out (DO), to send on-off signals, or analog-out (AO) to control field devices.
51. IP: Internet protocol. A data-oriented protocol used by source and destination hosts for communicating data across a packet-switched inter-network. Data in an IP inter-network are sent in blocks referred to as packets or datagrams (the terms are basically synonymous in IP).
52. ISA: International Society of Automation.
53. ISO: International Organization for Standardization. The International Organization for Standardization, also known as ISO, is global network of the national standards bodies of 156 countries dedicated to technical standards development.
54. IWS: Instructor workstation.
55. LAN: Local area network.
56. LIMS: Laboratory Information management system.
57. LCP: Local control panel.
58. LOR: Local-Off-Remote.
59. LOS: Lock-out stop.
60. L/R: Local/Remote.
61. Malware: Malware is malicious software designed to infiltrate or damage a computer system, without the owner’s consent. Malware is commonly taken to include computer viruses, worms, Trojan horses, rootkits, spyware, and adware.
62. MBC: Metropolitan Biosolids Center.

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63. MTBF: Mean time before failure.
64. MTTR: Mean time to repair.
65. MOC II: Metropolitan Operations Center.
66. MOV: Motor-operated valve.
67. NCWRP: North City Water Reclamation Plant.
68. NEC: National Electrical Code.
69. NEMA: National Electrical Manufacturers Association.
70. NFPA: National Fire Protection Association.
71. NIC: Network interface card.
72. NMS: Network management system.
73. NIST: National Institute of Standards and Technology.
74. NRC: National Research Council.
75. NTP: Notice-to-proceed.
76. OPC: Open connectivity via open standards. OPC is open connectivity in industrial automation and the enterprise systems that support industry. Interoperability is assured through the creation and maintenance of open standards specifications. OPC has been termed object linking embedding (OLE) for process control.
77. OPH: Ovation process historian. OPH is a dedicated term for City's COMNET system.
78. ORT: Operational readiness test. ORT is completed at the final stage of DCS installation to verify installed system is ready for live deployment and functional testing of unit processes.
79. OS: Operating system.
80. OSC: Ovation security center.
81. OSHA: Occupational Safety and Health Standards.
82. OSI: Open systems interconnection reference model. OSI is a layered abstract description for communications and computer network protocol design, developed as part of the open systems interconnect initiative.
83. OWS: Operator workstation.
84. PCM: Process control module. PCM is a dedicated term for City's COMNET system. A PCM refers to a combination of various modules including central processing unit/modules, network modules, I/O modules, and/or other special modules, these modules are normally located in the same enclosure, and function together to accomplish data acquisition, alarming and implementation of control strategies for a designated process area.
85. P&ID: Piping and instrumentation diagram.
86. PID: Proportional-integral-derivative controller. A standard feedback loop component in industrial control applications. It measures an "output" of a process and controls an "input," with a goal of maintaining the output at a target value, which is called the "setpoint."

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87. PIN: Process information network. PIN is a dedicated term for the existing COMNET system. The PIN provides connectivity between WSS, PCMs, and the historian system (HS) to enable the timely update and archiving of process information and timely control response.
88. PLC: Programmable logic controller.
89. PLWTP: Point Loma Wastewater Treatment Plant.
90. PMS: Power monitoring system.
91. PPS: Penasquitos Pump Station.
92. QA: Quality assurance.
93. QC: Quality control.
94. QoS: Quality of service.
95. RAID: Redundant array of independent disks.
96. RDT: Remote desktop.
97. RDS: Remote data server.
98. RFP: Request for proposal.
99. RSSI: Receive signal strength indicator.
100. RTU: Remote terminal unit. An RTU, or remote terminal unit is a device which interfaces objects in the physical world to a DCS or SCADA system by transmitting telemetry data to the system and/or altering the state of connected objects based on control messages received from the system.
101. SBWRP: South Bay Water Reclamation Plant.
102. SAT: Site acceptance testing.
103. SCADA: Supervisory control and data acquisition.
104. SOP: Standard operating procedure.
105. SS: Selector switch.
106. S/S: Start/Stop.
107. SNMP: Simple network management protocol.
108. TCP: Transmission control protocol.
109. TCP/IP: Transmission control protocol/internet protocol.
110. Terminal Server: A hardware device or server that provides terminals (PCs, printers, and other devices) with a common connection point to a local or wide area network.
111. TIA: Telecommunications Industry Association.
112. UFC: Uniform Fire Code.
113. UL: Standards to measure performance, environmental health and sustainability.
114. UPS: Uninterruptible power supply.
115. VFD: Variable frequency drive.
116. VLAN: Virtual LAN. A virtual LAN, commonly known as a VLAN, is a logically segmented network mapped over physical hardware.



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117. VoIP: Voice over internet protocol (also called VoIP, IP telephony, internet telephony, and digital phone) is the routing of voice conversations over the internet or any other IP-based network. Voice data flows over a general-purpose packet-switched network, instead of traditional dedicated, circuit-switched voice transmission lines.
118. VPN: Virtual private network. A private, encrypted communications network usually used within a company, or by several different companies or organizations, used for communicating in a software tunnel over a public network.
119. WAN: Wide area network.
120. WDPF II: Westinghouse distributed processing family, second generation.
121. WiFi: Wireless fidelity. Short for wireless fidelity and is meant to be used generically when referring of any type of 802.11 network, whether 802.11b/a/g dual-band, etc.
122. WiMax: Worldwide interoperability of microwave access. WiMax is the name commonly given to the IEEE 802.16 standard. A wireless protocol designed for distances as far as 30 miles but more commonly 3 to 5 miles.
123. WS: Workstation, see also EWS, FWS, IWS, OWS.

B. Types of Variables:

1. Calculated Analog Points (CA): Analog variables computed from inputs, manual inputs, calculated discrete points, and other calculated analog points.
2. Calculated Discrete Points (CD): Discrete variables computed from inputs, manual inputs, calculated analog points, and other calculated discrete points.
3. Manual Inputs (MI): Variables whose values are manually entered, e.g., laboratory data.
4. Process Variables (PV): Analog variables from analog inputs and calculated analog points.
5. Report Variables: Variables computed by report generator.

1.02 RELATED SECTIONS

A. Codes and Standards: The Work shall comply with the current editions of the publication and codes as adopted by the City of San Diego.

1. Division 01, General Requirements.
2. Division 26, Electrical.
3. Division 40, Process Interconnections.

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**PART 2      PRODUCTS (NOT USED)**

**PART 3      EXECUTION (NOT USED)**

**END SECTION**

**SECTION 40 90 06  
 DCS BILL OF MATERIALS AND QUANTITIES**

<b>TABLE A-1                  DROP 7 – 60PCM05 DCS HARDWARE</b>					
<b>Item</b>	<b>Manufacturer</b>	<b>EMOD Model Number</b>	<b>PMOD Model Number</b>	<b>Qty</b>	<b>Notes</b>
Ovation Controller Module [Redundant]	Emerson	5X00481G01		0	
I/O Interface Module	Emerson	5X00226G03		2	
Analog Input [HART] Module	Emerson	5X00106G01	5X00109G02	1	8-Point
RTD Input Module	Emerson	5X00119G01	5X00121G01	1	8-Point
Analog Output Module	Emerson	5X00062G01	5X00063G01	2	8-Point
Digital Input Module	Emerson	1C31232G02	5X00034G01	6	16-Point
Digital Output Module	Emerson	5A26458G04	NONE	2	12-Point [Relay]
Serial Link Module [RS232]	Emerson	1C31166G02	1C31169G01	0	
Ethernet Link Controller Module	Emerson	5X00419G01	1X00569H01	4	
All required additional or ancillary components and cables shall be provided as required to provide a complete and functional DCS.					

**TABLE A-2  
DROP 8 – 60PCM06 DCS HARDWARE**

Item	Manufacturer	EMOD Model Number	PMOD Model Number	Qty	Notes
Ovation Controller Module [Redundant]	Emerson	5X00481G01		0	
I/O Interface Module	Emerson	5X00226G03		2	
Analog Input [HART] Module	Emerson	5X00106G01	5X00109G02	2	8-Point
RTD Input Module	Emerson	5X00119G01	5X00121G01	1	8-Point
Analog Output Module	Emerson	5X00062G01	5X00063G01	1	8-Point
Digital Input Module	Emerson	1C31232G02	5X00034G01	10	16-Point
Digital Output Module	Emerson	5A26458G04	NONE	3	12-Point [Relay]
Serial Link Module [RS232]	Emerson	1C31166G02	1C31169G01	0	
Ethernet Link Controller Module	Emerson	5X00419G01	1X00569H01	3	
All required additional or ancillary components and cables shall be provided as required to provide a complete and functional DCS.					

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**TABLE A-3  
 DROP 10 – 76PCM01 DCS HARDWARE**

<b>Item</b>	<b>Manufacturer</b>	<b>EMOD Model Number</b>	<b>PMOD Model Number</b>	<b>Qty</b>	<b>Notes</b>
Ovation Controller Module [Redundant]	Emerson	5X00481G01		0	
I/O Interface Module	Emerson	5X00226G03		2	
Analog Input [HART] Module	Emerson	5X00106G01	5X00109G02	2	8-Point
RTD Input Module	Emerson	5X00119G01	5X00121G01	1	8-Point
Analog Output Module	Emerson	5X00062G01	5X00063G01	2	8-Point
Digital Input Module	Emerson	1C31232G02	5X00034G01	17	16-Point
Digital Output Module	Emerson	5A26458G04	NONE	5	12-Point [Relay]
Serial Link Module [RS232]	Emerson	1C31166G02	1C31169G01	0	
Ethernet Link Controller Module	Emerson	5X00419G01	1X00569H01	3	
All required additional or ancillary components and cables shall be provided as required to provide a complete and functional DCS.					

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**TABLE A-4  
DROP 11 – 76PCM02 DCS HARDWARE**

Item	Manufacturer	EMOD Model Number	PMD Model Number	Qty	Notes
Ovation Controller Module [Redundant]	Emerson	5X00481G01		0	
I/O Interface Module	Emerson	5X00226G03		2	
Analog Input [HART] Module	Emerson	5X00106G01	5X00109G02	2	8-Point
RTD Input Module	Emerson	5X00119G01	5X00121G01	1	8-Point
Analog Output Module	Emerson	5X00062G01	5X00063G01	2	8-Point
Digital Input Module	Emerson	1C31232G02	5X00034G01	9	16-Point
Digital Output Module	Emerson	5A26458G04	NONE	2	12-Point [Relay]
Serial Link Module [RS232]	Emerson	1C31166G02	1C31169G01	0	
Ethernet Link Controller Module	Emerson	5X00419G01	1X00569H01	3	
All required additional or ancillary components and cables shall be provided as required to provide a complete and functional DCS.					

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<b>TABLE A-5 DROP 13 – 76PCM03 DCS HARDWARE</b>					
<b>Item</b>	<b>Manufacturer</b>	<b>EMOD Model Number</b>	<b>PMOD Model Number</b>	<b>Qty</b>	<b>Notes</b>
Ovation Controller Module [Redundant]	Emerson	5X00481G01		0	
I/O Interface Module	Emerson	5X00226G03		2	
Analog Input [HART] Module	Emerson	5X00106G01	5X00109G02	1	8-Point
RTD Input Module	Emerson	5X00119G01	5X00121G01	1	8-Point
Analog Output Module	Emerson	5X00062G01	5X00063G01	1	8-Point
Digital Input Module	Emerson	1C31232G02	5X00034G01	5	16-Point
Digital Output Module	Emerson	5A26458G04	NONE	1	12-Point [Relay]
Serial Link Module [RS232]	Emerson	1C31166G02	1C31169G01	1	
Ethernet Link Controller Module	Emerson	5X00419G01	1X00569H01	3	
All required additional or ancillary components and cables shall be provided as required to provide a complete and functional DCS.					

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**TABLE A-6  
DROP 17 – 76PCM07 DCS HARDWARE**

Item	Manufacturer	EMOD Model Number	PMD Model Number	Qty	Notes
Ovation Controller Module [Redundant]	Emerson	5X00481G01		0	
I/O Interface Module	Emerson	5X00226G03		2	
Analog Input [HART] Module	Emerson	5X00106G01	5X00109G02	6	8-Point
RTD Input Module	Emerson	5X00119G01	5X00121G01	1	8-Point
Analog Output Module	Emerson	5X00062G01	5X00063G01	1	8-Point
Digital Input Module	Emerson	1C31232G02	5X00034G01	16	16-Point
Digital Output Module	Emerson	5A26458G04	NONE	5	12-Point [Relay]
Serial Link Module [RS232]	Emerson	1C31166G02	1C31169G01	0	
Ethernet Link Controller Module	Emerson	5X00419G01	1X00569H01	4	
All required additional or ancillary components and cables shall be provided as required to provide a complete and functional DCS.					



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<b>TABLE A-7 DROP 18– 76PCM08 DCS HARDWARE</b>					
<b>Item</b>	<b>Manufacturer</b>	<b>EMOD Model Number</b>	<b>PMOD Model Number</b>	<b>Qty</b>	<b>Notes</b>
Ovation Controller Module [Redundant]	Emerson	5X00481G01		0	
I/O Interface Module	Emerson	5X00226G03		1	
Analog Input [HART] Module	Emerson	5X00106G01	5X00109G02	0	8-Point
RTD Input Module	Emerson	5X00119G01	5X00121G01	2	8-Point
Analog Output Module	Emerson	5X00062G01	5X00063G01	0	8-Point
Digital Input Module	Emerson	1C31232G02	5X00034G01	21	16-Point
Digital Output Module	Emerson	5A26458G04	NONE	2	12-Point [Relay]
Serial Link Module [RS232]	Emerson	1C31166G02	1C31169G01	0	
Ethernet Link Controller Module	Emerson	5X00419G01	1X00569H01	2	
All required additional or ancillary components and cables shall be provided as required to provide a complete and functional DCS.					

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**TABLE A-8  
DROP 38 – 80PCM05 DCS HARDWARE**

Item	Manufacturer	EMOD Model Number	PMOD Model Number	Qty	Notes
Ovation Controller Module [Redundant]	Emerson	5X00481G01		0	
I/O Interface Module	Emerson	5X00226G03		2	
Analog Input [HART] Module	Emerson	5X00106G01	5X00109G02	2	8-Point
RTD Input Module	Emerson	5X00119G01	5X00121G01	1	8-Point
Analog Output Module	Emerson	5X00062G01	5X00063G01	2	8-Point
Digital Input Module	Emerson	1C31232G02	5X00034G01	8	16-Point
Digital Output Module	Emerson	5A26458G04	NONE	2	12-Point [Relay]
Serial Link Module [RS232]	Emerson	1C31166G02	1C31169G01	1	
Ethernet Link Controller Module	Emerson	5X00419G01	1X00569H01	2	
All required additional or ancillary components and cables shall be provided as required to provide a complete and functional DCS.					

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<b>TABLE A-9 DROP 29 – 94PCM01 DCS HARDWARE</b>					
<b>Item</b>	<b>Manufacturer</b>	<b>EMOD Model Number</b>	<b>PMOD Model Number</b>	<b>Qty</b>	<b>Notes</b>
Ovation Controller Module [Redundant]	Emerson	5X00481G01		0	
I/O Interface Module	Emerson	5X00226G03		2	
Analog Input [HART] Module	Emerson	5X00106G01	5X00109G02	5	8-Point
RTD Input Module	Emerson	5X00119G01	5X00121G01	1	8-Point
Analog Output Module	Emerson	5X00062G01	5X00063G01	3	8-Point
Digital Input Module	Emerson	1C31232G02	5X00034G01	15	16-Point
Digital Output Module	Emerson	5A26458G04	NONE	5	12-Point [Relay]
Serial Link Module [RS232]	Emerson	1C31166G02	1C31169G01	0	
Ethernet Link Controller Module	Emerson	5X00419G01	1X00569H01	4	
All required additional or ancillary components and cables shall be provided as required to provide a complete and functional DCS.					

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**TABLE A-10  
DROP 30 – 94PCM02 DCS HARDWARE**

Item	Manufacturer	EMOD Model Number	PMOD Model Number	Qty	Notes
Ovation Controller Module [Redundant]	Emerson	5X00481G01		0	
I/O Interface Module	Emerson	5X00226G03		2	
Analog Input [HART] Module	Emerson	5X00106G01	5X00109G02	3	8-Point
RTD Input Module	Emerson	5X00119G01	5X00121G01	1	8-Point
Analog Output Module	Emerson	5X00062G01	5X00063G01	2	8-Point
Digital Input Module	Emerson	1C31232G02	5X00034G01	11	16-Point
Digital Output Module	Emerson	5A26458G04	NONE	3	12-Point [Relay]
Serial Link Module [RS232]	Emerson	1C31166G02	1C31169G01	0	
Ethernet Link Controller Module	Emerson	5X00419G01	1X00569H01	3	
All required additional or ancillary components and cables shall be provided as required to provide a complete and functional DCS.					

**END OF SECTION**

**SECTION 40 90 07**  
**SCOPE OF WORK**

**PART 1 GENERAL**

1.01 REQUIREMENTS

A. General:

1. The intent of this section is to provide the DCSP direction in the specific and unique tasks of Work related to the Project segment of the delivery. All other requirements of these Specifications apply.
2. The Work includes, but is not limited to the design, procurement, installation, staging, testing, warranty maintenance, and documentation, of a distributed control system (DCS) for the MBC Improvements Project, which includes all process area of the Project required by the Contract Documents.
3. The new DCS equipment is being provided under a proprietary sole-source agreement, and must be fully compatible with, and integrate onto the existing City of San Diego Enterprise wide COMNET DCS.
4. See following drawings in Exhibits:
  - a. Plant: Data Highway Topology.
  - b. Plant: Plant Network Architecture and Topology.

1.02 RELATED SECTIONS

- A. The Work described in the following sections applies to the Work identified in this section.
1. Division 01, General Requirements.
  2. Division 26, Electrical.
  3. Division 40, Process Interconnections.

1.03 SPECIFICATIONS, CODES, AND STANDARDS

- A. The Work shall comply with the current editions of the publication and codes identified in Section 40 90 04, References.

1.04 DEFINITIONS

- A. Definitions of acronyms are identified in Section 40 90 05, Definitions.

1.05 SUBMITTALS

- A. The DCSP shall systematically design, install, test and cut-over all DCS project segments in a carefully phased and coordinated way that will ensure that all

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outages are planned, sequenced, and coordinated with plant supervisors and staff, when applicable and in concert with the Prime Contractor's master baseline schedule.

- B. All DCSP required submittals are referenced through Division 40, Process Interconnections, of the Project Specifications as well as Division 01, General Requirements. All required DCSP Submittals shall be submitted in accordance with Section 01 33 00, Submittal Procedures.

**PART 2 PRODUCTS**

2.01 REQUIREMENTS

- A. The requirements of each product, material or other are contained in the Specifications below. Other sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this Work.
  - 1. Division 26, Electrical.
  - 2. Division 40, Process Interconnections.
  - 3. Other Technical Specifications.

**PART 3 EXECUTION**

3.01 REQUIREMENTS FOR THE MBC IMPROVEMENTS PROJECT - PROJECT WORK SEGMENT

- A. The DCSP shall provide the following I/O and all required control logic, distributed in the PCMs by process area according to the control narratives, exhibits and drawings identified in the Contract Documents and, in addition, provide spare capacity of 20 percent I/O in each PCM.
- B. The DCSP shall provide all I/O, including the upgrade from Emerson Series "Q" to Series "R" as specified in Section 40 94 24, Process Inputs/Outputs (I/O), Supplement DCS Input/Output List.
- C. The DCSP is to follow the design engineer's layout and DCS configuration. However, the DCSP may consider consolidation of PCM counts, in adjacent-area PCMs, shall submit the request to the City's representative, and shall receive approval from the City to co-locate I/O. In this event, the DCSP shall be responsible for coordinating redesign of all raceways, conduits and duct bank affected by the consolidation. The DCSP shall submit the redesigned I/O to the City's representative for change issuance to the Prime Contractor. If consolidation is approved, the DCSP shall ensure that the PCM complies with expansion requirements set forth in the Contract Documents.
- D. No PCMs shall be consolidated beyond adjacent process area or unit process.

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- E. The consolidation of PCMs shall be optimized by DCSP to limit the disruption to other unit processes and process areas during construction and operation.
- F. The consolidation of PCMs shall maintain the integrity of the DCS and shall not cause single points of failure of ANY process or subprocess.
- G. The DCSP shall provide one fully redundant PCM with two I/O cards of each type to support IWS training requirements and Section 40 98 06, Distributed Control System Training.
- H. The DCSP shall segment all I/O and cards to increase the reliability of all systems and limit any single I/O card failure causing an outage to a process or process area.
- I. The DCSP shall perform all necessary drawing reviews and site investigations to provide the specified DCS portions of the Loop Diagrams, which are the responsibility of the General Contractor to create.
- J. The DCSP shall provide all DCS furniture, enclosures and associated equipment, where shown on Drawings.
- K. New copper based intra-site LAN communications is being installed and terminated by others under Division 26, Electrical. The DCSP shall provide oversight of the cable installation and termination to, patch or termination panels provided by the DCSP under this Specification.
- L. All equipment shall be located and installed so that it will be readily accessible for operation and maintenance. All code space-clearance requirements of NEC shall be adhered to.

3.02 SPECIFIC REQUIREMENTS OF MBC IMPROVEMENTS PROJECT –  
ENGINEERING AND DESIGN PHASE

- A. The DCSP shall provide all submittals required by these Specifications to provide a complete final design for the new DCS at the Project. The DCSP submittals shall fully detail DCSPS' engineered design addressing, at a minimum, the following:
  - 1. All administrative submittals.
  - 2. Staging area modifications at approved staging site.
  - 3. Configuration/architecture, equipment locations, programming and testing of all hardware and software required by these Specifications.
  - 4. Review of design and specification of the DCSLAN for communications, including verification of signal loss budgets.
  - 5. Classroom and computer based training.

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6. Field verification documentation of all existing conditions and adequate as-built drawings required to successfully complete the Work.
  7. Pre-installation staging and witnessed operational readiness testing (ORT) at approved staging area.
  8. Provide DCS-related information (e.g., PCM termination nomenclature, software level addressing, etc.) required to support the General Contractor to produce the as-constructed loop diagrams and process and instrumentation diagrams (P&IDs).
  9. As-built documents of all system elements, software and custom applications.
  10. Warranty services required by Contract Documents.
- B. When necessary to accomplish the Work of the DCS, the DCSP shall request through the City representative and then facilitate all workshops necessary to gather information, reach consensus and deliver design submittals in accordance with the milestones contained in the Prime Contractors master baseline schedule.
- C. The DCSP shall immediately, if needed, on notice-to-proceed design, build and furnish the approved staging area adequately to, support their proposed staff, test all systems and equipment, provide long term maintenance and storage for spare parts for the life of the Project segments.
- D. The DCSP shall perform project management, engineering, programming and staging work at the approved staging area.
- E. The DCSP shall design, provide and oversee installation of new uninterruptible power supplies (UPS) for the Work as defined in Division 26, Electrical.

3.03 SPECIFIC REQUIREMENTS OF PROJECT PROCUREMENT, STAGING, PROGRAMMING AND TESTING PHASE

- A. Procurement and Staging:
1. The DCSP shall develop the approved staging area as the basis of their operations where DCSP staff provides all labor for the entire Project. The design and build out of the staging area shall commence with the notice to proceed of the Project, unless DCSP is using a staging area previously developed. The DCSP shall be responsible for providing a safe, secure, maintained area for the staging area, including janitorial service and supplies, security systems, power and sanitary services.
  2. DCSP shall procure, program and stage all system elements at the approved staging area to build a complete and operable DCS.
  3. All equipment shall be delivered FOB to the DCSP approved staging area. DCSP shall provide all labor and materials including but not limited to, shipping, logistics, material training tracking, and insurance required bonds and setup/testing costs.



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B. Programming and Testing Phase:

1. DCSP shall program system elements at the staging area to build a complete and operable DCS.
2. DCSP shall provide any and all configuration and programming required to create a fully functional DCS for the Project, including but not limited to:
  - a. DCSP shall create all graphics to operate with the new DCS.
  - b. DCSP shall create all trends/trend groups commonly used on the City's DCS to operate with the new DCS.
  - c. DCSP shall create all control programming to operate with the new DCS.
  - d. DCSP shall create all reports to operate with the new DCS, and integrate with the Enterprise DCS Reports generation system. Existing types and quantities of the reports for Project are as follows:
    - 1) 40 plant level reports.
    - 2) 25 state/regulatory level reports.
    - 3) 25 enterprise level reports.
  - e. In addition, when requested by the City, the DCSP shall facilitate a minimum of five meetings/workshops with the City's representative for the DCSP to design, program, install, and test the following:
    - 1) An additional 10 three-dimensional main graphic process screens as defined by user workshops.
    - 2) An additional 20 main graphic process screens as defined by user workshops.
    - 3) An additional 15 subgraphic (windows) process screens as defined by user workshops.
    - 4) An additional eight plant-level reports as defined by user workshops.
    - 5) An additional five state/regulatory reports as defined by user workshops.
    - 6) An additional five enterprise level reports as defined by user workshops.
    - 7) An additional 20 trend groups as defined by user workshops.
  - f. The DCSP shall remove the Centrifuge Building screenings equipment from the DCS database, control logic, and graphics.
    - 1) Screens:
      - a) 76-S-01.
      - b) 76-S-02.
      - c) 76-S-03.
    - 2) Screening Conveyors:
      - a) 76-O-01.
      - b) 76-O-02.
      - c) 76-SH-01.
    - 3) Lime Day Tank: 76-LDT-01.

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- g. The DCSP shall provide monitoring of PCM redundant power supplies through the PCM's controller chassis built in power monitoring.
- 3. DCSP shall provide any and all configuration and programming required to create a fully functional DCS for the Project including, but not limited to, all intermediate or calculated values, I/O database, control and graphic programming, report and historian programming and trending.
- 4. In addition to all the other requirements of the DCS identified throughout Division 40, Process Interconnections, the DCSP shall provide an additional 20 percent of software database I/O of each I/O type for integration to other systems or as directed by the City's representative. These I/O, if needed, will be defined during the course of the delivery by DCSP facilitated workshops with the City's representative.
- 5. The DCSP shall provide all necessary products, services, and materials as required by these Specifications for the DCSLAN. All DCSLAN equipment shall be staged and tested in pre-installation testing for ORT.
- 6. DCSP shall conduct all factory acceptance testing (FAT) at the approved staging area.

3.04 SPECIFIC REQUIREMENTS MBC IMPROVEMENTS PROJECT FIELD CONSTRUCTION AND COMMISSIONING PHASE

- A. The DCSP shall obtain all required intra-plant permits and approvals for the DCS construction.
- B. The DCSP shall witness the installation of final termination in PCM, RIO, etc. for all new UPSs for the DCS as defined in Division 26, Electrical.
- C. The DCSP shall perform ORT in the field, working in conjunction with the General Contractor.
- D. DCSP shall perform all testing requirements including but not limited to; complete testing of all DCS-ends of loops, functional testing, and other field testing as required.

3.05 SPECIFIC REQUIREMENTS OF PROJECT WARRANTY SERVICES PHASE

- A. Work shall be performed pursuant to Prime Contract warranty requirements of Division 01, General Requirements. The City may, at its sole discretion, contract with the DCSP for an extended warranty and maintenance period.

**END OF SECTION**

**SECTION 40 94 00**  
**DISTRIBUTED CONTROL SYSTEM GENERAL REQUIREMENTS**

**PART 1 GENERAL**

1.01 SUMMARY

- A. The intent of this section is to provide the Distributed Control System Provider (DCSP) direction in specific and unique tasks of Work related to the Project segment of the delivery. All other requirements of these Specifications apply.
- B. The Work includes, but is not limited to, the design, procurement, installation, staging, testing, warranty maintenance, and documentation of a distributed control system (DCS) for the Project, which includes all process areas of the Project required by the Contract Documents.
- C. The new DCS components is being provided under a proprietary sole-source agreement, and must be fully compatible with, and integrated into the existing City of San Diego Enterprise-wide COMNET DCS.

1.02 RELATED SECTIONS

- A. This section gives general requirements for the Distributed Control System (DCS). The following DCS subsections expand on requirements of this section:
  - 1. Section 40 90 06, DCS Bill of Materials and Quantities.
  - 2. Section 40 94 23, Process Control Module (PCM).
  - 3. Section 40 94 24, Process Inputs/Outputs (I/O).
  - 4. Section 40 95 13, Field Cabinetry.
  - 5. Section 40 96 00, Applications Software.
  - 6. Section 40 98 00, Project Management Services.
  - 7. Section 40 98 01, Engineering and Design Services.
  - 8. Section 40 98 04, Field Construction / Commissioning Services.
  - 9. Section 40 98 05, Quality Control.
  - 10. Section 40 98 06, Distributed Control System Training.
- B. Major Work Items: Includes but is not limited to engineering, furnishing, installing, calibrating, adjusting, testing, documenting, starting up, and training for complete PIC.
  - 1. Distributed Control System (DCS).
  - 2. Computers and networks for Human Machine Interface (HMI).
  - 3. Applications Software: Provided by the Distributed Control System Provider (DCSP) for DCS and HMI.

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- C. The DCSP shall furnish all equipment and provide all applicable engineering for a fully functional distributed control system, that complies with the technical requirements of the Contract Documents including, but not limited to, project management, design assistance, coordination with on-site area contractors, detailed system design and integration, conducting graphic design workshops, equipment supply and shipment, storage, job site delivery, programming and configuration, installation oversight, testing, commissioning and startup, integration with the existing City-wide Operation and Management Network (COMNET), and training.
1. The work covered by this Specification and all of its subparts shall include, but not limited to, field verification of all existing conditions, engineering and design of system and components, manufacture and/or procurement of all necessary equipment, components, material, transportation, labor, special tools, factory testing, application programming, shipment, storage, and jobsite delivery, operational readiness testing, installation of equipment, system integration, startup operation, site testing, training and documentation, support, maintenance/warranty of a complete, integrated and operational Distributed Control System (DCS) for the City of San Diego.
  2. The statements of work contained herein are necessarily general in nature and should not be construed as an all-inclusive list of devices, equipment, software and services necessary for successful completion of the Work.
  3. It shall be the responsibilities of the DCSP to coordinate and project manage the Work, as set forth in this section of the Specifications, with work and equipment specified under other sections of the Specifications, in order to provide a complete and satisfactory installation.
  4. To ensure that the distributed control system shall be a standard system of Emerson Process Management, Ovation family. With a complete repertoire of pre-existing software modules running in a familiar hardware environment and free from hardware/software incompatibilities.
  5. This Specification is generic to all facilities and applicable sections shall be delivered for each process segment of the Work as defined in these Specifications and project Contract Documents.
  6. The DCSP shall be responsible for coordination, installation and testing of DCS. The Prime Contractor is responsible for termination of I/O signals, power and ground utilities for all DCS equipment. The DCSP shall review and inspect all current designs and all Contract Documents to assess space allocations, power allotments and available grounds. If the DCSP's requirements for power, grounding or spatial requirements differ from that shown within the Contract Documents, the DCSP shall include all required engineering, design and construction details to the Prime Contractor and City's representative immediately.

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7. The DCSP shall be responsible for providing all equipment, installation supervision, engineering, programming, configuration, management and services associated with integrating all instrumentation and control devices, and special systems, including Foreign Device Interfaces (FDI), into the DCS in a transparent and seamless manner. The use of a third party, system house, or system integrators for the above service is not acceptable.
8. DCSP shall be fully responsible for the implementation, installation, and integration of the DCS as outlined in this Specification.
9. The provisions of this section shall apply to all items specified in the various Sections of Division 40, Process Interconnections, and all other Divisions.
  - a. DCSP shall be responsible for interfacing to all existing instrumentation and all other Input/Output (I/O) devices.
  - b. During field functional testing the DCSP shall verify the operation of all instruments and field devices and associated wiring (from instrument/device to DCS) and notify the City's representative and Prime Contractor of any deficiencies that exist.

D. SCOPE OF WORK

1. The Work generally consists of the supply of all labor, tools, services and provision of all products required, for a complete, integrated, operational DCS control system in accordance with the Contract Specifications and Drawings.
2. Identify other on-going projects/systems development that are not part of this contract. Ensure other ongoing activities, in close proximity or otherwise, do not disturb or interrupt the operation of the existing systems or the Work already commissioned or placed into operation. Should any such activity pose a risk to this Work or to the system operation, advise the City immediately.
3. In general, the Work involves the supply, installation and commissioning of the DCS control system as indicated on Drawings and specification sheets, and as defined in the Matrix of Responsibilities in Scope of Work. The following is a summary of the major works:
  - a. Engineer to provide a high-level description of the Project-specific Work including provision of all instruments, hardware, software, network, cabling, and services such as testing, commissioning, training, documentation.
  - b. Following the instructions in Scope of Work, provide, test, and commission all field instrumentation including field wiring, instrument control panels, and control system hardware including all lightning and surge protection, and all peripheral devices necessary.

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- c. Conduits and Wires:
- 1) All conduits, including those for the district information network (DIN), plant information network (PIN) and facility information network (FIN), will be furnished and installed by the Contractor. All conductors, including power and grounding for DCSP furnished equipment will be furnished and installed by the Contractor. DCS grounding will use a special triad grounding system; specifications for this system are provided in the contract documents in accordance with the DCSP requirements. All signal conductors, except for PIN, and FIN fiber optic and coaxial cables, will be provided and installed by the General Contractor.
  - 2) The PIN and FIN fiber optic and coaxial cables will be furnished, installed and terminated by the DCSP. DIN fiber optic cable will be furnished by the DCSP and installed by the Contractor up to the first termination point within a facility. All wire termination except for PIN, FIN and DIN cables will be performed by the General Contractor.
  - 3) Cables and conduits for non-DCS communications systems, such as the telephone system, will be furnished and installed by the General Contractor.
    - a) Provide all programming and microprocessor-based instrument configuration.
    - b) Provide all required testing, commissioning and start up services. Allow in the contract price, for any additional time deemed necessary to meet the testing and commission requirements.
    - c) Provide Factory Acceptance Testing (FAT) to demonstrate the operational functionality of hardware and communications per specifications.
    - d) Provide Operational Readiness Testing (ORT) to demonstrate the correct operation of the control system with both hardware and software in place per specifications.
    - e) Provide Performance Acceptance Test (PAT) to ensure entire system functions properly per specifications.
    - f) Provide all required training per specifications.
    - g) Provide warranty services per Contract requirements.

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4. Interfacing and Responsibilities of General Contractor (GC) and DCSP: The following Table 1 shows the procurement, installation, and labor responsibilities of the DCSP and the GC. All field instrumentation devices and final control elements which are needed to support DCS functionality will be wired to process control modules (PCMs). Tables 2 and Table 3 define in greater detail of the responsibilities assigned to the General Contractor and the DCSP.

<b>Table 1: Matrix of Responsibilities - Equipment/Devices/Materials</b>		
<b>Product</b>	<b>Supply</b>	<b>Install</b>
DCS Process Control Modules (PCMs)	DCSP	GC
DCS Workstations (WSs)	DCSP	DCSP
DCS Historian System (HS)	DCSP	DCSP
DCS PIN/FIN Hubs and network equipment	DCSP	DCSP
DCS Printers and Stands	DCSP	DCSP
Fiber Optic Network Cables (PIN and FIN cables)	DCSP	DCSP
Fiber Optic "DIN Cables"	DCSP	GC
All Other Communication Cables which interconnect the DCS Equipment	DCSP	DCSP
UPS Systems and Ancillaries for DCSP provided equipment	DCSP	GC
Instrumentation Panels (including PLCs) and racks provided by DCSP	DCSP	GC
Panels (including PLCs) and racks provided by GCs	GC	GC
Instrumentation provided by GCs	GC	GC
Instrumentation provided by DCSP (including specialized communications cables required)	DCSP	GC
Interposing relays to interface DCS control commands with equipment controls FIE	GC	GC
DCS Isolated (Reference) Grounding Cables and Rods	GC	GC
Large Screen Control Room Video System	DCSP	GC

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<b>Table 2: Matrix of Responsibilities - Wire/Conduit/Terminations</b>			
<b>Description</b>	<b>Supply</b>	<b>Install</b>	<b>Terminate</b>
Power conduits and wire to GC furnished equipment and devices	GC	GC	GC
Power conduits and wire to DCSP furnished equipment and devices	GC	GC	GC
Signal conduits from DCSP or GC furnished instruments to DCSP or GC furnished equipment and device	GC	GC	---
Signal wire/cable from DCSP or GC furnished instruments to DCSP or GC furnished equipment and devices	GC	GC	GC
All conduits associated with the PIN, FIN, DIN and other communication links	GC	GC	----
PIN and FIN fiber optic, unshielded twisted-pair and coaxial cables	DCSP	DCSP	DCSP
Other communications cables from GC-supplied equipment to the DCS	GC	GC	GC
All cable associated with the DIN	DCSP	GC	DCSP
All conduits associated with the fire alarm, CCTV, page party and security/card reader systems, as required	GC	GC	----
All signal wire/cable associated with the fire alarm, CCTV, page party, and security/card reader systems	GC	GC	GC
All power wire/cable associated with the fire alarm, CCTV, page party and security/card reader systems	GC	GC	GC
Ground conduits and wire/cable from power panel to PCM or any other DCSP furnished equipment	GC	GC	GC



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<b>Table 3: Matrix of Responsibilities - Testing and Services</b>		
<b>Task</b>	<b>DCSP</b>	<b>GC</b>
Prepare DCS hardware/installation submittals (PCM; WSS; HS; CM; UPS; fire alarm system, if required)	X	
Prepare DCS software submittal	X	
Provide SAMA functional diagrams	X	
Prepare annotated software listings of all GC-furnished PLCs and other programmable equipment		X
Prepare instrument submittal		X
Calibrate instruments		X
Prepare GC panel submittals		X
Prepare loop drawings to support the termination of all DCS I/O and the installation of all instruments		X
Coordinate all control systems integration (instrumentation, PLCs, DCS, network, communications and data exchange) amongst various subs		X
Perform operational readiness test (ORT) of DCS	X	
Perform ORT test of GC panels		X
Perform loop tests	X	X
Participate in plant startup	X	X
Provide DCS information to support GC development of loop drawings	X	

1.03 RELATED SECTIONS

A. The Work described in the following sections also applies to the Work in this section. Other sections of the specifications not referenced below shall also apply to the extent required for proper performance of this Work.

1. Division 01, General Requirements.
2. Division 26, Electrical.
3. Division 40, Process Interconnections.

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- B. Codes and Standards: The Work shall comply with the current editions of the publication and codes as adopted by the City of San Diego.

1.04 SPECIFICATIONS, CODES, AND STANDARDS

- A. The Work shall comply with the current editions of the publications and codes identified in Section 40 90 04, References, and herein.

1.05 DEFINITIONS

- A. Definitions of acronyms are identified in Section 40 90 05, Definitions.

1.06 SUBMITTALS

- A. The DCSP shall develop and submit within the first 45 days after NTP, a detailed list of submittals required by all Contract Documents for review and approval. The list shall contain the title of each submittal, detailed description of its contents and the applicable reference sections. Submittal shall be grouped, organized and sequenced logically such that it facilitates the City's representative's review process. This requirement extends to all Work required by all other Divisions.
- B. All submittals shall be executed in accordance with Section 01 33 00, Submittal Procedures.
- C. The DCSP shall conduct a presubmittal conference. At a minimum, the following shall be presented at the conference:
  - 1. A list of equipment and materials required for the applicable submittal content.
  - 2. A list of proposed exceptions to the Specifications and Drawings, along with a brief explanation of each.
  - 3. An exact one-to-one sample of each type of document to be submitted.
  - 4. Any implementation and construction documentation associated with the submittal.
  - 5. A schedule or schedule fragment that applies to the submittal.
- D. The DCSP shall coordinate the work of the DCS with the Contractor and its subcontractor so that a complete DCS package will be provided inclusive of accurate Shop Drawings and Record Drawings. The DCSP shall prepare and submit complete and organized Shop Drawings, as specified herein. Incomplete or partial submittals are not acceptable. All Shop Drawings and Record Drawings shall be submitted in accordance with Section 01 33 00, Submittal Procedures.
  - 1. Plant-wide loop drawing submittal (PLDS) to verify the DCS interfaces with all instrumentation and devices being provided or installed under this

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Project are to be developed by the Contractor or its subcontractor with the assistance of DCSP. The Loop Drawings shall define all interfaces with equipment provided by the DCSP and as such the DCSP is responsible for providing all necessary information to the Contractor on a timely basis. The Loop Drawings shall be developed in accordance with existing City Loop Drawing standards, as follows:

- a. The loop drawing shall be composed of three sections.
  - b. Page 1: A device schedule with a table showing the following:
    - 1) Device tag number, with Prefix, Unit Process, ISA Tag Prefix, Tag No, Tag suffix.
    - 2) Equipment Service.
    - 3) Device Type.
    - 4) Location.
    - 5) Device Manufacturer.
    - 6) Model No.
    - 7) Specification No.
    - 8) Area Contractor (if applicable).
    - 9) Submittal No.
    - 10) Remarks.
    - 11) Data Sheet No.
    - 12) I/O Signal (AI, AO, DI, or DO).
    - 13) Signal Level.
    - 14) Device Range.
    - 15) Engineering Units.
    - 16) Process Set Point.
    - 17) Loop Diagram No.
    - 18) Loop Drawing File Name.
    - 19) Interconnect Drawing File Name.
    - 20) For third-party devices, should also include: IP (if applicable), module addresses, data registers, IO Tag Names (AB), protocols etc.
  - c. Page 2: Loop drawing meeting the requirements of ANSI/ISA S5.4, except that intermediate terminal junction boxes may omitted and be shown on Page 3 for clarity.
  - d. Page 3: Abbreviated diagram showing instrument, wire and cable numbers, intermediate terminal junction boxes, and PCM terminations.
2. The DCSP shall augment the content of the Loop Drawings by providing all of the requisite data relating to the DCS. For each DCS input/output, the DCSP shall note on the PLDS the following information:
- a. PCM number, and physical location.
  - b. Controller number.
  - c. Type of input.
  - d. I/O card location and address.

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- e. All DCS-dependent displayed functions using ISA symbology.
  - f. Drawing reference for DCS software content.
3. In these Contract Documents all systems, all meters, all instruments, and all other elements are represented schematically, and are designated by symbology as derived from International Society of Automation ISA S5.1 (latest revision). The nomenclature and numbers designated herein and on Drawings shall be employed exclusively throughout Shop Drawings, and similar materials. Any other symbols, designations, and nomenclature unique to any manufacturer's standard methods shall not replace those prescribed above, used herein, and on Drawings.
4. All Shop Drawings shall include a City-approved title block. The title block shall include, as a minimum, business name and address, project name, drawing name, revision level, and personnel responsible for the content Drawing. Loop Drawing Submittals shall be submitted in accordance with Section 01 33 00, Submittal Procedures.
- E. The DCS hardware submittal (DCSHS) shall be singular and all inclusive, submitted in accordance with Section 01 33 00, Submittal Procedures. The DCS Hardware Submittal shall include, but not be limited to:
- 1. A complete set of system diagrams which depict:
    - a. All Process Control Modules (PCMs), Workstations (WSs), video devices, printers, UPS, Foreign Device Interfaces (Data Link) telemetry devices, communication devices, and communication links.
    - b. A one-line showing the designed conduit and wire required to support the power, ground, Input/Output, and communication requirements of the system.
    - c. A complete I/O Database showing all I/Os, annotated in ISA format, which depicts all designed I/O, both external and internal hard-wired and data-linked, inclusive of DCS termination locations.
    - d. A complete one-line diagram showing all power wiring and ground wiring, including UPS power, Utility (non-UPS) power and any other external dc. or ac. sources for each PCM.
  - 2. A complete set of factory data sheets for every DCS component. This shall include layout drawings that show enclosure details, including seismic mounting, as well as the location of each component within the DCS PCM enclosure. Drawings shall contain a scaled representation of the placement of all DCS equipment being provided under this contract and its spatial relationship to all other equipment (both new and existing) located in the abutting and adjoining areas. All acquired access and clearances associated with the DCS equipment and other equipment must be shown with a statement of compliance to DCSP requirements, NEC, NFPS and other applicable codes.

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3. Detailed installation, mounting and anchoring details for all components and assemblies to be field mounted, including access requirements, conduit connections or entry details shall be provided.
  - a. DCSP shall provide seismic calculations for each DCS PCM enclosure, or other anchored apparatus, based on the proposed mounting arrangement. Installation/mounting/anchoring drawings shall be stamped by a Structural Engineer, registered with the State of California. Each individual anchoring drawing, as well as the seismic calculations drawings, shall be stamped by the structural engineer.
  - b. A complete, and detailed, bill of material (BOM) shall be provided. The BOM shall show the factory model number for each component within the DCS.
  
- F. The DCS Network submittal (DCSNS) shall be singular and all inclusive, submitted in accordance with Section 01 33 00, Submittal Procedures. The DCS Hardware Submittal shall include, but not be limited to:
  1. A complete set of network diagrams which depict:
    - a. All Process Control Modules (PCMs), Workstations (WSs), video devices, printers, UPS, Foreign Device Interfaces (Data Link) telemetry devices, communication devices, and communication links.
    - b. A one-line showing the designed conduit and wire required to support the power, ground, Input/Output, and communication requirements of the system.
    - c. A complete network design report including IP scheme, traffic planning and control, QoS, configuration of every network equipment including routers, switches and firewalls.
    - d. A Complete fiber connection diagrams including fiber routing plans, fiber details, link budget calculations etc.
    - e. A complete, and detailed, bill of material (BOM) shall be provided. The BOM shall show the factory model number for each component within the DCS.
  2. A complete set of Factory Data sheets for every network component.
  
- G. The DCS Software Submittal (DCSSS) shall be singular and all inclusive, submitted in accordance with Section 01 33 00, Submittal Procedures. The DCS Software Submittal shall include, but not be limited to:
  1. A complete set of all available software algorithms.
  2. A complete set of Designer control strategies, with annotations provided by the DCSP depicting engineering details to show how all monitoring and control functions, on a loop by loop basis, will be accomplished. So operators can understand how the process will respond to his actions through DCS interfaces.

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3. An English narrative of each data acquisition or control loop mission and anticipated action. Narratives shall enumerate the signal point name, signal descriptor, associated PCM number, associated system template displays, system functions activated by signal (i.e., interlocks, alarms, logs, etc.).
  4. A complete set of PCM configuration sheets depicting each loop linkage. Each loop shall be on its own 8-1/2-inch by 11-inch sheet.
  5. A complete listing of the DCS data base listing for each data point's relevant parameters such as range, contact orientation, limits, incremental limits, I/O card type, I/O hardware address and assignment, including ALL Macros used/created for the Software.
- H. The DCS Graphic Submittal (DCSGS) shall be singular and all inclusive, submitted in accordance with Section 01 33 00, Submittal Procedures. The DCS Graphics Submittal shall include, but not be limited to:
1. One complete set of all WS-accessible displays which are unique to this project (i.e., process global, system global, process regional, systems regional, process group, process loop, process component, integrated tutorials, integrated process tutorials, integrated documentation, user assistance).
  2. The DCSP shall ensure that all graphics development, and graphics submittal, conform to the existing graphics layouts, linkages and formats used throughout the COMNET Enterprise.
  3. The Graphics Submittals shall contain displays in full size color graphic format and replicate the proposed screen contents. All background colors shall be identical to that of the screen content. All displays shall be arranged in a hierarchical order with references to associated WSs.
  4. A system display linkage diagram which defines the hierarchical order and the linkages via page, down, left, right commands.
  5. A definition of each displays data fields by tag numbers, utilizing the existing DCS COMNET standard.
  6. A definition of each displays dynamic elements which shall blink, change color, rotate or change shape in response to process changes, and conforms to the existing COMNET standard.
  7. A listing of all "help" text associated with each display screen, arranges in conformance to the COMNET standard.

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- I. The DCSP shall prepare and submit a Plan for the Operation Readiness Tests (ORT). The ORT plan shall be submitted in accordance with Section 01 33 00, Submittal Procedures. The ORT Plan shall be a single-source document which shall encompass means and methods for testing the complete DCS for this Project segment.
  1. The ORT Plan shall provide testing of all DCS hardware, software, graphics, alarms and network communications.
  2. The ORT Plan shall elaborate on the simulator to be utilized to provide proof of performance testing for the I&C and DCS functions of the project.
  3. The ORT Plan shall provide sample sheets depicting all I/O, hardware, data links, communication networking and internally generated alarms, and I/O points. Once approved conceptually by the City, these forms will be populated and utilized by the DCSP in the submission of each PCM individual ORT submittal.
  
- J. The DCSP shall prepare a complete Training Plan. The Training Plan shall be submitted in accordance with Section 01 33 00, Submittal Procedures. The DCS Training Plan will provide the structure and syllabus for training sessions as follows:
  1. Operator Training: Shall provide instruction to Operators already familiar with the operation of the Enterprise DCS, and shall be tailored to the new I/O, process controls, P&ID schemes and specialty consideration for the controls for this Project.
  2. Maintenance Training; Shall provide training to City DCS staff on all enhancements to the DCS, new-generation components and all other hardware, software or graphics maintenance requirements, not currently covered in the City's existing Enterprise DCS.
  3. The DCSP shall allow for a minimum of four sessions of each class outlined in the Training Plan to ensure staff availability and shift-differential considerations are facilitated.
  4. Resumes of all Training Instructors to be utilized in DCS training shall be included in the Training Plan submittal.
  5. After approval of the Training Plan, the DCSP is responsible for coordinating with City DCS staff, or the City's project representative, to schedule training classes at appropriate times in advance of cut-over and start-up.

## **PART 2 PRODUCTS**

### **2.01 CURRENT TECHNOLOGY**

- A. All hardware and software shall be the product of Emerson Process Management (EPM) and shall be of the Ovation family of DCS.
- B. The DCS should utilize state-of-the-art products in the DCSP's product line. However, the DCSP must ensure that all products used for this Project are compatible, and will fully integrate into the City's existing enterprise wide COMNET DCS.
- C. Successful operation and calculation shall be demonstrated during Factory Acceptance Testing (FAT), Operational Readiness Testing (ORT) and Functional Testing phases.

### **2.02 HARDWARE AND SOFTWARE COMMONALITY**

- A. Where there is more than one item of similar equipment being furnished, all such similar equipment shall be the of the same Ovation family series.
- B. The DCSP shall submit a plan in case of a discontinued or upgraded product, or other cases where changing technology requires changes in equipment, the DCSP shall submit a Substitute Item Request Form.
- C. All equipment shall be of modular design to facilitate interchangeability of parts and to assure ease of servicing. This interchangeability shall apply to the following components, as a minimum, of the DCS.
  - 1. Processor Modules.
  - 2. Bulk Memory Modules.
  - 3. Communication Interface Modules.
  - 4. Analog and Discrete Signal Modules.
  - 5. Power Supply Modules, and UPS devices.
  - 6. Workstations and operator interface devices.
  - 7. Software licenses.

### **2.03 DCS PRIMARY ARCHITECTURAL COMPONENTS**

- A. The DCS supplied by EPM shall consist of, but not be limited to, the following primary architectural components:
  - 1. Operator, engineering, instructor, and field workstations.
  - 2. Copper and fiber optic communications network (at DCS PCMs, etc.).



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3. DCS OS Software for alarms, events, monitoring and control, and configuration tools.
4. Security.
5. Historian/historical data recording and reporting.
6. System Configuration (Application Software) of I/O database, displays, control loops, and human machine interfaces (HMI) graphics.
7. Process Control Modules (PCM).
8. Input/output (I/O) cards and devices, I/O racks, I/O units, remote IO, and Termination Cabinets.
9. PLCs, RTUs, Foreign Device Interface (FDI) modules for PCMs.

B. In addition, components associated with the DCS are:

1. Control room furniture as shown on Drawings and contained in these Specifications, peripherals such as large screen displays, alarm printers, etc.).
2. Services related to DCS (including system maintenance, upgrading, and third party and enterprise integration).
3. Enclosures, termination panels, power, UPS, and ground termination busses, etc.

#### 2.04 INTEGRATION COMPONENTS

A. The Integration components shall consist of the following:

1. Integration server (where show on design drawings and specified herein).
2. Integration adapters.
3. Software integration services.
4. Web services (when required by Specifications).

#### 2.05 SUPPORTING COMPONENTS

A. The supporting components and associated application software shall consist of the following:

1. DCSLAN Switches.
2. DCSLAN/DCSWAN Routers.
3. Patch Management Server (when specified herein).
4. Security hardware and software, including Antivirus software and malware detection.

**PART 3 EXECUTION**

**3.01 PROJECT EXECUTION AND PROJECT MANAGEMENT SERVICES**

- A. The DCSP shall prosecute all Work in strict accordance with the sequence and schedule of the Prime Contractor's Master Baseline Schedule.
- B. The DCSP'S attention is called to the Contract Documents and Division 40, Process Interconnections, for specific administrative and commercial requirements of the Work.
- C. The DCSP shall provide all project management services required to complete the Work of these documents. At a minimum project management services shall include:
  - 1. Progress review meetings.
  - 2. Meeting and workshops to develop project requirements and design details.
  - 3. Regular meetings on scheduling and invoicing.
  - 4. All required meetings for design and submittal reviews.
  - 5. Coordination of support and warranty.
  - 6. Coordination of training.
  - 7. Development and delivery of DCS project controls and document management that coordinates with that of the Prime Contractor.
  - 8. Attend coordination meetings with Prime Contractor, City's representative, plant staff and other City entities as they relate to the delivery of DCS Work.
  - 9. Respond to City representative's requests for information and project documentation.
  - 10. Respond to RFI reviews, as requested by the Design Engineer through the City's representative.
- D. The DCSP shall provide all labor, equipment, materials and furniture for the tenant improvements required for the approved staging site at the sole expense of the DCSP.

**3.02 ENGINEERING AND DESIGN PHASE**

- A. The DCSP shall provide all engineering, resources, equipment, and labor required to successfully:
  - 1. Produce all submittals, in accordance with Section 01 33 00, Submittal Procedures, and Division 40, Process Interconnections requirements.
  - 2. Program, configure, and test of all hardware and software as required by these Specifications.

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3. Design and specify the enterprise inter-site WAN interface at Project site for communications interface with the existing COMNET DCS.
4. Develop the classroom and computer-based-training for all system elements.
5. Execute field verification and documentation of all conditions, and develop installation drawings and accurate as-constructed documents to successfully complete the Work.
6. Setup, stage and test the Work of each process segment and perform ORT, witnessed by the City's representative at the approved staging area prior to any installation.
7. Put into service all system elements by detailed I/O tests, loop checks, and commissioning. Develop and perform functional and performance testing.
8. Develop and submit PCM-by-PCM cutover plans for approval by the City's representative.
9. Document all system elements, software and custom applications
10. Maintain, upgrade and warrant all Work required by the Prime Contract.
11. Design, develop, program, test, and commission Integration of DCS with other systems, see Section 40 90 00, Instrumentation and Control.
12. The DCSP shall develop and submit a uniform and standardized I/O tag name convention, and follow the ISA tagging scheme standardly used by the COMNET DCS.

3.03 PROCUREMENT, STAGING, PROGRAMMING, AND TESTING PHASE

- A. The DCSP shall provide all engineering, resources, equipment, and labor required to:
  1. Procure all goods and services required to conform to these Specifications.
  2. Perform all shipments required by the Work.
  3. Ship all equipment and software to the approved staging facility, including deliveries from approved staging site to Project site.
- B. Assemble, stage and program each segment of Work at the approved staging area and perform ORT prior to delivery for installation. All tests shall be performed in accordance with Division 40, Process Interconnections specifications and approved test procedures.
- C. The system elements (i.e. WS, PCM, FHS, etc.) may be assembled at the DCSPS facility and shipped to the approved staging area for staging, programming and testing. However, the City reserves the right to inspect these system elements prior to shipment, and again prior to delivery from the staging site to the Project site.

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3.04 FIELD CONSTRUCTION/COMMISSIONING PHASE

- A. Provide all engineering, resources, equipment and labor required to:
1. Oversee the physical install, by others, of all Process Control Modules (PCM) and Remote IO (RIO) enclosures and electronics.
  2. Oversee termination, by others, of all field wiring in 'B' or PCM Cabinets.
  3. Run new wires from cabinet to DCS IO where required.
  4. Design, install, and test foreign devices including serial or networked I/O.
  5. Oversee supply and termination of power and grounding of all devices, by others.
  6. Test all signal grounding and certify proper installation and function.
  7. Deliver Uninterruptible Power Supplies, for installation by others under Division 26, Electrical.
  8. Obtain and manage all required intra-plant permits.
  9. Install and test all DCS-related networking hardware and cabling.
  10. Test all workstations, hardened workstations, PCM and RIO cabinetry and enclosures.
  11. Manage and deliver as-built documentation including DCS loop diagram information and P&IDs information. As specified.
  12. Conduct a functional test, and site acceptance test to verify DCS performance.
  13. Update and submit all specified documentation to reflect "as-built" or record conditions.

3.05 MAINTENANCE AND UPGRADE SERVICES PHASE

- A. The DCSP shall warrant all parts and services for a period as specified for the Prime Contract, after Final DCS acceptance.

3.06 ENVIRONMENTAL SUITABILITY

- A. All DCS devices provided under this Contract shall be provided with enclosures which are suitable for use in a treatment facility environment where there are typically high energy AC fields, DC control pulses, and varying ground potentials between the transducers or process instrument locations and those occupied by DCS components.
- B. The system design shall be adequate to provide proper protection against interferences from all such possible situations.

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- C. As a minimum, all DCS equipment shall be resistive to airborne contaminants commonly found in wastewater treatment facilities, and be suitable for installation in an environment which conforms to a G2 classification as defined by ISA-S71.04.
- D. Field-Situated Equipment:
1. DCS equipment being furnished under this contract shall be suitable for use in wastewater treatment facilities, some of which are in an environment of air with traces of methane and hydrogen purging sulfide. The system design shall be adequate to provide proper protection against such an environment.
  2. All field-situated components including PCMs shall be UL-listed or approved LABOS by an independent certification agency acceptable to the City of San Diego.
  3. All DCS devices shall be housed in an enclosure suitable for its intended service and installation location.
  4. All DCS devices to be installed in MCC or other protected areas shall be furnished in NEMA 12 rated enclosure.
  5. All DCS devices to be installed in indoor protected areas shall be furnished in NEMA 12 rated enclosures.
  6. All DCS devices to be installed in indoor unprotected or areas subject to hose-down conditions, or outdoor areas, shall be furnished in Type 316 stainless steel NEMA 4X rated enclosures.
  7. At a minimum, the DCS shall be designed and constructed for satisfactory, long, and low maintenance operation under the following environmental conditions:
    - a. Temperature Range: 0 degrees C through 50 degrees C (32 degrees F through 122 degrees F).
    - b. Thermal Shock: 0.55 degrees C (1 degree F per minute maximum).
    - c. Relative Humidity: 5 percent through 95 percent (noncondensing).
  8. The mounting of all enclosures shall meet the requirements as specified in Division 26, Electrical, and shall be seismically braced as required by code for this seismic zone.

**END SECTION**

**SECTION 40 94 23**  
**PROCESS CONTROL MODULE (PCM)**

**PART 1 GENERAL**

1.01 REQUIREMENT

- A. This specification section covers furnishing all labor, materials, equipment and programming for the provision of the required process control modules (PCMs) to complete this Work.
- B. Named Types: Process Control Modules (PCM) type.
- C. At a minimum, a PCM shall include the redundant controller processors, redundant memory and communication modules, redundant power supplies with arbitration control, redundant I/O communication processors, NEMA enclosure and backplane, all wiring, power and ground distribution, mounting and anchoring hardware. If part of the manufacturer's standard assembly, it shall also include the chassis to facilitate the I/O modules.
- D. Fault Tolerant:
  - 1. Where a system processor or a system is required to be redundant, that unit shall function as a fault tolerant device.
  - 2. Fault tolerant processing shall consist of two parallel-operation processors (electronics) with separate connections to the system communication network. Both processors shall receive and process information simultaneously, with faults detected by the processors themselves.
  - 3. A fault tolerant configuration shall provide synchronous read/execute/compare capabilities with no database transfer.
  - 4. Upon detection of a fault, self-diagnostics shall be run by both processors to determine which processor is defective. The nondefective processor shall then assume communication and control without affecting normal system operation. Upon replacement of the defective processor the system shall automatically, or the operator may initiate, download of the database to the replaced processor and assume communications via the network without affecting normal system operation. The use of backup, "hot standby," or "automatic and bumpless switch over" configurations are acceptable if the transition from failed device to backup device does not degrade the process monitoring and control system or the system's availability.

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1.02 RELATED SECTIONS

- A. The Work described in the following sections also applies to the Work in this section. Other sections of the specifications not referenced below shall also apply to the extent required for proper performance of this Work.
  - 1. Division 01, General Requirements.
  - 2. Division 26, Electrical.
  - 3. Division 40, Process Interconnections.
- B. Codes and Standards: The Work shall comply with the current editions of the publication and codes as adopted by the City of San Diego.

1.03 SUBMITTALS

- A. The DCSP shall provide all submittals in accordance with the requirements of Section 01 33 00, Submittal Procedures. In addition, the DCSP shall provide PCM component data: Manufacturer's standard catalog data, including a description and depiction of all control devices and instruments in sufficient detail to demonstrate complete specification compliance. If standard catalog data does not contain sufficient detail to verify compliance, then the DCSP shall submit supplementary documentation to verify compliance.
- B. PCM Design:
  - 1. Layout and shop drawings, including the following:
    - a. Panel layout, including fully dimensioned and detailed external spatial views and internal layout.
    - b. Electrical schematics, including, new panel wiring, instrument wiring and power and grounding.
    - c. Layout of relays, breakers, switches and instrumentation provided, and applicable single line and wiring diagrams.
    - d. I/O card placement and layout.
    - e. Enclosures, including all associated hardware devices.
    - f. Detailed description and associated diagrams of all software components of the PCM.

1.04 CODES AND REGULATORY REQUIREMENTS

- A. Instrument Society of America: ISA S5.1 (ANSI/ISA-5.01.01) Instrument Symbols and Identification.
- B. National Electric Manufacturers Association (NEMA):
  - 1. NEMA 250, Enclosures for Electrical Equipment.
  - 2. NEMA ICS 2, Industrial Control Devices, Controllers, and Assemblies.

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- C. National Fire Protection Association (NFPA): NFPA 70, National Electrical Code.

1.05 DEFINITIONS

- A. Definitions of acronyms are identified in Section 40 90 05, Definitions.

**PART 2 PRODUCTS**

2.01 PCM REQUIREMENTS

- A. All DCS controllers shall be manufactured by Emerson Process Management (EPM) and shall be of the Ovation family line. All I/O modules shall match existing and shall be compatible with and seamlessly integrate onto the existing Enterprise wide COMNET DCS.
- B. DCS controllers shall be directly or remotely connected to field Input/Output (I/O) modules.
- C. All requirements for Process Control Modules (PCM) enclosures shall apply to a RIO enclosure.
- D. Examples of PLCs provided as a part of a vendor's standard package system are: UV disinfection controls, RO filtration units, HVAC controls and generator controls. This application is distinguished by extensive use of packaged control software and a substantial number of I/Os which are of secondary interest and do not directly affect the major treatment processes (monitoring of lamp status in UV systems, for example). Many of these systems are provided standard with separate operator interfaces. Because of limited space and maintenance requirements, panel-mounted color LCD operator interfaces for these packaged control systems are preferred over desktop personal computers. For these systems, the DCS will be used for supervisory control and monitoring via a communications link, preferably Modbus/TCP, with the PLC operating in the "slave" mode.
- E. All PLCs and local operator interface panels provided for a packaged system project will be of a common manufacturer. Furthermore, the design consultant will consult with City prior to the naming of acceptable PLC manufacturers. The PLC programmer will include a heartbeat bit to be exchanged between the PLC and the DCS, and the designer will include this bit in the MODBUS I/O list. The City's standard PLC is Allen-Bradley. Designers must carefully select I/O points included in PLC to DCS communications. Points transmitted must support the control strategies, necessary alarms, or otherwise be useful to the operator. Simply specifying that all PLC points will be transmitted to the DCS is not acceptable.
- F. All remote I/O (RIO) shall be physically connected to its associated PCM. Wireless communication is not acceptable.



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- G. Each PCM shall contain all of the required I/O, inclusive of all attributes, data, alarming, and control strategies required to monitor and control its associated process.
- H. PCMs, including remote I/O, shall receive power from a dedicated UPS branch circuit and from an additional secondary branch power source (other than the circuit feed to the UPS) to create a redundant bumpless transfer of power to the PCM and/or RIO. UPS and utility power circuits are to be provided to the PCM and RIO by others, under Division 26, Electrical.
- I. PCMs shall be configured, programmed and loaded using engineering functions found in Ovation Developer Studio. The number of user licenses required for each engineering function for each project will be identified in the scope of work.
- J. PCMs shall be dual network ported to communicate with other DCS devices over the fault tolerant DCSLAN.
- K. PCMs shall communicate with the facility historian system (FHS), and workstations (WSs) over the DCSLAN.
- L. Each PCM shall be able to communicate with every other PCM directly in a peer-to-peer manner using peer protocol.
- M. Each process location shall be provided with dual redundant DCS controllers (excluding I/O) configured for fault tolerant processing via standard system configuration procedures.
- N. Each DCS Controller shall be redundant and provide complete “bumpless” automatic failover to a backup PCM controller in the event of primary PCM failure.
- O. Each PCM enclosure shall be provided with an interior cabinet temperature sensor and security switch to report “real-time temperature” and “door ajar” conditions, respectively.
- P. Each PCM enclosure with additional air purge shall be equipped with a sensor to report air purge system fail.
- Q. PCM Interface to Packaged System PLCs:
  - 1. PLCs shall interface to the DCS through Foreign Device Interfaces (FDI) which is defined as follows:
    - a. The DCS shall be provided with an integrated fault-tolerant FDI in the PCM which supports monitoring and control of the PLC.
    - b. The FDI shall be fault-tolerant and redundant where indicated.

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- c. The DCS shall have an open architecture, which shall enable the FDI to provide a means of integration with multiple vendors in a manner which is transparent to the user at the WS level. All of the data associated with the FPI shall appear at the WS in a similar format and presentation to data derived from PCMs. All WS interaction functions that the operator uses to monitor and control inputs/outputs associated with the PLC(s) shall be similar to those used by the operator to interact with inputs/outputs associated with the PCM(s).
  - d. The FDIs provided shall interface with all existing packaged system PLCs that are connected to inputs/outputs on the plant.
  - e. All self-documentation features which relate to DCS devices shall also relate to the documentation of PLC configurations made at the DCS. All documentation produced shall be in like format as that for all other DCS components.
  - f. The FDI shall support existing field workstations that are part of the existing or packaged system PLC.
  - g. DCSP shall include all research, development of drivers (if necessary), I/O maps, I/O register address/protocol maps, configure and startup all FDIs.
  - h. As an alternative to the above, if the FDI utilizes custom software drivers to communicate with various manufacturers PLCs/PLC networks, the DCSP shall include all costs associated with providing, licensing, documenting, and revising these software drivers throughout the duration of this contract. If a software driver is used at more than one location, the DCSP shall furnish the additional software driver(s) at no additional cost. A minimum of one set of hardware and all required software shall be furnished to interface with each of the PLCs and PLC communications networks listed below.
2. The DCSP shall provide all hardware, software, to interface to the existing PLCs. FDI network cabling will be supplied and installed by others, under Division 26, Electrical.
  3. The following interface communication protocols and support management shall be provided via the FDI for third-party PLC integration:
    - a. Allen-Bradley (EIP, TCP and serial DF-1).
    - b. Modbus (TCP and serial).
    - c. DNP3.

R. Process Database:

1. PCMs shall support the following types of database points:
  - a. I/O points from I/O resident in PCMs, remote I/O, or OWS/EWS.
  - b. I/O points from FDIs.
  - c. DCS calculated analog and calculated discrete points.
  - d. DCS manual inputs.
  - e. PLC/RTU registers.

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2. The user shall be able to configure all database points and attribute information from the EWS.
3. The PCM shall store the following configurable/default fields about each database point:
  - a. DCS Tag Numbers: 16 characters, minimum, assigned as follows:
    - 1) Characters 1-3 to identify each plant/collection system, e.g., ‘DCT.’
    - 2) Characters 4-X pad with zeros (0’s).
    - 3) DCS Point Naming Guidelines: Below are naming guidelines for DCS I/O points and user-created internal DCS points that are visible to operations (such as derived alarm points that are shown on alarm screens, calculated points that are collected by the historian, or shown on reports, graphics, or on trend screens).
      - a) For all such points, the recommended tag structure is:

<Plant> <Plant Area> <ISA Acronym> <Loop Number>  
<Suffix>, where:

**<Plant>** = A single letter to designate the Plant or system as follows:

“M” for Metropolitan Biosolids Center (MBC)

“N” for North City WRP

“P” for Point Loma WTP

“S” for South Bay WRP

“T” for Pump Stations 1 and 2

“I” for Pump Stations 64 and 65

“E” for East Mission Gorge Pump Station

“Q” for Penasquitos Pump Station

“C” for SCADA

“G” for Grove Avenue Pump Station (GAPS)

“O” for Otay Pump Station

**<Plant Area>** = Two-digit Plant area code

For example, “05” is commonly used for the “Headworks” area.

**<ISA Acronym>** = Two or more identification letters chosen based on “ISA-5.4 Appendix B”

If an appropriate ISA Acronym is not readily identifiable, the letter “X” (“unclassified”) may be used.

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**<Loop Number>** = Four Digit Loop Number

For points that are derived from an I/O point or associated with a device for which a loop number is defined, the loop number should be readily identifiable. If an appropriate loop number is not readily identifiable, the number “0” may be used, or any number in the range 0-999 chosen at the discretion of the programmer (for example unit number, system number).

**<Suffix>** = A multi alpha-numeric character string that begins with a letter. The string is chosen at the discretion of the programmer to make the point unique and/or to clarify point use.

- 4) DCS point names should be composed of alpha-numeric characters only (i.e., characters A through Z and 0 through 9). They should not include any special characters such as #, \$, &, (, %, -, and so on.
- 5) For all such user-created points, engineering descriptions should be provided. For packed points, where individual bits are used for separate functions, descriptions should be provided for any individual bits that are used.
- 6) DCS point names must be unique.

2.02 PCM HARDWARE COMPONENT PLATFORM

- A. Each PCM shall use minimum 32 BIT processor.
- B. Redundancy – Fully Redundant Pairs:
  1. The PCM cabinet shall be provided with the following redundancy unless specified otherwise:
    - a. Dual functional processors.
    - b. Dual redundant network interfaces.
    - c. Dual processor power supplies.
    - d. Dual I/O power supplies.
    - e. Dual input power feeds.
    - f. Dual I/O interfaces not dual I/O.
    - g. Dual auxiliary power supplies (loop power).
    - h. Auto fail over from active PCM to standby PCM for all sites that contain dual PCMs.
    - i. Hot programming of backup module.

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**PART 3 EXECUTION**

3.01 GENERAL

- A. The DCSP shall furnish all materials, tools, equipment, consumables and supplies, hardware, firmware, software and software licenses, and shall perform all labor required to complete the Work in this specification.
- B. All I/O tags shall be incorporated as defined elsewhere in these Specifications required for the process database as defined in these Specifications.
- C. The International Society of Automation (ISA) standards will be used if there are no conflicts with existing codes. If there is a conflict between existing Enterprise DCS facility, DCS tag codes, and the current published ISA table, which lists the ISA identifiers, it shall be brought to the attention of the City's representative and the fix coordinated with the City COMNET staff and Project Design Engineers.
- D. Spares, Tools, and Test Equipment:
  - 1. General:
    - a. The DCSP shall furnish all spare parts, tools and test equipment, which may be unique to hardware or software provided under this Contract, that is required to repair and calibrate the DCS and maintain it in good operating condition. In addition, the DCSP shall provide the following spare parts and supplies:
      - 1) One of each type of processor board associated with PCMs, WSs, and peripheral devices.
      - 2) One spare I/O card, of each type used, for every PCM provided under this Contract.
      - 3) One of each type of communication board.
      - 4) Three of each type power supplies, used in any DCS component of the Contract.

**END OF SECTION**

**SECTION 40 94 24**  
**PROCESS INPUTS/OUTPUTS (I/O)**

**PART 1 GENERAL**

1.01 REQUIREMENT

- A. Process I/O to and from the DCS shall be provided primarily through I/O modules connected to each PCM.
- B. I/O modules shall be modular plug-in components.
- C. Analog Input Modules shall be available for analog-to-digital conversion, including 4 to 20 mA, 1 to 5V dc or RTD input signals.
- D. Analog output modules shall be 24V dc and generate 4 mA to 20 mA output signals.
- E. Digital and analog I/O modules shall be 24V dc.
- F. Digital output modules shall be available with current sinking and relay outputs.
- G. Intelligent device modules (e.g., Hart, DeviceNet, Fieldbus, etc.) shall be a requirement.
- H. Foreign processor interface (FPI) referenced in Section 40 94 23, Process Control Module (PCM).

1.02 RELATED SECTIONS

- A. The Work described in the following sections also applies to the Work in this section. Other sections of the specifications not referenced below shall also apply to the extent required for proper performance of this Work.
  - 1. Division 01, General Requirements.
  - 2. Division 26, Electrical.
  - 3. Division 40, Process Interconnections.
- B. Codes and Standards: The Work shall comply with the current editions of the publication and codes as adopted by the City of San Diego.

1.03 SUBMITTALS

- A. The DCSP shall provide submittals in accordance with the requirement in Section 01 33 00, Submittal Procedures.

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1.04 CODES AND REGULATORY REQUIREMENTS

- A. The Work shall comply with the current editions of the publication and codes identified in Section 40 90 04, References.

1.05 DEFINITIONS

- A. Definitions of acronyms are identified in Section 40 90 05, Definitions.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. All I/O products shall be manufactured by Emerson Process Management (EPM) and shall be of the Ovation family line. All I/O modules shall match existing and shall be compatible with and seamlessly integrate onto the existing Enterprise-wide COMNET DCS.
- B. All process I/O modules shall be located in an enclosure that is proximal or integral to the associated PCM.
- C. All I/O modules shall be 24V dc maximum. Connection to external 120V ac and other foreign voltages shall use interposing relays. Interposing or slave relays shall also be provided in cases where the number, type or rating of the DO module output are incompatible with the electrical circuit to which it is connected. All interposing relays switching 120V ac shall be isolated from low voltage I/O in accordance with NFPA.
- D. Boards or modules shall be provided to interface with process I/O and intelligent transmitters as follows:
  - 1. Analog Inputs HART (AI):
    - a. Maximum 8 AI per analog input module.
    - b. Four-wire transmitters shall provide an isolated 4 mA to 20 mA signal.
    - c. Two-wire transmitters shall provide an isolated 4 mA to 20 mA signal powered from dc power supplies internal or external to the DCS.
    - d. Sink/source selection shall be available by hard jumper or software configuration on a point-by-point basis.
    - e. All AIs shall be HART protocol compatible.
    - f. DCS analog inputs shall have a load of 250 ohms.
    - g. Each analog input shall have a minimum of 12-bit resolution, accuracy of 0.25 percent, and a dedicated A/D converter.

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2. Thermocouple Inputs and RTD Modules:
  - a. Maximum 8 RTD per RTD input module.
  - b. Thermocouple input cards shall be able to receive signals from Type J, K, and T thermocouples.
  - c. Thermocouple type shall be selectable on a point-by-point basis.
  - d. Each RTD or thermocouple input shall have a minimum of 12-bit resolution, accuracy of 0.25 percent, and a dedicated D/A converter.
3. Analog Outputs (AO):
  - a. Maximum 8 AO per analog output module.
  - b. Analog output boards shall provide isolated 4 to 20 mA output signals.
  - c. Signals shall be capable of driving a loop impedance of at least 600 ohms.
  - d. Each analog output shall have a minimum of 12-bit resolution, accuracy of 0.25 percent, and a dedicated D/A converter.
4. Discrete Inputs (DI):
  - a. Maximum 16 DI per digital input module.
  - b. Discrete inputs shall be powered by the DCS.
  - c. 24V dc signals shall be available.
  - d. Field contacts shall be dry isolated inputs to the DCS.
  - e. Field contacts that are used for alarms or control purposes shall be wired in a fail-safe manner; i.e. an open wire will result in an alarm and/or in the DCS controlling the system to a safe state.
5. Discrete Outputs (DO):
  - a. Maximum 12 DO per digital output module.
  - b. Discrete outputs shall be dry, isolated relay contacts capable of switching a minimum of 2 amps, at 24V dc, or bussed 24V dc current sinking output (maximum 0.5-amp per channel and 6-amp per module), depending on the application.
  - c. Power for sensing (“wetting”) discrete outputs shall be provided external to the DCS.
  - d. Output signal shall use interposing or slave relays.
6. Intelligent Transmitters:
  - a. Intelligent transmitter module (ITM) providing bi-directional communications with smart transmitters shall be available.
  - b. PCM shall allow remote transmitter configuration that simultaneously updates DCS database, excluding DeviceNet.
  - c. All digital communication with the intelligent process instrumentation from the DCS WS shall be in engineering units and shall be received a minimum of ten times per second.
  - d. ITMs shall be available that communicate using Foundation Fieldbus, Profibus, etc.



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- e. Each message shall contain the following information with analog values specified in standard IEEE 754 32-bit floating-point:
  - 1) Primary measurement information such as flow, pressure, level, etc.
  - 2) Transmitter temperature readings.
  - 3) Data security information.
  - 4) Diagnostic information.
  - 5) Message checking.
- 7. Configuration and status information shall be accessible at any DCS workstation, and shall include:
  - a. The assignment of configurable parameters such as tag number, location, address, tag name, upper and lower range values, zero elevation or suppression, linear or square root output for d/p cells, and damping time.
  - b. I/O card diagnostics graphic display.
  - c. Display of the process value in terms of percent of span, engineering units, or current level.
  - d. Diagnostics, card faults, and communications errors.
  - e. DCS sites that contain AMS shall be up dated with new HART I/O when added by Contract.

### **PART 3 EXECUTION**

#### **3.01 GENERAL**

- A. DCSP shall furnish and install all I/O boards and related equipment as shown on Drawings and called for in Project Specifications.
- B. Modules will be Configured Using:
  - 1. Established format of fully qualified module record point names with full English descriptions.
  - 2. Ac line frequency set at 60-Hz.
  - 3. Suppress point fault module alarm active.
  - 4. Blown fuse detection enabled.
- C. Valve Network Communications:
  - 1. Preferred communication protocol is Modbus/TCP. Convert communications protocol from Serial to Modbus/TCP where existing wiring infrastructure supports this change. See Supplement 1 (DCS Input / Output List) and Network Block Diagrams for which protocol is used by each valve network.
  - 2. Pakscan valve network communications:
    - a. The Pakscan 3 controller uses RS-232 to connect to the DCS Ethernet Link Controller.

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- b. The Pakscan 3 controller uses RS-232 to connect to the DCS, where called out in the DCS Input / Output List change Pakscan 3 communication setting to use the Ethernet protocol Modbus/TCP to connect to the DCS Ethernet Link Controller.
3. Flowserve valve network communications:
  - a. The Master Station II controller uses RS-485 to connect to the DCS, change Master Station II communication setting to use the Ethernet protocol Modbus/TCP to connect to the DCS Ethernet Link Controller.

3.02 SUPPLEMENT

- A. The supplements listed below, following “End of Section,” are part of this Specification.
  1. DCS Input/Output List: Highlighted text indicates additional DCS I/O.
  2. Deleted DCS Input/Output List: List of existing DCS I/O points to be deleted under this Contract.

**END OF SECTION**

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP7	60PCM05	5X00419G01		73VDL01 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			ET	1.1.1
			73MV1110	RAW SOLIDS FEED PUMP INLET VALVE 1				
			73MV1111	RAW SOLIDS FEED PUMP INLET VALVE 2				
			73MV1112	RAW SOLIDS FEED PUMP INLET VALVE 3				
			73MV1113	RAW SOLIDS FEED PUMP INLET VALVE 4				
			73MV1114	RAW SOLIDS FEED PUMP DISCHARGE VALVE				
			73MV1116	RECEIVING TANK 1 SAMPLE VALVE				
			73MV1117	RECEIVING TANK 2 SAMPLE VALVE				
			73MV1119	RECEIVING TANK 1 INLET VALVE 2				
			73MV1120	RECEIVING TANK 1 SOLIDS RECYCLE VALVE				
			73MV1121	RECEIVING TANK 1 INLET VALVE 1				
			73MV1125	J-TUBES INLET VALVE 1				
			73MV1131	RAW SOLIDS MIX PUMP DISCHARGE VALVE 1				
			73MV1132	RAW SOLIDS MIX PUMP DISCHARGE VALVE 2				
			73MV1134	RAW SOLIDS MIX PUMP DISCHARGE VALVE 4				
			73MV1135	RAW SOLIDS MIX PUMP DISCHARGE VALVE 3				
			73MV1144	RAW SOLIDS MIX PUMP 3 INLET VALVE				
			73MV1145	RAW SOLIDS MIX PUMP 3 DISCHARGE VALVE				
			73MV1150	RAW SOLIDS FEED PUMP 1 INLET VALVE				
			73MV1151	RAW SOLIDS FEED PUMP 1 DISCHARGE VALVE				
			73MV1152	RAW SOLIDS FEED PUMP 2 INLET VALVE				
			73MV1153	RAW SOLIDS FEED PUMP 2 DISCHARGE VALVE				
			73MV1194	RAW SOLIDS MIX PUMP 6 INLET VALVE				
			73MV1195	RAW SOLIDS MIX PUMP 6 DISCHARGE VALVE				
			73MV1305	BLENDING TANK 2 INLET VALVE				
			73MV1306	BLENDING TANK 2 DISCHARGE VALVE				
			73MV1312	BLENDING TANK 2 MIX VALVE 1				
			73MV1313	BLENDING TANK 2 MIX VALVE 2				
			73MV1330	BLENDING MIX PUMP 3 INLET VALVE				
			73MV1331	BLENDING MIX PUMP 3 DISCHARGE VALVE				
			73MV1340	BLENDING TANKS TRANSFER VALVE				
			73MV1341	BLENDING TANKS SCUM VALVE 1				
			73MV1342	BLENDING TANKS SCUM VALVE 2				
			73MV1343	BLENDING TANKS TRANSFER SAMPLE VALVE				
			73MV1350	DIGESTER FEED PUMP 1 INLET VALVE				
			73MV1351	DIGESTER FEED PUMP 1 HEADER 1 VALVE				
			73MV1352	DIGESTER FEED PUMP 1 HEADER 2 VALVE				
73MV1355	DIGESTER FEED PUMP 2 INLET VALVE							
73MV1356	DIGESTER FEED PUMP 2 HEADER 1 VALVE							
73MV1357	DIGESTER FEED PUMP 2 HEADER 2 VALVE							
DROP7	60PCM05	5X00419G01	<b>M73P0121</b>	<b>RAW SOLIDS FEED PUMP NO. 1</b>			ET	1.1.2
DROP7	60PCM05			Spare Module Address				1.1.3
DROP7	60PCM05			Spare Module Address				1.1.4

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP7	60PCM05	5X00106G01	M73ST0121	RAW SOLIDS FEED PUMP NO. 1	0	100 PCT	AI - HART	1.1.5.1	
DROP7	60PCM05	5X00106G01	M73FT2111	RAW SOLID FEED PUMPS DISCH FLW	0	3500 GPM	AI - HART	1.1.5.2	
DROP7	60PCM05	5X00106G01	M73ST0111	DIGESTER FEED PUMP NO. 1	0	100 PCT	AI - HART	1.1.5.3	
DROP7	60PCM05	5X00106G01	SPARE				AI - HART	1.1.5.4	
DROP7	60PCM05	5X00106G01	M73LT2120	RECEIVE TANK 1 LEVEL	0	45 FEET	AI - HART	1.1.5.5	
DROP7	60PCM05	5X00106G01	M73FT2121	RECEIVE TANK 1 INLET FLOW	0	3000 GPM	AI - HART	1.1.5.6	
DROP7	60PCM05	5X00106G01	SPARE				AI - HART	1.1.5.7	
DROP7	60PCM05	5X00106G01	SPARE				AI - HART	1.1.5.8	
DROP7	60PCM05	Spare Module Address							1.1.6
DROP7	60PCM05	5X00167G01	M73SC0111	DIGESTER FD PMP NO. 1 SPD DMND	0	100 PCT	AO	1.1.7.1	
DROP7	60PCM05	5X00167G01	M73SC0121	RAW SOLIDS FD PMP1 SPD DMND	0	100 PCT	AO	1.1.7.2	
DROP7	60PCM05	5X00167G01					AO	1.1.7.3	
DROP7	60PCM05	5X00167G01	M73FC2301	BLENDING TANK 1 LEVEL SETPOINT	0	13 FEET	AO	1.1.7.4	
DROP7	60PCM05	5X00167G01	M73FC9050	BLND TNKS XFR SMPLR FLOW PACE	0	100 PCT	AO	1.1.7.5	
DROP7	60PCM05	5X00167G01					AO	1.1.7.6	
DROP7	60PCM05	5X00167G01					AO	1.1.7.7	
DROP7	60PCM05	5X00167G01					AO	1.1.7.8	
DROP7	60PCM05	5X00119G01	MDPU07T1	DPU07 60PCM05 CABINET TEMP	32	154 DEG F	RTD	1.1.8.1	
DROP7	60PCM05	5X00119G01	SPARE				RTD	1.1.8.2	
DROP7	60PCM05	5X00119G01	SPARE				RTD	1.1.8.3	
DROP7	60PCM05	5X00119G01	SPARE				RTD	1.1.8.4	
DROP7	60PCM05	5X00119G01	SPARE				RTD	1.1.8.5	
DROP7	60PCM05	5X00119G01	SPARE				RTD	1.1.8.6	
DROP7	60PCM05	5X00119G01	SPARE				RTD	1.1.8.7	
DROP7	60PCM05	5X00119G01	SPARE				RTD	1.1.8.8	
DROP7	60PCM05	Spare Module Address							1.2.1
DROP7	60PCM05	5X00167G01	M73SC0112	DIGESTER FD PMP NO. 2 SPD DMND	0	100 PCT	AO	1.2.2.1	
DROP7	60PCM05	5X00167G01	M73SC0122	RAW SOLIDS FD PMP2 SPD DMND	0	100 PCT	AO	1.2.2.2	
DROP7	60PCM05	5X00167G01					AO	1.2.2.3	
DROP7	60PCM05	5X00167G01	M73FC9040	RAW SOLIDS SAMPLER FLOW PACE	0	100 PCT	AO	1.2.2.4	
DROP7	60PCM05	5X00167G01	M73TC2310	BLND MX TNK1 HEAT EXCH VLV POS	0	100 PCT	AO	1.2.2.5	
DROP7	60PCM05	5X00167G01					AO	1.2.2.6	
DROP7	60PCM05	5X00167G01					AO	1.2.2.7	
DROP7	60PCM05	5X00167G01					AO	1.2.2.8	
DROP7	60PCM05	Spare Module Address							1.2.3
DROP7	60PCM05	5X00106G01	M73ST0122	RAW SOLIDS FEED PUMP NO. 2	0	100 PCT	AI - HART	1.2.4.1	
DROP7	60PCM05	5X00106G01	SPARE				AI - HART	1.2.4.2	
DROP7	60PCM05	5X00106G01	M73ST0112	DIGESTER FEED PUMP NO. 2	0	100 PCT	AI - HART	1.2.4.3	
DROP7	60PCM05	5X00106G01	SPARE				AI - HART	1.2.4.4	
DROP7	60PCM05	5X00106G01	M73LT2125	RECEIVE TANK 1 LEVEL	0	45 FEET	AI - HART	1.2.4.5	
DROP7	60PCM05	5X00106G01	SPARE				AI - HART	1.2.4.6	
DROP7	60PCM05	5X00106G01	SPARE				AI - HART	1.2.4.7	

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP7	60PCM05	5X00106G01	M73ZT1315	HEAT XCHNGR 1 HOT H2O SUPPLY	0	100 PCT	AI - HART	1.2.4.8
DROP7	60PCM05			Spare Module Address				1.2.5
DROP7	60PCM05			Spare Module Address				1.2.6
DROP7	60PCM05	5X00419G01	<b>M73P0122</b>	<b>RAW SOLIDS FEED PUMP NO. 2</b>			ET	1.2.7
DROP7	60PCM05	5X00419G01		73VDL01 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			ET	1.2.8
DROP7	60PCM05	1C31232G01	M73MI0121	RAW SOLIDS FEED PUMP NO. 1	OFF	RUNNNG	DI	1.3.1.1
DROP7	60PCM05	1C31232G01	M73QI0121	RAW SOLIDS FEED PUMP NO. 1	LOCAL	INCOMP	DI	1.3.1.2
DROP7	60PCM05	1C31232G01	M73RI0121	RAW SOLIDS FEED PUMP NO. 1	WAIT	READY	DI	1.3.1.3
DROP7	60PCM05	1C31232G01	M73UA0121	RAW SOLIDS FEED PUMP NO. 1	NORMAL	FAIL	DI	1.3.1.4
DROP7	60PCM05	1C31232G01	M73FAL0121	RAW SOLIDS FEED PUMP NO. 1	NORMAL	LOW	DI	1.3.1.5
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.1.6
DROP7	60PCM05	1C31232G01	M73MI0133A	RAW SOLIDS MIX PUMP NO. 3	NORMAL	RNFAST	DI	1.3.1.7
DROP7	60PCM05	1C31232G01	M73MI0133B	RAW SOLIDS MIX PUMP NO. 3	NORMAL	RNSLOW	DI	1.3.1.8
DROP7	60PCM05	1C31232G01	M73QI0133	RAW SOLIDS MIX PUMP NO. 3	LOCAL	INCOMP	DI	1.3.1.9
DROP7	60PCM05	1C31232G01	M73RI0133	RAW SOLIDS MIX PUMP NO. 3	WAIT	READY	DI	1.3.1.10
DROP7	60PCM05	1C31232G01	M73FAL2142	RAW SOLIDS MIX PMP 3 DISCH FLW	NORMAL	LOW	DI	1.3.1.11
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.1.12
DROP7	60PCM05	1C31232G01	M73RI1315	HEAT XCHNGR 1 HOT H2O SUPPLY	WAIT	READY	DI	1.3.1.13
DROP7	60PCM05	1C31232G01	M73JA2301	BLENDING TANK 1 LEVEL	NORMAL	F/OVER	DI	1.3.1.14
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.1.15
DROP7	60PCM05	1C31232G01	<b>M7QC3S01</b>	<b>DPU07 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16
DROP7	60PCM05	1C31232G01	M73MI0111	DIGESTER FEED PUMP NO. 1	OFF	RUNNNG	DI	1.3.2.1
DROP7	60PCM05	1C31232G01	M73QI0111	DIGESTER FEED PUMP NO. 1	LOCAL	INCOMP	DI	1.3.2.2
DROP7	60PCM05	1C31232G01	M73RI0111	DIGESTER FEED PUMP NO. 1	WAIT	READY	DI	1.3.2.3
DROP7	60PCM05	1C31232G01	M73UA0111	DIGESTER FEED PUMP NO. 1	NORMAL	FAIL	DI	1.3.2.4
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.2.5
DROP7	60PCM05	1C31232G01	M73ZD1126	J-TUBE DISCH VALVE 1	NORMAL	OPENED	DI	1.3.2.6
DROP7	60PCM05	1C31232G01	M73ZB1126	J-TUBE DISCH VALVE 1	NORMAL	CLOSED	DI	1.3.2.7
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.2.8
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.2.9
DROP7	60PCM05	1C31232G01	M73PAH2351	DIGESTER FD PMP 1 PRESS CUTOUT	NORMAL	HIGH	DI	1.3.2.10
DROP7	60PCM05	1C31232G01	M73PAL2351A	DIGESTER FD PMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.3.2.11
DROP7	60PCM05	1C31232G01	M73PAL2351B	DIGESTER FD PMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.3.2.12
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.2.13
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.2.14
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.2.15
DROP7	60PCM05	1C31232G01	<b>M7QC3S02</b>	<b>DPU07 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP7	60PCM05			Spare Module Address				1.3.3
DROP7	60PCM05			Spare Module Address				1.3.4
DROP7	60PCM05			Spare Module Address				1.3.5
DROP7	60PCM05			Spare Module Address				1.3.6
DROP7	60PCM05			Spare Module Address				1.3.7
DROP7	60PCM05			Spare Module Address				1.3.8
DROP7	60PCM05	1C31232G01	M73ZB1123	RECEIVE TANK 1 VAC RELIEF VLV	NORMAL	CLOSED	DI	1.4.1.1
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.1.2
DROP7	60PCM05	1C31232G01	M73ZB1133	RAW SOLID MIX PMPS1-3 ISO VLV2	NORMAL	CLOSED	DI	1.4.1.3
DROP7	60PCM05	1C31232G01	M73ZD1130	RAW SOLID MIX PMPS1-3 ISO VLV1	NORMAL	OPENED	DI	1.4.1.4
DROP7	60PCM05	1C31232G01	M73ZB1127	J-TUBE DISCH VALVE 2	NORMAL	CLOSED	DI	1.4.1.5
DROP7	60PCM05	1C31232G01	M73ZD1127	J-TUBE DISCH VALVE 2	NORMAL	OPENED	DI	1.4.1.6
DROP7	60PCM05	1C31232G01	M73MI0112	DIGESTER FEED PUMP NO. 2	OFF	RUNNNG	DI	1.4.1.7
DROP7	60PCM05	1C31232G01	M73QI0112	DIGESTER FEED PUMP NO. 2	LOCAL	INCOMP	DI	1.4.1.8
DROP7	60PCM05	1C31232G01	M73RI0112	DIGESTER FEED PUMP NO. 2	WAIT	READY	DI	1.4.1.9
DROP7	60PCM05	1C31232G01	M73UA0112	DIGESTER FEED PUMP NO. 2	NORMAL	FAIL	DI	1.4.1.10
DROP7	60PCM05	1C31232G01	M73PAH2356	DIGESTER FD PMP 2 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.1.11
DROP7	60PCM05	1C31232G01	M73PAL2356A	DIGESTER FD PMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.12
DROP7	60PCM05	1C31232G01	M73PAL2356B	DIGESTER FD PMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.13
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.1.14
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.1.15
DROP7	60PCM05	1C31232G01	<b>M7QC4S01</b>	<b>DPU07 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16
DROP7	60PCM05	1C31232G01	M73MI0122	RAW SOLIDS FEED PUMP NO. 2	OFF	RUNNNG	DI	1.4.2.1
DROP7	60PCM05	1C31232G01	M73QI0122	RAW SOLIDS FEED PUMP NO. 2	LOCAL	INCOMP	DI	1.4.2.2
DROP7	60PCM05	1C31232G01	M73RI0122	RAW SOLIDS FEED PUMP NO. 2	WAIT	READY	DI	1.4.2.3
DROP7	60PCM05	1C31232G01	M73UA0122	RAW SOLIDS FEED PUMP NO. 2	NORMAL	FAIL	DI	1.4.2.4
DROP7	60PCM05	1C31232G01	M73FAL0122	RAW SOLIDS FEED PUMP NO. 2	NORMAL	LOW	DI	1.4.2.5
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.2.6
DROP7	60PCM05	1C31232G01	M73QI2301A	BLENDING TANK 1 LEVEL	LOCAL	INCOMP	DI	1.4.2.7
DROP7	60PCM05	1C31232G01	M73QI2301B	BLENDING TANK 1 LEVEL	LOCAL	INCOMP	DI	1.4.2.8
DROP7	60PCM05	1C31232G01	M73QI2310	BLEND MIX TANK 1 INLET TEMP	LOCAL	INCOMP	DI	1.4.2.9
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.2.10
DROP7	60PCM05	1C31232G01	M73QI1315	HEAT XCHNGR 1 HOT H2O SUPPLY	LOCAL	INCOMP	DI	1.4.2.11
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.2.12
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.2.13
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.2.14
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.2.15
DROP7	60PCM05	1C31232G01	<b>M7QC4S02</b>	<b>DPU07 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP7	60PCM05	1C31232G01	M73ZB1122	RECEIVE TANK 1 VAC RELIEF VLV	NORMAL	CLOSED	DI	1.4.3.1
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.3.2
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.3.3
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.3.4
DROP7	60PCM05	1C31232G01	M73ZB1124	RECEIVE TANK 1 OUTLET ISO VLV	NORMAL	CLOSED	DI	1.4.3.5
DROP7	60PCM05	1C31232G01	M73ZD1124	RECEIVE TANK 1 OUTLET ISO VLV	NORMAL	OPENED	DI	1.4.3.6
DROP7	60PCM05	1C31232G01	M73ZB1130	RAW SOLID MIX PMPS1-3 ISO VLV1	NORMAL	CLOSED	DI	1.4.3.7
DROP7	60PCM05	1C31232G01	M73ZD1133	RAW SOLID MIX PMPS1-3 ISO VLV2	NORMAL	OPENED	DI	1.4.3.8
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.3.9
DROP7	60PCM05	1C31232G01	M73MI0136A	RAW SOLIDS MIX PUMP NO. 6	NORMAL	RNFAST	DI	1.4.3.10
DROP7	60PCM05	1C31232G01	M73MI0136B	RAW SOLIDS MIX PUMP NO. 6	NORMAL	RNSLOW	DI	1.4.3.11
DROP7	60PCM05	1C31232G01	M73QI0136	RAW SOLIDS MIX PUMP NO. 6	LOCAL	INCOMP	DI	1.4.3.12
DROP7	60PCM05	1C31232G01	M73RI0136	RAW SOLIDS MIX PUMP NO. 6	WAIT	READY	DI	1.4.3.13
DROP7	60PCM05	1C31232G01	M73FAL2192	RAW SOLIDS MIX PMP 6 DISCH FLW	NORMAL	LOW	DI	1.4.3.14
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.3.15
DROP7	60PCM05	1C31232G01	<b>M7QC4S03</b>	<b>DPU07 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP7	60PCM05	1C31232G01	M73FAL2322	BLEND MIX PUMP 3 DISCH FLOW	NORMAL	LOW	DI	1.4.4.1
DROP7	60PCM05	1C31232G01	M73MI0103	BLEND MIX PUMP NO. 3	OFF	RUNNNG	DI	1.4.4.2
DROP7	60PCM05	1C31232G01	M73QI0103	BLEND MIX PUMP NO. 3	LOCAL	INCOMP	DI	1.4.4.3
DROP7	60PCM05	1C31232G01	M73RI0103	BLEND MIX PUMP NO. 3	WAIT	READY	DI	1.4.4.4
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.5
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.6
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.7
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.8
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.9
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.10
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.11
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.12
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.13
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.14
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.15
DROP7	60PCM05	1C31232G01	<b>M7QC4S04</b>	<b>DPU07 QC DROP 4 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16
DROP7	60PCM05			Spare Module Address				1.4.5
DROP7	60PCM05			Spare Module Address				1.4.6
DROP7	60PCM05			Spare Module Address				1.4.7
DROP7	60PCM05			Spare Module Address				1.4.8

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP7	60PCM05	5A26458G04	M73HS0111	DIGESTER FEED PUMP NO. 1	OFF	RUN	DO	1.5.1.1
DROP7	60PCM05	5A26458G04	M73HS0121	RAW SOLIDS FEED PUMP NO. 1	OFF	RUN	DO	1.5.1.2
DROP7	60PCM05	5A26458G04	M73HS0133A	RAW SOLIDS MIX PUMP NO. 3	OFF	FAST	DO	1.5.1.3
DROP7	60PCM05	5A26458G04	M73HS0133B	RAW SOLIDS MIX PUMP NO. 3	OFF	SLOW	DO	1.5.1.4
DROP7	60PCM05	5A26458G04	M73HS2301A	BLENDING TANK 1 LEVEL 123	OFF	SELECT	DO	1.5.1.5
DROP7	60PCM05	5A26458G04	M73HS2301C	BLENDING TANK 1 LEVEL 312	OFF	SELECT	DO	1.5.1.6
DROP7	60PCM05	5A26458G04	SPARE				DO	1.5.1.7
DROP7	60PCM05	5A26458G04	SPARE				DO	1.5.1.8
DROP7	60PCM05	5A26458G04	SPARE				DO	1.5.1.9
DROP7	60PCM05	5A26458G04	SPARE				DO	1.5.1.10
DROP7	60PCM05	5A26458G04	M73QS2310	BLEND MIX TANK 1 INLET TEMP	OFF	CMPRDY	DO	1.5.1.11
DROP7	60PCM05	5A26458G04	SPARE				DO	1.5.1.12
DROP7	60PCM05	5A26458G04	M73HS0112	DIGESTER FEED PUMP NO. 2	OFF	RUN	DO	1.6.1.1
DROP7	60PCM05	5A26458G04	M73HS0122	RAW SOLIDS FEED PUMP NO. 2	OFF	RUN	DO	1.6.1.2
DROP7	60PCM05	5A26458G04	M73HS0136A	RAW SOLIDS MIX PUMP NO. 6	OFF	FAST	DO	1.6.1.3
DROP7	60PCM05	5A26458G04	M73HS0136B	RAW SOLIDS MIX PUMP NO. 6	OFF	SLOW	DO	1.6.1.4
DROP7	60PCM05	5A26458G04	M73HS2301B	BLENDING TANK 1 LEVEL 231	OFF	SELECT	DO	1.6.1.5
DROP7	60PCM05	5A26458G04	M73HS0103	BLEND MIX PUMP NO. 3	OFF	RUN	DO	1.6.1.6
DROP7	60PCM05	5A26458G04	SPARE				DO	1.6.1.7
DROP7	60PCM05	5A26458G04	SPARE				DO	1.6.1.8
DROP7	60PCM05	5A26458G04	SPARE				DO	1.6.1.9
DROP7	60PCM05	5A26458G04	SPARE				DO	1.6.1.10
DROP7	60PCM05	5A26458G04	M73QS2301	BLENDING TANK 1 LEVEL	OFF	CMPRDY	DO	1.6.1.11
DROP7	60PCM05	5A26458G04	SPARE				DO	1.6.1.12



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP8	60PCM06	5X00419G01		73VDL02 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1
			73MV1100	NORTH CITY LINE 1 PIG STN INLET VALVE				
			73MV1101	NORTH CITY LINE 1/2 CROSSOVER VALVE				
			73MV1103	PT LOMA/FUTURE WRP INLET VALVE				
			73MV1104	NORTH CITY LINE 2 INLET VAVLE				
			73MV1105	NORTH CITY LINE 2 PIG STN INLET VALVE				
			73MV1140	RAW SOLIDS MIX PUMP 1 INLET VALVE				
			73MV1141	RAW SOLIDS MIX PUMP 1 DISCHARGE VALVE				
			73MV1142	RAW SOLIDS MIX PUMP 2 INLET VALVE				
			73MV1143	RAW SOLIDS MIX PUMP 2 DISCHARGE VALVE				
			73MV1154	RAW SOLIDS FEED PUMP 3 INLET VALVE				
			73MV1155	RAW SOLIDS FEED PUMP 3 DISCHARGE VALVE				
			73MV1170	RECEIVE TANK 2 SOLIDS RECYCLE VAVLE				
			73MV1171	RECEIVE TANK 2 INLET VALVE				
			73MV1172	TANK TRANSFER VALVE 2				
			73MV1173	TANK TRANSFER VALVE 1				
			73MV1175	J-TUBES INLET VALVE 2				
			73MV1181	RAW SOLIDS MIX PUMPS 4-6 DISCHARGE VALVE				
			73MV1182	RAW SOLIDS MIX PUMPS 4-6 DISCHARGE VALVE				
			73MV1184	RAW SOLIDS MIX PUMPS 4-6 DISCHARGE VALVE				
			73MV1185	RAW SOLIDS MIX PUMPS 4-6 DISCHARGE VALVE				
			73MV1190	RAW SOLIDS MIX PUMP 4 INLET VALVE				
			73MV1191	RAW SOLIDS MIX PUMP 4 DISCHARGE VALVE				
			73MV1192	RAW SOLIDS MIX PUMP 5 INLET VALVE				
			73MV1193	RAW SOLIDS MIX PUMP 5 DISCHARGE VALVE				
			73MV1300	BLEEDING TANK 1 INLET VALVE				
			73MV1301	BLEEDING TANK 1 DISCHARGE VALVE				
			73MV1310	BLEND TANK 1 MIX VALVE 1				
			73MV1311	BLEND TANK 1 MIX VALVE 2				
			73MV1320	BLEND MIX PUMP 1 INLET VALVE				
			73MV1321	BLEND MIX PUMP 1 DISCHARGE VALVE				
			73MV1325	BLEND MIX PUMP 2 INLET VALVE				
			73MV1326	BLEND MIX PUMP 2 DISCHARGE VALVE				
73MV1360	DIGESTER FEED PUMP 3 INLET VALVE							
73MV1361	DIGESTER FEED PUMP 3 HEADER 1 VALVE							
73MV1362	DIGESTER FEED PUMP 3 HEADER 2 VALVE							
DROP8	60PCM06	5X00419G01	<b>M80GFL03</b>	<b>BIOGAS FLARE 3</b>			ET	1.1.2
DROP8	60PCM06			Spare Module Address				1.1.3

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP8	60PCM06	5X00106G01	M73FT2171	RECEIVE TANK 2 INLET FLOW	0	3000 GPM	AI - HART	1.1.4.1	
DROP8	60PCM06	5X00106G01	M73LT2170	RECEIVE TANK 2 LEVEL	0	45 FEET	AI - HART	1.1.4.2	
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.1.4.3	
DROP8	60PCM06	5X00106G01	M73PT2101	NORTH CITY LINE 2 INLET PRESS	0	50 PSI	AI - HART	1.1.4.4	
DROP8	60PCM06	5X00106G01	M73PT2104	POINT LOMA LINE 1 INLET PRESS	0	570 PSI	AI - HART	1.1.4.5	
DROP8	60PCM06	5X00106G01	M80PT2660	BIOGAS COLLECTION HEADER PRESS	0	16 IN H2O	AI - HART	1.1.4.6	
DROP8	60PCM06	5X00106G01	M80T19110	FLARE 1 FLAME TEMPERATURE	0	2472 DEG F	AI - HART	1.1.4.7	
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.1.4.8	
DROP8	60PCM06	5X00106G01	M73FT2108	POINT LOMA LINE 1 INLET FLOW	0	3000 GPM	AI - HART	1.1.5.1	
DROP8	60PCM06	5X00106G01	M80PT2680	GAS STORAGE TANK PRESSURE	0	16 IN H2O	AI - HART	1.1.5.2	
DROP8	60PCM06	5X00106G01	M73ST0123	RAW SOLIDS FEED PUMP NO. 3	0	100 PCT	AI - HART	1.1.5.3	
DROP8	60PCM06	5X00106G01	M73ST0113	DIGESTER FEED PUMP NO. 3	0	100 PCT	AI - HART	1.1.5.4	
DROP8	60PCM06	5X00106G01	M73PT2313	BLEND MIX TANK 2 INLET PRESS	0	30 PSI	AI - HART	1.1.5.5	
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.1.5.6	
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.1.5.7	
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.1.5.8	
DROP8	60PCM06		Spare Module Address						1.1.6
DROP8	60PCM06	5X00167G01	M73SC0113	DIGESTER FD PMP3 SPD DMND	0	100 PCT	AO	1.1.7.1	
DROP8	60PCM06	5X00167G01	M73SC0123	RAW SOLIDS FD PUMP3 SPD DMND	0	100 PCT	AO	1.1.7.2	
DROP8	60PCM06	5X00167G01	M73TC2312	BLND MX TNK2 HT EXCH VLV POS	0	100 PCT	AO	1.1.7.3	
DROP8	60PCM06	5X00167G01	SPARE	SPARE			AO	1.1.7.4	
DROP8	60PCM06	5X00167G01	SPARE	SPARE			AO	1.1.7.5	
DROP8	60PCM06	5X00167G01	SPARE	SPARE			AO	1.1.7.6	
DROP8	60PCM06	5X00167G01	M80FC1670	BIOGAS COMPRESSOR 1 INLET VLVE	0	100 PCT	AO	1.1.7.7	
DROP8	60PCM06	5X00167G01	M80FC1672	BIOGAS COMPRESSOR 2 INLET VLVE	0	100 PCT	AO	1.1.7.8	
DROP8	60PCM06	5X00119G01	MDPU08T1	DPU08 CABINET TEMP	32	154 DEG F	RTD	1.1.8.1	
DROP8	60PCM06	5X00119G01	SPARE				RTD	1.1.8.2	
DROP8	60PCM06	5X00119G01	SPARE				RTD	1.1.8.3	
DROP8	60PCM06	5X00119G01	SPARE				RTD	1.1.8.4	
DROP8	60PCM06	5X00119G01	SPARE				RTD	1.1.8.5	
DROP8	60PCM06	5X00119G01	SPARE				RTD	1.1.8.6	
DROP8	60PCM06	5X00119G01	SPARE				RTD	1.1.8.7	
DROP8	60PCM06	5X00119G01	SPARE				RTD	1.1.8.8	
DROP8	60PCM06		Spare Module Address						1.2.1
DROP8	60PCM06		Spare Module Address						1.2.2
DROP8	60PCM06		Spare Module Address						1.2.3

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DROP8	60PCM06	5X00106G01	M73FT2102	NORTH CITY LINE 2 INLET FLOW	0	2000 GPM	AI - HART	1.2.4.1
DROP8	60PCM06	5X00106G01	M73FT2105	POINT LOMA LINE 1 INLET FLOW	0	1600 GPM	AI - HART	1.2.4.2
DROP8	60PCM06	5X00106G01	M73PT2107	PLOMA LINE1 INLT PRSS/FUTR WRP	0	600 PSI	AI - HART	1.2.4.3
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.2.4.4
DROP8	60PCM06	5X00106G01	M80FT2662	BIOGAS COLLECTION HEADER FLOW	0	1000 SCFM	AI - HART	1.2.4.5
DROP8	60PCM06	5X00106G01	M80FT2692	BIOGAS FLOW TO FLARES	0	1000 SCFM	AI - HART	1.2.4.6
DROP8	60PCM06	5X00106G01	M80T19111	FLARE 2 FLAME TEMPERATURE	0	2472 DEG F	AI - HART	1.2.4.7
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.2.4.8
DROP8	60PCM06	5X00106G01	M80LT2681	GAS STORAGE TANK LEVEL	0	23 FEET	AI - HART	1.2.5.1
DROP8	60PCM06	5X00106G01	M73LT2175	RECEIVE TANK 2 LEVEL	0	45 FEET	AI - HART	1.2.5.2
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.2.5.3
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.2.5.4
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.2.5.5
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.2.5.6
DROP8	60PCM06	5X00106G01	M80ZT1670	BIOGAS COMPRESSOR 1 INLET VLVE	0	100 PCT	AI - HART	1.2.5.7
DROP8	60PCM06	5X00106G01	M80ZT1672	BIOGAS COMPRESSOR 2 INLET VLVE	0	100 PCT	AI - HART	1.2.5.8
DROP8	60PCM06			Spare Module Address				1.2.6
DROP8	60PCM06	5X00419G01	<b>M73P0123</b>	<b>RAW SOLIDS FEED PUMP NO. 3</b>			ET	1.2.7
DROP8	60PCM06	5X00419G01		73VDL02 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8
DROP8	60PCM06	1C31232G01	M73FAL0123	RAW SOLIDS FEED PUMP NO. 3	NORMAL	LOW	DI	1.3.1.1
DROP8	60PCM06	1C31232G01	M73MI0113	DIGESTER FEED PUMP NO. 3	OFF	RUNNNG	DI	1.3.1.2
DROP8	60PCM06	1C31232G01	M73MI0123	RAW SOLIDS FEED PUMP NO. 3	OFF	RUNNNG	DI	1.3.1.3
DROP8	60PCM06	1C31232G01	M73PAH2361	DGSTR FEED PMP3 PRESS CUTOUT	NORMAL	HIGH	DI	1.3.1.4
DROP8	60PCM06	1C31232G01	M73PAL2361A	DGSTR FEED PMP3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.1.5
DROP8	60PCM06	1C31232G01	M73PAL2361B	DGSTR FEED PMP3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.1.6
DROP8	60PCM06	1C31232G01	M73QI0113	DIGESTER FEED PUMP NO. 3	LOCAL	INCOMP	DI	1.3.1.7
DROP8	60PCM06	1C31232G01	M73QI0123	RAW SOLIDS FEED PUMP NO. 3	LOCAL	INCOMP	DI	1.3.1.8
DROP8	60PCM06	1C31232G01	M73RI0113	DIGESTER FEED PUMP NO. 3	WAIT	READY	DI	1.3.1.9
DROP8	60PCM06	1C31232G01	M73RI0123	RAW SOLIDS FEED PUMP NO. 3	WAIT	READY	DI	1.3.1.10
DROP8	60PCM06	1C31232G01	M73UA0113	DIGESTER FEED PUMP NO. 3	NORMAL	FAIL	DI	1.3.1.11
DROP8	60PCM06	1C31232G01	M73UA0123	RAW SOLIDS FEED PUMP NO. 3	NORMAL	FAIL	DI	1.3.1.12
DROP8	60PCM06	1C31232G01	M73ZB1176	J-TUBE DISCH VLV 3	NORMAL	CLOSED	DI	1.3.1.13
DROP8	60PCM06	1C31232G01	M73ZD1176	J-TUBE DISCH VLV 3	NORMAL	OPENED	DI	1.3.1.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.1.15
DROP8	60PCM06	1C31232G01	<b>M8QC3S01</b>	<b>DPU08 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16
DROP8	60PCM06	1C31232G01	M73FAL2140	RAW SOLID MX PMP1 DISCH FLOW	NORMAL	LOW	DI	1.3.2.1
DROP8	60PCM06	1C31232G01	M73FAL2320	BLEND MIX PUMP 1 DISCH FLOW	NORMAL	LOW	DI	1.3.2.2
DROP8	60PCM06	1C31232G01	M73MI0101	BLEND MIX PUMP NO. 1	OFF	RUNNNG	DI	1.3.2.3
DROP8	60PCM06	1C31232G01	M73MI0131A	RAW SOLIDS MIX PUMP NO. 1	NORMAL	RNFAST	DI	1.3.2.4
DROP8	60PCM06	1C31232G01	M73MI0131B	RAW SOLIDS MIX PUMP NO. 1	NORMAL	RNSLOW	DI	1.3.2.5
DROP8	60PCM06	1C31232G01	M73MI1375	ODOR CNTRL FAN NO. 1	OFF	RUNNNG	DI	1.3.2.6
DROP8	60PCM06	1C31232G01	M73PDAH2375	ODR CNTRL FAN1 NORML PRESS DRP	NORMAL	HIDIFF	DI	1.3.2.7
DROP8	60PCM06	1C31232G01	M73QI0101	BLEND MIX PUMP NO. 1	LOCAL	INCOMP	DI	1.3.2.8

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DROP8	60PCM06	1C31232G01	M73QI0131	RAW SOLIDS MIX PUMP NO. 1	LOCAL	INCOMP	DI	1.3.2.9
DROP8	60PCM06	1C31232G01	M73QI1375	ODOR CNTRL FAN NO. 1	LOCAL	INCOMP	DI	1.3.2.10
DROP8	60PCM06	1C31232G01	M73RI0101	BLEND MIX PUMP NO. 1	WAIT	READY	DI	1.3.2.11
DROP8	60PCM06	1C31232G01	M73RI0131	RAW SOLIDS MIX PUMP NO. 1	WAIT	READY	DI	1.3.2.12
DROP8	60PCM06	1C31232G01	M73RI1375	ODOR CNTRL FAN NO. 1	WAIT	READY	DI	1.3.2.13
DROP8	60PCM06	1C31232G01	M73ZD1180	RAW SOLID MX PMPS4-6 ISO VLV 1	NORMAL	OPENED	DI	1.3.2.14
DROP8	60PCM06	1C31232G01	M73ZD1183	RAW SOLID MX PMPS4-6 ISO VLV 2	NORMAL	OPENED	DI	1.3.2.15
DROP8	60PCM06	1C31232G01	<b>M8QC3S02</b>	<b>DPU08 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16
DROP8	60PCM06	1C31232G01	M73FAL2191	RAW SOLID MX PMP5 DISCH FLOW	NORMAL	LOW	DI	1.3.3.1
DROP8	60PCM06	1C31232G01	M73MI0135A	RAW SOLIDS MIX PUMP NO. 5	NORMAL	RNFAST	DI	1.3.3.2
DROP8	60PCM06	1C31232G01	M73MI0135B	RAW SOLIDS MIX PUMP NO. 5	NORMAL	RNSLOW	DI	1.3.3.3
DROP8	60PCM06	1C31232G01	M73QI0135	RAW SOLIDS MIX PUMP NO. 5	LOCAL	INCOMP	DI	1.3.3.4
DROP8	60PCM06	1C31232G01	M73RI0135	RAW SOLIDS MIX PUMP NO. 5	WAIT	READY	DI	1.3.3.5
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.3.6
DROP8	60PCM06	1C31232G01	M80LAHH2661	RECEIVE TNK 1 SEDIMENT TRP LVL	NORMAL	HI-HI	DI	1.3.3.7
DROP8	60PCM06	1C31232G01	M80LAHH2665	CONDENSATE SUMP LEVEL ALARMS	NORMAL	HI-HI	DI	1.3.3.8
DROP8	60PCM06	1C31232G01	M80LAHH2685	GAS FLARE INLT SEDIMNT TRP LVL	NORMAL	HI-HI	DI	1.3.3.9
DROP8	60PCM06	1C31232G01	M80LALL2661	RECEIVE TNK 1 SEDIMENT TRP LVL	NORMAL	LO-LO	DI	1.3.3.10
DROP8	60PCM06	1C31232G01	M80LALL2665	CONDENSATE SUMP LEVEL ALARMS	NORMAL	LO-LO	DI	1.3.3.11
DROP8	60PCM06	1C31232G01	M80LALL2685	GAS FLARE INLT SEDIMNT TRP LVL	NORMAL	LO-LO	DI	1.3.3.12
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.3.13
DROP8	60PCM06	1C31232G01	M80ZB1680	GAS ST TNK PRESS RELIEF VLV 2	NORMAL	CLOSED	DI	1.3.3.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.3.15
DROP8	60PCM06	1C31232G01	<b>M8QC3S03</b>	<b>DPU08 QC DROP 3 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.3.16
DROP8	60PCM06	1C31232G01	M80ZB1697	GAS FLARE NO. 2 INLET VLV	NORMAL	CLOSED	DI	1.3.4.1
DROP8	60PCM06	1C31232G01	M80ZD1697	GAS FLARE NO. 2 INLET VLV	NORMAL	OPENED	DI	1.3.4.2
DROP8	60PCM06	1C31232G01	M80QI1697	GAS FLARE NO. 2 INLET VLV	LOCAL	INCOMP	DI	1.3.4.3
DROP8	60PCM06	1C31232G01	M80RI1697	GAS FLARE NO. 2 INLET VLV	WAIT	READY	DI	1.3.4.4
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.4.5
DROP8	60PCM06	1C31232G01	M80BI9107	GAS FLARE NO. 2 FLAME ANALYZER	NORMAL	FLAME	DI	1.3.4.6
DROP8	60PCM06	1C31232G01	M80PDAH9106	GAS FLARE NO. 2 B/GAS FLM TRP D/P	NORMAL	HIDIFF	DI	1.3.4.7
DROP8	60PCM06	1C31232G01	M80UA9105	GAS FLARE NO. 2 IGNITION SYSTEM	FAIL	NORMAL	DI	1.3.4.8
DROP8	60PCM06	1C31232G01	M80QI9109	GAS FLARE NO. 2 BIOGAS SWITCH	LOCAL	INCOMP	DI	1.3.4.9
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.4.10
DROP8	60PCM06	1C31232G01	M80ZB1682	GAS HOLDING TANK INLET VLV	NORMAL	CLOSED	DI	1.3.4.11
DROP8	60PCM06	1C31232G01	M80ZD1682	GAS HOLDING TANK INLET VLV	NORMAL	OPENED	DI	1.3.4.12
DROP8	60PCM06	1C31232G01	M80QI1682	GAS HOLDING TANK INLET VLV	LOCAL	INCOMP	DI	1.3.4.13
DROP8	60PCM06	1C31232G01	M80RI1682	GAS HOLDING TANK INLET VLV	WAIT	READY	DI	1.3.4.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.4.15
DROP8	60PCM06	1C31232G01	<b>M8QC3S04</b>	<b>DPU08 QC DROP 3 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.4.16

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DROP8	60PCM06	1C31232G01	M80ZB1681	GAS ST TNK PRESS RELIEF VLV 1	NORMAL	CLOSED	DI	1.3.5.1
DROP8	60PCM06	1C31232G01	M80ZD1681	GAS ST TNK PRESS RELIEF VLV 1	NORMAL	OPENED	DI	1.3.5.2
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.3
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.4
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.5
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.6
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.7
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.8
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.9
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.10
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.11
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.12
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.13
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.15
DROP8	60PCM06	1C31232G01	M8QC3S05	DPU08 QC DROP 3 SL05 DI PWR MON	ALARM	NORMAL	DI	1.3.5.16
DROP8	60PCM06			Spare Module Address				1.3.6
DROP8	60PCM06			Spare Module Address				1.3.7
DROP8	60PCM06			Spare Module Address				1.3.8
DROP8	60PCM06	1C31232G01	M80ZB1692	GAS FLARE NO. 1 INLET VLV	NORMAL	CLOSED	DI	1.4.1.1
DROP8	60PCM06	1C31232G01	M80ZD1692	GAS FLARE NO. 1 INLET VLV	NORMAL	OPENED	DI	1.4.1.2
DROP8	60PCM06	1C31232G01	M80QI1692	GAS FLARE NO. 1 INLET VLV	LOCAL	INCOMP	DI	1.4.1.3
DROP8	60PCM06	1C31232G01	M80RI1692	GAS FLARE NO. 1 INLET VLV	WAIT	READY	DI	1.4.1.4
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.1.5
DROP8	60PCM06	1C31232G01	M80BI9102	GAS FLARE NO. 1 FLAME ANALYZER	NORMAL	FLAME	DI	1.4.1.6
DROP8	60PCM06	1C31232G01	M80PDAH9101	GAS FLARE NO. 1 B/GAS FLM TRP D/P	NORMAL	HIDIFF	DI	1.4.1.7
DROP8	60PCM06	1C31232G01	M80UA9100	GAS FLARE NO. 1 IGNITION SYSTEM	FAIL	NORMAL	DI	1.4.1.8
DROP8	60PCM06	1C31232G01	M80QI9104	GAS FLARE NO. 1 BIOGAS SWITCH	LOCAL	INCOMP	DI	1.4.1.9
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.1.10
DROP8	60PCM06	1C31232G01	M73ZB1115	POINT LOMA LINE 1 INLET VLV	NORMAL	CLOSED	DI	1.4.1.11
DROP8	60PCM06	1C31232G01	M73ZD1115	POINT LOMA LINE 1 INLET VLV	NORMAL	OPENED	DI	1.4.1.12
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.1.13
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.1.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.1.15
DROP8	60PCM06	1C31232G01	M8QC4S01	DPU08 QC DROP 4 SL01 DI PWR MON	ALARM	NORMAL	DI	1.4.1.16
DROP8	60PCM06	1C31232G01	M80ZB1693	GAS FLARE NO. 3 INLET VLV	NORMAL	CLOSED	DI	1.4.2.1
DROP8	60PCM06	1C31232G01	M80ZD1693	GAS FLARE NO. 3 INLET VLV	NORMAL	OPENED	DI	1.4.2.2
DROP8	60PCM06	1C31232G01	M80QI1693	GAS FLARE NO. 3 INLET VLV	LOCAL	INCOMP	DI	1.4.2.3
DROP8	60PCM06	1C31232G01	M80RI1693	GAS FLARE NO. 3 INLET VLV	WAIT	READY	DI	1.4.2.4
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.5
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.6

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DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.7
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.8
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.9
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.10
DROP8	60PCM06	1C31232G01	M73ZB1107	PT LOMA PIG CTCHR RUPT DISC 1	NORMAL	CLOSED	DI	1.4.2.11
DROP8	60PCM06	1C31232G01	M73ZD1107	PT LOMA PIG CTCHR RUPT DISC 1	NORMAL	OPENED	DI	1.4.2.12
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.13
DROP8	60PCM06	1C31232G01	M80ZD1680	GAS ST TNK PRESS RELIEF VLV 2	NORMAL	OPENED	DI	1.4.2.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.15
DROP8	60PCM06	1C31232G01	<b>M8QC4S02</b>	<b>DPU08 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16
DROP8	60PCM06	1C31232G01	M73FAL2141	RAW SOLID MX PMP2 DISCH FLOW	NORMAL	LOW	DI	1.4.3.1
DROP8	60PCM06	1C31232G01	M73FAL2321	BLEND MIX PUMP 2 DISCH FLOW	NORMAL	LOW	DI	1.4.3.2
DROP8	60PCM06	1C31232G01	M73MI0102	BLEND MIX PUMP NO. 2	OFF	RUNNING	DI	1.4.3.3
DROP8	60PCM06	1C31232G01	M73MI0132A	RAW SOLIDS MIX PUMP NO. 2	NORMAL	RNFAST	DI	1.4.3.4
DROP8	60PCM06	1C31232G01	M73MI0132B	RAW SOLIDS MIX PUMP NO. 2	NORMAL	RNSLOW	DI	1.4.3.5
DROP8	60PCM06	1C31232G01	M73QI0102	BLEND MIX PUMP NO. 2	LOCAL	INCOMP	DI	1.4.3.6
DROP8	60PCM06	1C31232G01	M73QI0132	RAW SOLIDS MIX PUMP NO. 2	LOCAL	INCOMP	DI	1.4.3.7
DROP8	60PCM06	1C31232G01	M73QI1314	HEAT XCHNGR 2 HOT WATER SUPPLY	LOCAL	INCOMP	DI	1.4.3.8
DROP8	60PCM06	1C31232G01	M73QI2312	BLEND MIX TANK 2 INLET TEMP	LOCAL	INCOMP	DI	1.4.3.9
DROP8	60PCM06	1C31232G01	M73RI0102	BLEND MIX PUMP NO. 2	WAIT	READY	DI	1.4.3.10
DROP8	60PCM06	1C31232G01	M73RI0132	RAW SOLIDS MIX PUMP NO. 2	WAIT	READY	DI	1.4.3.11
DROP8	60PCM06	1C31232G01	M73RI1314	HEAT XCHNGR 2 HOT WATER SUPPLY	WAIT	READY	DI	1.4.3.12
DROP8	60PCM06	1C31232G01	M73LAH2828	AREA7376 FeCl2 LEAK DETECT ALM	LEAK	NORMAL	DI	1.4.3.13
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.3.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.3.15
DROP8	60PCM06	1C31232G01	<b>M8QC4S03</b>	<b>DPU08 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP8	60PCM06	1C31232G01	M73FAL2190	RAW SOLID MIX PMP4 DISCH FLOW	NORMAL	LOW	DI	1.4.4.1
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.4.2
DROP8	60PCM06	1C31232G01	M73MI0134A	RAW SOLIDS MIX PUMP NO. 4	NORMAL	RNFAST	DI	1.4.4.3
DROP8	60PCM06	1C31232G01	M73MI0134B	RAW SOLIDS MIX PUMP NO. 4	NORMAL	RNSLOW	DI	1.4.4.4
DROP8	60PCM06	1C31232G01	M73QI0134	RAW SOLIDS MIX PUMP NO. 4	LOCAL	INCOMP	DI	1.4.4.5
DROP8	60PCM06	1C31232G01	M73RI0134	RAW SOLIDS MIX PUMP NO. 4	WAIT	READY	DI	1.4.4.6
DROP8	60PCM06	1C31232G01	M73ZB1177	J-TUBE DISCH VLV 4	NORMAL	CLOSED	DI	1.4.4.7
DROP8	60PCM06	1C31232G01	M73ZB1180	RAW SOLID MIX PMPS4-6 ISO VLV 1	NORMAL	CLOSED	DI	1.4.4.8
DROP8	60PCM06	1C31232G01	M73ZB1183	RAW SOLID MIX PMPS4-6 ISO VLV 2	NORMAL	CLOSED	DI	1.4.4.9
DROP8	60PCM06	1C31232G01	M73ZD1177	J-TUBE DISCH VLV 4	NORMAL	OPENED	DI	1.4.4.10
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.4.11
DROP8	60PCM06	1C31232G01	M73ZB1174	RECEIVE TANK 2 OUTLET ISO VLV	NORMAL	CLOSED	DI	1.4.4.12
DROP8	60PCM06	1C31232G01	M73ZD1174	RECEIVE TANK 2 OUTLET ISO VLV	NORMAL	OPENED	DI	1.4.4.13
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.4.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.4.15
DROP8	60PCM06	1C31232G01	<b>M8QC4S04</b>	<b>DPU08 QC DROP 4 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16

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DROP8	60PCM06	1C31232G01	M73XS9000	NORTH CITY PIG CTCHR PRESS	NORMAL	PIG	DI	1.4.5.1
DROP8	60PCM06	1C31232G01	M73ZB1102	NORTH CITY PIG CTCHR DRAIN VLV	NORMAL	CLOSED	DI	1.4.5.2
DROP8	60PCM06	1C31232G01	M73ZD1102	N CITY PIG CTCHR DRAIN VLV	NORMAL	OPENED	DI	1.4.5.3
DROP8	60PCM06	1C31232G01	M73ZB1106	N CITY PIG STATION INLET VLV	NORMAL	CLOSED	DI	1.4.5.4
DROP8	60PCM06	1C31232G01	M73ZD1106	N CITY PIG STATION INLET VLV	NORMAL	OPENED	DI	1.4.5.5
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.6
DROP8	60PCM06	1C31232G01	M73ZB1108	PT LOMA PIG CTCHR RUPT DISC 2	NORMAL	CLOSED	DI	1.4.5.7
DROP8	60PCM06	1C31232G01	M73ZD1108	PT LOMA PIG CTCHR RUPT DISC 2	NORMAL	OPENED	DI	1.4.5.8
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.9
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.10
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.11
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.12
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.13
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.15
DROP8	60PCM06	1C31232G01	<b>M8QC4S05</b>	<b>DPU08 QC DROP 4 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.5.16
DROP8	60PCM06			Spare Module Address				1.4.6
DROP8	60PCM06			Spare Module Address				1.4.7
DROP8	60PCM06			Spare Module Address				1.4.8
DROP8	60PCM06	5A26458G04	M73HS0102	BLEND MIX PUMP NO. 2	OFF	RUN	DO	1.5.1.1
DROP8	60PCM06	5A26458G04	M73HS0123	RAW SOLIDS FEED PUMP NO. 3	OFF	RUN	DO	1.5.1.2
DROP8	60PCM06	5A26458G04	M73HS0132A	RAW SOLIDS MIX PUMP NO. 2	OFF	FAST	DO	1.5.1.3
DROP8	60PCM06	5A26458G04	M73HS0132B	RAW SOLIDS MIX PUMP NO. 2	OFF	SLOW	DO	1.5.1.4
DROP8	60PCM06	5A26458G04	M73HS0134A	RAW SOLIDS MIX PUMP NO. 4	OFF	FAST	DO	1.5.1.5
DROP8	60PCM06	5A26458G04	M73HS0134B	RAW SOLIDS MIX PUMP NO. 4	OFF	SLOW	DO	1.5.1.6
DROP8	60PCM06	5A26458G04	SPARE				DO	1.5.1.7
DROP8	60PCM06	5A26458G04	SPARE				DO	1.5.1.8
DROP8	60PCM06	5A26458G04	M80HS1697A	GAS FLARE NO. 2 INLET VLV	OFF	OPEN	DO	1.5.1.9
DROP8	60PCM06	5A26458G04	M80HS1697B	GAS FLARE NO. 2 INLET VLV	OFF	CLOSE	DO	1.5.1.10
DROP8	60PCM06	5A26458G04	M80HS9109A	BIOGAS FLARE NO. 2 START	STOP	START	DO	1.5.1.11
DROP8	60PCM06	5A26458G04	M80HS9109B	BIOGAS FLARE NO. 2 RESET	NORMAL	RESET	DO	1.5.1.12



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DROP8	60PCM06	5A26458G04	M73HS0101	BLEND MIX PUMP NO. 1	OFF	RUN	DO	1.6.1.1
DROP8	60PCM06	5A26458G04	M73HS0113	DIGESTER FEED PUMP NO. 3	OFF	RUN	DO	1.6.1.2
DROP8	60PCM06	5A26458G04	M73HS0131A	RAW SOLIDS MIX PUMP NO. 1	OFF	FAST	DO	1.6.1.3
DROP8	60PCM06	5A26458G04	M73HS0131B	RAW SOLIDS MIX PUMP NO. 1	OFF	SLOW	DO	1.6.1.4
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.1.5
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.1.6
DROP8	60PCM06	5A26458G04	M80HS1682A	GAS HOLDING TANK INLET VLV	OFF	OPEN	DO	1.6.1.7
DROP8	60PCM06	5A26458G04	M80HS1682B	GAS HOLDING TANK INLET VLV	OFF	CLOSE	DO	1.6.1.8
DROP8	60PCM06	5A26458G04	M80HS1692A	GAS FLARE NO. 1 INLET VLV	OFF	OPEN	DO	1.6.1.9
DROP8	60PCM06	5A26458G04	M80HS1692B	GAS FLARE NO. 1 INLET VLV	OFF	CLOSE	DO	1.6.1.10
DROP8	60PCM06	5A26458G04	M80HS9104A	BIOGAS FLARE NO. 1 START	STOP	START	DO	1.6.1.11
DROP8	60PCM06	5A26458G04	M80HS9104B	BIOGAS FLARE NO. 1 RESET	NORMAL	RESET	DO	1.6.1.12
DROP8	60PCM06	5A26458G04	M73HS1375	ODOR CNTRL FAN NO. 1	OFF	RUN	DO	1.6.2.1
DROP8	60PCM06	5A26458G04	M73QS2312	BLEND MIX TANK 2 INLET TEMP	OFF	CMPRDY	DO	1.6.2.2
DROP8	60PCM06	5A26458G04	M73HS0135A	RAW SOLIDS MIX PUMP NO. 5	OFF	FAST	DO	1.6.2.3
DROP8	60PCM06	5A26458G04	M73HS0135B	RAW SOLIDS MIX PUMP NO. 5	OFF	SLOW	DO	1.6.2.4
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.2.5
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.2.6
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.2.7
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.2.8
DROP8	60PCM06	5A26458G04	<b>M80HS1693A</b>	<b>GAS FLARE NO. 3 INLET VLV</b>	<b>OFF</b>	<b>OPEN</b>	DO	1.6.2.9
DROP8	60PCM06	5A26458G04	<b>M80HS1693B</b>	<b>GAS FLARE NO. 3 INLET VLV</b>	<b>OFF</b>	<b>CLOSE</b>	DO	1.6.2.10
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.2.11
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.2.12



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DROP10	76PCM01	5X00419G01		76VDL01 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1	
			76MV1151	THICKENING CENTRIFUGE FEED PUMP 1 VALVE					
			76MV1152	THICKENING CENTRIFUGE FEED PUMP 1 DISCHARGE VALVE					
			76MV1153	THICKENING CENTRIFUGE FEED PUMP 1 BYPASS VALVE					
			76MV1155	THICKENING CENTRIFUGE FEED PUMP 2 INLET VALVE					
			76MV1156	THICKENING CENTRIFUGE FEED PUMP 2 DISCHARGE VALVE					
			76MV1157	THICKENING CENTRIFUGE FEED PUMP 2 BYPASS VALVE					
			76MV1274	NORTH CITY SCUM PUMP HOT WATER VALVE					
			76MV1275	NORTH CITY SCUM PUMP INLET VALVE					
			76MV1276	NORTH CITY SCUM PUMP DISCHARGE VALVE					
			76MV1277	NORTH CITY SCUM PUMP SCREEN VALVE					
			76MV1285	THICKENED SOLIDS TRANSFER PUMP 1 INLET VALVE					
			76MV1286	THICKENED SOLIDS TRANSFER PUMP 1 DISCHARGE VALVE					
			76MV1710	POLYMER DAY TANK 1 INLET VALVE					
			76MV1711	POLYMER DAY TANK 1 DISCHARGE VALVE 1					
			76MV1712	POLYMER DAY TANK 1 DISCHARGE VALVE 2					
			76MV1735	THICKENING CENTRIFUGE POLYMER FEED PUMP 1 INLET VALVE					
			76MV1736	THICKENING CENTRIFUGE POLYMER FEED PUMP 1 DISCHARGE VALVE					
			76MV1737	THICKENING POLYMER FEED PUMP 1 BYPASS VALVE					
			76MV1740	THICKENING CENTRIFUGE POLYMER FEED PUMP 2 INLET VALVE					
76MV1741	THICKENING CENTRIFUGE POLYMER FEED PUMP 2 DISCHARGE VALVE								
76MV1742	THICKENING CENTRIFUGE POLYMER FEED PUMP 2 BYPASS VALVE								
DROP10	76PCM01	5X00419G01	<b>M76TC01</b>	<b>TC NO. 1</b>			ET	1.1.2	
			<b>M76P0111</b>	<b>TC FEED PUMP NO. 1</b>					
			<b>M76TC02</b>	<b>TC NO. 2</b>					
			<b>M76P0112</b>	<b>TC FEED PUMP NO. 2</b>					
DROP10	76PCM01	5X00106G01	M76FT2152	TC FEED PUMP NO.1 SLUDGE FLOW	0	1500 GPM	AI - HART	1.1.3.1	
DROP10	76PCM01	5X00106G01	M76FT2736	TC POLY FEED PUMP NO.1 POLYMER FLW	0	30 GPM	AI - HART	1.1.3.2	
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.1.3.3	
DROP10	76PCM01	5X00106G01	M76PT2153	TC FEED PUMP NO.1 DISCH PRESS	0	45 PSI	AI - HART	1.1.3.4	
DROP10	76PCM01	5X00106G01	M76PT2289	THICK XFER PUMP NO.1 DISCH PRESS	0	130 PSI	AI - HART	1.1.3.5	
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.1.3.6	
DROP10	76PCM01	5X00106G01	M76PT2735	TC POLY FEED PMP NO.1 DISCH PRESS	0	45 PSI	AI - HART	1.1.3.7	
DROP10	76PCM01	5X00106G01	M76LT2710	POLY DAY TANK NO.1 LEVEL	0	10 FEET	AI - HART	1.1.3.8	
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.1.4.1	
DROP10	76PCM01	5X00106G01	M76FT2738	TC POLY FEED PUMP NO.1 ROTAMETER	0	20 GPM	AI - HART	1.1.4.2	
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.1.4.3	
DROP10	76PCM01	5X00106G01	M76ST0521	TC POLY FEED PUMP NO.1 SPEED	0	100 PCT	AI - HART	1.1.4.4	
DROP10	76PCM01	5X00106G01	M76FT2288	THICK XFER PUMP NO.1 DISCH FLOW	0	300 GPM	AI - HART	1.1.4.5	
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.1.4.6	
DROP10	76PCM01	5X00106G01	M76ST0701	OC EXHST FAN1 SPEED	0	100 PCT	AI - HART	1.1.4.7	
DROP10	76PCM01	5X00106G01	M76PT2701	PIPE LUBE RING 10 PRESSURE	0	1500 PSI	AI - HART	1.1.4.8	
DROP10	76PCM01		Spare Module Address						1.1.5

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP10	76PCM01			Spare Module Address				1.1.6
DROP10	76PCM01	5X00167G01	M73FC2111	RAW SOLIDS FD PMPS SPD STPNT	0	100 PCT	AO	1.1.7.1
DROP10	76PCM01	5X00167G01	<b>M76SC0521</b>	<b>TC POLY FEED PUMP NO.1 SPD CMD</b>	<b>0</b>	<b>100 PCT</b>	AO	1.1.7.2
DROP10	76PCM01	5X00167G01	SPARE				AO	1.1.7.3
DROP10	76PCM01	5X00167G01	M76SC0701	OC EXHST FAN1 OUT DMD	0	100 PCT	AO	1.1.7.4
DROP10	76PCM01	5X00167G01	SPARE				AO	1.1.7.5
DROP10	76PCM01	5X00167G01	SPARE				AO	1.1.7.6
DROP10	76PCM01	5X00167G01	SPARE				AO	1.1.7.7
DROP10	76PCM01	5X00167G01	SPARE				AO	1.1.7.8
DROP10	76PCM01	5X00119G01	MDPU10T1	DPU10 76PCM01 CABINET TEMP	32	154 DEG F	RTD	1.1.8.1
DROP10	76PCM01	5X00119G01	SPARE				RTD	1.1.8.2
DROP10	76PCM01	5X00119G01	SPARE				RTD	1.1.8.3
DROP10	76PCM01	5X00119G01	SPARE				RTD	1.1.8.4
DROP10	76PCM01	5X00119G01	SPARE				RTD	1.1.8.5
DROP10	76PCM01	5X00119G01	SPARE				RTD	1.1.8.6
DROP10	76PCM01	5X00119G01	SPARE				RTD	1.1.8.7
DROP10	76PCM01	5X00119G01	SPARE				RTD	1.1.8.8
DROP10	76PCM01	1C31232G01	M76MI0810	PIPELINE LUBE PUMP NO. 10	OFF	RUNNING	DI	1.2.1.1
DROP10	76PCM01	1C31232G01	M76UA0810	PIPELINE LUBE PUMP NO. 10	NORMAL	FAIL	DI	1.2.1.2
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.3
DROP10	76PCM01	1C31232G01	M73JA2111	RAW SOLID FD PMPS DISCH FLW	NORMAL	F OVER	DI	1.2.1.4
DROP10	76PCM01	1C31232G01	M73QI2111A	RAW SOLIDS FD PUMPS DISCH FLOW	LOCAL	INCOMP	DI	1.2.1.5
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.6
DROP10	76PCM01	1C31232G01	M76PAH2151	TC FEED PUMP 1 PRESS CUTOUT	NORMAL	HIGH	DI	1.2.1.7
DROP10	76PCM01	1C31232G01	M76PAL2151A	TC FEED PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.2.1.8
DROP10	76PCM01	1C31232G01	M76PAL2151B	TC FEED PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.2.1.9
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.10
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.11
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.12
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.13
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.15
DROP10	76PCM01	1C31232G01	<b>M10QC2S01</b>	<b>DPU10 QC DROP 2 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.2.1.16
DROP10	76PCM01	5X00167G01	M76FC2635	CENTRATE SAMPLER FLW PACE/DMND	0	100 PCT	AO	1.2.2.1
DROP10	76PCM01	5X00167G01	<b>M76SC0522</b>	<b>TC POLY FEED PUMP NO.2 SPD CMD</b>	<b>0</b>	<b>100 PCT</b>	AO	1.2.2.2
DROP10	76PCM01	5X00167G01	SPARE				AO	1.2.2.3
DROP10	76PCM01	5X00167G01	M76SC0703	OC EXHST FAN3 OUT DMD	0	100 PCT	AO	1.2.2.4
DROP10	76PCM01	5X00167G01	SPARE				AO	1.2.2.5
DROP10	76PCM01	5X00167G01	SPARE				AO	1.2.2.6
DROP10	76PCM01	5X00167G01	SPARE				AO	1.2.2.7
DROP10	76PCM01	5X00167G01	SPARE				AO	1.2.2.8

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP10	76PCM01			Spare Module Address				1.2.3
DROP10	76PCM01			Spare Module Address				1.2.4
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.2.5.1
DROP10	76PCM01	5X00106G01	M76FT2743	TC POLY FEED PUMP 2 ROTAMETER	0	20 GPM	AI - HART	1.2.5.2
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.2.5.3
DROP10	76PCM01	5X00106G01	M76ST0522	TC POLY FEED PUMP NO. 2 SPEED	0	100 PCT	AI - HART	1.2.5.4
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.2.5.5
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.2.5.6
DROP10	76PCM01	5X00106G01	M76ST0703	OC EXHST FAN3 SPEED	0	100 PCT	AI - HART	1.2.5.7
DROP10	76PCM01	5X00106G01	M76PT2700	PIPE LUBE RING 9 PRESSURE	0	1500 PSI	AI - HART	1.2.5.8
DROP10	76PCM01	5X00106G01	M76FT2156	TC FEED PUMP NO.2 SLUDGE FLOW	0	1500 GPM	AI - HART	1.2.6.1
DROP10	76PCM01	5X00106G01	M76FT2741	TC FEED PUMP NO.2 POLYMER FLW	0	30 GPM	AI - HART	1.2.6.2
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.2.6.3
DROP10	76PCM01	5X00106G01	M76PT2157	TC FEED PUMP NO.2 DISCH PRESS	0	45 PSI	AI - HART	1.2.6.4
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.2.6.5
DROP10	76PCM01	5X00106G01	M76LT2260	THICKENED SOLIDS WET WELL LVL	0	20 FEET	AI - HART	1.2.6.6
DROP10	76PCM01	5X00106G01	M76PT2740	TC POLY FEED PMP NO.2 DISCH PRESS	0	45 PSI	AI - HART	1.2.6.7
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.2.6.8
DROP10	76PCM01			Spare Module Address				1.2.7
DROP10	76PCM01	5X00419G01		76VDL01 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8
DROP10	76PCM01	1C31232G01	M76Q11900	CFUGE BIN 1 AIR INLET DMPR 1	LOCAL	INCOMP	DI	1.3.1.1
DROP10	76PCM01	1C31232G01	M76RI1900	CFUGE BIN 1 AIR INLET DMPR 1	WAIT	READY	DI	1.3.1.2
DROP10	76PCM01	1C31232G01	M76ZB1900	CFUGE BIN 1 AIR INLET DMPR 1	NORMAL	CLOSED	DI	1.3.1.3
DROP10	76PCM01	1C31232G01	M76ZD1900	CFUGE BIN 1 AIR INLET DMPR 1	NORMAL	OPENED	DI	1.3.1.4
DROP10	76PCM01	1C31232G01	M76Q11901	CFUGE BIN 1 AIR INLET DMPR 2	LOCAL	INCOMP	DI	1.3.1.5
DROP10	76PCM01	1C31232G01	M76RI1901	CFUGE BIN 1 AIR INLET DMPR 2	WAIT	READY	DI	1.3.1.6
DROP10	76PCM01	1C31232G01	M76ZB1901	CFUGE BIN 1 AIR INLET DMPR 2	NORMAL	CLOSED	DI	1.3.1.7
DROP10	76PCM01	1C31232G01	M76ZD1901	CFUGE BIN 1 AIR INLET DMPR 2	NORMAL	OPENED	DI	1.3.1.8
DROP10	76PCM01	1C31232G01	M76Q11902	CFUGE BIN1 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.1.9
DROP10	76PCM01	1C31232G01	M76RI1902	CFUGE BIN1 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.1.10
DROP10	76PCM01	1C31232G01	M76ZB1902	CFUGE BIN1 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.1.11
DROP10	76PCM01	1C31232G01	M76ZD1902	CFUGE BIN1 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.1.12
DROP10	76PCM01	1C31232G01	M76PDAH2930	OC FAN 1 NORMAL PRESS DROP	NORMAL	HIDIFF	DI	1.3.1.13
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.1.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.1.15
DROP10	76PCM01	1C31232G01	<b>M10QC3S01</b>	<b>DCU10 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP10	76PCM01	1C31232G01	M76QI1910	CFUGE BIN 3 AIR INLET DMPR 1	LOCAL	INCOMP	DI	1.3.2.1
DROP10	76PCM01	1C31232G01	M76RI1910	CFUGE BIN 3 AIR INLET DMPR 1	WAIT	READY	DI	1.3.2.2
DROP10	76PCM01	1C31232G01	M76ZB1910	CFUGE BIN 3 AIR INLET DMPR 1	NORMAL	CLOSED	DI	1.3.2.3
DROP10	76PCM01	1C31232G01	M76ZD1910	CFUGE BIN 3 AIR INLET DMPR 1	NORMAL	OPENED	DI	1.3.2.4
DROP10	76PCM01	1C31232G01	M76QI1911	CFUGE BIN 3 AIR INLET DMPR 2	LOCAL	INCOMP	DI	1.3.2.5
DROP10	76PCM01	1C31232G01	M76RI1911	CFUGE BIN 3 AIR INLET DMPR 2	WAIT	READY	DI	1.3.2.6
DROP10	76PCM01	1C31232G01	M76ZB1911	CFUGE BIN 3 AIR INLET DMPR 2	NORMAL	CLOSED	DI	1.3.2.7
DROP10	76PCM01	1C31232G01	M76ZD1911	CFUGE BIN 3 AIR INLET DMPR 2	NORMAL	OPENED	DI	1.3.2.8
DROP10	76PCM01	1C31232G01	M76QI1912	CFUGE BIN3 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.2.9
DROP10	76PCM01	1C31232G01	M76RI1912	CFUGE BIN3 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.2.10
DROP10	76PCM01	1C31232G01	M76ZB1912	CFUGE BIN3 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.2.11
DROP10	76PCM01	1C31232G01	M76ZD1912	CFUGE BIN3 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.2.12
DROP10	76PCM01	1C31232G01	M76PDAH2900	OC FAN 3 NORMAL PRESS DROP	NORMAL	HIDIFF	DI	1.3.2.13
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.2.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.2.15
DROP10	76PCM01	1C31232G01	<b>M10QC3S02</b>	<b>DPU10 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.3.1
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.3.2
DROP10	76PCM01	1C31232G01	M76ZB1903	DW CFUGE 1 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.3.3
DROP10	76PCM01	1C31232G01	M76ZD1903	DW CFUGE 1 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.3.4
DROP10	76PCM01	1C31232G01	M76QI1908	DW CFUGE 2 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.3.5
DROP10	76PCM01	1C31232G01	M76RI1908	DW CFUGE 2 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.3.6
DROP10	76PCM01	1C31232G01	M76ZB1908	DW CFUGE 2 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.3.7
DROP10	76PCM01	1C31232G01	M76ZD1908	DW CFUGE 2 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.3.8
DROP10	76PCM01	1C31232G01	M76QI1904	DW CFUGE 3 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.3.9
DROP10	76PCM01	1C31232G01	M76RI1904	DW CFUGE 3 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.3.10
DROP10	76PCM01	1C31232G01	M76ZB1904	DW CFUGE 3 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.3.11
DROP10	76PCM01	1C31232G01	M76ZD1904	DW CFUGE 3 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.3.12
DROP10	76PCM01	1C31232G01	M76ZB1419	PIPELINE LUBE PMP 10 DISCH VLV	NORMAL	CLOSED	DI	1.3.3.13
DROP10	76PCM01	1C31232G01	M76ZD1419	PIPELINE LUBE PMP 10 DISCH VLV	NORMAL	OPENED	DI	1.3.3.14
DROP10	76PCM01	1C31232G01	M76ZB1418	PIPELINE LUBE PUMP 10 INLT VLV	NORMAL	CLOSED	DI	1.3.3.15
DROP10	76PCM01	1C31232G01	<b>M10QC3S03</b>	<b>DPU10 QC DROP 3 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.3.16
DROP10	76PCM01	1C31232G01	M76QI1914	DW CFUGE 7 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.4.1
DROP10	76PCM01	1C31232G01	M76RI1914	DW CFUGE 7 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.4.2
DROP10	76PCM01	1C31232G01	M76ZB1914	DW CFUGE 7 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.4.3
DROP10	76PCM01	1C31232G01	M76ZD1914	DW CFUGE 7 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.4.4
DROP10	76PCM01	1C31232G01	M76MI0701	OC EXHST FAN1 ON	OFF	RUNNG	DI	1.3.4.5
DROP10	76PCM01	1C31232G01	M76QI0701	OC EXHST FAN1 REMOTE	LOCAL	INCOMP	DI	1.3.4.6
DROP10	76PCM01	1C31232G01	M76RI0701	OC EXHST FAN1 CTRL PWR	NRDY	READY	DI	1.3.4.7
DROP10	76PCM01	1C31232G01	M76LAH2711	POLY DAY TANK 1 LEVEL ALARMS	NORMAL	HIGH	DI	1.3.4.8
DROP10	76PCM01	1C31232G01	M76LAL2711	POLY DAY TANK 1 LEVEL ALARMS	NORMAL	LOW	DI	1.3.4.9
DROP10	76PCM01	1C31232G01	M76LM2711	POLY DAY TANK 1 LEVEL ALARMS	NORMAL	MIDPNT	DI	1.3.4.10
DROP10	76PCM01	1C31232G01	M76MI0501	POLY DAY TANK 1 MIXER	OFF	RUNNG	DI	1.3.4.11
DROP10	76PCM01	1C31232G01	M76QI0501	POLY DAY TANK 1 MIXER	LOCAL	INCOMP	DI	1.3.4.12
DROP10	76PCM01	1C31232G01	M76RI0501	POLY DAY TANK 1 MIXER	WAIT	READY	DI	1.3.4.13
DROP10	76PCM01	1C31232G01	M76PAH2737	TC POLY FD PUMP 1 PRESS CUTOUT	NORMAL	HIGH	DI	1.3.4.14
DROP10	76PCM01	1C31232G01	M76PAL2737A	TC POLY FD PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.3.4.15

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP10	76PCM01	1C31232G01	<b>M10QC3S04</b>	<b>DPU10 QC DROP 3 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.4.16
DROP10	76PCM01	1C31232G01	M76QI1909	DW CFUGE 4 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.5.1
DROP10	76PCM01	1C31232G01	M76RI1909	DW CFUGE 4 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.5.2
DROP10	76PCM01	1C31232G01	M76ZB1909	DW CFUGE 4 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.5.3
DROP10	76PCM01	1C31232G01	M76ZD1909	DW CFUGE 4 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.5.4
DROP10	76PCM01	1C31232G01	M76QI1913	DW CFUGE 5 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.5.5
DROP10	76PCM01	1C31232G01	M76RI1913	DW CFUGE 5 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.5.6
DROP10	76PCM01	1C31232G01	M76ZB1913	DW CFUGE 5 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.5.7
DROP10	76PCM01	1C31232G01	M76ZD1913	DW CFUGE 5 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.5.8
DROP10	76PCM01	1C31232G01	M76QI1918	DW CFUGE 6 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.5.9
DROP10	76PCM01	1C31232G01	M76RI1918	DW CFUGE 6 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.5.10
DROP10	76PCM01	1C31232G01	M76ZB1918	DW CFUGE 6 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.5.11
DROP10	76PCM01	1C31232G01	M76ZD1918	DW CFUGE 6 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.5.12
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.5.13
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.5.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.5.15
DROP10	76PCM01	1C31232G01	<b>M10QC3S05</b>	<b>DPU10 QC DROP 3 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.5.16
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.6.1
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.6.2
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.6.3
DROP10	76PCM01	1C31232G01	M76ZB1190	TC 1 POLY INJECT VLV1	NORMAL	CLOSED	DI	1.3.6.4
DROP10	76PCM01	1C31232G01	M76ZD1190	TC 1 POLY INJECT VLV1	NORMAL	OPENED	DI	1.3.6.5
DROP10	76PCM01	1C31232G01	M76ZB1191	TC 1 POLY INJECT VLV2	NORMAL	CLOSED	DI	1.3.6.6
DROP10	76PCM01	1C31232G01	M76ZD1191	TC 1 POLY INJECT VLV2	NORMAL	OPENED	DI	1.3.6.7
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.6.8
DROP10	76PCM01	1C31232G01	M76QI1931	TOT SOLIDS WW FA DISCH DMPR	LOCAL	INCOMP	DI	1.3.6.9
DROP10	76PCM01	1C31232G01	M76RI1931	TOT SOLIDS WW FA DISCH DMPR	WAIT	READY	DI	1.3.6.10
DROP10	76PCM01	1C31232G01	M76ZB1931	THICK SOLIDS WW FA DISCH DMPR	NORMAL	CLOSED	DI	1.3.6.11
DROP10	76PCM01	1C31232G01	M76ZD1931	THICKND SOLID WW FA DISCH DMPR	NORMAL	OPENED	DI	1.3.6.12
DROP10	76PCM01	1C31232G01	M76LAH2261	THICKEND SOLIDS WW LEVEL ALRMS	NORMAL	HIGH	DI	1.3.6.13
DROP10	76PCM01	1C31232G01	M76LAL2261	THICKEND SOLIDS WW LEVEL ALRMS	NORMAL	LOW	DI	1.3.6.14
DROP10	76PCM01	1C31232G01	M76QI2260A	THICKENED SOLIDS WET WELL LVL	LOCAL	INCOMP	DI	1.3.6.15
DROP10	76PCM01	1C31232G01	<b>M10QC3S06</b>	<b>DPU10 QC DROP 3 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.6.16
DROP10	76PCM01	1C31232G01	M76PAH2287	THICK XFER PUMP 1 PRESS CUTOUT	NORMAL	HIGH	DI	1.3.7.1
DROP10	76PCM01	1C31232G01	M76PAL2287A	THICK XFER PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.3.7.2
DROP10	76PCM01	1C31232G01	M76PAL2287B	THICK XFER PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.3.7.3
DROP10	76PCM01	1C31232G01	M76MI0131	THICK XFER PUMP NO. 1	OFF	RUNNING	DI	1.3.7.4
DROP10	76PCM01	1C31232G01	M76QI0131	THICK XFER PUMP NO. 1	LOCAL	INCOMP	DI	1.3.7.5
DROP10	76PCM01	1C31232G01	M76RI0131	THICK XFER PUMP NO. 1	WAIT	READY	DI	1.3.7.6
DROP10	76PCM01	1C31232G01	<b>M76UA0131</b>	<b>THICK XFER PUMP NO. 1</b>	<b>NORMAL</b>	<b>FAIL</b>	DI	1.3.7.7
DROP10	76PCM01	1C31232G01	M76QI1936	TC 4 FA DISCH DMPR	LOCAL	INCOMP	DI	1.3.7.8
DROP10	76PCM01	1C31232G01	M76RI1936	TC 4 FA DISCH DMPR	WAIT	READY	DI	1.3.7.9
DROP10	76PCM01	1C31232G01	M76ZB1936	TC 4 FA DISCH DMPR	NORMAL	CLOSED	DI	1.3.7.10
DROP10	76PCM01	1C31232G01	M76ZD1936	TC 4 FA DISCH DMPR	NORMAL	OPENED	DI	1.3.7.11
DROP10	76PCM01	1C31232G01	M76QI1935	TC 6 FA DISCH DMPR	LOCAL	INCOMP	DI	1.3.7.12
DROP10	76PCM01	1C31232G01	M76RI1935	TC 6 FA DISCH DMPR	WAIT	READY	DI	1.3.7.13

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP10	76PCM01	1C31232G01	M76ZB1935	TC 6 FA DISCH DMPR	NORMAL	CLOSED	DI	1.3.7.14
DROP10	76PCM01	1C31232G01	M76ZD1935	TC 6 FA DISCH DMPR	NORMAL	OPENED	DI	1.3.7.15
DROP10	76PCM01	1C31232G01	<b>M10QC3S07</b>	<b>DPUI0 QC DROP 3 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.7.16
DROP10	76PCM01	1C31232G01	M76MI0703	OC EXHST FAN1 ON	OFF	RUNNG	DI	1.3.8.1
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.8.2
DROP10	76PCM01	1C31232G01	M76QI0703	OC EXHST FAN3 REMOTE	LOCAL	INCOMP	DI	1.3.8.3
DROP10	76PCM01	1C31232G01	M76RI0703	OC EXHST FAN3 CTRL PWR	NRDY	READY	DI	1.3.8.4
DROP10	76PCM01	1C31232G01	M76MI0521	TC POLY FEED PUMP NO. 1	OFF	RUNNG	DI	1.3.8.5
DROP10	76PCM01	1C31232G01	<b>M76QI0521</b>	<b>TC POLY FEED PUMP NO. 1</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.3.8.6
DROP10	76PCM01	1C31232G01	M76RI0521	TC POLY FEED PUMP NO. 1	WAIT	READY	DI	1.3.8.7
DROP10	76PCM01	1C31232G01	M76UA0521	TC POLY FEED PUMP NO. 1	NORMAL	FAIL	DI	1.3.8.8
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.8.9
DROP10	76PCM01	1C31232G01	M76QI1930	TOT SOLIDS WW AIR INLT DMPR	LOCAL	INCOMP	DI	1.3.8.10
DROP10	76PCM01	1C31232G01	M76RI1930	TOT SOLIDS WW AIR INLET DMPR	WAIT	READY	DI	1.3.8.11
DROP10	76PCM01	1C31232G01	M76ZB1930	THICK SOLIDS WW AIR INLET DMPR	NORMAL	CLOSED	DI	1.3.8.12
DROP10	76PCM01	1C31232G01	M76ZD1930	THICKND SOLID WW AIR INLT DMPR	NORMAL	OPENED	DI	1.3.8.13
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.8.14
DROP10	76PCM01	1C31232G01	M73XS2103	POINT LOMA LINE 1 PIG DETECTOR	NORMAL	PIG	DI	1.3.8.15
DROP10	76PCM01	1C31232G01	<b>M10QC3S08</b>	<b>DPUI0 QC DROP 3 SL08 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.8.16
DROP10	76PCM01	1C31232G01	M76QI1905	CFUGE BIN 2 AIR INLET DMPR 1	LOCAL	INCOMP	DI	1.4.1.1
DROP10	76PCM01	1C31232G01	M76RI1905	CFUGE BIN 2 AIR INLET DMPR 1	WAIT	READY	DI	1.4.1.2
DROP10	76PCM01	1C31232G01	M76ZB1905	CFUGE BIN 2 AIR INLET DMPR 1	NORMAL	CLOSED	DI	1.4.1.3
DROP10	76PCM01	1C31232G01	M76ZD1905	CFUGE BIN 2 AIR INLET DMPR 1	NORMAL	OPENED	DI	1.4.1.4
DROP10	76PCM01	1C31232G01	M76QI1906	CFUGE BIN 2 AIR INLET DMPR 2	LOCAL	INCOMP	DI	1.4.1.5
DROP10	76PCM01	1C31232G01	M76RI1906	CFUGE BIN 2 AIR INLET DMPR 2	WAIT	READY	DI	1.4.1.6
DROP10	76PCM01	1C31232G01	M76ZB1906	CFUGE BIN 2 AIR INLET DMPR 2	NORMAL	CLOSED	DI	1.4.1.7
DROP10	76PCM01	1C31232G01	M76ZD1906	CFUGE BIN 2 AIR INLET DMPR 2	NORMAL	OPENED	DI	1.4.1.8
DROP10	76PCM01	1C31232G01	M76QI1907	CFUGE BIN2 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.4.1.9
DROP10	76PCM01	1C31232G01	M76RI1907	CFUGE BIN2 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.4.1.10
DROP10	76PCM01	1C31232G01	M76ZB1907	CFUGE BIN2 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.4.1.11
DROP10	76PCM01	1C31232G01	M76ZD1907	CFUGE BIN2 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.4.1.12
DROP10	76PCM01	1C31232G01	M76PDAH2935	OC FAN 2 NORMAL PRESS DROP	NORMAL	HIDIFF	DI	1.4.1.13
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.1.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.1.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S01</b>	<b>DPUI0 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16
DROP10	76PCM01	1C31232G01	M76QI1915	CFUGE BIN 4 AIR INLET DMPR 1	LOCAL	INCOMP	DI	1.4.2.1
DROP10	76PCM01	1C31232G01	M76RI1915	CFUGE BIN 4 AIR INLET DMPR 1	WAIT	READY	DI	1.4.2.2
DROP10	76PCM01	1C31232G01	M76ZB1915	CFUGE BIN 4 AIR INLET DMPR 1	NORMAL	CLOSED	DI	1.4.2.3
DROP10	76PCM01	1C31232G01	M76ZD1915	CFUGE BIN 4 AIR INLET DMPR 1	NORMAL	OPENED	DI	1.4.2.4
DROP10	76PCM01	1C31232G01	M76QI1916	CFUGE BIN 4 AIR INLET DMPR 2	LOCAL	INCOMP	DI	1.4.2.5
DROP10	76PCM01	1C31232G01	M76RI1916	CFUGE BIN 4 AIR INLET DMPR 2	WAIT	READY	DI	1.4.2.6
DROP10	76PCM01	1C31232G01	M76ZB1916	CFUGE BIN 4 AIR INLET DMPR 2	NORMAL	CLOSED	DI	1.4.2.7
DROP10	76PCM01	1C31232G01	M76ZD1916	CFUGE BIN 4 AIR INLET DMPR 2	NORMAL	OPENED	DI	1.4.2.8
DROP10	76PCM01	1C31232G01	M76QI1917	CFUGE BIN4 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.4.2.9
DROP10	76PCM01	1C31232G01	M76RI1917	CFUGE BIN4 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.4.2.10
DROP10	76PCM01	1C31232G01	M76ZB1917	CFUGE BIN4 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.4.2.11



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP10	76PCM01	1C31232G01	M76ZD1917	CFUGE BIN4 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.4.2.12
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.2.13
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.2.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.2.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S02</b>	<b>DPU10 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16
DROP10	76PCM01	1C31232G01	M73XS2106	FUTURE WRP PIG DETECTOR	NORMAL	PIG	DI	1.4.3.1
DROP10	76PCM01	1C31232G01	M73XS2100	NORTH CITY LINE 2 PIG DETECTOR	NORMAL	PIG	DI	1.4.3.2
DROP10	76PCM01	1C31232G01	M76MI0531	NORTH CITY SCUM PUMP	OFF	RUNNNG	DI	1.4.3.3
DROP10	76PCM01	1C31232G01	M76QI0531	NORTH CITY SCUM PUMP	LOCAL	INCOMP	DI	1.4.3.4
DROP10	76PCM01	1C31232G01	M76RI0531	NORTH CITY SCUM PUMP	WAIT	READY	DI	1.4.3.5
DROP10	76PCM01	1C31232G01	M76ZI2274	N. CITY SCUM PUMP INLET PSTN	NORMAL	IN POS	DI	1.4.3.6
DROP10	76PCM01	1C31232G01	M76PAH2277	N. CITY SCUM PUMP PRESS CUTOUT	NORMAL	HIGH	DI	1.4.3.7
DROP10	76PCM01	1C31232G01	M76PAL2277A	N. CITY SCUM PUMP PRESS CUTOUT	NORMAL	LOW	DI	1.4.3.8
DROP10	76PCM01	1C31232G01	M76PAL2277B	N. CITY SCUM PUMP PRESS CUTOUT	NORMAL	LOW	DI	1.4.3.9
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.3.10
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.3.11
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.3.12
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.3.13
DROP10	76PCM01	1C31232G01	<b>M76QI0522</b>	<b>TC POLY FEED PUMP NO. 2</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.4.3.14
DROP10	76PCM01	1C31232G01	M76RI0522	TC POLY FEED PUMP NO. 2	WAIT	READY	DI	1.4.3.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S03</b>	<b>DPU10 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP10	76PCM01	1C31232G01	M76QI1919	DW CFUGE 8 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.4.4.1
DROP10	76PCM01	1C31232G01	M76RI1919	DW CFUGE 8 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.4.4.2
DROP10	76PCM01	1C31232G01	M76ZB1919	DW CFUGE 8 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.4.4.3
DROP10	76PCM01	1C31232G01	M76ZD1919	DW CFUGE 8 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.4.4.4
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.4.5
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.4.6
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.4.7
DROP10	76PCM01	1C31232G01	M76PAH2155	TC FEED PUMP 2 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.4.8
DROP10	76PCM01	1C31232G01	M76PAL2155A	TC FEED PUMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.4.9
DROP10	76PCM01	1C31232G01	M76PAL2155B	TC FEED PUMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.4.10
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.4.11
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.4.12
DROP10	76PCM01	1C31232G01	M76UA0703A	OC EXHST FAN3 FAIL	NORMAL	FAIL	DI	1.4.4.13
DROP10	76PCM01	1C31232G01	M76UA0703B	OC EXHST FAN3 ALARM	NORMAL	ALARM	DI	1.4.4.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.4.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S04</b>	<b>DPU10 QC DROP 4 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16

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DROP10	76PCM01	1C31232G01	M76UPSALA	AREA 76 UPS TROUBLE ALARM	ALARM	NORMAL	DI	1.4.5.1
DROP10	76PCM01	1C31232G01	M76UPSMBYP	AREA 76 UPS IN USE	NORMAL	BYPASS	DI	1.4.5.2
DROP10	76PCM01	1C31232G01	M76UPSLOW	AREA 76 UPS LOW BATTERY ALARM	NORMAL	LOW	DI	1.4.5.3
DROP10	76PCM01	1C31232G01	M76UPSNOR	AREA 76 UPS FEED OK/NORML MODE	ALARM	NORMAL	DI	1.4.5.4
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.5.5
DROP10	76PCM01	1C31232G01	M76MI0809	PIPELINE LUBE PUMP NO. 9	OFF	RUNNNG	DI	1.4.5.6
DROP10	76PCM01	1C31232G01	M76UA0809	PIPELINE LUBE PUMP NO. 9	NORMAL	FAIL	DI	1.4.5.7
DROP10	76PCM01	1C31232G01	M76ZB1417	PIPELINE LUBE PUMP 9 DISCH VLV	NORMAL	CLOSED	DI	1.4.5.8
DROP10	76PCM01	1C31232G01	M76ZD1417	PIPELINE LUBE PUMP 9 DISCH VLV	NORMAL	OPENED	DI	1.4.5.9
DROP10	76PCM01	1C31232G01	M76ZB1416	PIPELINE LUBE PUMP 9 INLET VLV	NORMAL	CLOSED	DI	1.4.5.10
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.5.11
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.5.12
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.5.13
DROP10	76PCM01	1C31232G01	M76UA0701A	OC EXHST FAN1 FAIL	NORMAL	FAIL	DI	1.4.5.14
DROP10	76PCM01	1C31232G01	M76UA0701B	OC EXHST FAN1 ALARM	NORMAL	ALARM	DI	1.4.5.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S05</b>	<b>DPU10 QC DROP 4 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.5.16
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.6.1
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.6.2
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.6.3
DROP10	76PCM01	1C31232G01	M76ZB1200	TC 2 POLY INJECT VLV1	NORMAL	CLOSED	DI	1.4.6.4
DROP10	76PCM01	1C31232G01	M76ZD1200	TC 2 POLY INJECT VLV1	NORMAL	OPENED	DI	1.4.6.5
DROP10	76PCM01	1C31232G01	M76ZB1201	TC 2 POLY INJECT VLV2	NORMAL	CLOSED	DI	1.4.6.6
DROP10	76PCM01	1C31232G01	M76ZD1201	TC 2 POLY INJECT VLV2	NORMAL	OPENED	DI	1.4.6.7
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.6.8
DROP10	76PCM01	1C31232G01	M76QI1934	TC 1 FA DISCH DMPR	LOCAL	INCOMP	DI	1.4.6.9
DROP10	76PCM01	1C31232G01	M76RI1934	TC 1 FA DISCH DMPR	WAIT	READY	DI	1.4.6.10
DROP10	76PCM01	1C31232G01	M76ZB1934	TC 1 FA DISCH DMPR	NORMAL	CLOSED	DI	1.4.6.11
DROP10	76PCM01	1C31232G01	M76ZD1934	TC 1 FA DISCH DMPR	NORMAL	OPENED	DI	1.4.6.12
DROP10	76PCM01	1C31232G01	M76QI1933	TC 3 FA DISCH DMPR	LOCAL	INCOMP	DI	1.4.6.13
DROP10	76PCM01	1C31232G01	M76RI1933	TC 3 FA DISCH DMPR	WAIT	READY	DI	1.4.6.14
DROP10	76PCM01	1C31232G01	M76ZB1933	TC 3 FA DISCH DMPR	NORMAL	CLOSED	DI	1.4.6.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S06</b>	<b>DPU10 QC DROP 4 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.6.16
DROP10	76PCM01	1C31232G01	M76QI1937	TC 2 FA DISCH DMPR	LOCAL	INCOMP	DI	1.4.7.1
DROP10	76PCM01	1C31232G01	M76RI1937	TC 2 FA DISCH DMPR	WAIT	READY	DI	1.4.7.2
DROP10	76PCM01	1C31232G01	M76ZB1937	TC 2 FA DISCH DMPR	NORMAL	CLOSED	DI	1.4.7.3
DROP10	76PCM01	1C31232G01	M76ZD1937	TC 2 FA DISCH DMPR	NORMAL	OPENED	DI	1.4.7.4
DROP10	76PCM01	1C31232G01	M76QI1932	TC 5 FA DISCH DMPR	LOCAL	INCOMP	DI	1.4.7.5
DROP10	76PCM01	1C31232G01	M76RI1932	TC 5 FA DISCH DMPR	WAIT	READY	DI	1.4.7.6
DROP10	76PCM01	1C31232G01	M76ZB1932	TC 5 FA DISCH DMPR	NORMAL	CLOSED	DI	1.4.7.7
DROP10	76PCM01	1C31232G01	M76ZD1932	TC 5 FA DISCH DMPR	NORMAL	OPENED	DI	1.4.7.8
DROP10	76PCM01	1C31232G01	M76QI2260B	THICKENED SOLIDS WET WELL LVL	LOCAL	INCOMP	DI	1.4.7.9
DROP10	76PCM01	1C31232G01	M76PAL2737B	TC POLY FD PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.4.7.10
DROP10	76PCM01	1C31232G01	M73QI2111B	RAW SOLIDS FD PUMPS DISCH FLOW	LOCAL	INCOMP	DI	1.4.7.11
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.7.12
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.7.13



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DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.7.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.7.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S07</b>	<b>DPU10 QC DROP 4 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.7.16
DROP10	76PCM01	1C31232G01	M76PAL2742A	TC POLY FEED PUMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.8.1
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.8.2
DROP10	76PCM01	1C31232G01	M76MI0522	TC POLY FEED PUMP NO. 2	OFF	RUNNING	DI	1.4.8.3
DROP10	76PCM01	1C31232G01	M76PAL2742B	TC POLY FD PUMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.8.4
DROP10	76PCM01	1C31232G01	M76ZD1416	PIPELINE LUBE PUMP 9 INLET VLV	NORMAL	OPENED	DI	1.4.8.5
DROP10	76PCM01	1C31232G01	M76UA0522	TC POLY FEED PUMP NO. 2	NORMAL	FAIL	DI	1.4.8.6
DROP10	76PCM01	1C31232G01	M76ZD1418	PIPELINE LUBE PUMP 10 INLT VLV	NORMAL	OPENED	DI	1.4.8.7
DROP10	76PCM01	1C31232G01	M76LAH2712	POLY DAY TNKS 1 & 2 FLOOD ALRM	FLOOD	NORMAL	DI	1.4.8.8
DROP10	76PCM01	1C31232G01	M76PAH2742	TC POLY FD PUMP 2 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.8.9
DROP10	76PCM01	1C31232G01	M76ZD1933	TC 3 FA DISCH DMPR	NORMAL	OPENED	DI	1.4.8.10
DROP10	76PCM01	1C31232G01	M76BUPSNORMALMOD	THICKENING UPS FD OK NRML MODE	ALARM	NORMAL	DI	1.4.8.11
DROP10	76PCM01	1C31232G01	M76BUPSBYPASSMOD	THICKENING UPS IN USE	BYPASS	NORMAL	DI	1.4.8.12
DROP10	76PCM01	1C31232G01	M76BUPSLOBATTERY	THICKENING UPS LO BATTERY ALRM	LOWBAT	NORMAL	DI	1.4.8.13
DROP10	76PCM01	1C31232G01	M76BUPSALARM	THICKENING UPS NO TRBL/ALARM	ALARM	NORMAL	DI	1.4.8.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.8.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S08</b>	<b>DPU10 QC DROP 4 SL08 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.8.16
DROP10	76PCM01	5A26458G04	M76HS1914A	DW CFUGE 7 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.5.1.1
DROP10	76PCM01	5A26458G04	M76HS1930A	THICKND SOLID WW AIR INLT DMPR	OPEN	CLOSE	DO	1.5.1.2
DROP10	76PCM01	5A26458G04	M76HS1902A	CFUGE BIN1 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.5.1.3
DROP10	76PCM01	5A26458G04	M76HS1901A	CFUGE BIN 1 AIR INLET DMPR 2	OPEN	CLOSE	DO	1.5.1.4
DROP10	76PCM01	5A26458G04	M76HS1900A	CFUGE BIN 1 AIR INLET DMPR 1	OPEN	CLOSE	DO	1.5.1.5
DROP10	76PCM01	5A26458G04	M76HS1936A	TC 4 FA DISCH DMPR	OPEN	CLOSE	DO	1.5.1.6
DROP10	76PCM01	5A26458G04	M76HS1905A	CFUGE BIN 2 AIR INLET DMPR 1	OPEN	CLOSE	DO	1.5.1.7
DROP10	76PCM01	5A26458G04	M76HS1906A	CFUGE BIN 2 AIR INLET DMPR 2	OPEN	CLOSE	DO	1.5.1.8
DROP10	76PCM01	5A26458G04	M76HS1907A	CFUGE BIN2 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.5.1.9
DROP10	76PCM01	5A26458G04	M76HS1919A	DW CFUGE 8 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.5.1.10
DROP10	76PCM01	5A26458G04	M76HS1933A	TC 3 FA DISCH DMPR	OPEN	CLOSE	DO	1.5.1.11
DROP10	76PCM01	5A26458G04	M76HS1932A	TC 5 FA DISCH DMPR	OPEN	CLOSE	DO	1.5.1.12
DROP10	76PCM01	5A26458G04	M76HS1904A	DW CFUGE 3 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.5.2.1
DROP10	76PCM01	5A26458G04	M76HS1910A	CFUGE BIN 3 AIR INLET DMPR 1	OPEN	CLOSE	DO	1.5.2.2
DROP10	76PCM01	5A26458G04	M76HS1911A	CFUGE BIN 3 AIR INLET DMPR 2	OPEN	CLOSE	DO	1.5.2.3
DROP10	76PCM01	5A26458G04	M76HS1912A	CFUGE BIN3 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.5.2.4
DROP10	76PCM01	5A26458G04	M76HS1931A	TOT SOLIDS WW FA DISCH DMPR	OPEN	CLOSE	DO	1.5.2.5
DROP10	76PCM01	5A26458G04	M76HS1917A	CFUGE BIN4 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.5.2.6
DROP10	76PCM01	5A26458G04	M76HS1934A	TC 1 FA DISCH DMPR	OPEN	CLOSE	DO	1.5.2.7
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.2.8
DROP10	76PCM01	5A26458G04	M76HS1916A	CFUGE BIN 4 AIR INLET DMPR 2	OPEN	CLOSE	DO	1.5.2.9
DROP10	76PCM01	5A26458G04	M76HS1915A	CFUGE BIN 4 AIR INLET DMPR 1	OPEN	CLOSE	DO	1.5.2.10
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.2.11
DROP10	76PCM01	5A26458G04	M76HS1937A	TC 2 FA DISCH DMPR	OPEN	CLOSE	DO	1.5.2.12

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DROP10	76PCM01	5A26458G04	<b>M76HS0521</b>	<b>TC POLY FEED PUMP NO.1 START/STOP</b>	<b>OFF</b>	<b>RUN</b>	DO	1.5.3.1	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.3.2	
DROP10	76PCM01	5A26458G04	M76HS0501	POLY DAY TANK 1 MIXER	OFF	RUN	DO	1.5.3.3	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.3.4	
DROP10	76PCM01	5A26458G04	M76HS0131	THICK XFER PUMP NO. 1	OFF	RUN	DO	1.5.3.5	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.3.6	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.3.7	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.3.8	
DROP10	76PCM01	5A26458G04	M73HS2111C	RAW SOLIDS FD PUMPS DISCH FLOW	NORMAL	312	DO	1.5.3.9	
DROP10	76PCM01	5A26458G04	M73QS2111	DCS in Control	OFF	CMPRDY	DO	1.5.3.10	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.3.11	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.3.12	
DROP10	76PCM01	5A26458G04	M76HS1909A	DW CFUGE 4 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.6.1.1	
DROP10	76PCM01	5A26458G04	M76HS1913A	DW CFUGE 5 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.6.1.2	
DROP10	76PCM01	5A26458G04	M76HS1918A	DW CFUGE 6 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.6.1.3	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.1.4	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.1.5	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.1.6	
DROP10	76PCM01	5A26458G04	M76HS0531	NORTH CITY SCUM PUMP	OFF	RUN	DO	1.6.1.7	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.1.8	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.1.9	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.1.10	
DROP10	76PCM01	5A26458G04	M73HS2111A	RAW SOLIDS FD PUMPS DISCH FLOW	NORMAL	123	DO	1.6.1.11	
DROP10	76PCM01	5A26458G04	M73HS2111B	RAW SOLIDS FD PUMPS DISCH FLOW	NORMAL	231	DO	1.6.1.12	
DROP10	76PCM01	5A26458G04	<b>M76HS0522</b>	<b>TC POLY FEED PUMP NO.2 START/STOP</b>	<b>OFF</b>	<b>RUN</b>	DO	1.6.2.1	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.2.2	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.2.3	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.2.4	
DROP10	76PCM01	5A26458G04	M76HS1935A	TC 6 FA DISCH DMPR	OPEN	CLOSE	DO	1.6.2.5	
DROP10	76PCM01	5A26458G04	M76HS1908A	DW CFUGE 2 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.6.2.6	
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.2.7	
DROP10	76PCM01	5A26458G04	M76HS0701	OC EXHST FAN1 RUN CMD	OFF	RUN	DO	1.6.2.8	
DROP10	76PCM01	5A26458G04	M76HS2260A	THICKENED SOLIDS WET WELL LVL	NORMAL	123	DO	1.6.2.9	
DROP10	76PCM01	5A26458G04	M76HS2260B	THICKENED SOLIDS WET WELL LVL	NORMAL	231	DO	1.6.2.10	
DROP10	76PCM01	5A26458G04	M76HS2260C	THICKENED SOLIDS WET WELL LVL	NORMAL	312	DO	1.6.2.11	
DROP10	76PCM01	5A26458G04	M76QS2260	THICKENED SOLIDS WET WELL LVL	OFF	CMPRDY	DO	1.6.2.12	
DROP10	76PCM01		Spare Module Address						1.6.3

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DROP11	76PCM02	5X00419G01		76VDL02 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1
			76MV1160	THICKENING CENTRIFUGE FEED PUMP 3 INLET VALVE				
			76MV1161	THICKENING CENTRIFUGE FEED PUMP 3 DISCHARGE VALVE				
			76MV1162	THICKENING CENTRIFUGE FEED PUMP 3 BYPASS VALVE				
			76MV1165	THICKENING CENTRIFUGE FEED PUMP 4 INLET VALVE				
			76MV1166	THICKENING CENTRIFUGE FEED PUMP 4 DISCHARGE VALVE				
			76MV1167	THICKENING CENTRIFUGE FEED PUMP 4 BYPASS VALVE				
			76MV1290	THICKENED TRANSFER PUMP 2 INLET VALVE				
			76MV1291	THICKENED TRANSFER PUMP 2 DISCHARGE VALVE				
			76MV1295	THICKENED TRANSFER PUMP 3 INLET VALVE				
			76MV1296	THICKENED TRANSFER PUMP 3 DISCHARGE VALVE				
			76MV1715	POLYMER DAY TANK 2 INLET VALVE				
			76MV1716	POLYMER DAT TANK 2 DISCHARGE VALVE 1				
			76MV1717	POLYMER DAY TANK 2 DISCHARGE VALVE 2				
			76MV1745	THICKENING CENTRIFUGE POLYMER FEED PUMP 3 INLET VALVE				
			76MV1746	THICKENING CENTRIFUGE POLYMER FEED PUMP 3 DISCHARGE VALVE				
			76MV1747	THICKENING CENTRIFUGE POLYMER FEED PUMP 3 BYPASS VALVE				
76MV1750	THICKENING CENTRIFUGE POLYMER FEED PUMP 4 INLET VALVE							
76MV1751	THICKENING CENTRIFUGE POLYMER FEED PUMP 4 DISCHARGE VALVE							
76MV1752	THICKENING CENTRIFUGE POLYMER FEED PUMP 4 BYPASS VALVE							
DROP11	76PCM02	5X00419G01	<b>M76TC03</b>	<b>TC NO. 3</b>			ET	1.1.2
			<b>M76P0113</b>	<b>TC FEED PUMP NO. 3</b>				
			<b>M76TC04</b>	<b>TC NO. 4</b>				
			<b>M76P0114</b>	<b>TC FEED PUMP NO. 4</b>				
DROP11	76PCM02	5X00106G01	M76FT2161	THICK CENTRIFUGE 3 SLUDGE FLOW	0	1500 GPM	AI - HART	1.1.3.1
DROP11	76PCM02	5X00106G01	M76FT2746	THICKENING CFUGE 3 POLYMER FLW	0	30 GPM	AI - HART	1.1.3.2
DROP11	76PCM02	5X00106G01	M76FT2748	TC POLY FEED PUMP 3 ROTAMETER	0	20 GPM	AI - HART	1.1.3.3
DROP11	76PCM02	5X00106G01	M76PT2745	TC POLY FEED PUMP 3 DISCH PRESS	0	45 PSI	AI - HART	1.1.3.4
DROP11	76PCM02	5X00106G01	M76ST0523	TC POLY FEED PUMP NO. 3 SPEED	0	100 PCT	AI - HART	1.1.3.5
DROP11	76PCM02	5X00106G01	M76PT2162	TC FEED PUMP 3 DISCH PRESS	0	45 PSI	AI - HART	1.1.3.6
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.1.3.7
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.1.3.8
DROP11	76PCM02	5X00106G01	M76FT2298	THICK XFER PUMP 3 DISCH FLOW	0	300 GPM	AI - HART	1.1.4.1
DROP11	76PCM02	5X00106G01	M76PT2299	THICK XFER PUMP 3 DISCH PRESS	0	130 PSI	AI - HART	1.1.4.2
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.1.4.3
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.1.4.4
DROP11	76PCM02	5X00106G01	M76LT2715	POLY DAY TANK 2 LEVEL	0	10 FEET	AI - HART	1.1.4.5
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.1.4.6
DROP11	76PCM02	5X00106G01	M86ST0703	OC EXHST FAN3 SPEED	0	100 PCT	AI - HART	1.1.4.7
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.1.4.8

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DROP11	76PCM02			Spare Module Address				1.1.5
DROP11	76PCM02			Spare Module Address				1.1.6
DROP11	76PCM02	5X00167G01	<b>M76SC0523</b>	<b>TC POLY FEED PUMP NO.3 SPD CMD</b>	<b>0</b>	<b>100 PCT</b>	AO	1.1.7.1
DROP11	76PCM02	5X00167G01	SPARE				AO	1.1.7.2
DROP11	76PCM02	5X00167G01	SPARE				AO	1.1.7.3
DROP11	76PCM02	5X00167G01	M76SC0702	OC EXHST FAN2 OUT DMD	0	100 PCT	AO	1.1.7.4
DROP11	76PCM02	5X00167G01	SPARE				AO	1.1.7.5
DROP11	76PCM02	5X00167G01	SPARE				AO	1.1.7.6
DROP11	76PCM02	5X00167G01	SPARE				AO	1.1.7.7
DROP11	76PCM02	5X00167G01	SPARE				AO	1.1.7.8
DROP11	76PCM02	5X00119G01	MDPU11T1	DPU11 76PCM02A CABINET TEMP	32	154 Deg F	RTD	1.1.8.1
DROP11	76PCM02	5X00119G01	SPARE				RTD	1.1.8.2
DROP11	76PCM02	5X00119G01	SPARE				RTD	1.1.8.3
DROP11	76PCM02	5X00119G01	SPARE				RTD	1.1.8.4
DROP11	76PCM02	5X00119G01	SPARE				RTD	1.1.8.5
DROP11	76PCM02	5X00119G01	SPARE				RTD	1.1.8.6
DROP11	76PCM02	5X00119G01	SPARE				RTD	1.1.8.7
DROP11	76PCM02	5X00119G01	SPARE				RTD	1.1.8.8
DROP11	76PCM02			Spare Module Address				1.2.1
DROP11	76PCM02	5X00167G01	<b>M76SC0524</b>	<b>TC POLY FEED PUMP NO.4 SPD CMD</b>	<b>0</b>	<b>100 PCT</b>	AO	1.2.2.1
DROP11	76PCM02	5X00167G01	SPARE				AO	1.2.2.2
DROP11	76PCM02	5X00167G01	SPARE				AO	1.2.2.3
DROP11	76PCM02	5X00167G01	M86SC0703	OC EXHST FAN3 OUT DMD	0	100 PCT	AO	1.2.2.4
DROP11	76PCM02	5X00167G01	SPARE				AO	1.2.2.5
DROP11	76PCM02	5X00167G01	SPARE				AO	1.2.2.6
DROP11	76PCM02	5X00167G01	SPARE				AO	1.2.2.7
DROP11	76PCM02	5X00167G01	SPARE				AO	1.2.2.8
DROP11	76PCM02			Spare Module Address				1.2.3
DROP11	76PCM02			Spare Module Address				1.2.4
DROP11	76PCM02	5X00106G01	M76FT2293	THICK XFER PUMP 2 DISCH FLOW	0	300 GPM	AI - HART	1.2.5.1
DROP11	76PCM02	5X00106G01	M76PT2294	THICK XFER PUMP 2 DISCH PRESS	0	130 PSI	AI - HART	1.2.5.2
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.2.5.3
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.2.5.4
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.2.5.5
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.2.5.6
DROP11	76PCM02	5X00106G01	M76ST0702	OC EXHST FAN2 SPEED	0	100 PCT	AI - HART	1.2.5.7
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.2.5.8

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DROP11	76PCM02	5X00106G01	M76FT2166	THICK CENTRIFUGE 4 SLUDGE FLOW	0	1500 GPM	AI - HART	1.2.6.1	
DROP11	76PCM02	5X00106G01	M76FT2751	THICKENING CFUGE 4 POLYMER FLW	0	30 GPM	AI - HART	1.2.6.2	
DROP11	76PCM02	5X00106G01	M76FT2753	TC POLY FEED PUMP 4 ROTAMETER	0	20 GPM	AI - HART	1.2.6.3	
DROP11	76PCM02	5X00106G01	M76PT2750	TC POLY FEED PUMP 4 DISCH PRESS	0	45 PSI	AI - HART	1.2.6.4	
DROP11	76PCM02	5X00106G01	M76ST0524	TC POLY FEED PUMP NO. 4 SPEED	0	100 PCT	AI - HART	1.2.6.5	
DROP11	76PCM02	5X00106G01	M76PT2167	TC FEED PUMP 4 DISCH PRESS	0	45 PSI	AI - HART	1.2.6.6	
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.2.6.7	
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.2.6.8	
DROP11	76PCM02	Spare Module Address							1.2.7
DROP11	76PCM02	5X00419G01		76VDL02 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8	
DROP11	76PCM02	1C31232G01	<b>M76QS0523</b>	<b>TC POLY FEED PUMP NO. 3</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.3.1.1	
DROP11	76PCM02	1C31232G01	M76RI0523	TC POLY FEED PUMP NO. 3	WAIT	READY	DI	1.3.1.2	
DROP11	76PCM02	1C31232G01	M76MI0523	TC POLY FEED PUMP NO. 3	OFF	RUNNING	DI	1.3.1.3	
DROP11	76PCM02	1C31232G01	M76UA0523	TC POLY FEED PUMP NO. 3	NORMAL	FAIL	DI	1.3.1.4	
DROP11	76PCM02	1C31232G01	M76PAH2747	TC POLY FD PUMP 3 PRESS CUTOUT	NORMAL	HIGH	DI	1.3.1.5	
DROP11	76PCM02	1C31232G01	M76PAL2747A	TC POLY FD PUMP 3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.1.6	
DROP11	76PCM02	1C31232G01	M76PAL2747B	TC POLY FD PUMP 3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.1.7	
DROP11	76PCM02	1C31232G01	M76ZB1210	THICK CFUGE3 POLY INJECT VLV 1	NORMAL	CLOSED	DI	1.3.1.8	
DROP11	76PCM02	1C31232G01	M76ZD1210	THICK CFUGE3 POLY INJECT VLV 1	NORMAL	OPENED	DI	1.3.1.9	
DROP11	76PCM02	1C31232G01	M76ZB1211	THICK CFUGE3 POLY INJECT VLV 2	NORMAL	CLOSED	DI	1.3.1.10	
DROP11	76PCM02	1C31232G01	M76ZD1211	THICK CFUGE3 POLY INJECT VLV 2	NORMAL	OPENED	DI	1.3.1.11	
DROP11	76PCM02	1C31232G01	M76PAH2160	TC FEED PUMP 3 PRESS CUTOUT	NORMAL	HIGH	DI	1.3.1.12	
DROP11	76PCM02	1C31232G01	M76PAL2160A	TC FEED PUMP 3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.1.13	
DROP11	76PCM02	1C31232G01	M76PAL2160B	TC FEED PUMP 3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.1.14	
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.1.15	
DROP11	76PCM02	1C31232G01	<b>M11QC3S01</b>	<b>DPU11 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16	
DROP11	76PCM02	1C31232G01	M76MI0133	THICK XFER PUMP NO. 3	OFF	RUNNING	DI	1.3.2.1	
DROP11	76PCM02	1C31232G01	M76QI0133	THICK XFER PUMP NO. 3	LOCAL	INCOMP	DI	1.3.2.2	
DROP11	76PCM02	1C31232G01	M76RI0133	THICK XFER PUMP NO. 3	NORMAL	READY	DI	1.3.2.3	
DROP11	76PCM02	1C31232G01	<b>M76UA0133</b>	<b>THICK XFER PUMP NO. 3</b>	<b>NORMAL</b>	<b>FAIL</b>	DI	1.3.2.4	
DROP11	76PCM02	1C31232G01	M76PAH2297	THICK XFER PUMP 3 PRESS CUTOUT	NORMAL	HIGH	DI	1.3.2.5	
DROP11	76PCM02	1C31232G01	M76PAL2297A	THICK XFER PUMP 3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.2.6	
DROP11	76PCM02	1C31232G01	M76PAL2297B	THICK XFER PUMP 3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.2.7	
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.2.8	
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.2.9	
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.2.10	
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.2.11	
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.2.12	
DROP11	76PCM02	1C31232G01	M76QI9998	BLDG 76 SITE LIGHTING 1	LOCAL	INCOMP	DI	1.3.2.13	
DROP11	76PCM02	1C31232G01	M76QI9999	BLDG 76 LITE LIGHTING 2	LOCAL	INCOMP	DI	1.3.2.14	
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.2.15	
DROP11	76PCM02	1C31232G01	<b>M11QC3S02</b>	<b>DPU11 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16	
DROP11	76PCM02	1C31232G01	M76ZD9264	76USSD - FEED B BREAKER	NORMAL	OPENED	DI	1.3.3.1	
DROP11	76PCM02	1C31232G01	M76ZD9266	76USSD - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.3.3.2	

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP11	76PCM02	1C31232G01	M76ZD9268	76USSD - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.3.3.3
DROP11	76PCM02	1C31232G01	M76ZD9270	76USSD - 76MCC76D01 FD BREAKER	NORMAL	OPENED	DI	1.3.3.4
DROP11	76PCM02	1C31232G01	M76ZD9272	76USSD - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.3.3.5
DROP11	76PCM02	1C31232G01	M76ZD9274	76USSD - 76-TC-03 FEED BREAKER	NORMAL	OPENED	DI	1.3.3.6
DROP11	76PCM02	1C31232G01	M86QI0703	OC EXHST FAN3 REMOTE	LOCAL	INCOMP	DI	1.3.3.7
DROP11	76PCM02	1C31232G01	M86MI0703	OC EXHST FAN3 ON	OFF	RUNNG	DI	1.3.3.8
DROP11	76PCM02	1C31232G01	M86RI0703	OC EXHST FAN3 CTRL PWR	NRDY	RDY	DI	1.3.3.9
DROP11	76PCM02	1C31232G01	M86UA0703A	OC EXHST FAN3 FAIL	NORMAL	FAIL	DI	1.3.3.10
DROP11	76PCM02	1C31232G01	M86UA0703B	OC EXHST FAN3 ALARM	NORMAL	ALARM	DI	1.3.3.11
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.3.12
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.3.13
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.3.14
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.3.15
DROP11	76PCM02	1C31232G01	<b>M11QC3S03</b>	<b>DPU11 QC DROP 3 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.3.16
DROP11	76PCM02	1C31232G01	M76UA9261	76USSD - LINE A TRANSFORMER	NORMAL	TRBL	DI	1.3.4.1
DROP11	76PCM02	1C31232G01	M76ZA9263	76USSD - FEED A BREAKER	NORMAL	TRIPPD	DI	1.3.4.2
DROP11	76PCM02	1C31232G01	M76ZA9265	76USSD - TIE BREAKER	NORMAL	TRIPPD	DI	1.3.4.3
DROP11	76PCM02	1C31232G01	M76ZA9267	76USSD - 76-TC-06 FEED BREAKER	TRIPPD	NORMAL	DI	1.3.4.4
DROP11	76PCM02	1C31232G01	M76ZA9269	76USSD - 76-TC-05 FEED BREAKER	TRIPPD	NORMAL	DI	1.3.4.5
DROP11	76PCM02	1C31232G01	M76ZA9271	76USSD - 76MCC76D02 FD BREAKER	TRIPPD	NORMAL	DI	1.3.4.6
DROP11	76PCM02	1C31232G01	M76ZA9273	76USSD - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.3.4.7
DROP11	76PCM02	1C31232G01	M76ZA9275	76USSD - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.3.4.8
DROP11	76PCM02	1C31232G01	M76ZB9263	76USSD - FEED A BREAKER	NORMAL	CLOSED	DI	1.3.4.9
DROP11	76PCM02	1C31232G01	M76ZB9265	76USSD - TIE BREAKER	NORMAL	CLOSED	DI	1.3.4.10
DROP11	76PCM02	1C31232G01	M76ZB9267	76USSD - 76-TC-06 FEED BREAKER	NORMAL	CLOSED	DI	1.3.4.11
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.4.12
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.4.13
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.4.14
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.4.15
DROP11	76PCM02	1C31232G01	<b>M11QC3S04</b>	<b>DPU11 QC DROP 3 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.4.16
DROP11	76PCM02	1C31232G01	M76ZD9263	76USSD - FEED A BREAKER	NORMAL	OPENED	DI	1.3.5.1
DROP11	76PCM02	1C31232G01	M76ZD9265	76 USSD TIE BREAKER	NORMAL	OPENED	DI	1.3.5.2
DROP11	76PCM02	1C31232G01	M76ZD9267	76USSD - 76-TC-06 FEED BREAKER	NORMAL	OPENED	DI	1.3.5.3
DROP11	76PCM02	1C31232G01	M76ZD9269	76USSD - 76-TC-05 FEED BREAKER	NORMAL	OPENED	DI	1.3.5.4
DROP11	76PCM02	1C31232G01	M76ZD9271	76USSD - 76MCC76D02 FD BREAKER	NORMAL	OPENED	DI	1.3.5.5
DROP11	76PCM02	1C31232G01	M76ZD9273	76USSD - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.3.5.6
DROP11	76PCM02	1C31232G01	M76ZD9275	76USSD - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.3.5.7
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.5.8
DROP11	76PCM02	1C31232G01	M76EAL9261	76USSD - LINE A TRANSFORMER	U/VOLT	NORMAL	DI	1.3.5.9
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.5.10
DROP11	76PCM02	1C31232G01	M76ZB9269	76USSD - 76-TC-05 FEED BREAKER	NORMAL	CLOSED	DI	1.3.5.11
DROP11	76PCM02	1C31232G01	M76ZB9271	76USSD - 76MCC76D02 FD BREAKER	NORMAL	CLOSED	DI	1.3.5.12
DROP11	76PCM02	1C31232G01	M76ZB9273	76USSD - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.3.5.13
DROP11	76PCM02	1C31232G01	M76ZB9275	76USSD - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.3.5.14
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.5.15
DROP11	76PCM02	1C31232G01	<b>M11QC3S05</b>	<b>DPU11 QC DROP 3 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.5.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP11	76PCM02			Spare Module Address				1.3.6
DROP11	76PCM02			Spare Module Address				1.3.7
DROP11	76PCM02			Spare Module Address				1.3.8
DROP11	76PCM02	1C31232G01	M76MI0132	THICK XFER PUMP NO. 2	OFF	RUNNNG	DI	1.4.1.1
DROP11	76PCM02	1C31232G01	M76QI0132	THICK XFER PUMP NO. 2	LOCAL	INCOMP	DI	1.4.1.2
DROP11	76PCM02	1C31232G01	M76RI0132	THICK XFER PUMP NO. 2	NORMAL	READY	DI	1.4.1.3
DROP11	76PCM02	1C31232G01	<b>M76UA0132</b>	<b>THICK XFER PUMP NO. 2</b>	<b>NORMAL</b>	<b>FAIL</b>	DI	1.4.1.4
DROP11	76PCM02	1C31232G01	M76PAH2292	THICK XFER PUMP 2 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.1.5
DROP11	76PCM02	1C31232G01	M76PAL2292A	THICK XFER PUMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.6
DROP11	76PCM02	1C31232G01	M76PAL2292B	THICK XFER PUMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.7
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.1.8
DROP11	76PCM02	1C31232G01	M76MI0502	POLY DAY TANK 2 MIXER	OFF	RUNNNG	DI	1.4.1.9
DROP11	76PCM02	1C31232G01	M76QI0502	POLY DAY TANK 2 MIXER	LOCAL	INCOMP	DI	1.4.1.10
DROP11	76PCM02	1C31232G01	M76RI0502	POLY DAY TANK 2 MIXER	NORMAL	READY	DI	1.4.1.11
DROP11	76PCM02	1C31232G01	M76LAH2716	POLY DAY TANK 2 LEVEL ALARMS	NORMAL	HIGH	DI	1.4.1.12
DROP11	76PCM02	1C31232G01	M76LM2716	POLY DAY TANK 2 LEVEL ALARMS	NORMAL	MIDPNT	DI	1.4.1.13
DROP11	76PCM02	1C31232G01	M76LAL2716	POLY DAY TANK 2 LEVEL ALARMS	NORMAL	LOW	DI	1.4.1.14
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.1.15
DROP11	76PCM02	1C31232G01	<b>M11QC4S01</b>	<b>DPU11 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16
DROP11	76PCM02	1C31232G01	M76EAL9262	76USSD - LINE B TRANSFORMER	U/VOLT	NORMAL	DI	1.4.2.1
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.2
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.3
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.4
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.5
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.6
DROP11	76PCM02	1C31232G01	M76QI0702	OC EXHST FAN2 REMOTE	LOCAL	INCOMP	DI	1.4.2.7
DROP11	76PCM02	1C31232G01	M76MI0702	OC EXHST FAN2 ON	OFF	RUNNNG	DI	1.4.2.8
DROP11	76PCM02	1C31232G01	M76RI0702	OC EXHST FAN2 CTRL PWR	NRDY	RDY	DI	1.4.2.9
DROP11	76PCM02	1C31232G01	M76UA0702A	OC EXHST FAN2 FAIL	NORMAL	FAIL	DI	1.4.2.10
DROP11	76PCM02	1C31232G01	M76UA0702B	OC EXHST FAN2 ALARM	NORMAL	ALARM	DI	1.4.2.11
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.12
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.13
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.14
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.15
DROP11	76PCM02	1C31232G01	<b>M11QC4S02</b>	<b>DPU11 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP11	76PCM02	1C31232G01	M76MI0524	TC POLY FEED PUMP NO. 4	OFF	RUNNNG	DI	1.4.3.1
DROP11	76PCM02	1C31232G01	<b>M76QS0524</b>	<b>TC POLY FEED PUMP NO. 4</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.4.3.2
DROP11	76PCM02	1C31232G01	M76RI0524	TC POLY FEED PUMP NO. 4	WAIT	READY	DI	1.4.3.3
DROP11	76PCM02	1C31232G01	M76UA0524	TC POLY FEED PUMP NO. 4	NORMAL	FAIL	DI	1.4.3.4
DROP11	76PCM02	1C31232G01	M76PAH2752	TC POLY FD PUMP 4 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.3.5
DROP11	76PCM02	1C31232G01	M76PAL2752A	TC POLY FD PUMP 4 PRESS CUTOUT	NORMAL	LOW	DI	1.4.3.6
DROP11	76PCM02	1C31232G01	M76PAL2752B	TC POLY FD PUMP 4 PRESS CUTOUT	NORMAL	LOW	DI	1.4.3.7
DROP11	76PCM02	1C31232G01	M76ZB1220	THICK CFUGE4 POLY INJECT VLV 1	NORMAL	CLOSED	DI	1.4.3.8
DROP11	76PCM02	1C31232G01	M76ZD1220	THICK CFUGE4 POLY INJECT VLV 1	NORMAL	OPENED	DI	1.4.3.9
DROP11	76PCM02	1C31232G01	M76ZB1221	THICK CFUGE4 POLY INJECT VLV 2	NORMAL	CLOSED	DI	1.4.3.10
DROP11	76PCM02	1C31232G01	M76ZD1221	THICK CFUGE4 POLY INJECT VLV 2	NORMAL	OPENED	DI	1.4.3.11
DROP11	76PCM02	1C31232G01	M76PAH2165	TC FEED PUMP 4 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.3.12
DROP11	76PCM02	1C31232G01	M76PAL2165A	TC FEED PUMP 4 PRESS CUTOUT	NORMAL	LOW	DI	1.4.3.13
DROP11	76PCM02	1C31232G01	M76PAL2165B	TC FEED PUMP 4 PRESS CUTOUT	NORMAL	LOW	DI	1.4.3.14
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.3.15
DROP11	76PCM02	1C31232G01	<b>M11QC4S03</b>	<b>DPU11 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.4.1
DROP11	76PCM02	1C31232G01	M76UA9262	76USSD - LINE B TRANSFORMER	NORMAL	TRBL	DI	1.4.4.2
DROP11	76PCM02	1C31232G01	M76ZA9264	76USSD - FEED B BREAKER	NORMAL	TRIPPD	DI	1.4.4.3
DROP11	76PCM02	1C31232G01	M76ZA9266	76USSD - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.4.4.4
DROP11	76PCM02	1C31232G01	M76ZA9268	76USSD - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.4.4.5
DROP11	76PCM02	1C31232G01	M76ZA9270	76USSD - 76MCC76D01 FD BREAKER	TRIPPD	NORMAL	DI	1.4.4.6
DROP11	76PCM02	1C31232G01	M76ZA9272	76USSD - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.4.4.7
DROP11	76PCM02	1C31232G01	M76ZA9274	76USSD - 76-TC-03 FEED BREAKER	TRIPPD	NORMAL	DI	1.4.4.8
DROP11	76PCM02	1C31232G01	M76ZB9264	76USSD - FEED B BREAKER	NORMAL	CLOSED	DI	1.4.4.9
DROP11	76PCM02	1C31232G01	M76ZB9266	76USSD - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.4.4.10
DROP11	76PCM02	1C31232G01	M76ZB9268	76USSD - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.4.4.11
DROP11	76PCM02	1C31232G01	M76ZB9270	76USSD - 76MCC76D01 FD BREAKER	NORMAL	CLOSED	DI	1.4.4.12
DROP11	76PCM02	1C31232G01	M76ZB9272	76USSD - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.4.4.13
DROP11	76PCM02	1C31232G01	M76ZB9274	76USSD - 76-TC-03 FEED BREAKER	NORMAL	CLOSED	DI	1.4.4.14
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.4.15
DROP11	76PCM02	1C31232G01	<b>M11QC4S04</b>	<b>DPU11 QC DROP 4 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16
DROP11	76PCM02			Spare Module Address				1.4.6
DROP11	76PCM02			Spare Module Address				1.4.7
DROP11	76PCM02			Spare Module Address				1.4.8



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP11	76PCM02	5A26458G04	<b>M76HS0523</b>	<b>TC POLY FEED PUMP NO.3 START/STOP</b>	<b>OFF</b>	<b>RUN</b>	DO	1.5.1.1
DROP11	76PCM02	5A26458G04	M76HS0133	THICK XFER PUMP NO. 3	OFF	RUN	DO	1.5.1.2
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.3
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.4
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.5
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.6
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.7
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.8
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.9
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.10
DROP11	76PCM02	5A26458G04	M76HS9998	BLDG 76 SITE LIGHTING 1	OFF	RUN	DO	1.5.1.11
DROP11	76PCM02	5A26458G04	M86HS0703	OC EXHST FAN3 RUN CMD	OFF	RUN	DO	1.5.1.12
DROP11	76PCM02	5A26458G04	<b>M76HS0524</b>	<b>TC POLY FEED PUMP NO.4 START/STOP</b>	<b>OFF</b>	<b>RUN</b>	DO	1.6.1.1
DROP11	76PCM02	5A26458G04	M76HS0132	THICK XFER PUMP NO. 2	OFF	RUN	DO	1.6.1.2
DROP11	76PCM02	5A26458G04	SPARE				DO	1.6.1.3
DROP11	76PCM02	5A26458G04	M76HS0502	POLY DAY TANK 2 MIXER	OFF	RUN	DO	1.6.1.4
DROP11	76PCM02	5A26458G04	SPARE				DO	1.6.1.5
DROP11	76PCM02	5A26458G04	SPARE				DO	1.6.1.6
DROP11	76PCM02	5A26458G04	SPARE				DO	1.6.1.7
DROP11	76PCM02	5A26458G04	SPARE				DO	1.6.1.8
DROP11	76PCM02	5A26458G04	SPARE				DO	1.6.1.9
DROP11	76PCM02	5A26458G04	SPARE				DO	1.6.1.10
DROP11	76PCM02	5A26458G04	M76HS9999	BLDG 76 LITE LIGHTING 2	OFF	RUN	DO	1.6.1.11
DROP11	76PCM02	5A26458G04	M76HS0702	OC EXHST FAN2 RUN CMD	OFF	RUN	DO	1.6.1.12

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP13	76PCM03	5X00419G01		76VDL03 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1
			76MV1170	THICKENING CENTRIFUGE FEED PUMP 5 INLET VALVE				
			76MV1171	THICKENING CENTRIFUGE FEED PUMP 5 DISCH VALVE				
			76MV1172	THICKENING CENTRIFUGE FEED PUMP 5 BYPASS VAVLE				
			76MV1755	THICKENING CENTRIFUGE POLY FEED PUMP 5 INLET VALVE				
			76MV1756	THICKENING CENTRIFUGE POLY FEED PUMP 5 DISCH VALVE				
			76MV1757	THICKENING CENTRIFUGE POLY FEED PUMP 5 BYPASS VALVE				
DROP13	76PCM03	5X00419G01	M76TC05	TC NO. 5			ET	1.1.2
			M76P0115	TC FEED PUMP NO. 5				
DROP13	76PCM03		Spare Module Address					1.1.3
DROP13	76PCM03		Spare Module Address					1.1.4
DROP13	76PCM03	5X00106G01	M76FT2171	THICK CENTRIFUGE 5 SLUDGE FLOW	0	1500 GPM	AI - HART	1.1.5.1
DROP13	76PCM03	5X00106G01	M76FT2756	TC 5 POLYMER FLOW	0	30 GPM	AI - HART	1.1.5.2
DROP13	76PCM03	5X00106G01	M76FT2758	TC POLY FEED PUMP 5 ROTAMETER	0	20 GPM	AI - HART	1.1.5.3
DROP13	76PCM03	5X00106G01	M76PT2755	TC POLY FD PUMP 5 DISCH PRESS	0	45 PSI	AI - HART	1.1.5.4
DROP13	76PCM03	5X00106G01	M76ST0525	TC POLY FEED PUMP NO. 5 SPEED	0	100 PCT	AI - HART	1.1.5.5
DROP13	76PCM03	5X00106G01	M76PT2172	TC FEED PUMP 5 DISCH PRESS	0	45 PSI	AI - HART	1.1.5.6
DROP13	76PCM03	5X00106G01	SPARE				AI - HART	1.1.5.7
DROP13	76PCM03	5X00106G01	SPARE				AI - HART	1.1.5.8
DROP13	76PCM03		Spare Module Address					1.1.6
DROP13	76PCM03		Spare Module Address					1.1.7
DROP13	76PCM03	5X00119G01	MDPU13T1	DPU 13 CABINET TEMPERATURE	32	154 DEG F	RTD	1.1.8.1
DROP13	76PCM03	5X00119G01	SPARE				RTD	1.1.8.2
DROP13	76PCM03	5X00119G01	SPARE				RTD	1.1.8.3
DROP13	76PCM03	5X00119G01	SPARE				RTD	1.1.8.4
DROP13	76PCM03	5X00119G01	SPARE				RTD	1.1.8.5
DROP13	76PCM03	5X00119G01	SPARE				RTD	1.1.8.6
DROP13	76PCM03	5X00119G01	SPARE				RTD	1.1.8.7
DROP13	76PCM03	5X00119G01	SPARE				RTD	1.1.8.8
DROP13	76PCM03		Spare Module Address					1.2.1

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP13	76PCM03	5X00167G01	<b>M76SC0525</b>	<b>TC POLY FEED PUMP NO.5 SPD CMD</b>	<b>0</b>	<b>100 PCT</b>	AO	1.2.2.1	
DROP13	76PCM03	5X00167G01	SPARE				AO	1.2.2.2	
DROP13	76PCM03	5X00167G01	SPARE				AO	1.2.2.3	
DROP13	76PCM03	5X00167G01	SPARE				AO	1.2.2.4	
DROP13	76PCM03	5X00167G01	SPARE				AO	1.2.2.5	
DROP13	76PCM03	5X00167G01	SPARE				AO	1.2.2.6	
DROP13	76PCM03	5X00167G01	SPARE				AO	1.2.2.7	
DROP13	76PCM03	5X00167G01	SPARE				AO	1.2.2.8	
DROP13	76PCM03	Spare Module Address							1.2.3
DROP13	76PCM03	5X00106G01	M76FT2141	TC FEED HDR RECYCLE FLOW	0	900 GPM	AI - HART	1.2.4.1	
DROP13	76PCM03	5X00106G01	M76DT2140	TC INLT SLUDGE DENSITY	0	5 PCT	AI - HART	1.2.4.2	
DROP13	76PCM03	5X00106G01	M76PT2142	TC FEED HDR RECYCLE PRESS	0	50 PSI	AI - HART	1.2.4.3	
DROP13	76PCM03	5X00106G01	SPARE				AI - HART	1.2.4.4	
DROP13	76PCM03	5X00106G01	SPARE				AI - HART	1.2.4.5	
DROP13	76PCM03	5X00106G01	SPARE				AI - HART	1.2.4.6	
DROP13	76PCM03	5X00106G01	SPARE				AI - HART	1.2.4.7	
DROP13	76PCM03	5X00106G01	SPARE				AI - HART	1.2.4.8	
DROP13	76PCM03	Spare Module Address							1.2.5
DROP13	76PCM03	Spare Module Address							1.2.6
DROP13	76PCM03	1C31166G02		CENTRIFUGE BUILDING - POWER MONITORING			SERIAL	1.2.7	
DROP13	76PCM03	5X00419G01		76VDL03 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8	
DROP13	76PCM03	1C31232G01	M76EAL9201	76USSA - LINE A TRANSFORMER	NORMAL	U/VOLT	DI	1.3.1.1	
DROP13	76PCM03	1C31232G01	M76ZD9214	76USSA - 76MCC76A02 FD BREAKER	OPENED	NORMAL	DI	1.3.1.2	
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.1.3	
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.1.4	
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.1.5	
DROP13	76PCM03	1C31232G01	M76UA9201	76USSA - LINE A TRANSFORMER	TRBL	NORMAL	DI	1.3.1.6	
DROP13	76PCM03	1C31232G01	M76ZA9203	76USSA - FEED A BREAKER	TRIPPD	NORMAL	DI	1.3.1.7	
DROP13	76PCM03	1C31232G01	M76ZA9206	76USSA - 76MCC76A01 FD BREAKER	NORMAL	TRIPPD	DI	1.3.1.8	
DROP13	76PCM03	1C31232G01	M76ZA9207	76USSA - SPARE MCC FD BREAKER	NORMAL	TRIPPD	DI	1.3.1.9	
DROP13	76PCM03	1C31232G01	M76ZA9209	76USSA - 76-TC-01 FEED BREAKER	NORMAL	TRIPPD	DI	1.3.1.10	
DROP13	76PCM03	1C31232G01	M76ZA9212	76USSA - SPARE MCC FD BREAKER	NORMAL	TRIPPD	DI	1.3.1.11	
DROP13	76PCM03	1C31232G01	M76ZB9203	76USSA - FEED A BREAKER	CLOSED	NORMAL	DI	1.3.1.12	
DROP13	76PCM03	1C31232G01	M76ZB9206	76USSA - 76MCC76A01 FD BREAKER	CLOSED	NORMAL	DI	1.3.1.13	
DROP13	76PCM03	1C31232G01	M76ZB9207	76USSA - SPARE MCC FD BREAKER	CLOSED	NORMAL	DI	1.3.1.14	
DROP13	76PCM03	1C31232G01	M76ZB9209	76USSA - 76-TC-01 FEED BREAKER	CLOSED	NORMAL	DI	1.3.1.15	
DROP13	76PCM03	1C31232G01	<b>M13QC3S01</b>	<b>DPU13 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16	

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.1
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.2
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.3
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.4
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.5
DROP13	76PCM03	1C31232G01	M76ZD9204	76USSA - FEED B BREAKER	OPENED	NORMAL	DI	1.3.2.6
DROP13	76PCM03	1C31232G01	M76ZD9206	76USSA - 76MCC76A01 FD BREAKER	OPENED	NORMAL	DI	1.3.2.7
DROP13	76PCM03	1C31232G01	M76ZD9208	76USSA - 76-TC-02 FEED BREAKER	OPENED	NORMAL	DI	1.3.2.8
DROP13	76PCM03	1C31232G01	M76ZD9210	76USSA - 76-TC-04 FEED BREAKER	OPENED	NORMAL	DI	1.3.2.9
DROP13	76PCM03	1C31232G01	M76ZD9212	76USSA - SPARE MCC FD BREAKER	OPENED	NORMAL	DI	1.3.2.10
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.11
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.12
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.13
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.14
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.15
DROP13	76PCM03	1C31232G01	<b>M13QC3S02</b>	<b>DPU13 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16
DROP13	76PCM03	1C31232G01	M76ZB9212	76USSA - SPARE MCC FD BREAKER	CLOSED	NORMAL	DI	1.3.3.1
DROP13	76PCM03	1C31232G01	M76ZB9213	76USSA - SPARE MCC FD BREAKER	CLOSED	NORMAL	DI	1.3.3.2
DROP13	76PCM03	1C31232G01	M76ZB9214	76USSA - 76MCC76A02 FD BREAKER	CLOSED	NORMAL	DI	1.3.3.3
DROP13	76PCM03	1C31232G01	M76ZD9203	76USSA - FEED A BREAKER	OPENED	NORMAL	DI	1.3.3.4
DROP13	76PCM03	1C31232G01	M76ZD9205	76USSA - TIE BREAKER	OPENED	NORMAL	DI	1.3.3.5
DROP13	76PCM03	1C31232G01	M76ZD9207	76USSA - SPARE MCC FD BREAKER	OPENED	NORMAL	DI	1.3.3.6
DROP13	76PCM03	1C31232G01	M76ZD9209	76USSA - 76-TC-01 FEED BREAKER	OPENED	NORMAL	DI	1.3.3.7
DROP13	76PCM03	1C31232G01	M76ZD9211	76USSA - SPARE MCC FD BREAKER	OPENED	NORMAL	DI	1.3.3.8
DROP13	76PCM03	1C31232G01	M76ZD9213	76USSA - SPARE MCC FD BREAKER	OPENED	NORMAL	DI	1.3.3.9
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.3.10
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.3.11
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.3.12
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.3.13
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.3.14
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.3.15
DROP13	76PCM03	1C31232G01	<b>M13QC3S03</b>	<b>DPU13 QC DROP 3 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.3.16
DROP13	76PCM03			Spare Module Address				1.3.4
DROP13	76PCM03			Spare Module Address				1.3.5
DROP13	76PCM03			Spare Module Address				1.3.6
DROP13	76PCM03			Spare Module Address				1.3.7
DROP13	76PCM03			Spare Module Address				1.3.8

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP13	76PCM03	1C31232G01	M76MI0525	TC POLY FEED PUMP NO. 5	RUNNING	OFF	DI	1.4.1.1
DROP13	76PCM03	1C31232G01	<b>M76QS0525</b>	<b>TC POLY FEED PUMP NO. 5</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.4.1.2
DROP13	76PCM03	1C31232G01	M76RI0525	TC POLY FEED PUMP NO. 5	WAIT	READY	DI	1.4.1.3
DROP13	76PCM03	1C31232G01	M76UA0525	TC POLY FEED PUMP NO. 5	NORMAL	FAIL	DI	1.4.1.4
DROP13	76PCM03	1C31232G01	M76PAH2757	TC POLY FD PUMP 5 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.1.5
DROP13	76PCM03	1C31232G01	M76PAL2757A	TC POLY FD PUMP 5 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.6
DROP13	76PCM03	1C31232G01	M76PAL2757B	TC POLY FD PUMP 5 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.7
DROP13	76PCM03	1C31232G01	M76ZB1230	THICK CFUGE 5 POLY INJECT VLV1	CLOSED	NORMAL	DI	1.4.1.8
DROP13	76PCM03	1C31232G01	M76ZD1230	THICK CFUGE 5 POLY INJECT VLV1	OPENED	NORMAL	DI	1.4.1.9
DROP13	76PCM03	1C31232G01	M76ZB1231	THICK CFUGE 5 POLY INJECT VLV2	CLOSED	NORMAL	DI	1.4.1.10
DROP13	76PCM03	1C31232G01	M76ZD1231	THICK CFUGE 5 POLY INJECT VLV2	OPENED	NORMAL	DI	1.4.1.11
DROP13	76PCM03	1C31232G01	M76PAH2170	TC FEED PUMP 5 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.1.12
DROP13	76PCM03	1C31232G01	M76PAL2170A	TC FEED PUMP 5 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.13
DROP13	76PCM03	1C31232G01	M76PAL2170B	TC FEED PUMP 5 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.14
DROP13	76PCM03	1C31232G01	SPARE				DI	1.4.1.15
DROP13	76PCM03	1C31232G01	<b>M13QC4S01</b>	<b>DPU13 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16
DROP13	76PCM03	1C31232G01	M76EAL9202	76USSA - LINE B TRANSFORMER	NORMAL	U/VOLT	DI	1.4.2.1
DROP13	76PCM03	1C31232G01	SPARE				DI	1.4.2.2
DROP13	76PCM03	1C31232G01	M76UA9202	76USSA - LINE B TRANSFORMER	TRBL	NORMAL	DI	1.4.2.3
DROP13	76PCM03	1C31232G01	M76ZA9204	76USSA - FEED B BREAKER	TRIPPD	NORMAL	DI	1.4.2.4
DROP13	76PCM03	1C31232G01	M76ZA9205	76USSA - TIE BREAKER	TRIPPD	NORMAL	DI	1.4.2.5
DROP13	76PCM03	1C31232G01	M76ZA9208	76USSA - 76-TC-02 FEED BREAKER	NORMAL	TRIPPD	DI	1.4.2.6
DROP13	76PCM03	1C31232G01	M76ZA9210	76USSA - 76-TC-04 FEED BREAKER	NORMAL	TRIPPD	DI	1.4.2.7
DROP13	76PCM03	1C31232G01	M76ZA9211	76USSA - SPARE MCC FD BREAKER	NORMAL	TRIPPD	DI	1.4.2.8
DROP13	76PCM03	1C31232G01	M76ZA9213	76USSA - SPARE MCC FD BREAKER	NORMAL	TRIPPD	DI	1.4.2.9
DROP13	76PCM03	1C31232G01	M76ZA9214	76USSA - 76MCC76A02 FD BREAKER	NORMAL	TRIPPD	DI	1.4.2.10
DROP13	76PCM03	1C31232G01	M76ZB9204	76USSA - FEED B BREAKER	CLOSED	NORMAL	DI	1.4.2.11
DROP13	76PCM03	1C31232G01	M76ZB9205	76USSA - TIE BREAKER	CLOSED	NORMAL	DI	1.4.2.12
DROP13	76PCM03	1C31232G01	M76ZB9208	76USSA - 76-TC-02 FEED BREAKER	CLOSED	NORMAL	DI	1.4.2.13
DROP13	76PCM03	1C31232G01	M76ZB9210	76USSA - 76-TC-04 FEED BREAKER	CLOSED	NORMAL	DI	1.4.2.14
DROP13	76PCM03	1C31232G01	M76ZB9211	76USSA - SPARE MCC FD BREAKER	CLOSED	NORMAL	DI	1.4.2.15
DROP13	76PCM03	1C31232G01	<b>M13QC4S02</b>	<b>DPU13 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16
DROP13	76PCM03			Spare Module Address				1.4.3
DROP13	76PCM03			Spare Module Address				1.4.4
DROP13	76PCM03			Spare Module Address				1.4.5
DROP13	76PCM03			Spare Module Address				1.4.6
DROP13	76PCM03			Spare Module Address				1.4.7
DROP13	76PCM03			Spare Module Address				1.4.8

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP13	76PCM03	5A26458G04	<b>M76HS0525</b>	<b>TC POLY FEED PUMP NO.5 START/STOP</b>	<b>OFF</b>	<b>RUN</b>	DO	1.5.1.1
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.2
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.3
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.4
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.5
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.6
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.7
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.8
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.9
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.10
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.11
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.12

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP17	76PCM07	5X00419G01		76VDL07 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1
			76MV1535	DEWATERING CENTRIFUGE FEED PUMP 8 INLET VALVE				
			76MV1536	DEWATERING CENTRIFUGE FEED PUMP 8 DISCHARGE VALVE				
			76MV1537	DEWATERING CENTRIFUGE FEED PUMP 8 BYPASS VALVE				
			76MV1666	CENTRIFUGE CAKE PUMP 2 DISCHARGE VALVE				
			76MV1676	CENTRIFUGE CAKE PUMP 4 DISCHARGE VALVE				
			76MV1686	CENTRIFUGE CAKE PUMP 6 DISCHARGE VALVE				
			76MV1696	CENTRIFUGE CAKE PUMP 8 DISCHARGE VALVE				
			76MV1725	POLYMER DAY TANK 4 INLET VALVE				
			76MV1726	POLYMER DAY TANK 4 DISCHARGE VALVE 1				
			76MV1727	POLYMER DAY TANK 4 DISCHARGE VALVE 2				
			76MV1805	DEWATERING CENTRIFUGE POLYMER FEED PUMP 8 INLET VALVE				
			76MV1806	DEWATERING CENTRIFUGE POLYMER FEED PUMP 8 BYPASS VALVE				
			76MV1807	DEWATERING CENTRIFUGE POLYMER FEED PUMP 8 DISCHARGE VALVE				
			76MV1825	FERRIC CHLORIDE DAY TANK 2 DISCHARGE VALVE 1				
			76MV1826	FERRIC CHLORIDE DAY TANK 2 DISCHARGE VALVE 2				
76MV1827	FERRIC CHLORIDE DAY TANK 2 INLET VALVE							
DROP17	76PCM07	5X00419G01	<b>M76DC08</b>	<b>DC NO. 8</b>			ET	1.1.2
DROP17	76PCM07	5X00106G01	M76ST0258	DC FEED PUMP NO. 8	0	100 PCT	AI - HART	1.1.3.1
DROP17	76PCM07	5X00106G01	M76PT2542	DC FEED PUMP 8 DISCH PRESS	0	50 PSI	AI - HART	1.1.3.2
DROP17	76PCM07	5X00106G01	M76FT2541	DC 8 SLUDGE FLOW	0	350 GPM	AI - HART	1.1.3.3
DROP17	76PCM07	5X00106G01	M76PT2625	DC 8 INLT SLUDGE PRESS	0	50 PSI	AI - HART	1.1.3.4
DROP17	76PCM07	5X00106G01	M76TT2626	DEWAT CFUGE 8 INLT SLUDGE TEMP	70	150 DEG F	AI - HART	1.1.3.5
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.1.3.6
DROP17	76PCM07	5X00106G01	M76LT2695	SURGE BIN 8 LEVEL	0	100 PCT	AI - HART	1.1.3.7
DROP17	76PCM07	5X00106G01	M76PT2696	PIPE LUBE RING 8 PRESSURE	0	1500 PSI	AI - HART	1.1.3.8
DROP17	76PCM07	5X00106G01	M76ST0568	DC POLY FEED PUMP NO. 8	0	100 PCT	AI - HART	1.1.4.1
DROP17	76PCM07	5X00106G01	M76PT2805	DC POLY FEED PUMP 8 DISCH PRESS	0	100 PSI	AI - HART	1.1.4.2
DROP17	76PCM07	5X00106G01	M76FT2806	DC 8 POLYMER FLOW	0	40 GPM	AI - HART	1.1.4.3
DROP17	76PCM07	5X00106G01	M76FT2808	DC POLY FEED PUMP 8 ROTAMETER	0	40 GPM	AI - HART	1.1.4.4
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.1.4.5
DROP17	76PCM07	5X00106G01	M76FT0288	DC CAKE PUMP 8	0	150 GPM	AI - HART	1.1.4.6
DROP17	76PCM07	5X00106G01	M76UY0288	DC CAKE PMP 8 EFFICIENCY	0	100 PCT	AI - HART	1.1.4.7
DROP17	76PCM07	5X00106G01	M76PT2698	CAKE PUMP 8 DISCH PRESSURE	0	1500 PSI	AI - HART	1.1.4.8
DROP17	76PCM07	5X00106G01	M76LT2120	GRIT CONTAINER 1 LEVEL	0	5 FEET	AI - HART	1.1.5.1
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.1.5.2
DROP17	76PCM07	5X00106G01	M76LT2651A	CFUGE BIN 2 LEVEL	0	4 FEET	AI - HART	1.1.5.3
DROP17	76PCM07	5X00106G01	M76LT2656A	CFUGE BIN 4 LEVEL	0	4 FEET	AI - HART	1.1.5.4
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.1.5.5
DROP17	76PCM07	5X00106G01	M76ST0245	CFUGE BIN 4 SCREW FEEDER 1	0	100 PCT	AI - HART	1.1.5.6
DROP17	76PCM07	5X00106G01	M76ST0235	CFUGE BIN 2 SCREW FEEDER 1	0	100 PCT	AI - HART	1.1.5.7
DROP17	76PCM07	5X00106G01	M76ZT1629	HEAT EXCHANGR 8 HOT WTR SUPPLY	0	100 PCT	AI - HART	1.1.5.8

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP17	76PCM07	5X00106G01	M76FT0286	CFUGE CAKE PUMP 6	0	150 GPM	AI - HART	1.1.6.1	
DROP17	76PCM07	5X00106G01	M76UY0286	DC CAKE PMP 6 EFFICIENCY	0	100 PCT	AI - HART	1.1.6.2	
DROP17	76PCM07	5X00106G01	M76PT2688	CAKE PUMP 6 DISCH PRESSURE	0	1500 PSI	AI - HART	1.1.6.3	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.1.6.4	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.1.6.5	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.1.6.6	
DROP17	76PCM07	5X00106G01	M76LT2685	SURGE BIN 6 LEVEL	0	100 PCT	AI - HART	1.1.6.7	
DROP17	76PCM07	5X00106G01	M76PT2686	PIPE LUBE RING 6 PRESSURE	0	1500 PSI	AI - HART	1.1.6.8	
DROP17	76PCM07	Spare Module Address							1.1.7
DROP17	76PCM07	5X00119G01	MDPU17T1	DPU17 76PCM07 CABINET TEMP	0	40	RTD	1.1.8.1	
DROP17	76PCM07	5X00119G01	SPARE				RTD	1.1.8.2	
DROP17	76PCM07	5X00119G01	SPARE				RTD	1.1.8.3	
DROP17	76PCM07	5X00119G01	SPARE				RTD	1.1.8.4	
DROP17	76PCM07	5X00119G01	SPARE				RTD	1.1.8.5	
DROP17	76PCM07	5X00119G01	SPARE				RTD	1.1.8.6	
DROP17	76PCM07	5X00119G01	SPARE				RTD	1.1.8.7	
DROP17	76PCM07	5X00119G01	SPARE				RTD	1.1.8.8	
DROP17	76PCM07	Spare Module Address							1.2.1
DROP17	76PCM07	5X00167G01	M76FC2541	DC FEED PUMP 8 SPEED DEMAND	0	100 PCT	AO	1.2.2.1	
DROP17	76PCM07	5X00167G01	M76FC2806	DC POLY FD PMP 8 SPEED DEMAND	0	100 PCT	AO	1.2.2.2	
DROP17	76PCM07	5X00167G01	SPARE				AO	1.2.2.3	
DROP17	76PCM07	5X00167G01	M76TC2626	DC HEAT EXCHANGER 8 VLV POS	0	100 PCT	AO	1.2.2.4	
DROP17	76PCM07	5X00167G01	SPARE				AO	1.2.2.5	
DROP17	76PCM07	5X00167G01	SPARE				AO	1.2.2.6	
DROP17	76PCM07	5X00167G01	SPARE				AO	1.2.2.7	
DROP17	76PCM07	5X00167G01	SPARE				AO	1.2.2.8	
DROP17	76PCM07	Spare Module Address							1.2.3
DROP17	76PCM07	5X00106G01	M76FT0282	CFUGE CAKE PUMP 2	0	150 GPM	AI - HART	1.2.4.1	
DROP17	76PCM07	5X00106G01	M76UY0282	DC CAKE PMP 2 EFFICIENCY	0	100 PCT	AI - HART	1.2.4.2	
DROP17	76PCM07	5X00106G01	M76PT2668	CAKE PUMP 2 DISCH PRESSURE	0	1500 PSI	AI - HART	1.2.4.3	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.2.4.4	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.2.4.5	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.2.4.6	
DROP17	76PCM07	5X00106G01	M76LT2665	SURGE BIN 2 LEVEL	0	100 PCT	AI - HART	1.2.4.7	
DROP17	76PCM07	5X00106G01	M76PT2666	PIPE LUBE RING 2 PRESSURE	0	1500 PSI	AI - HART	1.2.4.8	



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP17	76PCM07	5X00106G01	M76LT2121	GRIT CONTAINER 2 LEVEL	0	5 FEET	AI - HART	1.2.5.1	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.2.5.2	
DROP17	76PCM07	5X00106G01	M76FT0284	CFUGE CAKE PUMP 4	0	150 GPM	AI - HART	1.2.5.3	
DROP17	76PCM07	5X00106G01	M76UY0284	DC CAKE PMP 4 EFFICIENCY	0	100 PCT	AI - HART	1.2.5.4	
DROP17	76PCM07	5X00106G01	M76PT2678	CAKE PUMP 4 DISCH PRESSURE	0	1500 PSI	AI - HART	1.2.5.5	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.2.5.6	
DROP17	76PCM07	5X00106G01	M76LT2675	SURGE BIN 4 LEVEL	0	100 PCT	AI - HART	1.2.5.7	
DROP17	76PCM07	5X00106G01	M76PT2676	PIPE LUBE RING 4 PRESSURE	0	1500 PSI	AI - HART	1.2.5.8	
DROP17	76PCM07	5X00106G01	M76LT2651B	CFUGE BIN 2 LEVEL	0	4 FEET	AI - HART	1.2.6.1	
DROP17	76PCM07	5X00106G01	M76LT2656B	CFUGE BIN 4 LEVEL	0	4 FEET	AI - HART	1.2.6.2	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.2.6.3	
DROP17	76PCM07	5X00106G01	M76ST0236	CFUGE BIN 2 SCREW FEEDER 2	0	100 PCT	AI - HART	1.2.6.4	
DROP17	76PCM07	5X00106G01	M76ST0246	CFUGE BIN 4 SCREW FEEDER 2	0	100 PCT	AI - HART	1.2.6.5	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.2.6.6	
DROP17	76PCM07	5X00106G01	M76LT2826	FERRIC CHLORIDE DAY TNK 2 LVL	0	10 FEET	AI - HART	1.2.6.7	
DROP17	76PCM07	5X00106G01	M76LT2725	POLY DAY TANK 4 LEVEL	0	12 FEET	AI - HART	1.2.6.8	
DROP17	76PCM07		Spare Module Address						1.2.7
DROP17	76PCM07	5X00419G01		76VDL07 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8	
DROP17	76PCM07	1C31232G01	M76MI0442	GRIT CONVEYOR NO. 2	OFF	RUNNNG	DI	1.3.1.1	
DROP17	76PCM07	1C31232G01	M76RI0442	GRIT CONVEYOR NO. 2	WAIT	READY	DI	1.3.1.2	
DROP17	76PCM07	1C31232G01	M76XA0442	GRIT CONVEYOR NO. 2	NORMAL	ZERO/S	DI	1.3.1.3	
DROP17	76PCM07	1C31232G01	M76NAH0442	GRIT CONVEYOR NO. 2	NORMAL	HIGH	DI	1.3.1.4	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.1.5	
DROP17	76PCM07	1C31232G01	M76ZB1122	GRIT CONVEYOR 2 DISCH GATE 2	NORMAL	CLOSED	DI	1.3.1.6	
DROP17	76PCM07	1C31232G01	M76ZD1122	GRIT CONVEYOR 2 DISCH GATE 2	NORMAL	OPENED	DI	1.3.1.7	
DROP17	76PCM07	1C31232G01	M76QI1122	GRIT CONVEYOR 2 DISCH GATE 2	LOCAL	INCOMP	DI	1.3.1.8	
DROP17	76PCM07	1C31232G01	M76RI1122	GRIT CONVEYOR 2 DISCH GATE 2	WAIT	READY	DI	1.3.1.9	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.1.10	
DROP17	76PCM07	1C31232G01	M76MI0462	GRIT DEWAT NO. 2	OFF	RUNNNG	DI	1.3.1.11	
DROP17	76PCM07	1C31232G01	M76QI0462	GRIT DEWAT NO. 2	LOCAL	INCOMP	DI	1.3.1.12	
DROP17	76PCM07	1C31232G01	M76RI0462	GRIT DEWAT NO. 2	WAIT	READY	DI	1.3.1.13	
DROP17	76PCM07	1C31232G01	M76XA0462	GRIT DEWAT NO. 2	NORMAL	ZERO/S	DI	1.3.1.14	
DROP17	76PCM07	1C31232G01	M76NAH0462	GRIT DEWAT NO. 2	NORMAL	HIGH	DI	1.3.1.15	
DROP17	76PCM07	1C31232G01	<b>M17QC3S01</b>	<b>DCU17 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16	

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP17	76PCM07	1C31232G01	M76MI0236A	CFUGE BIN 2 SCREW FEEDER 2	OFF	RUNFWD	DI	1.3.2.1
DROP17	76PCM07	1C31232G01	M76MI0236B	CFUGE BIN 2 SCREW FEEDER 2	OFF	RUNRVS	DI	1.3.2.2
DROP17	76PCM07	1C31232G01	M76QI0236	CFUGE BIN 2 SCREW FEEDER 2	LOCAL	INCOMP	DI	1.3.2.3
DROP17	76PCM07	1C31232G01	M76RI0236	CFUGE BIN 2 SCREW FEEDER 2	WAIT	READY	DI	1.3.2.4
DROP17	76PCM07	1C31232G01	M76UA0236B	CFUGE BIN2 SCREW FDR2 COMMON	NORMAL	FAIL	DI	1.3.2.5
DROP17	76PCM07	1C31232G01	M76UA0236A	CFUGE BIN2 SCREW FDR2 TORQUE	NORMAL	HIGH	DI	1.3.2.6
DROP17	76PCM07	1C31232G01	M76XA0236	CFUGE BIN 2 SCREW FEEDER 2	NORMAL	FAIL	DI	1.3.2.7
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.2.8
DROP17	76PCM07	1C31232G01	M76MI0246A	CFUGE BIN 4 SCREW FEEDER 2	OFF	RUNFWD	DI	1.3.2.9
DROP17	76PCM07	1C31232G01	M76MI0246B	CFUGE BIN 4 SCREW FEEDER 2	OFF	RUNRVS	DI	1.3.2.10
DROP17	76PCM07	1C31232G01	M76QI0246	CFUGE BIN 4 SCREW FEEDER 2	LOCAL	INCOMP	DI	1.3.2.11
DROP17	76PCM07	1C31232G01	M76RI0246	CFUGE BIN 4 SCREW FEEDER 2	WAIT	READY	DI	1.3.2.12
DROP17	76PCM07	1C31232G01	M76UA0246A	CFUGE BIN4 SCREW FDR2 TORQUE	NORMAL	HIGH	DI	1.3.2.13
DROP17	76PCM07	1C31232G01	M76UA0246B	CFUGE BIN4 SCREW FDR2 COMMON	NORMAL	FAIL	DI	1.3.2.14
DROP17	76PCM07	1C31232G01	M76XA0246	CFUGE BIN 4 SCREW FEEDER 2	NORMAL	FAIL	DI	1.3.2.15
DROP17	76PCM07	1C31232G01	<b>M17QC3S02</b>	<b>DPU17 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16
DROP17	76PCM07	1C31232G01	M76QI1105	GRIT SEPARATOR 2 INLET VALVE	LOCAL	INCOMP	DI	1.3.3.1
DROP17	76PCM07	1C31232G01	M76RI1105	GRIT SEPARATOR 2 INLET VALVE	WAIT	READY	DI	1.3.3.2
DROP17	76PCM07	1C31232G01	M76ZB1105	GRIT SEPARATOR 2 INLET VALVE	NORMAL	CLOSED	DI	1.3.3.3
DROP17	76PCM07	1C31232G01	M76ZD1105	GRIT SEPARATOR 2 INLET VALVE	NORMAL	OPENED	DI	1.3.3.4
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.3.5
DROP17	76PCM07	1C31232G01	M76QI1108	GRIT SEPARATOR 2 DISCH VALVE	LOCAL	INCOMP	DI	1.3.3.6
DROP17	76PCM07	1C31232G01	M76RI1108	GRIT SEPARATOR 2 DISCH VALVE	WAIT	READY	DI	1.3.3.7
DROP17	76PCM07	1C31232G01	M76ZB1108	GRIT SEPARATOR 2 DISCH VALVE	NORMAL	CLOSED	DI	1.3.3.8
DROP17	76PCM07	1C31232G01	M76ZD1108	GRIT SEPARATOR 2 DISCH VALVE	NORMAL	OPENED	DI	1.3.3.9
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.3.10
DROP17	76PCM07	1C31232G01	<b>M76QI1106</b>	<b>GRIT SEPARATOR 2 GRIT VALVE 1</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.3.3.11
DROP17	76PCM07	1C31232G01	M76RI1106	GRIT SEPARATOR 2 GRIT VALVE 1	WAIT	READY	DI	1.3.3.12
DROP17	76PCM07	1C31232G01	M76ZD1106	GRIT SEPARATOR 2 GRIT VALVE 1	NORMAL	OPENED	DI	1.3.3.13
DROP17	76PCM07	1C31232G01	M76ZB1106	GRIT SEPARATOR 2 GRIT VALVE 1	NORMAL	CLOSED	DI	1.3.3.14
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.3.15
DROP17	76PCM07	1C31232G01	<b>M17QC3S03</b>	<b>DPU17 QC DROP 3 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.3.16
DROP17	76PCM07	1C31232G01	M76QI1107	GRIT DEWATERING UNIT NO.2 INLET VALVE	LOCAL	INCOMP	DI	1.3.4.1
DROP17	76PCM07	1C31232G01	M76RI1107	GRIT DEWATERING UNIT NO.2 INLET VALVE	WAIT	READY	DI	1.3.4.2
DROP17	76PCM07	1C31232G01	M76ZB1107	GRIT DEWATERING UNIT NO.2 INLET VALVE	NORMAL	CLOSED	DI	1.3.4.3
DROP17	76PCM07	1C31232G01	M76ZD1107	GRIT DEWATERING UNIT NO.2 INLET VALVE	NORMAL	OPENED	DI	1.3.4.4
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.4.5
DROP17	76PCM07	1C31232G01	M76FAL2101	GRIT SEPARATORS WATER FLOW	NORMAL	FAIL	DI	1.3.4.6
DROP17	76PCM07	1C31232G01	M76QI1121	GRIT CONVEYOR 2 DISCH GATE 1	LOCAL	INCOMP	DI	1.3.4.7
DROP17	76PCM07	1C31232G01	M76RI1121	GRIT CONVEYOR 2 DISCH GATE 1	WAIT	READY	DI	1.3.4.8
DROP17	76PCM07	1C31232G01	M76ZB1121	GRIT CONVEYOR 2 DISCH GATE 1	NORMAL	CLOSED	DI	1.3.4.9
DROP17	76PCM07	1C31232G01	M76ZD1121	GRIT CONVEYOR 2 DISCH GATE 1	NORMAL	OPENED	DI	1.3.4.10
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.4.11
DROP17	76PCM07	1C31232G01	M76ZB1621	DC 8 FERRIC INJECT VALVE	NORMAL	CLOSED	DI	1.3.4.12
DROP17	76PCM07	1C31232G01	M76ZD1621	DC 8 FERRIC INJECT VALVE	NORMAL	OPENED	DI	1.3.4.13

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP17	76PCM07	1C31232G01	M76LAH2825	FeCl3 DAY TNK 2 LEVEL ALARMS	HIGH	NORMAL	DI	1.3.4.14
DROP17	76PCM07	1C31232G01	M76LAL2825	FeCl3 DAY TNK 2 LEVEL ALARMS	NORMAL	LOW	DI	1.3.4.15
DROP17	76PCM07	1C31232G01	<b>M17QC3S04</b>	<b>DPU17 QC DROP 3 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.4.16
DROP17	76PCM07	1C31232G01	M76MI0235A	CFUGE BIN 2 SCREW FEEDER 1	OFF	RUNFWD	DI	1.3.5.1
DROP17	76PCM07	1C31232G01	M76MI0235B	CFUGE BIN 2 SCREW FEEDER 1	OFF	RUNRVS	DI	1.3.5.2
DROP17	76PCM07	1C31232G01	M76QI0235	CFUGE BIN 2 SCREW FEEDER 1	LOCAL	INCOMP	DI	1.3.5.3
DROP17	76PCM07	1C31232G01	M76RI0235	CFUGE BIN 2 SCREW FEEDER 1	WAIT	READY	DI	1.3.5.4
DROP17	76PCM07	1C31232G01	M76UA0235B	CFUGE BIN2 SCREW FDR1 COMMON	NORMAL	FAIL	DI	1.3.5.5
DROP17	76PCM07	1C31232G01	M76UA0235A	CFUGE BIN2 SCREW FDR1 TORQUE	NORMAL	HIGH	DI	1.3.5.6
DROP17	76PCM07	1C31232G01	M76XA0235	CFUGE BIN 2 SCREW FEEDER 1	NORMAL	FAIL	DI	1.3.5.7
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.5.8
DROP17	76PCM07	1C31232G01	M76MI0245A	CFUGE BIN 4 SCREW FEEDER 1	OFF	RUNFWD	DI	1.3.5.9
DROP17	76PCM07	1C31232G01	M76MI0245B	CFUGE BIN 4 SCREW FEEDER 1	OFF	RUNRVS	DI	1.3.5.10
DROP17	76PCM07	1C31232G01	M76QI0245	CFUGE BIN 4 SCREW FEEDER 1	LOCAL	INCOMP	DI	1.3.5.11
DROP17	76PCM07	1C31232G01	M76RI0245	CFUGE BIN 4 SCREW FEEDER 1	WAIT	READY	DI	1.3.5.12
DROP17	76PCM07	1C31232G01	M76UA0245A	CFUGE BIN4 SCREW FDR1 TORQUE	NORMAL	HIGH	DI	1.3.5.13
DROP17	76PCM07	1C31232G01	M76UA0245B	CFUGE BIN4 SCREW FDR1 COMMON	NORMAL	FAIL	DI	1.3.5.14
DROP17	76PCM07	1C31232G01	M76XA0245	CFUGE BIN 4 SCREW FEEDER 1	NORMAL	FAIL	DI	1.3.5.15
DROP17	76PCM07	1C31232G01	<b>M17QC3S05</b>	<b>DPU17 QC DROP 3 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.5.16
DROP17	76PCM07	1C31232G01	M76QI0282B	CAKE PUMP NO. 2	DSELCT	SELECT	DI	1.3.6.1
DROP17	76PCM07	1C31232G01	M76QI0282C	CAKE PUMP NO. 4	DSELCT	SELECT	DI	1.3.6.2
DROP17	76PCM07	1C31232G01	M76QI0282D	CAKE PUMP NO. 2 & 4	DSELCT	SELECT	DI	1.3.6.3
DROP17	76PCM07	1C31232G01	M76QI0282E	CAKE PUMP 2 & 4 SELECTR SWITCH	LOCAL	INCOMP	DI	1.3.6.4
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.6.5
DROP17	76PCM07	1C31232G01	M76MI0284	CFUGE CAKE PUMP 4	OFF	RUNNNG	DI	1.3.6.6
DROP17	76PCM07	1C31232G01	M76QI0284	CAKE PUMP NO. 4 DCS STATUS	LOCAL	INCOMP	DI	1.3.6.7
DROP17	76PCM07	1C31232G01	M76RI0284	CFUGE CAKE PUMP 4	WAIT	READY	DI	1.3.6.8
DROP17	76PCM07	1C31232G01	M76ZD0284	CFUGE CAKE PUMP 4	NORMAL	ALARM	DI	1.3.6.9
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.6.10
DROP17	76PCM07	1C31232G01	M76MI0282	CFUGE CAKE PUMP 2	OFF	RUNNNG	DI	1.3.6.11
DROP17	76PCM07	1C31232G01	M76QI0282	CAKE PUMP NO. 2 DCS STATUS	LOCAL	INCOMP	DI	1.3.6.12
DROP17	76PCM07	1C31232G01	M76RI0282	CFUGE CAKE PUMP 2	WAIT	READY	DI	1.3.6.13
DROP17	76PCM07	1C31232G01	M76ZD0282	CFUGE CAKE PUMP 2	NORMAL	ALARM	DI	1.3.6.14
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.6.15
DROP17	76PCM07	1C31232G01	<b>M17QC3S06</b>	<b>DPU17 QC DROP 3 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.6.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP17	76PCM07	1C31232G01	M76ZB1403	PIPELINE LUBE PUMP 2 DISCH VLV	NORMAL	CLOSED	DI	1.3.7.1	
DROP17	76PCM07	1C31232G01	M76ZD1403	PIPELINE LUBE PUMP 2 DISCH VLV	NORMAL	OPENED	DI	1.3.7.2	
DROP17	76PCM07	1C31232G01	M76ZB1402	PIPELINE LUBE PUMP 2 INLET VLV	NORMAL	CLOSED	DI	1.3.7.3	
DROP17	76PCM07	1C31232G01	M76ZD1402	PIPELINE LUBE PUMP 2 INLET VLV	NORMAL	OPENED	DI	1.3.7.4	
DROP17	76PCM07	1C31232G01	M76MI0802	PIPELINE LUBE PUMP NO. 2	OFF	RUNNNG	DI	1.3.7.5	
DROP17	76PCM07	1C31232G01	M76UA0802	PIPELINE LUBE PUMP NO. 2	NORMAL	FAIL	DI	1.3.7.6	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.7.7	
DROP17	76PCM07	1C31232G01	M76ZB1407	PIPELINE LUBE PUMP 4 DISCH VLV	NORMAL	CLOSED	DI	1.3.7.8	
DROP17	76PCM07	1C31232G01	M76ZD1407	PIPELINE LUBE PUMP 4 DISCH VLV	NORMAL	OPENED	DI	1.3.7.9	
DROP17	76PCM07	1C31232G01	M76ZB1406	PIPELINE LUBE PUMP 4 INLET VLV	NORMAL	CLOSED	DI	1.3.7.10	
DROP17	76PCM07	1C31232G01	M76ZD1406	PIPELINE LUBE PUMP 4 INLET VLV	NORMAL	OPENED	DI	1.3.7.11	
DROP17	76PCM07	1C31232G01	M76MI0804	PIPELINE LUBE PUMP NO. 4	OFF	RUNNNG	DI	1.3.7.12	
DROP17	76PCM07	1C31232G01	M76UA0804	PIPELINE LUBE PUMP NO. 4	NORMAL	FAIL	DI	1.3.7.13	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.7.14	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.7.15	
DROP17	76PCM07	1C31232G01	<b>M17QC3S07</b>	<b>DPU17 QC DROP 3 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.7.16	
DROP17	76PCM07		Spare Module Address						1.3.8
DROP17	76PCM07	1C31232G01	M76QI0286B	CAKE PUMP NO. 6	DSELECT	SELECT	DI	1.4.1.1	
DROP17	76PCM07	1C31232G01	M76QI0286C	CAKE PUMP NO. 8	DSELECT	SELECT	DI	1.4.1.2	
DROP17	76PCM07	1C31232G01	M76QI0286D	CAKE PUMP NO. 6 & 8	DSELECT	SELECT	DI	1.4.1.3	
DROP17	76PCM07	1C31232G01	M76QI0286E	CAKE PUMP 6 & 8 SELECTR SWITCH	LOCAL	INCOMP	DI	1.4.1.4	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.1.5	
DROP17	76PCM07	1C31232G01	M76MI0286	CFUGE CAKE PUMP 6	OFF	RUNNNG	DI	1.4.1.6	
DROP17	76PCM07	1C31232G01	M76QI0286	CAKE PUMP NO. 6 DCS STATUS	LOCAL	INCOMP	DI	1.4.1.7	
DROP17	76PCM07	1C31232G01	M76RI0286	CFUGE CAKE PUMP 6	WAIT	READY	DI	1.4.1.8	
DROP17	76PCM07	1C31232G01	M76ZD0286	CFUGE CAKE PUMP 6	NORMAL	ALARM	DI	1.4.1.9	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.1.10	
DROP17	76PCM07	1C31232G01	M76MI0288	CFUGE CAKE PUMP 8	OFF	RUNNNG	DI	1.4.1.11	
DROP17	76PCM07	1C31232G01	M76QI0288	CAKE PUMP NO. 8 DCS STATUS	LOCAL	INCOMP	DI	1.4.1.12	
DROP17	76PCM07	1C31232G01	M76RI0288	CFUGE CAKE PUMP 8	WAIT	READY	DI	1.4.1.13	
DROP17	76PCM07	1C31232G01	M76ZD0288	CFUGE CAKE PUMP 8	NORMAL	ALARM	DI	1.4.1.14	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.1.15	
DROP17	76PCM07	1C31232G01	<b>M17QC4S01</b>	<b>DPU17 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16	
DROP17	76PCM07	1C31232G01	M76MI0258	DC FEED PUMP NO. 8	OFF	RUNNNG	DI	1.4.2.1	
DROP17	76PCM07	1C31232G01	M76QI0258B	DC FEED PUMP NO. 8	LOCAL	INCOMP	DI	1.4.2.2	
DROP17	76PCM07	1C31232G01	M76RI0258	DC FEED PUMP NO. 8	WAIT	READY	DI	1.4.2.3	
DROP17	76PCM07	1C31232G01	M76UA0258	DC FEED PUMP NO. 8	NORMAL	FAIL	DI	1.4.2.4	
DROP17	76PCM07	1C31232G01	M76PAH2540	DC FEED PUMP 8 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.2.5	
DROP17	76PCM07	1C31232G01	M76PAL2540A	DC FEED PUMP 8 PRESS CUTOUT	NORMAL	LOW	DI	1.4.2.6	
DROP17	76PCM07	1C31232G01	M76PAL2540B	DC FEED PUMP 8 PRESS CUTOUT	NORMAL	LOW	DI	1.4.2.7	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.2.8	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.2.9	

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP17	76PCM07	1C31232G01	M76ZB1628	DC 8 CAKE TO CENT VALVE	NORMAL	CLOSED	DI	1.4.2.10
DROP17	76PCM07	1C31232G01	M76ZD1628	DC 8 CAKE TO CENT VALVE	NORMAL	OPENED	DI	1.4.2.11
DROP17	76PCM07	1C31232G01	M76ZB1627	DC 8 DISCH CAKE GATE	CLOSED	NORMAL	DI	1.4.2.12
DROP17	76PCM07	1C31232G01	M76ZD1627	DC 8 DISCH CAKE GATE	OPENED	NORMAL	DI	1.4.2.13
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.2.14
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.2.15
DROP17	76PCM07	1C31232G01	<b>M17QC4S02</b>	<b>DPU17 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.3.1
DROP17	76PCM07	1C31232G01	M76ZB1620	DC 8 POLY INJECT VALVE 1	NORMAL	CLOSED	DI	1.4.3.2
DROP17	76PCM07	1C31232G01	M76ZD1620	DC 8 POLY INJECT VALVE 1	NORMAL	OPENED	DI	1.4.3.3
DROP17	76PCM07	1C31232G01	M76ZB1625	DC 8 POLY INJECT VALVE 2	NORMAL	CLOSED	DI	1.4.3.4
DROP17	76PCM07	1C31232G01	M76ZD1625	DC 8 POLY INJECT VALVE 2	NORMAL	OPENED	DI	1.4.3.5
DROP17	76PCM07	1C31232G01	M76ZB1626	DC 8 POLY INJECT VALVE 3	NORMAL	CLOSED	DI	1.4.3.6
DROP17	76PCM07	1C31232G01	M76ZD1626	DC 8 POLY INJECT VALVE 3	NORMAL	OPENED	DI	1.4.3.7
DROP17	76PCM07	1C31232G01	M76ZB1548	DC 8 POLY INJECT VALVE 4	NORMAL	CLOSED	DI	1.4.3.8
DROP17	76PCM07	1C31232G01	M76ZD1548	DC 8 POLY INJECT VALVE 4	NORMAL	OPENED	DI	1.4.3.9
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.3.10
DROP17	76PCM07	1C31232G01	M76MI0512	POLY DAY TANK 4 MIXER	OFF	RUNNNG	DI	1.4.3.11
DROP17	76PCM07	1C31232G01	M76QI0512	POLY DAY TANK 4 MIXER	LOCAL	INCOMP	DI	1.4.3.12
DROP17	76PCM07	1C31232G01	M76RI0512	POLY DAY TANK 4 MIXER	WAIT	READY	DI	1.4.3.13
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.3.14
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.3.15
DROP17	76PCM07	1C31232G01	<b>M17QC4S03</b>	<b>DPU17 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP17	76PCM07	1C31232G01	M76QI1110	GRIT SEPARATOR 3 INLET VALVE	LOCAL	INCOMP	DI	1.4.4.1
DROP17	76PCM07	1C31232G01	M76RI1110	GRIT SEPARATOR 3 INLET VALVE	WAIT	READY	DI	1.4.4.2
DROP17	76PCM07	1C31232G01	M76ZB1110	GRIT SEPARATOR 3 INLET VALVE	NORMAL	CLOSED	DI	1.4.4.3
DROP17	76PCM07	1C31232G01	M76ZD1110	GRIT SEPARATOR 3 INLET VALVE	NORMAL	OPENED	DI	1.4.4.4
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.4.5
DROP17	76PCM07	1C31232G01	M76QI1113	GRIT SEPARATOR 3 DISCH VALVE	LOCAL	INCOMP	DI	1.4.4.6
DROP17	76PCM07	1C31232G01	M76RI1113	GRIT SEPARATOR 3 DISCH VALVE	WAIT	READY	DI	1.4.4.7
DROP17	76PCM07	1C31232G01	M76ZB1113	GRIT SEPARATOR 3 DISCH VALVE	NORMAL	CLOSED	DI	1.4.4.8
DROP17	76PCM07	1C31232G01	M76ZD1113	GRIT SEPARATOR 3 DISCH VALVE	NORMAL	OPENED	DI	1.4.4.9
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.4.10
DROP17	76PCM07	1C31232G01	<b>M76QI1111</b>	<b>GRIT SEPARATOR 3 GRIT VALVE 1</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.4.4.11
DROP17	76PCM07	1C31232G01	M76RI1111	GRIT SEPARATOR 3 GRIT VALVE 1	WAIT	READY	DI	1.4.4.12
DROP17	76PCM07	1C31232G01	M76ZB1111	GRIT SEPARATOR 3 GRIT VALVE 1	NORMAL	CLOSED	DI	1.4.4.13
DROP17	76PCM07	1C31232G01	M76ZD1111	GRIT SEPARATOR 3 GRIT VALVE 1	NORMAL	OPENED	DI	1.4.4.14
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.4.15
DROP17	76PCM07	1C31232G01	<b>M17QC4S04</b>	<b>DPU17 QC DROP 4 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16
DROP17	76PCM07	1C31232G01	M76MI0568	DC POLY FEED PUMP NO. 8	OFF	RUNNNG	DI	1.4.5.1
DROP17	76PCM07	1C31232G01	M76QI0568B	DC POLY FEED PUMP NO. 8	LOCAL	INCOMP	DI	1.4.5.2
DROP17	76PCM07	1C31232G01	M76RI0568	DC POLY FEED PUMP NO. 8	WAIT	READY	DI	1.4.5.3
DROP17	76PCM07	1C31232G01	M76UA0568	DC POLY FEED PUMP NO. 8	NORMAL	FAIL	DI	1.4.5.4
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.5.5
DROP17	76PCM07	1C31232G01	M76PAH2807	DC POLY FD PUMP 8 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.5.6
DROP17	76PCM07	1C31232G01	M76PAL2807A	DC POLY FD PUMP 8 PRESS CUTOUT	NORMAL	LOW	DI	1.4.5.7

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP17	76PCM07	1C31232G01	M76PAL2807B	DC POLY FD PUMP 8 PRESS CUTOUT	NORMAL	LOW	DI	1.4.5.8
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.5.9
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.5.10
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.5.11
DROP17	76PCM07	1C31232G01	M76LAH2726	POLY DAY TANK 4 LEVEL ALARMS	NORMAL	HIGH	DI	1.4.5.12
DROP17	76PCM07	1C31232G01	M76LM2726	POLY DAY TANK 4 LEVEL ALARMS	NORMAL	MIDPNT	DI	1.4.5.13
DROP17	76PCM07	1C31232G01	M76LAL2726	POLY DAY TANK 4 LEVEL ALARMS	NORMAL	LOW	DI	1.4.5.14
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.5.15
DROP17	76PCM07	1C31232G01	<b>M17QC4S05</b>	<b>DCU17 QC DROP 4 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.5.16
DROP17	76PCM07	1C31232G01	M76ZB1411	PIPELINE LUBE PUMP 6 DISCH VLV	NORMAL	CLOSED	DI	1.4.6.1
DROP17	76PCM07	1C31232G01	M76ZD1411	PIPELINE LUBE PUMP 6 DISCH VLV	NORMAL	OPENED	DI	1.4.6.2
DROP17	76PCM07	1C31232G01	M76ZB1410	PIPELINE LUBE PUMP 6 INLET VLV	NORMAL	CLOSED	DI	1.4.6.3
DROP17	76PCM07	1C31232G01	M76ZD1410	PIPELINE LUBE PUMP 6 INLET VLV	NORMAL	OPENED	DI	1.4.6.4
DROP17	76PCM07	1C31232G01	M76MI0806	PIPELINE LUBE PUMP NO. 6	OFF	RUNNNG	DI	1.4.6.5
DROP17	76PCM07	1C31232G01	M76UA0806	PIPELINE LUBE PUMP NO. 6	NORMAL	FAIL	DI	1.4.6.6
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.6.7
DROP17	76PCM07	1C31232G01	M76ZB1415	PIPELINE LUBE PUMP 8 DISCH VLV	NORMAL	CLOSED	DI	1.4.6.8
DROP17	76PCM07	1C31232G01	M76ZD1415	PIPELINE LUBE PUMP 8 DISCH VLV	NORMAL	OPENED	DI	1.4.6.9
DROP17	76PCM07	1C31232G01	M76ZB1414	PIPELINE LUBE PUMP 8 INLET VLV	NORMAL	CLOSED	DI	1.4.6.10
DROP17	76PCM07	1C31232G01	M76ZD1414	PIPELINE LUBE PUMP 8 INLET VLV	NORMAL	OPENED	DI	1.4.6.11
DROP17	76PCM07	1C31232G01	M76MI0808	PIPELINE LUBE PUMP NO. 8	OFF	RUNNNG	DI	1.4.6.12
DROP17	76PCM07	1C31232G01	M76UA0808	PIPELINE LUBE PUMP NO. 8	NORMAL	FAIL	DI	1.4.6.13
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.6.14
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.6.15
DROP17	76PCM07	1C31232G01	<b>M17QC4S06</b>	<b>DCU17 QC DROP 4 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.6.16
DROP17	76PCM07	1C31232G01	M76ZB1622	DC 8 HT XCHNGR INLET VALVE	NORMAL	CLOSED	DI	1.4.7.1
DROP17	76PCM07	1C31232G01	M76ZD1622	DC 8 HT XCHNGR INLET VALVE	NORMAL	OPENED	DI	1.4.7.2
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.7.3
DROP17	76PCM07	1C31232G01	M76ZB1623	DC 8 HT XCHNGR BPASS VALVE	NORMAL	CLOSED	DI	1.4.7.4
DROP17	76PCM07	1C31232G01	M76ZD1623	DC 8 HT XCHNGR BPASS VALVE	NTOPEN	OPENED	DI	1.4.7.5
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.7.6
DROP17	76PCM07	1C31232G01	M76ZB1624	DC 8 HT XCHNGR DISCH VALVE	NORMAL	CLOSED	DI	1.4.7.7
DROP17	76PCM07	1C31232G01	M76ZD1624	DC 8 HT XCHNGR DISCH VALVE	NORMAL	OPENED	DI	1.4.7.8
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.7.9
DROP17	76PCM07	1C31232G01	M76QI1629	HEAT EXCHANGR8 HOT WTR SUPPLY	LOCAL	INCOMP	DI	1.4.7.10
DROP17	76PCM07	1C31232G01	M76RI1629	HEAT EXCHANGR8 HOT WTR SUPPLY	WAIT	READY	DI	1.4.7.11
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.7.12
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.7.13
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.7.14
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.7.15
DROP17	76PCM07	1C31232G01	<b>M17QC4S07</b>	<b>DCU17 QC DROP 4 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.7.16



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP17	76PCM07			Spare Module Address				1.4.8
DROP17	76PCM07	5A26458G04	M76QS0282A	CAKE PMP 2 STATUS TO 76-LCP-03	DSELECT	SELECT	DO	1.5.1.1
DROP17	76PCM07	5A26458G04	M76HS0282	CAKE PMP 2 S/S TO 76-LCP-03	OFF	RUN	DO	1.5.1.2
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.1.3
DROP17	76PCM07	5A26458G04	M76QS0282B	CAKE PMP 4 STATUS TO 76-LCP-03	DSELECT	SELECT	DO	1.5.1.4
DROP17	76PCM07	5A26458G04	M76HS0284	CAKE PMP 4 S/S TO 76-LCP-03	OFF	RUN	DO	1.5.1.5
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.1.6
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.1.7
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.1.8
DROP17	76PCM07	5A26458G04	M76MU0284	DC CAKE PMP 4 BYPASS/LOAD	OFF	BYPASS	DO	1.5.1.9
DROP17	76PCM07	5A26458G04	M76MU0282	DC CAKE PMP 2 BYPASS/LOAD	LOAD	BYPASS	DO	1.5.1.10
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.1.11
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.1.12
DROP17	76PCM07	5A26458G04	M76HS1105A	GRIT SEPARATOR 2 INLET VALVE	OFF	OPEN	DO	1.5.2.1
DROP17	76PCM07	5A26458G04	M76HS1105B	GRIT SEPARATOR 2 INLET VALVE	OFF	CLOSE	DO	1.5.2.2
DROP17	76PCM07	5A26458G04	M76HS1108A	GRIT SEPARATOR 2 DISCH VALVE	OFF	OPEN	DO	1.5.2.3
DROP17	76PCM07	5A26458G04	M76HS1108B	GRIT SEPARATOR 2 DISCH VALVE	OFF	CLOSE	DO	1.5.2.4
DROP17	76PCM07	5A26458G04	M76HS1106A	GRIT SEPARATOR 2 GRIT VALVE	OFF	OPEN	DO	1.5.2.5
DROP17	76PCM07	5A26458G04	M76HS1106B	GRIT SEPARATOR 2 GRIT VALVE	OFF	CLOSE	DO	1.5.2.6
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.2.7
DROP17	76PCM07	5A26458G04	M76HS1107A	GRIT DEWATERING UNIT NO.2 INLET VALVE	OFF	OPEN	DO	1.5.2.8
DROP17	76PCM07	5A26458G04	M76HS1107B	GRIT DEWATERING UNIT NO.2 INLET VALVE	OFF	CLOSE	DO	1.5.2.9
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.2.10
DROP17	76PCM07	5A26458G04	M76HS1121A	GRIT CONVEYOR 2 DISCH GATE 1	OFF	OPEN	DO	1.5.2.11
DROP17	76PCM07	5A26458G04	M76HS1121B	GRIT CONVEYOR 2 DISCH GATE 1	OFF	CLOSE	DO	1.5.2.12
DROP17	76PCM07	5A26458G04	M76HS1122A	GRIT CONVEYOR 2 DISCH GATE 2	OFF	OPEN	DO	1.5.3.1
DROP17	76PCM07	5A26458G04	M76HS1122B	GRIT CONVEYOR 2 DISCH GATE 2	OFF	CLOSE	DO	1.5.3.2
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.3.3
DROP17	76PCM07	5A26458G04	M76HS1110A	GRIT SEPARATOR 3 INLET VALVE	OFF	OPEN	DO	1.5.3.4
DROP17	76PCM07	5A26458G04	M76HS1110B	GRIT SEPARATOR 3 INLET VALVE	OFF	CLOSE	DO	1.5.3.5
DROP17	76PCM07	5A26458G04	M76HS1113A	GRIT SEPARATOR 3 DISCH VALVE	OFF	OPEN	DO	1.5.3.6
DROP17	76PCM07	5A26458G04	M76HS1113B	GRIT SEPARATOR 3 DISCH VALVE	OFF	CLOSE	DO	1.5.3.7
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.3.8
DROP17	76PCM07	5A26458G04	M76HS1111A	GRIT SEPARATOR 3 GRIT VALVE 2	OFF	OPEN	DO	1.5.3.9
DROP17	76PCM07	5A26458G04	M76HS1111B	GRIT SEPARATOR 3 GRIT VALVE 2	OFF	CLOSE	DO	1.5.3.10
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.3.11
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.3.12

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP17	76PCM07	5A26458G04	M76HS0258B	DC FEED PUMP NO. 8	OFF	RUN	DO	1.6.1.1
DROP17	76PCM07	5A26458G04	M76HS0258C	DC SLUDGE FEED PUMP 8 DISABLE	ENABLE	DISABLE	DO	1.6.1.2
DROP17	76PCM07	5A26458G04	M76HS0568B	DC POLY FEED PUMP NO. 8	OFF	RUN	DO	1.6.1.3
DROP17	76PCM07	5A26458G04	M76HS0208	DEWAT CFUGE NO. 8	OFF	RUN	DO	1.6.1.4
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.1.5
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.1.6
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.1.7
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.1.8
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.1.9
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.1.10
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.1.11
DROP17	76PCM07	5A26458G04	M76HS0512	POLY DAY TANK 4 MIXER	OFF	RUN	DO	1.6.1.12
DROP17	76PCM07	5A26458G04	M76QS0286A	CAKE PMP 6 STATUS TO 76-LCP-03	DSELCT	SELECT	DO	1.6.2.1
DROP17	76PCM07	5A26458G04	M76HS0286	CAKE PMP 6 S/S TO 76-LCP-03	OFF	RUN	DO	1.6.2.2
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.2.3
DROP17	76PCM07	5A26458G04	M76QS0286B	CAKE PMP 8 STATUS TO 76-LCP-03	DSELCT	SELECT	DO	1.6.2.4
DROP17	76PCM07	5A26458G04	M76HS0288	CAKE PMP 8 S/S TO 76-LCP-03	OFF	RUN	DO	1.6.2.5
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.2.6
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.2.7
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.2.8
DROP17	76PCM07	5A26458G04	M76MU0286	DC CAKE PMP 6 BYPASS/LOAD	OFF	BYPASS	DO	1.6.2.9
DROP17	76PCM07	5A26458G04	M76MU0288	DC CAKE PMP 8 BYPASS/LOAD	OFF	BYPASS	DO	1.6.2.10
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.2.11
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.2.12



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	5X00419G01		76VDL08 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1
			76MV1090	GRIT SEPARATORS INLET VALVE				
			76MV1091	GRIT SEPARATORS OUTLET VALVE				
			76MV1092	GRIT SEPARATORS BYPASS VALVE				
			76MV1300	SCREENS INLET VALVE				
			76MV1301	SCREENS DISCHARGE VALVE				
			76MV1302	SCREENS BYPASS VALVE				
DROP18	76PCM08	5X00106G01	M76PT2090	GRIT SEPARATORS INLET PRESS	0	100 PSIG	AI - HART	1.1.2.1
DROP18	76PCM08	5X00106G01	M76PT2091	GRIT SEPARATORS DISCH PRESS	0	100 PSIG	AI - HART	1.1.2.2
DROP18	76PCM08	5X00106G01	SPARE	SPARE			AI - HART	1.1.2.3
DROP18	76PCM08	5X00106G01	SPARE	SPARE			AI - HART	1.1.2.4
DROP18	76PCM08	5X00106G01	SPARE	SPARE			AI - HART	1.1.2.5
DROP18	76PCM08	5X00106G01	SPARE	SPARE			AI - HART	1.1.2.6
DROP18	76PCM08	5X00106G01	SPARE	SPARE			AI - HART	1.1.2.7
DROP18	76PCM08	5X00106G01	SPARE	SPARE			AI - HART	1.1.2.8
DROP18	76PCM08			Spare Module Address				1.2.3
DROP18	76PCM08			Spare Module Address				1.2.4
DROP18	76PCM08			Spare Module Address				1.2.5
DROP18	76PCM08			Spare Module Address				1.2.6
DROP18	76PCM08			Spare Module Address				1.2.7
DROP18	76PCM08	5X00119G01	M76PT9041	DPU16 76PCM08 CABINET TEMP	32	154 DEG F	RTD	1.1.8.1
DROP18	76PCM08	5X00119G01	SPARE				RTD	1.1.8.2
DROP18	76PCM08	5X00119G01	SPARE				RTD	1.1.8.3
DROP18	76PCM08	5X00119G01	SPARE				RTD	1.1.8.4
DROP18	76PCM08	5X00119G01	SPARE				RTD	1.1.8.5
DROP18	76PCM08	5X00119G01	SPARE				RTD	1.1.8.6
DROP18	76PCM08	5X00119G01	SPARE				RTD	1.1.8.7
DROP18	76PCM08	5X00119G01	SPARE				RTD	1.1.8.8
DROP18	76PCM08	1C31232G01	M76AAHH2355B	CF BLDG G/FLR CH4 GRIT AREA N	HI-HI	NORMAL	DI	1.2.1.1
DROP18	76PCM08	1C31232G01	M76AAHH2355C	CF BLDG G/FLR CH4 DW AREA SW	HI-HI	NORMAL	DI	1.2.1.2
DROP18	76PCM08	1C31232G01	M76AAHH2355D	CF BLDG G/FLR CH4 DW AREA SE	HI-HI	NORMAL	DI	1.2.1.3
DROP18	76PCM08	1C31232G01	M76AAHH2355E	CF BLDG G/FLR CH4 DW AREA NW	HI-HI	NORMAL	DI	1.2.1.4
DROP18	76PCM08	1C31232G01	M76AAHH2355F	CF BLDG G/FLR CH4 DW AREA NE	HI-HI	NORMAL	DI	1.2.1.5
DROP18	76PCM08	1C31232G01	M76AAHH2355G	CF BLDG G/FLR CH4 THKNG AREA W	HI-HI	NORMAL	DI	1.2.1.6
DROP18	76PCM08	1C31232G01	M76AAHH2355H	CF BLDG G/FLR CH4 THKNG AREA E	HI-HI	NORMAL	DI	1.2.1.7
DROP18	76PCM08	1C31232G01	M76AAHH2355J	CF BLDG G/FLR CH4 CHEM AREA 1	HI-HI	NORMAL	DI	1.2.1.8
DROP18	76PCM08	1C31232G01	M76AAHH2355K	CF BLDG G/FLR CH4 CHEM AREA 2	HI-HI	NORMAL	DI	1.2.1.9
DROP18	76PCM08	1C31232G01	M76AAHH2355L	CF BLDG G/FLR CH4 MCC ROOM 1	HI-HI	NORMAL	DI	1.2.1.10
DROP18	76PCM08	1C31232G01	M76AAHH2355M	CF BLDG G/FLR CH4 MCC ROOM 2	HI-HI	NORMAL	DI	1.2.1.11
DROP18	76PCM08	1C31232G01	M76AAHH2355N	CF BLDG G/FLR CH4 ST AREA 1	HI-HI	NORMAL	DI	1.2.1.12
DROP18	76PCM08	1C31232G01	M76AAHH2355P	CF BLDG G/FLR CH4 ST AREA 2	HI-HI	NORMAL	DI	1.2.1.13

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	1C31232G01	M76AAHH2355Q	CF BLDG G/FLR CH4 ELEVTR LOBBY	HI-HI	NORMAL	DI	1.2.1.14
DROP18	76PCM08	1C31232G01	M76XA2355A	CF BLDG G/FLR CH4 GRIT AREA S	FAIL	NORMAL	DI	1.2.1.15
DROP18	76PCM08	1C31232G01	<b>M18QC2S01</b>	<b>DPU18 QC DROP 2 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.2.1.16
DROP18	76PCM08	1C31232G01	M76XA2357H	CF BLDG FLR 3 CH4 T & C RM 1	FAIL	NORMAL	DI	1.2.2.1
DROP18	76PCM08	1C31232G01	M76XA2357J	CF BLDG FLR 3 CH4 CORRIDOR	FAIL	NORMAL	DI	1.2.2.2
DROP18	76PCM08	1C31232G01	M76XA2357K	CF BLDG FLR 3 CH4 ST AREA1	FAIL	NORMAL	DI	1.2.2.3
DROP18	76PCM08	1C31232G01	M76XA2357L	CF BLDG FLR 3 CH4 ST AREA2	FAIL	NORMAL	DI	1.2.2.4
DROP18	76PCM08	1C31232G01	M76XA2357M	CF BLDG FLR 3 CH4 ELVTR LOBBY	FAIL	NORMAL	DI	1.2.2.5
DROP18	76PCM08	1C31232G01	M76XA2357N	CF BLDG FLR 3 CH4 HVAC RM 2	FAIL	NORMAL	DI	1.2.2.6
DROP18	76PCM08	1C31232G01	M76XA2357P	CF BLDG FLR 3 CH4 T & C RM 2	FAIL	NORMAL	DI	1.2.2.7
DROP18	76PCM08	1C31232G01	M76AAH2357Q	CF BLDG FLR 3 CH4 P ELVTR SHFT	HIGH	NORMAL	DI	1.2.2.8
DROP18	76PCM08	1C31232G01	M76AAH2357R	CF BLDG FLR 3 CH4 F ELVTR SHFT	HIGH	NORMAL	DI	1.2.2.9
DROP18	76PCM08	1C31232G01	M76AAH2358A	CF BLDG GLRY LVL CH4 M/C RM	HIGH	NORMAL	DI	1.2.2.10
DROP18	76PCM08	1C31232G01	M76AAH2358B	CF BLDG GLRY LVL CH4 ELVTR LBY	HIGH	NORMAL	DI	1.2.2.11
DROP18	76PCM08	1C31232G01	M76AAH2358C	CF BLDG GLRY LVL CH4 STAIRCASE	HIGH	NORMAL	DI	1.2.2.12
DROP18	76PCM08	1C31232G01	M76AAHH2357Q	CF BLDG FLR 3 CH4 P ELVTR SHFT	HI-HI	NORMAL	DI	1.2.2.13
DROP18	76PCM08	1C31232G01	M76AAHH2357R	CF BLDG FLR 3 CH4 F ELVTR SHFT	HI-HI	NORMAL	DI	1.2.2.14
DROP18	76PCM08	1C31232G01	M76AAHH2358A	CF BLDG GLRY LVL CH4 M/C RM	HI-HI	NORMAL	DI	1.2.2.15
DROP18	76PCM08	1C31232G01	<b>M18QC2S02</b>	<b>DPU18 QC DROP 2 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.2.2.16
DROP18	76PCM08	1C31232G01	M76ZB9230	76USSB - 76-DC-08 FEED BREAKER	NORMAL	CLOSED	DI	1.2.3.1
DROP18	76PCM08	1C31232G01	M76ZB9232	76USSB - 76MCC76B02 FD BREAKER	NORMAL	CLOSED	DI	1.2.3.2
DROP18	76PCM08	1C31232G01	M76ZD9230	76USSB - 76-DC-08 FEED BREAKER	NORMAL	OPENED	DI	1.2.3.3
DROP18	76PCM08	1C31232G01	M76ZD9232	76USSB - 76MCC76B02 FD BREAKER	NORMAL	OPENED	DI	1.2.3.4
DROP18	76PCM08	1C31232G01	M76EAL9241	76USSC - LINE A TRANSFORMER	UV/VOLT	NORMAL	DI	1.2.3.5
DROP18	76PCM08	1C31232G01	M76UA9241	76USSC - LINE A TRANSFORMER	NORMAL	TRBL	DI	1.2.3.6
DROP18	76PCM08	1C31232G01	M76ZA9243	76USSC - FEED A BREAKER	NORMAL	TRIPPD	DI	1.2.3.7
DROP18	76PCM08	1C31232G01	M76ZA9245	76USSC - TIE BREAKER	NORMAL	TRIPPD	DI	1.2.3.8
DROP18	76PCM08	1C31232G01	M76ZA9247	76USSC - 76MCC76C01 FD BREAKER	TRIPPD	NORMAL	DI	1.2.3.9
DROP18	76PCM08	1C31232G01	M76ZB9243	76USSC - FEED A BREAKER	NORMAL	CLOSED	DI	1.2.3.10
DROP18	76PCM08	1C31232G01	M76ZB9245	76USSC - TIE BREAKER	NORMAL	CLOSED	DI	1.2.3.11
DROP18	76PCM08	1C31232G01	M76ZD9243	76USSC - FEED A BREAKER	NORMAL	OPENED	DI	1.2.3.12
DROP18	76PCM08	1C31232G01	M76ZD9245	76USSC - TIE BREAKER	NORMAL	OPENED	DI	1.2.3.13
DROP18	76PCM08	1C31232G01	M76ZD9246	76USSC - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.2.3.14
DROP18	76PCM08	1C31232G01	M76ZA9251	76USSC - 76-DC-02 FEED BREAKER	TRIPPD	NORMAL	DI	1.2.3.15
DROP18	76PCM08	1C31232G01	<b>M18QC2S03</b>	<b>DPU18 QC DROP 2 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.2.3.16
DROP18	76PCM08	1C31232G01	M76Q11102	GRIT DEWATERING UNIT NO.1 INLET VALVE	NORMAL	INCOMP	DI	1.2.4.1
DROP18	76PCM08	1C31232G01	M76R11102	GRIT DEWATERING UNIT NO.1 INLET VALVE	WAIT	READY	DI	1.2.4.2
DROP18	76PCM08	1C31232G01	M76ZB1102	GRIT DEWATERING UNIT NO.1 INLET VALVE	NORMAL	CLOSED	DI	1.2.4.3
DROP18	76PCM08	1C31232G01	M76ZD1102	GRIT DEWATERING UNIT NO.1 INLET VALVE	NORMAL	OPENED	DI	1.2.4.4
DROP18	76PCM08	1C31232G01	SPARE				DI	1.2.4.5
DROP18	76PCM08	1C31232G01	M76AAHH2358C	CF BLDG GLRY LVL CH4 STAIRCASE	HI-HI	NORMAL	DI	1.2.4.6
DROP18	76PCM08	1C31232G01	M76XA2357Q	CF BLDG FLR 3 CH4 P ELVTR SHFT	FAIL	NORMAL	DI	1.2.4.7
DROP18	76PCM08	1C31232G01	M76XA2357R	CF BLDG FLR 3 CH4 F ELVTR SHFT	FAIL	NORMAL	DI	1.2.4.8
DROP18	76PCM08	1C31232G01	M76XA2358A	CF BLDG GLRY LVL CH4 M/C RM	FAIL	NORMAL	DI	1.2.4.9
DROP18	76PCM08	1C31232G01	M76XA2358B	CF BLDG GLRY LVL CH4 ELVTR LBY	FAIL	NORMAL	DI	1.2.4.10
DROP18	76PCM08	1C31232G01	M76XA2358C	CF BLDG GLRY LVL CH4 STAIRCASE	FAIL	NORMAL	DI	1.2.4.11

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DROP18	76PCM08	1C31232G01	SPARE				DI	1.2.4.12	
DROP18	76PCM08	1C31232G01	SPARE				DI	1.2.4.13	
DROP18	76PCM08	1C31232G01	SPARE				DI	1.2.4.14	
DROP18	76PCM08	1C31232G01	SPARE				DI	1.2.4.15	
DROP18	76PCM08	1C31232G01	<b>M18QC2S04</b>	<b>DPU18 QC DROP 2 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.2.4.16	
DROP18	76PCM08	1C31232G01	M76XA2355C	CF BLDG G/FLR CH4 DW AREA SW	FAIL	NORMAL	DI	1.2.5.1	
DROP18	76PCM08	1C31232G01	M76XA2355D	CF BLDG G/FLR CH4 DW AREA SE	FAIL	NORMAL	DI	1.2.5.2	
DROP18	76PCM08	1C31232G01	M76XA2355E	CF BLDG G/FLR CH4 DW AREA NW	FAIL	NORMAL	DI	1.2.5.3	
DROP18	76PCM08	1C31232G01	M76XA2355F	CF BLDG G/FLR CH4 DW AREA NE	FAIL	NORMAL	DI	1.2.5.4	
DROP18	76PCM08	1C31232G01	M76XA2355G	CF BLDG G/FLR CH4 THKNG AREA W	FAIL	NORMAL	DI	1.2.5.5	
DROP18	76PCM08	1C31232G01	M76XA2355H	CF BLDG G/FLR CH4 THKNG AREA E	FAIL	NORMAL	DI	1.2.5.6	
DROP18	76PCM08	1C31232G01	M76XA2355J	CF BLDG G/FLR CH4 CHEM AREA 1	FAIL	NORMAL	DI	1.2.5.7	
DROP18	76PCM08	1C31232G01	M76XA2355K	CF BLDG G/FLR CH4 CHEM AREA 2	FAIL	NORMAL	DI	1.2.5.8	
DROP18	76PCM08	1C31232G01	M76XA2355L	CF BLDG G/FLR CH4 MCC ROOM 1	FAIL	NORMAL	DI	1.2.5.9	
DROP18	76PCM08	1C31232G01	M76XA2355M	CF BLDG G/FLR CH4 MCC ROOM 2	FAIL	NORMAL	DI	1.2.5.10	
DROP18	76PCM08	1C31232G01	M76XA2355N	CF BLDG G/FLR CH4 ST AREA 1	FAIL	NORMAL	DI	1.2.5.11	
DROP18	76PCM08	1C31232G01	M76XA2355P	CF BLDG G/FLR CH4 ST AREA 2	FAIL	NORMAL	DI	1.2.5.12	
DROP18	76PCM08	1C31232G01	M76XA2355Q	CF BLDG G/FLR CH4 ELEVTR LOBBY	FAIL	NORMAL	DI	1.2.5.13	
DROP18	76PCM08	1C31232G01	M76AAH2356A	CF BLDG FLR 2 CH4 GRIT AREA W	HIGH	NORMAL	DI	1.2.5.14	
DROP18	76PCM08	1C31232G01	M76AAH2356B	CF BLDG FLR 2 CH4 GRIT AREA S	HIGH	NORMAL	DI	1.2.5.15	
DROP18	76PCM08	1C31232G01	<b>M18QC2S05</b>	<b>DPU18 QC DROP 2 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.2.5.16	
DROP18	76PCM08	1C31232G01	M76XA2356D	CF BLDG FLR 2 CH4 HVAC ROOM	FAIL	NORMAL	DI	1.2.6.1	
DROP18	76PCM08	1C31232G01	M76XA2356E	CF BLDG FLR 2 CH4 STARTR RM 1	FAIL	NORMAL	DI	1.2.6.2	
DROP18	76PCM08	1C31232G01	M76XA2356F	CF BLDG FLR 2 CH4 CORRIDOR	FAIL	NORMAL	DI	1.2.6.3	
DROP18	76PCM08	1C31232G01	M76XA2356G	CF BLDG FLR 2 CH4 ST AREA 1	FAIL	NORMAL	DI	1.2.6.4	
DROP18	76PCM08	1C31232G01	M76XA2356H	CF BLDG FLR 2 CH4 ST AREA 2	FAIL	NORMAL	DI	1.2.6.5	
DROP18	76PCM08	1C31232G01	M76XA2356J	CF BLDG FLR 2 CH4 ELVTR LOBBY	FAIL	NORMAL	DI	1.2.6.6	
DROP18	76PCM08	1C31232G01	M76XA2356K	CF BLDG FLR 2 CH4 WOMENS RR	FAIL	NORMAL	DI	1.2.6.7	
DROP18	76PCM08	1C31232G01	M76XA2356L	CF BLDG FLR 2 CH4 MENS RR	FAIL	NORMAL	DI	1.2.6.8	
DROP18	76PCM08	1C31232G01	M76XA2356M	CF BLDG FLR 2 CH4 JANITOR CLST	FAIL	NORMAL	DI	1.2.6.9	
DROP18	76PCM08	1C31232G01	M76XA2356N	CF BLDG FLR 2 CH4 LABORATORY	FAIL	NORMAL	DI	1.2.6.10	
DROP18	76PCM08	1C31232G01	M76XA2356P	CF BLDG FLR 2 CH4 O&C ROOM	FAIL	NORMAL	DI	1.2.6.11	
DROP18	76PCM08	1C31232G01	M76XA2356Q	CF BLDG FLR 2 CH4 STARTER RM 2	FAIL	NORMAL	DI	1.2.6.12	
DROP18	76PCM08	1C31232G01	M76XA2356R	CF BLDG FLR 2 CH4 STARTER RM 3	FAIL	NORMAL	DI	1.2.6.13	
DROP18	76PCM08	1C31232G01	M76AAH2357A	CF BLDG FLR 3 CH4 CF AREA SW	HIGH	NORMAL	DI	1.2.6.14	
DROP18	76PCM08	1C31232G01	M76AAH2357B	CF BLDG FLR 3 CH4 CF AREA W	HIGH	NORMAL	DI	1.2.6.15	
DROP18	76PCM08	1C31232G01	<b>M18QC2S06</b>	<b>DPU18 QC DROP 2 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.2.6.16	
DROP18	76PCM08		Spare Module Address						1.2.7

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DROP18	76PMC08	5X00419G01		76VDL08 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8
DROP18	76PCM08	1C31232G01	M76EAL9221	76USSB - LINE A TRANSFORMER	U/VOLT	NORMAL	DI	1.3.1.1
DROP18	76PCM08	1C31232G01	M76UA9221	76USSB - LINE A TRANSFORMER	NORMAL	FAIL	DI	1.3.1.2
DROP18	76PCM08	1C31232G01	M76ZA9223	76USSB - FEED A BREAKER	NORMAL	TRIPPD	DI	1.3.1.3
DROP18	76PCM08	1C31232G01	M76ZA9225	76USSB - TIE BREAKER	NORMAL	TRIPPD	DI	1.3.1.4
DROP18	76PCM08	1C31232G01	M76ZA9226	76USSB - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.3.1.5
DROP18	76PCM08	1C31232G01	M76ZB9223	76USSB - FEED A BREAKER	NORMAL	CLOSED	DI	1.3.1.6
DROP18	76PCM08	1C31232G01	M76ZB9225	76USSB - TIE BREAKER	NORMAL	CLOSED	DI	1.3.1.7
DROP18	76PCM08	1C31232G01	M76ZB9226	76USSB - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.3.1.8
DROP18	76PCM08	1C31232G01	M76ZB9229	76USSB - 76-DC-05 FEED BREAKER	NORMAL	CLOSED	DI	1.3.1.9
DROP18	76PCM08	1C31232G01	M76ZD9223	76USSB - FEED A BREAKER	NORMAL	OPENED	DI	1.3.1.10
DROP18	76PCM08	1C31232G01	M76ZD9225	76USSB - TIE BREAKER	NORMAL	OPENED	DI	1.3.1.11
DROP18	76PCM08	1C31232G01	M76ZD9226	76USSB - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.3.1.12
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.1.13
DROP18	76PCM08	1C31232G01	M76ZD9229	76USSB - 76-DC-05 FEED BREAKER	NORMAL	OPENED	DI	1.3.1.14
DROP18	76PCM08	1C31232G01	M76ZA9230	76USSB - 76-DC-08 FEED BREAKER	TRIPPD	NORMAL	DI	1.3.1.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S01</b>	<b>DCU18 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16
DROP18	76PCM08	1C31232G01	M76ZD9247	76USSC - 76MCC76C01 FD BREAKER	NORMAL	OPENED	DI	1.3.2.1
DROP18	76PCM08	1C31232G01	M76ZD9249	76USSC - 76-DC-01 FEED BREAKER	NORMAL	OPENED	DI	1.3.2.2
DROP18	76PCM08	1C31232G01	M76ZA9253	76USSC - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.3.2.3
DROP18	76PCM08	1C31232G01	M76ZB9251	76USSC - 76-DC-02 FEED BREAKER	NORMAL	CLOSED	DI	1.3.2.4
DROP18	76PCM08	1C31232G01	M76ZB9253	76USSC - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.3.2.5
DROP18	76PCM08	1C31232G01	M76ZD9251	76USSC - 76-DC-02 FEED BREAKER	NORMAL	OPENED	DI	1.3.2.6
DROP18	76PCM08	1C31232G01	M76ZD9253	76USSC - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.3.2.7
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.2.8
DROP18	76PCM08	1C31232G01	M76ZA9232	76USSB - 76MCC76B02 FD BREAKER	TRIPPD	NORMAL	DI	1.3.2.9
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.2.10
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.2.11
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.2.12
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.2.13
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.2.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.2.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S02</b>	<b>DCU18 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16
DROP18	76PCM08	1C31232G01	M76AAHH2356A	CF BLDG FLR 2 CH4 GRIT AREA W	HI-HI	NORMAL	DI	1.3.3.1
DROP18	76PCM08	1C31232G01	M76AAHH2356B	CF BLDG FLR 2 CH4 GRIT AREA S	HI-HI	NORMAL	DI	1.3.3.2
DROP18	76PCM08	1C31232G01	M76AAH2356C	CF BLDG FLR 2 CH4 GRIT AREA N	HIGH	NORMAL	DI	1.3.3.3
DROP18	76PCM08	1C31232G01	M76XA2356C	CF BLDG FLR 2 CH4 GRIT AREA N	FAIL	NORMAL	DI	1.3.3.4
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.5
DROP18	76PCM08	1C31232G01	M76AAHH2356C	CF BLDG FLR 2 CH4 GRIT AREA N	HI-HI	NORMAL	DI	1.3.3.6
DROP18	76PCM08	1C31232G01	M76AAHH2357E	CF BLDG FLR 3 CH4 CF AREA E	HI-HI	NORMAL	DI	1.3.3.7
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.8
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.9
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.10
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.11
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.12
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.13

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S03</b>	<b>DPU18 QC DROP 3 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.3.16
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.1
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.2
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.3
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.4
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.5
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.6
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.7
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.8
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.9
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.10
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.11
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.12
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.13
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S04</b>	<b>DPU18 QC DROP 3 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.4.16
DROP18	76PCM08	1C31232G01	M76AAH2356D	CF BLDG FLR 2 CH4 HVAC ROOM	HIGH	NORMAL	DI	1.3.5.1
DROP18	76PCM08	1C31232G01	M76AAH2356E	CF BLDG FLR 2 CH4 STARTR RM 1	HIGH	NORMAL	DI	1.3.5.2
DROP18	76PCM08	1C31232G01	M76AAH2356F	CF BLDG FLR 2 CH4 CORRIDOR	HIGH	NORMAL	DI	1.3.5.3
DROP18	76PCM08	1C31232G01	M76AAH2356G	CF BLDG FLR 2 CH4 ST AREA 1	HIGH	NORMAL	DI	1.3.5.4
DROP18	76PCM08	1C31232G01	M76AAH2356H	CF BLDG FLR 2 CH4 ST AREA 2	HIGH	NORMAL	DI	1.3.5.5
DROP18	76PCM08	1C31232G01	M76AAH2356J	CF BLDG FLR 2 CH4 ELVTR LOBBY	HIGH	NORMAL	DI	1.3.5.6
DROP18	76PCM08	1C31232G01	M76AAH2356K	CF BLDG FLR 2 CH4 WOMENS RR	HIGH	NORMAL	DI	1.3.5.7
DROP18	76PCM08	1C31232G01	M76AAH2356L	CF BLDG FLR 2 CH4 MENS RR	1.3.5.1	NORMAL	DI	1.3.5.8
DROP18	76PCM08	1C31232G01	M76AAH2356M	CF BLDG FLR 2 CH4 JANITOR CLST	HIGH	NORMAL	DI	1.3.5.9
DROP18	76PCM08	1C31232G01	M76AAH2356N	CF BLDG FLR 2 CH4 LABORATORY	HIGH	NORMAL	DI	1.3.5.10
DROP18	76PCM08	1C31232G01	M76AAH2356P	CF BLDG FLR 2 CH4 O&C ROOM	HIGH	NORMAL	DI	1.3.5.11
DROP18	76PCM08	1C31232G01	M76AAH2356Q	CF BLDG FLR 2 CH4 STARTER RM 2	HIGH	NORMAL	DI	1.3.5.12
DROP18	76PCM08	1C31232G01	M76AAH2356R	CF BLDG FLR 2 CH4 STARTER RM 3	HIGH	NORMAL	DI	1.3.5.13
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.5.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.5.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S05</b>	<b>DPU18 QC DROP 3 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.5.16
DROP18	76PCM08	1C31232G01	M76AAH2357D	CF BLDG FLR 3 CH4 CF AREA SE	HIGH	NORMAL	DI	1.3.6.1
DROP18	76PCM08	1C31232G01	M76AAH2357E	CF BLDG FLR 3 CH4 CF AREA E	HIGH	NORMAL	DI	1.3.6.2
DROP18	76PCM08	1C31232G01	M76AAH2357F	CF BLDG FLR 3 CH4 CF AREA NE	HIGH	NORMAL	DI	1.3.6.3
DROP18	76PCM08	1C31232G01	M76AAH2357G	CF BLDG FLR 3 CH4 HVAC RM 1	HIGH	NORMAL	DI	1.3.6.4
DROP18	76PCM08	1C31232G01	M76AAH2357H	CF BLDG FLR 3 CH4 T & C RM 1	HIGH	NORMAL	DI	1.3.6.5
DROP18	76PCM08	1C31232G01	M76AAH2357J	CF BLDG FLR 3 CH4 CORRIDOR	HIGH	NORMAL	DI	1.3.6.6
DROP18	76PCM08	1C31232G01	M76AAH2357K	CF BLDG FLR 3 CH4 ST AREA1	HIGH	NORMAL	DI	1.3.6.7

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	1C31232G01	M76AAH2357L	CF BLDG FLR 3 CH4 ST AREA2	HIGH	NORMAL	DI	1.3.6.8
DROP18	76PCM08	1C31232G01	M76AAH2357M	CF BLDG FLR 3 CH4 ELVTR LOBBY	HIGH	NORMAL	DI	1.3.6.9
DROP18	76PCM08	1C31232G01	M76AAH2357N	CF BLDG FLR 3 CH4 HVAC RM 2	HIGH	NORMAL	DI	1.3.6.10
DROP18	76PCM08	1C31232G01	M76AAH2357P	CF BLDG FLR 3 CH4 T & C RM 2	HIGH	NORMAL	DI	1.3.6.11
DROP18	76PCM08	1C31232G01	M76AAHH2357A	CF BLDG FLR 3 CH4 CF AREA SW	HI-HI	NORMAL	DI	1.3.6.12
DROP18	76PCM08	1C31232G01	M76AAHH2357B	CF BLDG FLR 3 CH4 CF AREA W	HI-HI	NORMAL	DI	1.3.6.13
DROP18	76PCM08	1C31232G01	M76AAHH2357C	CF BLDG FLR 3 CH4 CF AREA NW	HI-HI	NORMAL	DI	1.3.6.14
DROP18	76PCM08	1C31232G01	M76AAHH2357D	CF BLDG FLR 3 CH4 CF AREA SE	HI-HI	NORMAL	DI	1.3.6.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S06</b>	<b>DPU18 QC DROP 3 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.6.16
DROP18	76PCM08	1C31232G01	M76EAL9222	76USSB - LINE B TRANSFORMER	U/VOLT	NORMAL	DI	1.3.7.1
DROP18	76PCM08	1C31232G01	M76UA9222	76USSB - LINE B TRANSFORMER	NORMAL	FAIL	DI	1.3.7.2
DROP18	76PCM08	1C31232G01	M76ZA9224	76USSB - FEED B BREAKER	NORMAL	TRIPPD	DI	1.3.7.3
DROP18	76PCM08	1C31232G01	M76ZA9227	76USSB - 76MCC76B01 FD BREAKER	TRIPPD	NORMAL	DI	1.3.7.4
DROP18	76PCM08	1C31232G01	M76ZA9228	76USSB - 76-DC-06 FEED BREAKER	TRIPPD	NORMAL	DI	1.3.7.5
DROP18	76PCM08	1C31232G01	M76ZA9229	76USSB - 76-DC-05 FEED BREAKER	TRIPPD	NORMAL	DI	1.3.7.6
DROP18	76PCM08	1C31232G01	M76ZB9224	76USSB - FEED B BREAKER	NORMAL	CLOSED	DI	1.3.7.7
DROP18	76PCM08	1C31232G01	M76ZB9227	76USSB - 76MCC76B01 FD BREAKER	NORMAL	CLOSED	DI	1.3.7.8
DROP18	76PCM08	1C31232G01	M76ZB9228	76USSB - 76-DC-06 FEED BREAKER	NORMAL	CLOSED	DI	1.3.7.9
DROP18	76PCM08	1C31232G01	M76ZD9224	76USSB - FEED B BREAKER	NORMAL	OPENED	DI	1.3.7.10
DROP18	76PCM08	1C31232G01	M76ZD9227	76USSB - 76MCC76B01 FD BREAKER	NORMAL	OPENED	DI	1.3.7.11
DROP18	76PCM08	1C31232G01	M76ZD9228	76USSB - 76-DC-06 FEED BREAKER	NORMAL	OPENED	DI	1.3.7.12
DROP18	76PCM08	1C31232G01	M76ZA9231	76USSB - 76-DC-07 FEED BREAKER	TRIPPD	NORMAL	DI	1.3.7.13
DROP18	76PCM08	1C31232G01	M76ZA9233	76USSB - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.3.7.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.7.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S07</b>	<b>DPU18 QC DROP 3 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.7.16
DROP18	76PCM08	1C31232G01	M76ZD9248	76USSC - 76-DC-03 FEED BREAKER	NORMAL	OPENED	DI	1.3.8.1
DROP18	76PCM08	1C31232G01	M76ZA9250	76USSC - 76-DC-04 FEED BREAKER	TRIPPD	NORMAL	DI	1.3.8.2
DROP18	76PCM08	1C31232G01	M76ZB9250	76USSC - 76-DC-04 FEED BREAKER	NORMAL	CLOSED	DI	1.3.8.3
DROP18	76PCM08	1C31232G01	M76ZB9252	76USSC - 76MCC76C02 FD BREAKER	NORMAL	CLOSED	DI	1.3.8.4
DROP18	76PCM08	1C31232G01	M76ZD9250	76USSC - 76-DC-04 FEED BREAKER	NORMAL	OPENED	DI	1.3.8.5
DROP18	76PCM08	1C31232G01	M76ZD9252	76USSC - 76MCC76C02 FD BREAKER	NORMAL	OPENED	DI	1.3.8.6
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.8.7
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.8.8
DROP18	76PCM08	1C31232G01	M76ZD9244	76USSC - FEED B BREAKER	NORMAL	OPENED	DI	1.3.8.9
DROP18	76PCM08	1C31232G01	M76AAHH2355A	CF BLDG G/FLR CH4 GRIT AREA S	HI-HI	NORMAL	DI	1.3.8.10
DROP18	76PCM08	1C31232G01	M76XA2357G	CF BLDG FLR 3 CH4 HVAC RM 1	FAIL	NORMAL	DI	1.3.8.11
DROP18	76PCM08	1C31232G01	M76ZA9252	76USSC - 76MCC76C02 FD BREAKER	TRIPPD	NORMAL	DI	1.3.8.12
DROP18	76PCM08	1C31232G01	M76XA2355B	CF BLDG G/FLR CH4 GRIT AREA N	FAIL	NORMAL	DI	1.3.8.13
DROP18	76PCM08	1C31232G01	M76AAHH2358B	CF BLDG GLRY LVL CH4 ELVTR LBY	HI-HI	NORMAL	DI	1.3.8.14
DROP18	76PCM08	1C31232G01	M76AAH2357C	CF BLDG FLR 3 CH4 CF AREA NW	HIGH	NORMAL	DI	1.3.8.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S08</b>	<b>DPU18 QC DROP 3 SL08 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.8.16



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	1C31232G01	M76QI1100	GRIT SEPARATOR 1 INLET VALVE	NORMAL	INCOMP	DI	1.4.1.1
DROP18	76PCM08	1C31232G01	M76RI1100	GRIT SEPARATOR 1 INLET VALVE	WAIT	READY	DI	1.4.1.2
DROP18	76PCM08	1C31232G01	M76ZB1100	GRIT SEPARATOR 1 INLET VALVE	NORMAL	CLOSED	DI	1.4.1.3
DROP18	76PCM08	1C31232G01	M76ZD1100	GRIT SEPARATOR 1 INLET VALVE	NORMAL	OPENED	DI	1.4.1.4
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.1.5
DROP18	76PCM08	1C31232G01	M76QI1103	GRIT SEPARATOR 1 DISCH VALVE	NORMAL	INCOMP	DI	1.4.1.6
DROP18	76PCM08	1C31232G01	M76RI1103	GRIT SEPARATOR 1 DISCH VALVE	WAIT	READY	DI	1.4.1.7
DROP18	76PCM08	1C31232G01	M76ZB1103	GRIT SEPARATOR 1 DISCH VALVE	NORMAL	CLOSED	DI	1.4.1.8
DROP18	76PCM08	1C31232G01	M76ZD1103	GRIT SEPARATOR 1 DISCH VALVE	NORMAL	OPENED	DI	1.4.1.9
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.1.10
DROP18	76PCM08	1C31232G01	<b>M76QI1101</b>	<b>GRIT SEPARATOR 1 GRIT VALVE 1</b>	<b>NORMAL</b>	<b>INCOMP</b>	DI	1.4.1.11
DROP18	76PCM08	1C31232G01	M76RI1101	GRIT SEPARATOR 1 GRIT VALVE 1	WAIT	READY	DI	1.4.1.12
DROP18	76PCM08	1C31232G01	M76ZB1101	GRIT SEPARATOR 1 GRIT VALVE 1	NORMAL	CLOSED	DI	1.4.1.13
DROP18	76PCM08	1C31232G01	M76ZD1101	GRIT SEPARATOR 1 GRIT VALVE 1	NORMAL	OPENED	DI	1.4.1.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.1.15
DROP18	76PCM08	1C31232G01	<b>M18QC4S01</b>	<b>DPU18 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16
DROP18	76PCM08	1C31232G01	M76AAH2355A	CF BLDG G/FLR CH4 GRIT AREA S	HIGH	NORMAL	DI	1.4.2.1
DROP18	76PCM08	1C31232G01	M76AAH2355B	CF BLDG G/FLR CH4 GRIT AREA N	HIGH	NORMAL	DI	1.4.2.2
DROP18	76PCM08	1C31232G01	M76AAH2355C	CF BLDG G/FLR CH4 DW AREA SW	HIGH	NORMAL	DI	1.4.2.3
DROP18	76PCM08	1C31232G01	M76AAH2355D	CF BLDG G/FLR CH4 DW AREA SE	HIGH	NORMAL	DI	1.4.2.4
DROP18	76PCM08	1C31232G01	M76AAH2355E	CF BLDG G/FLR CH4 DW AREA NW	HIGH	NORMAL	DI	1.4.2.5
DROP18	76PCM08	1C31232G01	M76AAH2355F	CF BLDG G/FLR CH4 DW AREA NE	HIGH	NORMAL	DI	1.4.2.6
DROP18	76PCM08	1C31232G01	M76AAH2355G	CF BLDG G/FLR CH4 THKNG AREA W	HIGH	NORMAL	DI	1.4.2.7
DROP18	76PCM08	1C31232G01	M76AAH2355H	CF BLDG G/FLR CH4 THKNG AREA E	HIGH	NORMAL	DI	1.4.2.8
DROP18	76PCM08	1C31232G01	M76AAH2355J	CF BLDG G/FLR CH4 CHEM AREA 1	HIGH	NORMAL	DI	1.4.2.9
DROP18	76PCM08	1C31232G01	M76AAH2355K	CF BLDG G/FLR CH4 CHEM AREA 2	HIGH	NORMAL	DI	1.4.2.10
DROP18	76PCM08	1C31232G01	M76AAH2355L	CF BLDG G/FLR CH4 MCC ROOM 1	HIGH	NORMAL	DI	1.4.2.11
DROP18	76PCM08	1C31232G01	M76AAH2355M	CF BLDG G/FLR CH4 MCC ROOM 2	HIGH	NORMAL	DI	1.4.2.12
DROP18	76PCM08	1C31232G01	M76AAH2355N	CF BLDG G/FLR CH4 ST AREA 1	HIGH	NORMAL	DI	1.4.2.13
DROP18	76PCM08	1C31232G01	M76AAH2355P	CF BLDG G/FLR CH4 ST AREA 2	HIGH	NORMAL	DI	1.4.2.14
DROP18	76PCM08	1C31232G01	M76AAH2355Q	CF BLDG G/FLR CH4 ELEVTR LOBBY	HIGH	NORMAL	DI	1.4.2.15
DROP18	76PCM08	1C31232G01	<b>M18QC4S02</b>	<b>DPU18 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16
DROP18	76PCM08	1C31232G01	<b>M76QI1118</b>	<b>GRIT SEPARATOR 4 INLET VALVE</b>	<b>NORMAL</b>	<b>INCOMP</b>	DI	1.4.3.1
DROP18	76PCM08	1C31232G01	<b>M76RI1118</b>	<b>GRIT SEPARATOR 4 INLET VALVE</b>	<b>WAIT</b>	<b>READY</b>	DI	1.4.3.2
DROP18	76PCM08	1C31232G01	<b>M76ZB1118</b>	<b>GRIT SEPARATOR 4 INLET VALVE</b>	<b>NORMAL</b>	<b>CLOSED</b>	DI	1.4.3.3
DROP18	76PCM08	1C31232G01	<b>M76ZD1118</b>	<b>GRIT SEPARATOR 4 INLET VALVE</b>	<b>NORMAL</b>	<b>OPENED</b>	DI	1.4.3.4
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.3.5
DROP18	76PCM08	1C31232G01	<b>M76QI1119</b>	<b>GRIT SEPARATOR 4 DISCH VALVE</b>	<b>NORMAL</b>	<b>INCOMP</b>	DI	1.4.3.6
DROP18	76PCM08	1C31232G01	<b>M76RI1119</b>	<b>GRIT SEPARATOR 4 DISCH VALVE</b>	<b>WAIT</b>	<b>READY</b>	DI	1.4.3.7
DROP18	76PCM08	1C31232G01	<b>M76ZB1119</b>	<b>GRIT SEPARATOR 4 DISCH VALVE</b>	<b>NORMAL</b>	<b>CLOSED</b>	DI	1.4.3.8
DROP18	76PCM08	1C31232G01	<b>M76ZD1119</b>	<b>GRIT SEPARATOR 4 DISCH VALVE</b>	<b>NORMAL</b>	<b>OPENED</b>	DI	1.4.3.9
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.3.10
DROP18	76PCM08	1C31232G01	<b>M76QI1124</b>	<b>GRIT SEPARATOR 4 GRIT VALVE</b>	<b>NORMAL</b>	<b>INCOMP</b>	DI	1.4.3.11
DROP18	76PCM08	1C31232G01	<b>M76RI1124</b>	<b>GRIT SEPARATOR 4 GRIT VALVE</b>	<b>WAIT</b>	<b>READY</b>	DI	1.4.3.12
DROP18	76PCM08	1C31232G01	<b>M76ZB1124</b>	<b>GRIT SEPARATOR 4 GRIT VALVE</b>	<b>NORMAL</b>	<b>CLOSED</b>	DI	1.4.3.13

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	1C31232G01	<b>M76ZD1124</b>	<b>GRIT SEPARATOR 4 GRIT VALVE</b>	<b>NORMAL</b>	<b>OPENED</b>	DI	1.4.3.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.3.15
DROP18	76PCM08	1C31232G01	<b>M18QC4S03</b>	<b>DPU18 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.1
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.2
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.3
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.4
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.5
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.6
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.7
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.8
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.9
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.10
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.11
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.12
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.13
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.15
DROP18	76PCM08	1C31232G01	<b>M18QC4S04</b>	<b>DPU18 QC DROP 4 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16
DROP18	76PCM08	1C31232G01	M76AAHH2356D	CF BLDG FLR 2 CH4 HVAC ROOM	HI-HI	NORMAL	DI	1.4.5.1
DROP18	76PCM08	1C31232G01	M76AAHH2356E	CF BLDG FLR 2 CH4 STARTR RM 1	HI-HI	NORMAL	DI	1.4.5.2
DROP18	76PCM08	1C31232G01	M76AAHH2356F	CF BLDG FLR 2 CH4 CORRIDOR	HI-HI	NORMAL	DI	1.4.5.3
DROP18	76PCM08	1C31232G01	M76AAHH2356G	CF BLDG FLR 2 CH4 ST AREA 1	HI-HI	NORMAL	DI	1.4.5.4
DROP18	76PCM08	1C31232G01	M76AAHH2356H	CF BLDG FLR 2 CH4 ST AREA 2	HI-HI	NORMAL	DI	1.4.5.5
DROP18	76PCM08	1C31232G01	M76AAHH2356J	CF BLDG FLR 2 CH4 ELVTR LOBBY	HI-HI	NORMAL	DI	1.4.5.6
DROP18	76PCM08	1C31232G01	M76AAHH2356K	CF BLDG FLR 2 CH4 WOMENS RR	HI-HI	NORMAL	DI	1.4.5.7
DROP18	76PCM08	1C31232G01	M76AAHH2356L	CF BLDG FLR 2 CH4 MENS RR	HI-HI	NORMAL	DI	1.4.5.8
DROP18	76PCM08	1C31232G01	M76AAHH2356M	CF BLDG FLR 2 CH4 JANITOR CLST	HI-HI	NORMAL	DI	1.4.5.9
DROP18	76PCM08	1C31232G01	M76AAHH2356N	CF BLDG FLR 2 CH4 LABORATORY	HI-HI	NORMAL	DI	1.4.5.10
DROP18	76PCM08	1C31232G01	M76AAHH2356P	CF BLDG FLR 2 CH4 O&C ROOM	HI-HI	NORMAL	DI	1.4.5.11
DROP18	76PCM08	1C31232G01	M76AAHH2356Q	CF BLDG FLR 2 CH4 STARTER RM 2	HI-HI	NORMAL	DI	1.4.5.12
DROP18	76PCM08	1C31232G01	M76AAHH2356R	CF BLDG FLR 2 CH4 STARTER RM 3	HI-HI	NORMAL	DI	1.4.5.13
DROP18	76PCM08	1C31232G01	M76XA2356A	CF BLDG FLR 2 CH4 GRIT AREA W	FAIL	NORMAL	DI	1.4.5.14
DROP18	76PCM08	1C31232G01	M76XA2356B	CF BLDG FLR 2 CH4 GRIT AREA S	FAIL	NORMAL	DI	1.4.5.15
DROP18	76PCM08	1C31232G01	<b>M18QC4S05</b>	<b>DPU18 QC DROP 4 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.5.16



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	1C31232G01	M76AAHH2357F	CF BLDG FLR 3 CH4 CF AREA NE	HI-HI	NORMAL	DI	1.4.6.1
DROP18	76PCM08	1C31232G01	M76AAHH2357G	CF BLDG FLR 3 CH4 HVAC RM 1	HI-HI	NORMAL	DI	1.4.6.2
DROP18	76PCM08	1C31232G01	M76AAHH2357H	CF BLDG FLR 3 CH4 T & C RM 1	HI-HI	NORMAL	DI	1.4.6.3
DROP18	76PCM08	1C31232G01	M76AAHH2357J	CF BLDG FLR 3 CH4 CORRIDOR	HI-HI	NORMAL	DI	1.4.6.4
DROP18	76PCM08	1C31232G01	M76AAHH2357K	CF BLDG FLR 3 CH4 ST AREA1	HI-HI	NORMAL	DI	1.4.6.5
DROP18	76PCM08	1C31232G01	M76AAHH2357L	CF BLDG FLR 3 CH4 ST AREA2	HI-HI	NORMAL	DI	1.4.6.6
DROP18	76PCM08	1C31232G01	M76AAHH2357M	CF BLDG FLR 3 CH4 ELVTR LOBBY	HI-HI	NORMAL	DI	1.4.6.7
DROP18	76PCM08	1C31232G01	M76AAHH2357N	CF BLDG FLR 3 CH4 HVAC RM 2	HI-HI	NORMAL	DI	1.4.6.8
DROP18	76PCM08	1C31232G01	M76AAHH2357P	CF BLDG FLR 3 CH4 T & C RM 2	HI-HI	NORMAL	DI	1.4.6.9
DROP18	76PCM08	1C31232G01	M76XA2357A	CF BLDG FLR 3 CH4 CF AREA SW	FAIL	NORMAL	DI	1.4.6.10
DROP18	76PCM08	1C31232G01	M76XA2357B	CF BLDG FLR 3 CH4 CF AREA W	FAIL	NORMAL	DI	1.4.6.11
DROP18	76PCM08	1C31232G01	M76XA2357C	CF BLDG FLR 3 CH4 CF AREA NW	FAIL	NORMAL	DI	1.4.6.12
DROP18	76PCM08	1C31232G01	M76XA2357D	CF BLDG FLR 3 CH4 CF AREA SE	FAIL	NORMAL	DI	1.4.6.13
DROP18	76PCM08	1C31232G01	M76XA2357E	CF BLDG FLR 3 CH4 CF AREA E	FAIL	NORMAL	DI	1.4.6.14
DROP18	76PCM08	1C31232G01	M76XA2357F	CF BLDG FLR 3 CH4 CF AREA NE	FAIL	NORMAL	DI	1.4.6.15
DROP18	76PCM08	1C31232G01	<b>M18QC4S06</b>	<b>DPU18 QC DROP 4 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.6.16
DROP18	76PCM08	1C31232G01	M76ZB9231	76USSB - 76-DC-07 FEED BREAKER	NORMAL	CLOSED	DI	1.4.7.1
DROP18	76PCM08	1C31232G01	M76ZB9233	76USSB - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.4.7.2
DROP18	76PCM08	1C31232G01	M76ZD9231	76USSB - 76-DC-07 FEED BREAKER	NORMAL	OPENED	DI	1.4.7.3
DROP18	76PCM08	1C31232G01	M76ZD9233	76USSB - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.4.7.4
DROP18	76PCM08	1C31232G01	M76EAL9242	76USSC - LINE B TRANSFORMER	U/VOLT	NORMAL	DI	1.4.7.5
DROP18	76PCM08	1C31232G01	M76UA9242	76USSC - LINE B TRANSFORMER	NORMAL	TRBL	DI	1.4.7.6
DROP18	76PCM08	1C31232G01	M76ZA9244	76USSC - FEED B BREAKER	NORMAL	TRIPPD	DI	1.4.7.7
DROP18	76PCM08	1C31232G01	M76ZA9246	76USSC - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.4.7.8
DROP18	76PCM08	1C31232G01	M76ZA9248	76USSC - 76-DC-03 FEED BREAKER	TRIPPD	NORMAL	DI	1.4.7.9
DROP18	76PCM08	1C31232G01	M76ZA9249	76USSC - 76-DC-01 FEED BREAKER	TRIPPD	NORMAL	DI	1.4.7.10
DROP18	76PCM08	1C31232G01	M76ZB9244	76USSC - FEED B BREAKER	NORMAL	CLOSED	DI	1.4.7.11
DROP18	76PCM08	1C31232G01	M76ZB9246	76USSC - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.4.7.12
DROP18	76PCM08	1C31232G01	M76ZB9247	76USSC - 76MCC76C01 FD BREAKER	NORMAL	CLOSED	DI	1.4.7.13
DROP18	76PCM08	1C31232G01	M76ZB9248	76USSC - 76-DC-03 FEED BREAKER	NORMAL	CLOSED	DI	1.4.7.14
DROP18	76PCM08	1C31232G01	M76ZB9249	76USSC - 76-DC-01 FEED BREAKER	NORMAL	CLOSED	DI	1.4.7.15
DROP18	76PCM08	1C31232G01	<b>M18QC4S07</b>	<b>DPU18 QC DROP 4 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.7.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	Spare Module Address						1.4.8
DROP18	76PCM08	5A26458G04	M76HS1100A	GRIT SEPARATOR 1 INLET VALVE	OFF	OPEN	DO	1.5.1.1
DROP18	76PCM08	5A26458G04	M76HS1100B	GRIT SEPARATOR 1 INLET VALVE	OFF	CLOSE	DO	1.5.1.2
DROP18	76PCM08	5A26458G04	SPARE				DO	1.5.1.3
DROP18	76PCM08	5A26458G04	M76HS1101A	GRIT SEPARATOR 1 GRIT VALVE 2	OFF	OPEN	DO	1.5.1.4
DROP18	76PCM08	5A26458G04	M76HS1101B	GRIT SEPARATOR 1 GRIT VALVE 2	OFF	CLOSE	DO	1.5.1.5
DROP18	76PCM08	5A26458G04	SPARE				DO	1.5.1.6
DROP18	76PCM08	5A26458G04	M76HS1103A	GRIT SEPARATOR 1 DISCH VALVE	OFF	OPEN	DO	1.5.1.7
DROP18	76PCM08	5A26458G04	M76HS1103B	GRIT SEPARATOR 1 DISCH VALVE	OFF	CLOSE	DO	1.5.1.8
DROP18	76PCM08	5A26458G04	SPARE				DO	1.5.1.9
DROP18	76PCM08	5A26458G04	SPARE				DO	1.5.1.10
DROP18	76PCM08	5A26458G04	M76HS1102A	GRIT DEWATERING UNIT NO.1 INLET VALVE	OFF	OPEN	DO	1.5.1.11
DROP18	76PCM08	5A26458G04	M76HS1102B	GRIT DEWATERING UNIT NO.1 INLET VALVE	OFF	CLOSE	DO	1.5.1.12
DROP18	76PCM08	5A26458G04	M76HS1118A	GRIT SEPARATOR 4 INLET VALVE	OFF	OPEN	DO	1.6.2.1
DROP18	76PCM08	5A26458G04	M76HS1118B	GRIT SEPARATOR 4 INLET VALVE	OFF	CLOSE	DO	1.6.2.2
DROP18	76PCM08	5A26458G04	SPARE				DO	1.6.2.3
DROP18	76PCM08	5A26458G04	M76HS1119A	GRIT SEPARATOR 4 DISCH VALVE	OFF	OPEN	DO	1.6.2.4
DROP18	76PCM08	5A26458G04	M76HS1119B	GRIT SEPARATOR 4 DISCH VALVE	OFF	CLOSE	DO	1.6.2.5
DROP18	76PCM08	5A26458G04	SPARE				DO	1.6.2.6
DROP18	76PCM08	5A26458G04	M76HS1124A	GRIT SEPARATOR 4 GRIT VALVE 2	OFF	OPEN	DO	1.6.2.7
DROP18	76PCM08	5A26458G04	M76HS1124B	GRIT SEPARATOR 4 GRIT VALVE 2	OFF	CLOSE	DO	1.6.2.8
DROP18	76PCM08	5A26458G04	SPARE				DO	1.6.2.9
DROP18	76PCM08	5A26458G04	SPARE				DO	1.6.2.10
DROP18	76PCM08	5A26458G04	SPARE				DO	1.6.2.11
DROP18	76PCM08	5A26458G04	SPARE				DO	1.6.2.12

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP29	94PCM01	5X00419G01		94VDL01 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1
			94MV1125	CENTRATE PUMP 1 INLET VALVE				
			94MV1126	CENTRATE PUMP 1 DISCHARGE VALVE				
			94MV1135	CENTRATE PUMP 3 INLET VALVE				
			94MV1136	CENTRATE PUMP 3 DISCHARGE VALVE				
			94MV1160	SCRUBBER 1 ACID INLET VALVE				
			94MV1165	ODER CONTROL RECIRCULATING PUMP 1 INLET VALVE				
			94MV1166	ODER CONTROL RECIRCULATING PUMP 1 DISCHARGE VALVE				
			94MV1180	SCRUBBER 2 CAUSTIC AND SHT INLET VALVE				
			94MV1185	ODER CONTROL RECIRCULATING PUMP 2 INLET VALVE				
			94MV1186	ODER CONTROL RECIRCULATING PUMP 2 DISCHARGE VALVE				
			94MV1320	SHT FEED PUMP 2 INLET VALVE				
			94MV1321	SHT FEED PUMP 2 DISCHARGE VALVE				
			94MV1350	CAUSTIC FEED PUMP 2 INLET VALVE				
			94MV1351	CAUSTIC FEED PUMP 2 DISCHARGE VALVE				
			94MV1380	ACID FEED PUMP 2 INLET VALVE				
94MV1381	ACID FEED PUMP 2 DISCHARGE VALVE							
DROP29	94PCM01	5X00419G01	<b>M94P0111</b>	<b>CENTRATE PUMP NO. 1</b>			ET	1.1.2
DROP29	94PCM01	5X00106G01	M94FT2123	CENTRATE PUMPS DISCHARGE FLOW	0	5000 GPM	AI - HART	1.1.3.1
DROP29	94PCM01	5X00106G01	M94PT2119	CENTRATE PUMPS DISCHARGE PRESS	0	100 PSIG	AI - HART	1.1.3.2
DROP29	94PCM01	5X00106G01	M94AT2129	CENTRATE PUMPS ANALYZER	0	14 PCT	AI - HART	1.1.3.3
DROP29	94PCM01	5X00106G01	M94LT2250	WASTEWATER WET WELL 1 LEVEL	0	15 FT	AI - HART	1.1.3.4
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.1.3.5
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.1.3.6
DROP29	94PCM01	5X00106G01	M94ST0111	CENTRATE PUMP NO. 1 SPEED	0	100 PCT	AI - HART	1.1.3.7
DROP29	94PCM01	5X00106G01	M94LT2120	CENTRATE WET WELL LEVEL 1	0	15 FT	AI - HART	1.1.3.8
DROP29	94PCM01	5X00106G01	M94PDT2190A	OC CRBN ADS 1 PRESS DROP	0	12 IN H2O	AI - HART	1.1.4.1
DROP29	94PCM01	5X00106G01	M94PDT2190B	OC CRBN ADS 1 PRESS DROP	0	12 IN H2O	AI - HART	1.1.4.2
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.1.4.3
DROP29	94PCM01	5X00106G01	M94PT2194	OC EXHST FAN 1 INLET PRESS	-20	0 INWC	AI - HART	1.1.4.4
DROP29	94PCM01	5X00106G01	M94TT2170	OC HEAT COIL 5 INLET AIR TEMP	30	120 DEG F	AI - HART	1.1.4.5
DROP29	94PCM01	5X00106G01	M94TT2171	OC HEAT COIL 5 DISCH TEMP	30	120 DEG F	AI - HART	1.1.4.6
DROP29	94PCM01	5X00106G01	M94FT2165B	OC SCRUBBER 1 RECIRC FLOW	0	150 GPM	AI - HART	1.1.4.7
DROP29	94PCM01	5X00106G01	M94FT2185B	OC SCRUBBER 2 RECIRC FLOW	0	150 GPM	AI - HART	1.1.4.8
DROP29	94PCM01	5X00106G01	M94AT2160	OC SCRUBBER 1 PH	0	14 PH	AI - HART	1.1.5.1
DROP29	94PCM01	5X00106G01	M94AT2180	OC SCRUBBER 2 PH	0	14 PH	AI - HART	1.1.5.2
DROP29	94PCM01	5X00106G01	M94AT2181	OC SCRUBBER 2 ORP	0	1000 PH	AI - HART	1.1.5.3
DROP29	94PCM01	5X00106G01	M94AT2198	OC STACK NO. 1 H2S	0	5 mVOLTS	AI - HART	1.1.5.4
DROP29	94PCM01	5X00106G01	M94AT2199	OC STACK NO. 1 AMMONIA	0	20 PPM	AI - HART	1.1.5.5
DROP29	94PCM01	5X00106G01	M94PDT2162A	OC SCRBR 1 PRESS DROP	0	3 IN H2O	AI - HART	1.1.5.6
DROP29	94PCM01	5X00106G01	M94PDT2162B	OC SCRBR 1 PRESS DROP	0	6 IN H2O	AI - HART	1.1.5.7
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.1.5.8

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP29	94PCM01	Spare Module Address							1.1.6
DROP29	94PCM01	5X00167G01	M94AC2180	OC SCRUBBER 2 pH SETPOINT	0	14 PH	AO	1.1.7.1	
DROP29	94PCM01	5X00167G01	M94SC0171	OC EXHST FAN1 OUT DMND	0	100 PCT	AO	1.1.7.2	
DROP29	94PCM01	5X00167G01	M94SC0142	ACID FEED PUMP NO. 2 SPD DMND	0	100 PCT	AO	1.1.7.3	
DROP29	94PCM01	5X00167G01					AO	1.1.7.4	
DROP29	94PCM01	5X00167G01	M94LC2250	WSTWTR WW 1 LVL STPNT/SPD DMND	0	100 PCT	AO	1.1.7.5	
DROP29	94PCM01	5X00167G01	M94SC0111	CENTRATE PUMP NO. 1 SPD DMND	0	100 PCT	AO	1.1.7.6	
DROP29	94PCM01	5X00167G01	M94SC0122	SHT FEED PUMP NO. 2 SPD DMND	0	100 PCT	AO	1.1.7.7	
DROP29	94PCM01	5X00167G01					AO	1.1.7.8	
DROP29	94PCM01	5X00119G01	MDPU29T1	DPU29 94PCM01 CABINET TEMP	32	154	RTD	1.1.8.1	
DROP29	94PCM01	5X00119G01	SPARE				RTD	1.1.8.2	
DROP29	94PCM01	5X00119G01	SPARE				RTD	1.1.8.3	
DROP29	94PCM01	5X00119G01	SPARE				RTD	1.1.8.4	
DROP29	94PCM01	5X00119G01	SPARE				RTD	1.1.8.5	
DROP29	94PCM01	5X00119G01	SPARE				RTD	1.1.8.6	
DROP29	94PCM01	5X00119G01	SPARE				RTD	1.1.8.7	
DROP29	94PCM01	5X00119G01	SPARE				RTD	1.1.8.8	
DROP29	94PCM01	Spare Module Address							1.2.1
DROP29	94PCM01	5X00167G01	M94AC2160	OC SCRUBBER 1 pH SETPOINT	0	14 PH	AO	1.2.2.1	
DROP29	94PCM01	5X00167G01	M94PC2194	OC EXHST FAN1 INLET POSITION	0	100 PCT	AO	1.2.2.2	
DROP29	94PCM01	5X00167G01	M94SC0132	CAUSTIC FEED PMP 2 SPD DMND	0	100 PCT	AO	1.2.2.3	
DROP29	94PCM01	5X00167G01	SPARE				AO	1.2.2.4	
DROP29	94PCM01	5X00167G01	M94LC2120	CNTRTE WW LVL 1 STPNT/SPD DMND	0	100 PCT	AO	1.2.2.5	
DROP29	94PCM01	5X00167G01	M94SC0113	CENTRATE PUMP NO. 3 SPD DMND	0	100 PCT	AO	1.2.2.6	
DROP29	94PCM01	5X00167G01	M94TC2171	OC HEAT COIL 5 DISCH POSITION	0	100 PCT	AO	1.2.2.7	
DROP29	94PCM01	5X00167G01	SPARE				AO	1.2.2.8	
DROP29	94PCM01	Spare Module Address							1.2.3
DROP29	94PCM01	5X00106G01	M94PDT2182A	OC SCRBR 2 PRESS DROP	0	3 IN H2O	AI - HART	1.2.4.1	
DROP29	94PCM01	5X00106G01	M94PDT2182B	OC SCRBR 2 PRESS DROP	0	6 IN H2O	AI - HART	1.2.4.2	
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.2.4.3	
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.2.4.4	
DROP29	94PCM01	5X00106G01	M94ST0122	SHT FEED PUMP NO. 2 SPEED	0	100 PCT	AI - HART	1.2.4.5	
DROP29	94PCM01	5X00106G01	M94ST0132	CAUSTIC FEED PUMP NO. 2 SPEED	0	100 PCT	AI - HART	1.2.4.6	
DROP29	94PCM01	5X00106G01	M94ST0142	ACID FEED PUMP NO. 2 SPEED	0	100 PCT	AI - HART	1.2.4.7	
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.2.4.8	

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP29	94PCM01	5X00106G01	M94ST0171	OC EXHST FAN1 SPEED	0	100 PCT	AI - HART	1.2.5.1
DROP29	94PCM01	5X00106G01	M94ZT1174	OC HEAT COIL 5 H/W VALVE	0	100 PCT	AI - HART	1.2.5.2
DROP29	94PCM01	5X00106G01	M94ZT1196	OC EXHST FAN1 INLET VANE POS	0	100 PCT	AI - HART	1.2.5.3
DROP29	94PCM01	5X00106G01	M94FT2165A	OC SCRUBBER 1 MAKE-UP FLOW	0	20 GPM	AI - HART	1.2.5.4
DROP29	94PCM01	5X00106G01	M94FT2185A	OC SCRUBBER 2 MAKE-UP FLOW	0	20 GPM	AI - HART	1.2.5.5
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.2.5.6
DROP29	94PCM01	5X00106G01	M94ST0113	CENTRATE PUMP NO. 3 SPEED	0	100 PCT	AI - HART	1.2.5.7
DROP29	94PCM01	5X00106G01	M94LT2121	CENTRATE WET WELL LEVEL 2	0	15 FT	AI - HART	1.2.5.8
DROP29	94PCM01			Spare Module Address				1.2.6
DROP29	94PCM01	5X00419G01	<b>M94P0113</b>	<b>CENTRATE PUMP NO. 3</b>			ET	1.2.7
DROP29	94PCM01	5X00419G01		94VDL01 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8
DROP29	94PCM01	1C31232G01	M94MI0113	CENTRATE PMP NO. 3	OFF	RUNNNG	DI	1.3.1.1
DROP29	94PCM01	1C31232G01	M94QI0113	CENTRATE PMP NO. 3	LOCAL	INCOMP	DI	1.3.1.2
DROP29	94PCM01	1C31232G01	M94RI0113	CENTRATE PMP NO. 3	WAIT	READY	DI	1.3.1.3
DROP29	94PCM01	1C31232G01	M94UA0113	CENTRATE PMP NO. 3	NORMAL	FAIL	DI	1.3.1.4
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.1.5
DROP29	94PCM01	1C31232G01	M94QI1120	CENTRATE WW INLET SLUICE GATE	LOCAL	INCOMP	DI	1.3.1.6
DROP29	94PCM01	1C31232G01	M94RI1120	CENTRATE WW INLET SLUICE GATE	WAIT	READY	DI	1.3.1.7
DROP29	94PCM01	1C31232G01	M94ZB1120	CENTRATE WW INLET SLUICE GATE	NORMAL	CLOSED	DI	1.3.1.8
DROP29	94PCM01	1C31232G01	M94ZD1120	CENTRATE WW INLET SLUICE GATE	NORMAL	OPENED	DI	1.3.1.9
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.1.10
DROP29	94PCM01	1C31232G01	M94MI0151	OC SCRBR 1 R/C PMP NO. 1	OFF	RUNNNG	DI	1.3.1.11
DROP29	94PCM01	1C31232G01	M94QI0151	OC SCRBR 1 R/C PMP NO. 1	LOCAL	INCOMP	DI	1.3.1.12
DROP29	94PCM01	1C31232G01	M94RI0151	OC SCRBR 1 R/C PMP NO. 1	WAIT	READY	DI	1.3.1.13
DROP29	94PCM01	1C31232G01	M94PAL2163	OC SCRBR 1 R/C PMP DISCH PRESS	NORMAL	LOW	DI	1.3.1.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.1.15
DROP29	94PCM01	1C31232G01	<b>M29QC3S01</b>	<b>DPU29 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16
DROP29	94PCM01	1C31232G01	M94QI1156	OC SCRBR 1 FA DISCH DMPR	LOCAL	INCOMP	DI	1.3.2.1
DROP29	94PCM01	1C31232G01	M94RI1156	OC SCRBR 1 FA DISCH DMPR	WAIT	READY	DI	1.3.2.2
DROP29	94PCM01	1C31232G01	M94ZB1156	OC SCRBR 1 FA DISCH DMPR	NORMAL	CLOSED	DI	1.3.2.3
DROP29	94PCM01	1C31232G01	M94ZD1156	OC SCRBR 1 FA DISCH DMPR	NORMAL	OPENED	DI	1.3.2.4
DROP29	94PCM01	1C31232G01	M94QI1155	OC SCRBR 1 FA INLET DMPR	LOCAL	INCOMP	DI	1.3.2.5
DROP29	94PCM01	1C31232G01	M94RI1155	OC SCRBR 1 FA INLET DMPR	WAIT	READY	DI	1.3.2.6
DROP29	94PCM01	1C31232G01	M94ZB1155	OC SCRBR 1 FA INLET DMPR	NORMAL	CLOSED	DI	1.3.2.7
DROP29	94PCM01	1C31232G01	M94ZD1155	OC SCRBR 1 FA INLET DMPR	NORMAL	OPENED	DI	1.3.2.8
DROP29	94PCM01	1C31232G01	M94QI1157	OC SCRBR 1 FA BYPASS DMPR	LOCAL	INCOMP	DI	1.3.2.9
DROP29	94PCM01	1C31232G01	M94RI1157	OC SCRBR 1 FA BYPASS DMPR	WAIT	READY	DI	1.3.2.10
DROP29	94PCM01	1C31232G01	M94ZB1157	OC SCRBR 1 FA BYPASS DMPR	NORMAL	CLOSED	DI	1.3.2.11
DROP29	94PCM01	1C31232G01	M94ZD1157	OC SCRBR 1 FA BYPASS DMPR	NORMAL	OPENED	DI	1.3.2.12
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.2.13
DROP29	94PCM01	1C31232G01	M94ZB1261	WW SUBMERSIBLE PMP 2 DIS VLV	NORMAL	CLOSED	DI	1.3.2.14
DROP29	94PCM01	1C31232G01	M94ZD1261	WW SUBMERSIBLE PMP 2 DIS VLV	NORMAL	OPENED	DI	1.3.2.15
DROP29	94PCM01	1C31232G01	<b>M29QC3S02</b>	<b>DPU29 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP29	94PCM01	1C31232G01	M94QI2250	WASTE H2O WET WELL 1 LEVEL	LOCAL	INCOMP	DI	1.3.3.1
DROP29	94PCM01	1C31232G01	M94QI2250A	WASTE H2O WET WELL 1 LEVEL	LOCAL	INCOMP	DI	1.3.3.2
DROP29	94PCM01	1C31232G01	M94LAH2251	WASTE H2O WET WELL 1 LEVEL	NORMAL	HIGH	DI	1.3.3.3
DROP29	94PCM01	1C31232G01	M94LAL2251	WASTE H2O WET WELL 1 LEVEL	NORMAL	LOW	DI	1.3.3.4
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.3.5
DROP29	94PCM01	1C31232G01	M94MI0171	OC EXHST FAN 1 ON	OFF	RUNNG	DI	1.3.3.6
DROP29	94PCM01	1C31232G01	M94QI0171	OC EXHST FAN 1 REMOTE	LOCAL	INCOMP	DI	1.3.3.7
DROP29	94PCM01	1C31232G01	M94QI1196	OC EXHST FAN 1 CTRL PWR	-	READY	DI	1.3.3.8
DROP29	94PCM01	1C31232G01	M94RI0171	OC EXHST FAN 1	NORMAL	LOW	DI	1.3.3.9
DROP29	94PCM01	1C31232G01	M94UA0171A	OC EXHST FAN 1 FAIL	NORMAL	FAIL	DI	1.3.3.10
DROP29	94PCM01	1C31232G01	M94UA0171B	OC EXHST FAN 1 ALARM	NORMAL	ALARM	DI	1.3.3.11
DROP29	94PCM01	1C31232G01	M94QI2194	OC EXHST FAN 1 INLET PRESS	LOCAL	INCOMP	DI	1.3.3.12
DROP29	94PCM01	1C31232G01	M94RI1196	OC EXHST FAN 1 INLET VANE PWR	NRDY	READY	DI	1.3.3.13
DROP29	94PCM01	1C31232G01	M94FAL2197	OC EXHST FAN 1 INLET VANE REM	LOCAL	INCOMP	DI	1.3.3.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.3.15
DROP29	94PCM01	1C31232G01	<b>M29QC3S03</b>	<b>DPU29 QC DROP 3 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.3.16
DROP29	94PCM01	1C31232G01	M94MI0111	CENTRATE PMP NO. 1	OFF	RUNNG	DI	1.3.4.1
DROP29	94PCM01	1C31232G01	M94QI0111	CENTRATE PMP NO. 1	LOCAL	INCOMP	DI	1.3.4.2
DROP29	94PCM01	1C31232G01	M94RI0111	CENTRATE PMP NO. 1	WAIT	READY	DI	1.3.4.3
DROP29	94PCM01	1C31232G01	M94UA0111	CENTRATE PMP NO. 1	NORMAL	FAIL	DI	1.3.4.4
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.4.5
DROP29	94PCM01	1C31232G01	M94MI0161	WASTE H2O PMP NO. 1	OFF	RUNNG	DI	1.3.4.6
DROP29	94PCM01	1C31232G01	M94QI0161	WASTE H2O PMP NO. 1	LOCAL	INCOMP	DI	1.3.4.7
DROP29	94PCM01	1C31232G01	M94RI0161	WASTE H2O PMP NO. 1	WAIT	READY	DI	1.3.4.8
DROP29	94PCM01	1C31232G01	M94XA0161	WASTE H2O PMP NO. 1	NORMAL	FAIL	DI	1.3.4.9
DROP29	94PCM01	1C31232G01	M94TAH0161	WASTE H2O PMP NO. 1	NORMAL	HIGH	DI	1.3.4.10
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.4.11
DROP29	94PCM01	1C31232G01	M94ZB1260	WW SUBMERSIBLE PMP 1 DIS VLV	NORMAL	CLOSED	DI	1.3.4.12
DROP29	94PCM01	1C31232G01	M94ZD1260	WW SUBMERSIBLE PMP 1 DIS VLV	NORMAL	OPENED	DI	1.3.4.13
DROP29	94PCM01	1C31232G01	M94LAH2122	CENTRATE DRY WELL FLOOD	HIGH	NORMAL	DI	1.3.4.14
DROP29	94PCM01	1C31232G01	M94QI2120B	CENTRATE WET WELL LCP	LOCAL	INCOMP	DI	1.3.4.15
DROP29	94PCM01	1C31232G01	<b>M29QC3S04</b>	<b>DPU29 QC DROP 3 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.4.16
DROP29	94PCM01	1C31232G01	M94ZB9106	94USS - 94-P-1 FEED BREAKER	NORMAL	CLOSED	DI	1.3.5.1
DROP29	94PCM01	1C31232G01	M94ZD9106	94USS - 94-P-1 FEED BREAKER	NORMAL	OPENED	DI	1.3.5.2
DROP29	94PCM01	1C31232G01	M94ZA9106	94USS - 94-P-1 FEED BREAKER	TRIPPED	NORMAL	DI	1.3.5.3
DROP29	94PCM01	1C31232G01	M94ZB9110	94USS - 94MCC9401 FEED BREAKER	NORMAL	CLOSED	DI	1.3.5.4
DROP29	94PCM01	1C31232G01	M94ZD9110	94USS - 94MCC9401 FEED BREAKER	NORMAL	OPENED	DI	1.3.5.5
DROP29	94PCM01	1C31232G01	M94ZA9110	94USS - 94MCC9401 FEED BREAKER	TRIPPED	NORMAL	DI	1.3.5.6
DROP29	94PCM01	1C31232G01	M94ZB9107	94USS - 94-P-3 FEED BREAKER	NORMAL	CLOSED	DI	1.3.5.7
DROP29	94PCM01	1C31232G01	M94ZD9107	94USS - 94-P-3 FEED BREAKER	NORMAL	OPENED	DI	1.3.5.8
DROP29	94PCM01	1C31232G01	M94ZA9107	94USS - 94-P-3 FEED BREAKER	TRIPPED	NORMAL	DI	1.3.5.9
DROP29	94PCM01	1C31232G01	M94ZB9108	94USS - 94MCC9403 FEED BREAKER	NORMAL	CLOSED	DI	1.3.5.10
DROP29	94PCM01	1C31232G01	M94ZD9108	94USS - 94MCC9403 FEED BREAKER	NORMAL	OPENED	DI	1.3.5.11
DROP29	94PCM01	1C31232G01	M94ZA9108	94USS - 94MCC9403 FEED BREAKER	TRIPPED	NORMAL	DI	1.3.5.12
DROP29	94PCM01	1C31232G01	M94ZB9101	94USS - FEED A BREAKER	NORMAL	CLOSED	DI	1.3.5.13
DROP29	94PCM01	1C31232G01	M94ZD9101	94USS - FEED A BREAKER	NORMAL	OPENED	DI	1.3.5.14
DROP29	94PCM01	1C31232G01	M94ZA9101	94USS - FEED A BREAKER	NORMAL	TRIPPED	DI	1.3.5.15



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DROP29	94PCM01	1C31232G01	<b>M29QC3S05</b>	<b>DPU29 QC DROP 3 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.5.16	
DROP29	94PCM01	1C31232G01	M94QI1190	OC CRBN ADS 1 OUTLET VLV 1	LOCAL	INCOMP	DI	1.3.6.1	
DROP29	94PCM01	1C31232G01	M94RI1190	OC CRBN ADS 1 OUTLET VLV 1	WAIT	READY	DI	1.3.6.2	
DROP29	94PCM01	1C31232G01	M94ZB1190	OC CARB ADS 1 OUTLET VLV 1	NORMAL	CLOSED	DI	1.3.6.3	
DROP29	94PCM01	1C31232G01	M94ZD1190	OC CRBN ADS 1 OUTLET VLV 1	NORMAL	OPENED	DI	1.3.6.4	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.6.5	
DROP29	94PCM01	1C31232G01	M94QI1192	OC CRBN ADS 1 BYPASS VLV	LOCAL	INCOMP	DI	1.3.6.6	
DROP29	94PCM01	1C31232G01	M94RI1192	OC CRBN ADS 1 BYPASS VLV	WAIT	READY	DI	1.3.6.7	
DROP29	94PCM01	1C31232G01	M94ZB1192	OC CARB ADS 1 BYPASS VLV	NORMAL	CLOSED	DI	1.3.6.8	
DROP29	94PCM01	1C31232G01	M94ZD1192	OC CRBN ADS 1 BYPASS VLV	NORMAL	OPENED	DI	1.3.6.9	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.6.10	
DROP29	94PCM01	1C31232G01	M94QI1191	OC CRBN ADS 1 OUTLET VLV 2	LOCAL	INCOMP	DI	1.3.6.11	
DROP29	94PCM01	1C31232G01	M94RI1191	OC CRBN ADS 1 OUTLET VLV 2	WAIT	READY	DI	1.3.6.12	
DROP29	94PCM01	1C31232G01	M94ZB1191	OC CARB ADS 1 OUTLET VLV 2	NORMAL	CLOSED	DI	1.3.6.13	
DROP29	94PCM01	1C31232G01	M94ZD1191	OC CRBN ADS 1 OUTLET VLV 2	NORMAL	OPENED	DI	1.3.6.14	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.6.15	
DROP29	94PCM01	1C31232G01	<b>M29QC3S06</b>	<b>DPU29 QC DROP 3 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.6.16	
DROP29	94PCM01	1C31232G01	M94HS2160A	ODOR CNTRL SCRBR 1 PH	LOCAL	INCOMP	DI	1.3.7.1	
DROP29	94PCM01	1C31232G01	M94QI2160A	ODOR CNTRL SCRBR 1 PH	NORMAL	PMP 1	DI	1.3.7.2	
DROP29	94PCM01	1C31232G01	M94QI2160B	ODOR CNTRL SCRBR 1 PH	NORMAL	PMP 2	DI	1.3.7.3	
DROP29	94PCM01	1C31232G01	M94LAHH9011	ODOR CNTRL SCRBR 1 LVL SW/ALM	NORMAL	HI-HI	DI	1.3.7.4	
DROP29	94PCM01	1C31232G01	M94LAH9011	ODOR CNTRL SCRBR 1 LVL SW/ALM	NORMAL	HIGH	DI	1.3.7.5	
DROP29	94PCM01	1C31232G01	M94LAL9011	ODOR CNTRL SCRBR 1 LVL SW/ALM	NORMAL	LOW	DI	1.3.7.6	
DROP29	94PCM01	1C31232G01	M94LALL9011	ODOR CNTRL SCRBR 1 LVL SW/ALM	NORMAL	LO-LO	DI	1.3.7.7	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.7.8	
DROP29	94PCM01	1C31232G01	M94QI1250	WASTE H2O WET WELL INLET VALVE	LOCAL	INCOMP	DI	1.3.7.9	
DROP29	94PCM01	1C31232G01	M94ZB1250	WASTE H2O WET WELL 1 INLET VLV	NORMAL	CLOSED	DI	1.3.7.10	
DROP29	94PCM01	1C31232G01	M94ZD1250	WASTE H2O WET WELL 1 INLET VLV	NORMAL	OPENED	DI	1.3.7.11	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.7.12	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.7.13	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.7.14	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.7.15	
DROP29	94PCM01	1C31232G01	<b>M29QC3S07</b>	<b>DPU29 QC DROP 3 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.7.16	
DROP29	94PCM01		Spare Module Address						1.3.8
DROP29	94PCM01	1C31232G01	M94MI0142	ACID FEED PMP NO. 2	OFF	RUNNNG	DI	1.4.1.1	
DROP29	94PCM01	1C31232G01	M94QI0142	ACID FEED PMP NO. 2	LOCAL	INCOMP	DI	1.4.1.2	
DROP29	94PCM01	1C31232G01	M94RI0142	ACID FEED PMP NO. 2	WAIT	READY	DI	1.4.1.3	
DROP29	94PCM01	1C31232G01	M94UA0142	ACID FEED PMP NO. 2	NORMAL	FAIL	DI	1.4.1.4	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.1.5	
DROP29	94PCM01	1C31232G01	M94MI0122	SHT FEED PMP NO. 2	OFF	RUNNNG	DI	1.4.1.6	
DROP29	94PCM01	1C31232G01	M94QI0122	SHT FEED PMP NO. 2	LOCAL	INCOMP	DI	1.4.1.7	
DROP29	94PCM01	1C31232G01	M94RI0122	SHT FEED PMP NO. 2	WAIT	READY	DI	1.4.1.8	
DROP29	94PCM01	1C31232G01	M94UA0122	SHT FEED PMP NO. 2	NORMAL	FAIL	DI	1.4.1.9	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.1.10	
DROP29	94PCM01	1C31232G01	M94MI0162	WASTE H2O PMP NO. 2	OFF	RUNNNG	DI	1.4.1.11	

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DROP29	94PCM01	1C31232G01	M94QI0162	WASTE H2O PMP NO. 2	LOCAL	INCOMP	DI	1.4.1.12
DROP29	94PCM01	1C31232G01	M94RI0162	WASTE H2O PMP NO. 2	WAIT	READY	DI	1.4.1.13
DROP29	94PCM01	1C31232G01	M94XA0162	WASTE H2O PMP NO. 2	NORMAL	FAIL	DI	1.4.1.14
DROP29	94PCM01	1C31232G01	M94TAH0162	WASTE H2O PMP NO. 2	NORMAL	HIGH	DI	1.4.1.15
DROP29	94PCM01	1C31232G01	<b>M29QC4S01</b>	<b>DPU29 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16
DROP29	94PCM01	1C31232G01	M94QI1170	OC SCRBR 2 INLET DMPR	LOCAL	INCOMP	DI	1.4.2.1
DROP29	94PCM01	1C31232G01	M94RI1170	OC SCRBR 2 INLET DMPR	WAIT	READY	DI	1.4.2.2
DROP29	94PCM01	1C31232G01	M94ZB1170	OC SCRBR 2 INLET DMPR	NORMAL	CLOSED	DI	1.4.2.3
DROP29	94PCM01	1C31232G01	M94ZD1170	OC SCRBR 2 INLET DMPR	NORMAL	OPENED	DI	1.4.2.4
DROP29	94PCM01	1C31232G01	M94QI1171	OC SCRBR 2 DISCH DMPR	LOCAL	INCOMP	DI	1.4.2.5
DROP29	94PCM01	1C31232G01	M94RI1171	OC SCRBR 2 DISCH DMPR	WAIT	READY	DI	1.4.2.6
DROP29	94PCM01	1C31232G01	M94ZB1171	OC SCRBR 2 DISCH DMPR	NORMAL	CLOSED	DI	1.4.2.7
DROP29	94PCM01	1C31232G01	M94ZD1171	OC SCRBR 2 DISCH DMPR	NORMAL	OPENED	DI	1.4.2.8
DROP29	94PCM01	1C31232G01	M94QI1172	OC SCRBR 2 BYPASS DMPR	LOCAL	INCOMP	DI	1.4.2.9
DROP29	94PCM01	1C31232G01	M94RI1172	OC SCRBR 2 BYPASS DMPR	WAIT	READY	DI	1.4.2.10
DROP29	94PCM01	1C31232G01	M94ZB1172	OC SCRBR 2 BYPASS DMPR	NORMAL	CLOSED	DI	1.4.2.11
DROP29	94PCM01	1C31232G01	M94ZD1172	OC SCRBR 2 BYPASS DMPR	NORMAL	OPENED	DI	1.4.2.12
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.2.13
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.2.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.2.15
DROP29	94PCM01	1C31232G01	<b>M29QC4S02</b>	<b>DPU29 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16
DROP29	94PCM01	1C31232G01	M94MI0132	CAUSTIC FEED PMP NO. 2	OFF	RUNNNG	DI	1.4.3.1
DROP29	94PCM01	1C31232G01	M94QI0132	CAUSTIC FEED PMP NO. 2	LOCAL	INCOMP	DI	1.4.3.2
DROP29	94PCM01	1C31232G01	M94RI0132	CAUSTIC FEED PMP NO. 2	WAIT	READY	DI	1.4.3.3
DROP29	94PCM01	1C31232G01	M94UA0132	CAUSTIC FEED PMP NO. 2	NORMAL	FAIL	DI	1.4.3.4
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.3.5
DROP29	94PCM01	1C31232G01	M94QI2171	OC HEAT COIL 5 DISCH TMP	LOCAL	INCOMP	DI	1.4.3.6
DROP29	94PCM01	1C31232G01	M94PDAH2172	OC HEAT COIL 5 PRESS DROP	NORMAL	HIGH	DI	1.4.3.7
DROP29	94PCM01	1C31232G01	M94QI1173	OC HEAT COIL 5 INLET AIR DMPR	LOCAL	INCOMP	DI	1.4.3.8
DROP29	94PCM01	1C31232G01	M94RI1173	OC HEAT COIL 5 INLET AIR DMPR	WAIT	READY	DI	1.4.3.9
DROP29	94PCM01	1C31232G01	M94ZB1173	OC HEAT COIL 5 INLET AIR DMPR	NORMAL	CLOSED	DI	1.4.3.10
DROP29	94PCM01	1C31232G01	M94ZD1173	OC HEAT COIL 5 INLET AIR DMPR	NORMAL	OPENED	DI	1.4.3.11
DROP29	94PCM01	1C31232G01	M94QI1174	OC HEAT COIL 5 HOT H2O VLV	LOCAL	INCOMP	DI	1.4.3.12
DROP29	94PCM01	1C31232G01	M94RI1174	OC HEAT COIL 5 HOT H2O VLV	WAIT	READY	DI	1.4.3.13
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.3.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.3.15
DROP29	94PCM01	1C31232G01	<b>M29QC4S03</b>	<b>DPU29 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16



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DROP29	94PCM01	1C31232G01	M94ZB9114	94USS - 94-P-2 FEED BREAKER	NORMAL	CLOSED	DI	1.4.4.1
DROP29	94PCM01	1C31232G01	M94ZD9114	94USS - 94-P-2 FEED BREAKER	NORMAL	OPENED	DI	1.4.4.2
DROP29	94PCM01	1C31232G01	M94ZA9114	94USS - 94-P-2 FEED BREAKER	TRIPPED	NORMAL	DI	1.4.4.3
DROP29	94PCM01	1C31232G01	M94ZB9111	94USS - 94MCC9402 FEED BREAKER	NORMAL	CLOSED	DI	1.4.4.4
DROP29	94PCM01	1C31232G01	M94ZD9111	94USS - 94MCC9402 FEED BREAKER	NORMAL	OPENED	DI	1.4.4.5
DROP29	94PCM01	1C31232G01	M94ZA9111	94USS - 94MCC9402 FEED BREAKER	TRIPPED	NORMAL	DI	1.4.4.6
DROP29	94PCM01	1C31232G01	M94ZB9115	94USS - 94-P-4 FEED BREAKER	NORMAL	CLOSED	DI	1.4.4.7
DROP29	94PCM01	1C31232G01	M94ZD9115	94USS - 94-P-4 FEED BREAKER	NORMAL	OPENED	DI	1.4.4.8
DROP29	94PCM01	1C31232G01	M94ZA9115	94USS - 94-P-4 FEED BREAKER	TRIPPED	NORMAL	DI	1.4.4.9
DROP29	94PCM01	1C31232G01	M94ZB9113	94USS - 94MCC9404 FEED BREAKER	NORMAL	CLOSED	DI	1.4.4.10
DROP29	94PCM01	1C31232G01	M94ZD9113	94USS - 94MCC9404 FEED BREAKER	NORMAL	OPENED	DI	1.4.4.11
DROP29	94PCM01	1C31232G01	M94ZA9113	94USS - 94MCC9404 FEED BREAKER	TRIPPED	NORMAL	DI	1.4.4.12
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.4.13
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.4.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.4.15
DROP29	94PCM01	1C31232G01	<b>M29QC4S04</b>	<b>DPU29 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16
DROP29	94PCM01	1C31232G01	M94UA9105	94USS - LINE B TRANSFORMER	NORMAL	TRBL	DI	1.4.5.1
DROP29	94PCM01	1C31232G01	M94EAL9105	94USS - LINE B TRANSFORMER	U/VOLT	NORMAL	DI	1.4.5.2
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.5.3
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.5.4
DROP29	94PCM01	1C31232G01	M94ZB9102	94USS - FEED B BREAKER	NORMAL	CLOSED	DI	1.4.5.5
DROP29	94PCM01	1C31232G01	M94ZD9102	94USS - FEED B BREAKER	NORMAL	OPENED	DI	1.4.5.6
DROP29	94PCM01	1C31232G01	M94ZA9102	94USS - FEED B BREAKER	NORMAL	TRIPPED	DI	1.4.5.7
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.5.8
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.5.9
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.5.10
DROP29	94PCM01	1C31232G01	M94MI0152	OC SCRBR 2 R/C PMP NO. 2	OFF	RUNNNG	DI	1.4.5.11
DROP29	94PCM01	1C31232G01	M94QI0152	OC SCRBR 2 R/C PMP NO. 2	LOCAL	INCOMP	DI	1.4.5.12
DROP29	94PCM01	1C31232G01	M94RI0152	OC SCRBR 2 R/C PMP NO. 2	WAIT	READY	DI	1.4.5.13
DROP29	94PCM01	1C31232G01	M94PAL2183	OC SCRBR 2 R/C PMP DISCH PRESS	NORMAL	LOW	DI	1.4.5.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.5.15
DROP29	94PCM01	1C31232G01	<b>M29QC4S05</b>	<b>DPU29 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.5.16
DROP29	94PCM01	1C31232G01	M94HS2180C	ODOR CNTRL SCRBR 2 PH	LOCAL	INCOMP	DI	1.4.6.1
DROP29	94PCM01	1C31232G01	M94QI2180B	ODOR CNTRL SCRBR 2 PH PMP1	NORMAL	PMP 1	DI	1.4.6.2
DROP29	94PCM01	1C31232G01	M94QI2180D	ODOR CNTRL SCRBR 2 PH PMP1	NORMAL	PMP 1	DI	1.4.6.3
DROP29	94PCM01	1C31232G01	M94QI2180C	ODOR CNTRL SCRBR 2 PH PMP2	NORMAL	PMP 2	DI	1.4.6.4
DROP29	94PCM01	1C31232G01	M94QI2180A	ODOR CNTRL SCRBR 2 PH PMP2	NORMAL	PMP 2	DI	1.4.6.5
DROP29	94PCM01	1C31232G01	M94LALL9012	ODOR CNTRL SCRBR 2 LVL SW/ALM	NORMAL	LO-LO	DI	1.4.6.6
DROP29	94PCM01	1C31232G01	M94LAL9012	ODOR CNTRL SCRBR 2 LVL SW/ALM	NORMAL	LOW	DI	1.4.6.7
DROP29	94PCM01	1C31232G01	M94LAH9012	ODOR CNTRL SCRBR 2 LVL SW/ALM	NORMAL	HIGH	DI	1.4.6.8
DROP29	94PCM01	1C31232G01	M94LAHH9012	ODOR CNTRL SCRBR 2 LVL SW/ALM	NORMAL	HI-HI	DI	1.4.6.9
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.6.10
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.6.11
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.6.12
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.6.13
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.6.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.6.15

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP29	94PCM01	1C31232G01	<b>M29QC4S06</b>	<b>DPU29 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.6.16
DROP29	94PCM01	1C31232G01	M94EAL9104	94USS - LINE A TRANSFORMER	U/VOLT	NORMAL	DI	1.4.7.1
DROP29	94PCM01	1C31232G01	M94UA9104	94USS - LINE A TRANSFORMER	NORMAL	TRBL	DI	1.4.7.2
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.7.3
DROP29	94PCM01	1C31232G01	M94ZB9103	94USS - TIE BREAKER	NORMAL	CLOSED	DI	1.4.7.4
DROP29	94PCM01	1C31232G01	M94ZD9103	94USS - TIE BREAKER	NORMAL	OPENED	DI	1.4.7.5
DROP29	94PCM01	1C31232G01	M94ZA9103	94USS - TIE BREAKER	NORMAL	TRIPPED	DI	1.4.7.6
DROP29	94PCM01	1C31232G01	M94ZB9109	94USS - SPARE FEED BREAKER	NORMAL	CLOSED	DI	1.4.7.7
DROP29	94PCM01	1C31232G01	M94ZD9109	94USS - SPARE FEED BREAKER	NORMAL	OPENED	DI	1.4.7.8
DROP29	94PCM01	1C31232G01	M94ZA9109	94USS - SPARE FEED BREAKER	TRIPPED	NORMAL	DI	1.4.7.9
DROP29	94PCM01	1C31232G01	M94ZB9112	94USS - SPARE MCC FEED BREAKER	NORMAL	CLOSED	DI	1.4.7.10
DROP29	94PCM01	1C31232G01	M94ZD9112	94USS - SPARE MCC FEED BREAKER	NORMAL	OPENED	DI	1.4.7.11
DROP29	94PCM01	1C31232G01	M94ZA9112	94USS - SPARE MCC FEED BREAKER	TRIPPED	NORMAL	DI	1.4.7.12
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.7.13
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.7.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.7.15
DROP29	94PCM01	1C31232G01	<b>M29QC4S07</b>	<b>DPU29 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.7.16
DROP29	94PCM01	1C31232G01	M94QI2120A	CENTRATE WET WELL LEVEL 1	LOCAL	INCOMP	DI	1.4.8.1
DROP29	94PCM01	1C31232G01	M94JA2120	CENTRATE WET WELL LEVEL 1	NORMAL	F/OVER	DI	1.4.8.2
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.8.3
DROP29	94PCM01	1C31232G01	M94LAL1100	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	LOW	DI	1.4.8.4
DROP29	94PCM01	1C31232G01	M94LALL1100	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	LO-LO	DI	1.4.8.5
DROP29	94PCM01	1C31232G01	M94PAL1100A	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	LOW	DI	1.4.8.6
DROP29	94PCM01	1C31232G01	M94PAL1100B	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	LOW	DI	1.4.8.7
DROP29	94PCM01	1C31232G01	M94TAH1100	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	HIGH	DI	1.4.8.8
DROP29	94PCM01	1C31232G01	M94UA1100A	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	FAIL	DI	1.4.8.9
DROP29	94PCM01	1C31232G01	M94UA1100B	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	FAIL	DI	1.4.8.10
DROP29	94PCM01	1C31232G01	M94UA1100C	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	FAIL	DI	1.4.8.11
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.8.12
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.8.13
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.8.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.8.15
DROP29	94PCM01	1C31232G01	<b>M29QC4S08</b>	<b>DPU29 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.8.16

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DROP29	94PCM01	5A26458G04	M94HS1155A	OC SCRBR 1 FA INLET DMPR	OPEN	CLOSE	DO	1.5.1.1
DROP29	94PCM01	5A26458G04	M94HS1156A	OC SCRBR 1 FA DIS DMPR	OPEN	CLOSE	DO	1.5.1.2
DROP29	94PCM01	5A26458G04	M94HS1157A	OC SCRBR 1 FA BYPASS DMPR	OPEN	CLOSE	DO	1.5.1.3
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.1.4
DROP29	94PCM01	5A26458G04	M94HS0151	ODOR CNTRL R/C PMP NO. 1	OFF	RUN	DO	1.5.1.5
DROP29	94PCM01	5A26458G04	M94QS2160	ODOR CNTRL SCRBR 1 PH	OFF	CMPRDY	DO	1.5.1.6
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.1.7
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.1.8
DROP29	94PCM01	5A26458G04	M94QS2171	ODOR CNTRL HEAT COIL 5 DIS TMP	OFF	CMPRDY	DO	1.5.1.9
DROP29	94PCM01	5A26458G04	M94HS1173A	OC HEAT COIL 5 INLET AIR DMPR	OPEN	CLOSE	DO	1.5.1.10
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.1.11
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.1.12
DROP29	94PCM01	5A26458G04	M94HS0111	CENTRATE PMP NO. 1	OFF	RUN	DO	1.5.2.1
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.2.2
DROP29	94PCM01	5A26458G04	M94HS0121A	SHT FD PMP NO. 1 - TRAIN 1	OFF	RUN	DO	1.5.2.3
DROP29	94PCM01	5A26458G04	M94HS0131A	CSTC FD PMP NO. 1 - TRAIN 1	OFF	RUN	DO	1.5.2.4
DROP29	94PCM01	5A26458G04	M94HS0141A	ACID FD PMP NO. 1 - TRAIN 1	OFF	RUN	DO	1.5.2.5
DROP29	94PCM01	5A26458G04	M94HS0161	WASTE H2O PMP NO. 1	OFF	RUN	DO	1.5.2.6
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.2.7
DROP29	94PCM01	5A26458G04	M94HS1190A	OC CRBN ADS 1 OUTLET VLV 1	OPEN	CLOSE	DO	1.5.2.8
DROP29	94PCM01	5A26458G04	M94HS1191A	OC CRBN ADS 1 OUTLET VLV 2	OPEN	CLOSE	DO	1.5.2.9
DROP29	94PCM01	5A26458G04	M94HS1192A	OC CRBN ADS 1 BYPASS VLV	OPEN	CLOSE	DO	1.5.2.10
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.2.11
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.2.12
DROP29	94PCM01	5A26458G04	M94QS0161	WASTE H2O WET WELL 1 LEVEL	LOCAL	DCS	DO	1.5.3.1
DROP29	94PCM01	5A26458G04	M94QS0162	WASTE H2O WET WELL 1 LEVEL	LOCAL	DCS	DO	1.5.3.2
DROP29	94PCM01	5A26458G04	M94HS1250A	WASTE H2O WET WELL 1 INLET VLV	OFF	OPEN	DO	1.5.3.3
DROP29	94PCM01	5A26458G04	M94HS1250B	WASTE H2O WET WELL 1 INLET VLV	OFF	CLOSE	DO	1.5.3.4
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.3.5
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.3.6
DROP29	94PCM01	5A26458G04	M94QS2120	CENTRATE WET WELL LEVEL 1	OFF	CMPRDY	DO	1.5.3.7
DROP29	94PCM01	5A26458G04	M94HS2120A	CENTRATE WET WELL LEVEL 1 1234	OFF	SELECT	DO	1.5.3.8
DROP29	94PCM01	5A26458G04	M94HS2120B	CENTRATE WET WELL LEVEL 1 2341	OFF	SELECT	DO	1.5.3.9
DROP29	94PCM01	5A26458G04	M94HS2120C	CENTRATE WET WELL LEVEL 1 3412	OFF	SELECT	DO	1.5.3.10
DROP29	94PCM01	5A26458G04	M94HS2120D	CENTRATE WET WELL LEVEL 1 4123	OFF	SELECT	DO	1.5.3.11
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.3.12

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DROP29	94PCM01	5A26458G04	M94HS1120A	CENTRATE WW INLET SLUICE GATE	OFF	OPEN	DO	1.6.1.1
DROP29	94PCM01	5A26458G04	M94HS1120B	CENTRATE WW INLET SLUICE GATE	OFF	CLOSE	DO	1.6.1.2
DROP29	94PCM01	5A26458G04	M94HS1120C	CENTRATE WW INLET SLUICE GATE	OFF	STOP	DO	1.6.1.3
DROP29	94PCM01	5A26458G04	M94QS2250	WASTE H2O WET WELL 1 LEVEL	OFF	CMPRDY	DO	1.6.1.4
DROP29	94PCM01	5A26458G04	M94HS2250A	WASTE H2O WET WELL 1 LEVEL 12	OFF	SELECT	DO	1.6.1.5
DROP29	94PCM01	5A26458G04	M94HS2250B	WASTE H2O WET WELL 1 LEVEL 21	OFF	SELECT	DO	1.6.1.6
DROP29	94PCM01	5A26458G04	SPARE				DO	1.6.1.7
DROP29	94PCM01	5A26458G04	SPARE				DO	1.6.1.8
DROP29	94PCM01	5A26458G04	M94QS2194	OC EXHST FAN1 INLT PRESS	OFF	CMPRDY	DO	1.6.1.9
DROP29	94PCM01	5A26458G04	M94HS0171	OC EXHST FAN1 RUN CMD	OFF	RUN	DO	1.6.1.10
DROP29	94PCM01	5A26458G04	SPARE				DO	1.6.1.11
DROP29	94PCM01	5A26458G04	SPARE				DO	1.6.1.12
DROP29	94PCM01	5A26458G04	M94HS0113	CENTRATE PMP NO. 3	OFF	RUN	DO	1.6.2.1
DROP29	94PCM01	5A26458G04	SPARE				DO	1.6.2.2
DROP29	94PCM01	5A26458G04	M94HS0122A	SHT FD PMP NO. 2 - TRAIN 1	OFF	RUN	DO	1.6.2.3
DROP29	94PCM01	5A26458G04	M94HS0132A	CSTC FD PMP NO. 2 - TRAIN 1	OFF	RUN	DO	1.6.2.4
DROP29	94PCM01	5A26458G04	M94HS0142A	ACID FD PMP NO. 2 - TRAIN 1	OFF	RUN	DO	1.6.2.5
DROP29	94PCM01	5A26458G04	M94HS0162	WASTE H2O PMP NO. 2	OFF	RUN	DO	1.6.2.6
DROP29	94PCM01	5A26458G04	M94QS2180	OCL SCRBR 2 PH	OFF	CMPRDY	DO	1.6.2.7
DROP29	94PCM01	5A26458G04	M94HS1170A	OC SCRBR 2 INLET DMPR	OPEN	CLOSE	DO	1.6.2.8
DROP29	94PCM01	5A26458G04	M94HS1171A	OC SCRBR 2 DIS DMPR	OPEN	CLOSE	DO	1.6.2.9
DROP29	94PCM01	5A26458G04	M94HS1172A	OC SCRBR 2 BYPASS DMPR	OPEN	CLOSE	DO	1.6.2.10
DROP29	94PCM01	5A26458G04	SPARE				DO	1.6.2.11
DROP29	94PCM01	5A26458G04	M94HS0152	ODOR CNTRL R/C PMP NO. 2	OFF	RUN	DO	1.6.2.12

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location					
DROP30	94PCM02	5X00419G01		94VDL02 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1					
			94MV1130	CENTRATE PUMP 2 INLET VALVE									
			94MV1131	CENTRATE PUMP 2 DISCHARGE VALVE									
			94MV1140	CENTRATE PUMP 4 INLET VALVE (FUTURE)									
			94MV1141	CENTRATE PUMP 4 DISCHARGE VALVE (FUTURE)									
			94MV1210	SCRUBBER 3 ACID INLET VALVE									
			94MV1215	ODER CONTROL RECIRCULATING PUMP 3 INLET VALVE									
			94MV1216	ODER CONTROL RECIRCULATING PUMP 3 DISCHARGE VALVE									
			94MV1230	SCRUBBER 4 CAUSTIC AND SHT INLET VALVE									
			94MV1235	ODER CONTROL RECIRCULATING PUMP 4 INLET VALVE									
			94MV1236	ODER CONTROL RECIRCULATING PUMP 4 DISCHARGE VALVE									
			94MV1300	SHT DAY TANK 1 INLET VALVE									
			94MV1301	SHT DAY TANK 1 DISCHARGE VALVE 1									
			94MV1302	SHT DAY TANK 1 DISCHARGE VALVE 2									
			94MV1305	SHT DAY TANK 2 INLET VALVE									
			94MV1306	SHT DAY TANK 2 DISCHARGE VALVE 1									
			94MV1307	SHT DAY TANK 2 DISCHARGE VALVE 2									
			94MV1310	SHT FEED PUMP 1 INLET VALVE									
			94MV1311	SHT FEED PUMP 1 DISCHARGE VALVE									
			94MV1330	CAUSTIC DAY TANK 1 INLET VALVE									
			94MV1331	CAUSTIC DAY TANK 1 DISCHARGE VALVE 1									
			94MV1332	CAUSTIC DAY TANK 1 DISCHARGE VALVE 2									
			94MV1335	CAUSTIC DAY TANK 2 INLET VALVE									
			94MV1336	CAUSTIC DAY TANK 2 DISCHARGE VALVE 1									
			94MV1337	CAUSTIC DAY TANK 2 DISCHARGE VALVE 2									
			94MV1340	CAUSTIC FEED PUMP 1 INLET VALVE									
			94MV1341	CAUSTIC FEED PUMP 1 DISCHARGE VALVE									
			94MV1360	ACID DAY TANK 1 INLET VALVE									
			94MV1361	ACID DAY TANK 1 DISCHARGE VALVE 1									
			94MV1362	ACID DAY TANK 1 DISCHARGE VALVE 2									
			94MV1365	ACID DAY TANK 2 INLET VALVE									
			94MV1366	ACID DAY TANK 2 DISCHARGE VALVE 1									
			94MV1367	ACID DAY TANK 2 DISCHARGE VALVE 2									
			94MV1370	ACID FEED PUMP 1 INLET VALVE									
			94MV1371	ACID FEED PUMP 1 DISCHARGE VALVE									
			94MV1360A	ACID DAY TANK 1 OVERFLOW VALVE									
			94MV1365A	ACID DAY TANK 2 OVERFLOW VALVE									
			DROP30	94PCM02	5X00419G01	<b>M94P0112</b>			<b>CENTRATE PUMP NO. 2</b>			ET	1.1.2

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP30	94PCM02	5X00106G01	M94LT2360	ACID DAY TANK 1 LEVEL	0	4 FEET	AI - HART	1.1.3.1	
DROP30	94PCM02	5X00106G01	M94LT2330	CAUSTIC DAY TANK 1 LEVEL	0	4 FEET	AI - HART	1.1.3.2	
DROP30	94PCM02	5X00106G01	M94LT2300	SHT DAY TANK 1 LEVEL	0	4 FEET	AI - HART	1.1.3.3	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.1.3.4	
DROP30	94PCM02	5X00106G01	M94ST0141	ACID FEED PUMP NO. 1	0	100 PCT	AI - HART	1.1.3.5	
DROP30	94PCM02	5X00106G01	M94ST0131	CAUSTIC FEED PUMP NO. 1	0	100 PCT	AI - HART	1.1.3.6	
DROP30	94PCM02	5X00106G01	M94ST0121	SHT FEED PUMP NO. 1	0	100 PCT	AI - HART	1.1.3.7	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.1.3.8	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.1.4.1	
DROP30	94PCM02	5X00106G01	M94AT2210	ODOR CNTRL SCRBR 3 PH	0	14 PH	AI - HART	1.1.4.2	
DROP30	94PCM02	5X00106G01	M94FT2215B	OC SCRUBBER 3 RECIRC FLOW	0	150 GPM	AI - HART	1.1.4.3	
DROP30	94PCM02	5X00106G01	M94FT2215A	OC SCRUBBER 3 MAKE-UP FLOW	0	20 GPM	AI - HART	1.1.4.4	
DROP30	94PCM02	5X00106G01	M94PDT2212A	ODOR CNTRL SCRBR 3 PRESS DROP	0	3 IN H2O	AI - HART	1.1.4.5	
DROP30	94PCM02	5X00106G01	M94PDT2212B	ODOR CNTRL SCRBR 3 PRESS DROP	0	6 IN H2O	AI - HART	1.1.4.6	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.1.4.7	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.1.4.8	
DROP30	94PCM02	5X00106G01	M94FT2150	SCRBR3 FOUL AIR INLET FLOW	0	9000 SCFM	AI - HART	1.1.5.1	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.1.5.2	
DROP30	94PCM02	5X00106G01	M94TT2220	OC HT COIL 6 INLET AIR TEMP	30	120 DEG F	AI - HART	1.1.5.3	
DROP30	94PCM02	5X00106G01	M94TT2221	OC HT COIL 6 DISCH TEMP	30	120 DEG F	AI - HART	1.1.5.4	
DROP30	94PCM02	5X00106G01	M94ZT1224	OC HEAT COIL 6 HOT H2O VLV	0	100 PCT	AI - HART	1.1.5.5	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.1.5.6	
DROP30	94PCM02	5X00106G01	M94FT2260	WW SUBMERSIBLE PUMPS DISCH FLW	0	750 GPM	AI - HART	1.1.5.7	
DROP30	94PCM02	5X00106G01	M94PT2261	WW SUBMERSIBL PMPS DISCH PRESS	0	50 PSI	AI - HART	1.1.5.8	
DROP30	94PCM02		Spare Module Address						1.1.6
DROP30	94PCM02	5X00167G01	M94SC0141	ACID FEED PUMP NO. 1 SPD DMND	0	100 PCT	AO	1.1.7.1	
DROP30	94PCM02	5X00167G01	M94SC0131	CAUSTIC FD PUMP NO. 1 SPD DMND	0	100 PCT	AO	1.1.7.2	
DROP30	94PCM02	5X00167G01	M94SC0121	SHT FEED PUMP NO. 1 SPD DMND	0	100 PCT	AO	1.1.7.3	
DROP30	94PCM02	5X00167G01	SPARE				AO	1.1.7.4	
DROP30	94PCM02	5X00167G01	M94AC2210	ODOR CNTRL SCRBR 3 PH SETPOINT	0	14 PH	AO	1.1.7.5	
DROP30	94PCM02	5X00167G01	M94SC0114	CENTRATE PUMP NO. 3 (FUTURE)	0	100 PCT	AO	1.1.7.6	
DROP30	94PCM02	5X00167G01	SPARE				AO	1.1.7.7	
DROP30	94PCM02	5X00167G01	SPARE				AO	1.1.7.8	
DROP30	94PCM02	5X00119G01	MDPU30T1	DPU30 94PCM02 CABINET TEMP	32	154 DEG F	RTD	1.1.8.1	
DROP30	94PCM02	5X00119G01	SPARE				RTD	1.1.8.2	
DROP30	94PCM02	5X00119G01	SPARE				RTD	1.1.8.3	
DROP30	94PCM02	5X00119G01	SPARE				RTD	1.1.8.4	
DROP30	94PCM02	5X00119G01	SPARE				RTD	1.1.8.5	
DROP30	94PCM02	5X00119G01	SPARE				RTD	1.1.8.6	
DROP30	94PCM02	5X00119G01	SPARE				RTD	1.1.8.7	
DROP30	94PCM02	5X00119G01	SPARE				RTD	1.1.8.8	

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DROP30	94PCM02	Spare Module Address							1.2.1
DROP30	94PCM02	5X00167G01	M94SC0172	OC EXHST FAN 2 OUT DMD	0	100 PCT	AO	1.2.2.1	
DROP30	94PCM02	5X00167G01	M94PC2244	OC EXHST FAN 2 INLET VANE POS	0	100 PSI	AO	1.2.2.2	
DROP30	94PCM02	5X00167G01	SPARE				AO	1.2.2.3	
DROP30	94PCM02	5X00167G01	M94TC2221	ODOR CNTRL HT COIL 6 VLV POS	0	100 PCT	AO	1.2.2.4	
DROP30	94PCM02	5X00167G01	SPARE				AO	1.2.2.5	
DROP30	94PCM02	5X00167G01	SPARE				AO	1.2.2.6	
DROP30	94PCM02	5X00167G01	M94AC2230	ODOR CNTRL SCRBR 4 PH SETPOINT	0	14 PH	AO	1.2.2.7	
DROP30	94PCM02	5X00167G01	M94SC0112	CENTRATE PUMP NO. 2 SPD DMND	0	100 PCT	AO	1.2.2.8	
DROP30	94PCM02	Spare Module Address							1.2.3
DROP30	94PCM02	5X00106G01	M94AT2231	ODOR CNTRL SCRBR 4 ORP	0	1000 mVOLTS	AI - HART	1.2.4.1	
DROP30	94PCM02	5X00106G01	M94AT2230	ODOR CNTRL SCRBR 4 PH	0	14 PH	AI - HART	1.2.4.2	
DROP30	94PCM02	5X00106G01	M94FT2235B	OC SCRUBBER 4 RECIRC FLOW	0	150 GPM	AI - HART	1.2.4.3	
DROP30	94PCM02	5X00106G01	M94FT2235A	OC SCRUBBER 4 MAKE-UP FLOW	0	20 GPM	AI - HART	1.2.4.4	
DROP30	94PCM02	5X00106G01	M94PDT2232A	ODOR CNTRL SCRBR 4 PRESS DROP	0	3 IN H2O	AI - HART	1.2.4.5	
DROP30	94PCM02	5X00106G01	M94PDT2232B	ODOR CNTRL SCRBR 4 PRESS DROP	0	6 IN H2O	AI - HART	1.2.4.6	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.2.4.7	
DROP30	94PCM02	5X00106G01	M94ST0114	CENTRATE PUMP NO. 4 (FUTR)	0	100 PCT	AI - HART	1.2.4.8	
DROP30	94PCM02	5X00106G01	M94AT2249	ODOR CNTRL STACK NO. 2 AMMONIA	0	20 PPM	AI - HART	1.2.5.1	
DROP30	94PCM02	5X00106G01	M94AT2248	ODOR CNTRL STACK NO. 2 H2S	0	5 PPM	AI - HART	1.2.5.2	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.2.5.3	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.2.5.4	
DROP30	94PCM02	5X00106G01	M94ST0172	OC EXHST FAN 2 SPEED	0	100 PCT	AI - HART	1.2.5.5	
DROP30	94PCM02	5X00106G01	M94ZT1246	OC EXHST FAN 2 INLET VANE	0	100 PCT	AI - HART	1.2.5.6	
DROP30	94PCM02	5X00106G01	M94PT2244	OC EXHST FAN 2 INLET PRESS	-20	0 INWC	AI - HART	1.2.5.7	
DROP30	94PCM02	5X00106G01	M94ST0112	CENTRATE PUMP NO. 2	0	100 PCT	AI - HART	1.2.5.8	
DROP30	94PCM02	5X00106G01	M94LT2365	ACID DAY TANK 2 LEVEL	0	4 FEET	AI - HART	1.2.6.1	
DROP30	94PCM02	5X00106G01	M94LT2335	CAUSTIC DAY TANK 2 LEVEL	0	4 FEET	AI - HART	1.2.6.2	
DROP30	94PCM02	5X00106G01	M94LT2305	SHT DAY TANK 2 LEVEL	0	4 FEET	AI - HART	1.2.6.3	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.2.6.4	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.2.6.5	
DROP30	94PCM02	5X00106G01	M94PDT2240A	OC CRBN ADS 2 PRESS DROP	0	12 IN H2O	AI - HART	1.2.6.6	
DROP30	94PCM02	5X00106G01	M94PDT2240B	OC CRBN ADS 2 PRESS DROP	0	12 IN H2O	AI - HART	1.2.6.7	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.2.6.8	
DROP30	94PCM02	Spare Module Address							1.2.7
DROP30	94PCM02	5X00419G01		94VDL02 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8	



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DROP30	94PCM02	1C31232G01	M94QI1206	OC SCRBR 3 FA DISCH DAMP	LOCAL	INCOMP	DI	1.3.1.1	
DROP30	94PCM02	1C31232G01	M94RI1206	OC SCRBR 3 FA DISCH DMPR	WAIT	READY	DI	1.3.1.2	
DROP30	94PCM02	1C31232G01	M94ZD1206	OC SCRBR 3 FA DISCH DMPR	NORMAL	OPENED	DI	1.3.1.3	
DROP30	94PCM02	1C31232G01	M94ZB1206	OC SCRBR 3 FA DISCH DMPR	NORMAL	CLOSED	DI	1.3.1.4	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.1.5	
DROP30	94PCM02	1C31232G01	M94QI1207	OC SCRBR 3 FA B/PASS DAMP	LOCAL	INCOMP	DI	1.3.1.6	
DROP30	94PCM02	1C31232G01	M94RI1207	OC SCRBR 3 FA BYPASS DMPR	WAIT	READY	DI	1.3.1.7	
DROP30	94PCM02	1C31232G01	M94ZD1207	OC SCRBR 3 FA B/PASS DMPR	NORMAL	OPENED	DI	1.3.1.8	
DROP30	94PCM02	1C31232G01	M94ZB1207	OC SCRBR 3 FA B/PASS DMPR	NORMAL	CLOSED	DI	1.3.1.9	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.1.10	
DROP30	94PCM02	1C31232G01	M94HS2210A	ODOR CNTRL SCRBR 3 PH	LOCAL	INCOMP	DI	1.3.1.11	
DROP30	94PCM02	1C31232G01	M94QI2210A	ODOR CNTRL SCRBR 3 PH	OFF	PUMP 2	DI	1.3.1.12	
DROP30	94PCM02	1C31232G01	M94QI2210B	ODOR CNTRL SCRBR 3 PH	OFF	PUMP 1	DI	1.3.1.13	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.1.14	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.1.15	
DROP30	94PCM02	1C31232G01	<b>M30QC3S01</b>	<b>DPU30 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16	
DROP30	94PCM02	1C31232G01	M94QI1220	OC SCRBR 4 INLET DAMPER	LOCAL	INCOMP	DI	1.3.2.1	
DROP30	94PCM02	1C31232G01	M94RI1220	OC SCRBR 4 INLET DAMPER	WAIT	READY	DI	1.3.2.2	
DROP30	94PCM02	1C31232G01	M94ZD1220	OC SCRBR 4 INLET DAMPER	NORMAL	OPENED	DI	1.3.2.3	
DROP30	94PCM02	1C31232G01	M94ZB1220	OC SCRBR 4 INLET DAMPER	NORMAL	CLOSED	DI	1.3.2.4	
DROP30	94PCM02	1C31232G01	M94QI1240	OC CARB ADSBR 2 OUT VLV 1	LOCAL	INCOMP	DI	1.3.2.5	
DROP30	94PCM02	1C31232G01	M94RI1240	OC CARB ADSBR 2 OUT VLV 1	WAIT	READY	DI	1.3.2.6	
DROP30	94PCM02	1C31232G01	M94ZD1240	OC CARB ADSBR 2 OUT VLV 1	NORMAL	OPENED	DI	1.3.2.7	
DROP30	94PCM02	1C31232G01	M94ZB1240	OC CRBN ADSBR 2 OUT VLV 1	NORMAL	CLOSED	DI	1.3.2.8	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.2.9	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.2.10	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.2.11	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.2.12	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.2.13	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.2.14	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.2.15	
DROP30	94PCM02	1C31232G01	<b>M30QC3S02</b>	<b>DPU30 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16	
DROP30	94PCM02		Spare Module Address						1.3.3
DROP30	94PCM02	1C31232G01	M94AAHH2124B	PUMP STN WET WELL GAS MNTRG	HI-HI	NORMAL	DI	1.3.4.1	
DROP30	94PCM02	1C31232G01	M94AAH2124B	PUMP STN WET WELL GAS MNTRG	HIGH	NORMAL	DI	1.3.4.2	
DROP30	94PCM02	1C31232G01	M94XA2124B	PUMP STN WET WELL GAS MNTRG	FAIL	NORMAL	DI	1.3.4.3	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.4.4	
DROP30	94PCM02	1C31232G01	M94AAHH2124D	PUMP STN WET WELL GAS MNTRG	HI-HI	NORMAL	DI	1.3.4.5	
DROP30	94PCM02	1C31232G01	M94AAH2124D	PUMP STN WET WELL GAS MNTRG	HIGH	NORMAL	DI	1.3.4.6	
DROP30	94PCM02	1C31232G01	M94XA2124D	PUMP STN WET WELL GAS MNTRG	FAIL	NORMAL	DI	1.3.4.7	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.4.8	
DROP30	94PCM02	1C31232G01	M94MI0131	CAUSTIC FEED PUMP NO. 1	OFF	RUNNNG	DI	1.3.4.9	
DROP30	94PCM02	1C31232G01	M94QI0131	CAUSTIC FEED PUMP NO. 1	LOCAL	INCOMP	DI	1.3.4.10	
DROP30	94PCM02	1C31232G01	M94RI0131	CAUSTIC FEED PUMP NO. 1	WAIT	READY	DI	1.3.4.11	
DROP30	94PCM02	1C31232G01	M94UA0131	CAUSTIC FEED PUMP NO. 1	NORMAL	FAIL	DI	1.3.4.12	
DROP30	94PCM02	1C31232G01	M94LAL2331	CAUSTIC DAY TANK 1 LVL ALRM	NORMAL	LOW	DI	1.3.4.13	



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DROP30	94PCM02	1C31232G01	M94LAH2331	CAUSTIC DAY TANK 1 LVL ALRM	HIGH	NORMAL	DI	1.3.4.14
DROP30	94PCM02	1C31232G01	M94LAH2334	CAUSTIC DAY TANKS FLOOD ALARM	HIGH	NORMAL	DI	1.3.4.15
DROP30	94PCM02	1C31232G01	<b>M30QC3S04</b>	<b>DPU30 QC DROP 3 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.4.16
DROP30	94PCM02	1C31232G01	M94LAH2361	ACID DAY TANK 1 LVL ALRM	HIGH	NORMAL	DI	1.3.5.1
DROP30	94PCM02	1C31232G01	M94LAL2361	ACID DAY TANK 1 LVL ALRM	NORMAL	LOW	DI	1.3.5.2
DROP30	94PCM02	1C31232G01	M94LAH2364	ACID DAY TANKS FLOOD ALARM	HIGH	NORMAL	DI	1.3.5.3
DROP30	94PCM02	1C31232G01	M94MI0141	ACID FEED PUMP NO. 1	OFF	RUNNNG	DI	1.3.5.4
DROP30	94PCM02	1C31232G01	M94QI0141	ACID FEED PUMP NO. 1	LOCAL	INCOMP	DI	1.3.5.5
DROP30	94PCM02	1C31232G01	M94RI0141	ACID FEED PUMP NO. 1	WAIT	READY	DI	1.3.5.6
DROP30	94PCM02	1C31232G01	M94UA0141	ACID FEED PUMP NO. 1	NORMAL	FAIL	DI	1.3.5.7
DROP30	94PCM02	1C31232G01					DI	1.3.5.8
DROP30	94PCM02	1C31232G01	M94JA2250	WASTE H2O WET WELL 1 LEVEL	NORMAL	F/OVER	DI	1.3.5.9
DROP30	94PCM02	1C31232G01					DI	1.3.5.10
DROP30	94PCM02	1C31232G01					DI	1.3.5.11
DROP30	94PCM02	1C31232G01					DI	1.3.5.12
DROP30	94PCM02	1C31232G01					DI	1.3.5.13
DROP30	94PCM02	1C31232G01					DI	1.3.5.14
DROP30	94PCM02	1C31232G01					DI	1.3.5.15
DROP30	94PCM02	1C31232G01	<b>M30QC3S05</b>	<b>DPU30 QC DROP 3 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.5.16
DROP30	94PCM02	1C31232G01	M94LAH2301	SHT DAY TANK 1 LVL ALRM	HIGH	NORMAL	DI	1.3.6.1
DROP30	94PCM02	1C31232G01	M94LAH2304	SHT DAY TANKS FLOOD ALARM	HIGH	NORMAL	DI	1.3.6.2
DROP30	94PCM02	1C31232G01	M94LAL2301	SHT DAY TANK 1 LVL ALRM	NORMAL	LOW	DI	1.3.6.3
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.6.4
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.6.5
DROP30	94PCM02	1C31232G01	M94MI0121	SHT FEED PUMP NO. 1	OFF	RUNNNG	DI	1.3.6.6
DROP30	94PCM02	1C31232G01	M94QI0121	SHT FEED PUMP NO. 1	LOCAL	INCOMP	DI	1.3.6.7
DROP30	94PCM02	1C31232G01	M94RI0121	SHT FEED PUMP NO. 1	WAIT	READY	DI	1.3.6.8
DROP30	94PCM02	1C31232G01	M94UA0121	SHT FEED PUMP NO. 1	NORMAL	FAIL	DI	1.3.6.9
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.6.10
DROP30	94PCM02	1C31232G01	M94MI0114	CENTRATE PUMP NO. 3 (FUTURE)	OFF	RUNNNG	DI	1.3.6.11
DROP30	94PCM02	1C31232G01	M94QI0114	CENTRATE PUMP NO. 3 (FUTURE)	LOCAL	INCOMP	DI	1.3.6.12
DROP30	94PCM02	1C31232G01	M94RI0114	CENTRATE PUMP NO. 3 (FUTURE)	WAIT	READY	DI	1.3.6.13
DROP30	94PCM02	1C31232G01	M94UA0114	CENTRATE PUMP NO. 3 (FUTURE)	NORMAL	FAIL	DI	1.3.6.14
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.6.15
DROP30	94PCM02	1C31232G01	<b>M30QC3S06</b>	<b>DPU30 QC DROP 3 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.6.16
DROP30	94PCM02	1C31232G01	M94MI0153	ODOR CNTRL R/C PUMP NO. 3	OFF	RUNNNG	DI	1.3.7.1
DROP30	94PCM02	1C31232G01	M94QI0153	ODOR CNTRL R/C PUMP NO. 3	LOCAL	INCOMP	DI	1.3.7.2
DROP30	94PCM02	1C31232G01	M94RI0153	ODOR CNTRL R/C PUMP NO. 3	WAIT	READY	DI	1.3.7.3
DROP30	94PCM02	1C31232G01	M94PAL2213	OC SCRBR 3 R/C PMP DISCH PRESS	NORMAL	LOW	DI	1.3.7.4
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.7.5
DROP30	94PCM02	1C31232G01	M94LAH9013	ODOR CNTRL SCRBR 3 LVL ALRM	NORMAL	HIGH	DI	1.3.7.6
DROP30	94PCM02	1C31232G01	M94LAHH9013	ODOR CNTRL SCRBR 3 LVL SW ALRM	NORMAL	HI-HI	DI	1.3.7.7
DROP30	94PCM02	1C31232G01	M94LAL9013	ODOR CNTRL SCRBR 3 LVL SW ALRM	NORMAL	LOW	DI	1.3.7.8
DROP30	94PCM02	1C31232G01	M94LALL9013	ODOR CNTRL SCRBR 3 LVL SW ALRM	NORMAL	LO-LO	DI	1.3.7.9
DROP30	94PCM02	1C31232G01	M94QI1205	OC SCRBR 3 FA INLET DAMP	LOCAL	INCOMP	DI	1.3.7.10
DROP30	94PCM02	1C31232G01	M94RI1205	OC SCRBR 3 FA INLET DMPR	WAIT	READY	DI	1.3.7.11

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DROP30	94PCM02	1C31232G01	M94ZD1205	OC SCRBR 3 FA INLET DMPR	NORMAL	OPENED	DI	1.3.7.12	
DROP30	94PCM02	1C31232G01	M94ZB1205	OC SCRBR 3 FA INLET DMPR	NORMAL	CLOSED	DI	1.3.7.13	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.7.14	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.7.15	
DROP30	94PCM02	1C31232G01	<b>M30QC3S07</b>	<b>DPU30 QC DROP 3 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.7.16	
DROP30	94PCM02		Spare Module Address						1.3.8
DROP30	94PCM02	1C31232G01	M94MI0172	OC EXHST FAN 2 ON	OFF	RUNNNG	DI	1.4.1.1	
DROP30	94PCM02	1C31232G01	M94QI0172	OC EXHST FAN 2 REMOTE	LOCAL	INCOMP	DI	1.4.1.2	
DROP30	94PCM02	1C31232G01	M94RI0172	OC EXHST FAN 2 CTRL PWR	WAIT	READY	DI	1.4.1.3	
DROP30	94PCM02	1C31232G01	M94UA0172A	OC EXHST FAN 2 FAIL	NORMAL	FAIL	DI	1.4.1.4	
DROP30	94PCM02	1C31232G01	M94UA0172B	OC EXHST FAN 2 ALARM	NORMAL	ALARM	DI	1.4.1.5	
DROP30	94PCM02	1C31232G01	M94QI2244	OC EXHST FAN 2 IN PRESS	LOCAL	INCOMP	DI	1.4.1.6	
DROP30	94PCM02	1C31232G01	M94QI1246	OC EXHST FAN 2 INLET VANE REM	LOCAL	INCOMP	DI	1.4.1.7	
DROP30	94PCM02	1C31232G01	M94RI1246	OC EXHST FAN 2 INLET VANE PWR	NRDY	READY	DI	1.4.1.8	
DROP30	94PCM02	1C31232G01	M94FAL2247	OC EXHST FAN 2	NORMAL	LOW	DI	1.4.1.9	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.1.10	
DROP30	94PCM02	1C31232G01	M94MI0112	CENTRATE PUMP NO. 2	OFF	RUNNNG	DI	1.4.1.11	
DROP30	94PCM02	1C31232G01	M94QI0112	CENTRATE PUMP NO. 2	LOCAL	INCOMP	DI	1.4.1.12	
DROP30	94PCM02	1C31232G01	M94RI0112	CENTRATE PUMP NO. 2	WAIT	READY	DI	1.4.1.13	
DROP30	94PCM02	1C31232G01	M94UA0112	CENTRATE PUMP NO. 2	NORMAL	FAIL	DI	1.4.1.14	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.1.15	
DROP30	94PCM02	1C31232G01	<b>M30QC4S01</b>	<b>DPU30 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16	
DROP30	94PCM02	1C31232G01	M94LAL2366	ACID DAY TANK 2 LVL ALRM	NORMAL	LOW	DI	1.4.2.1	
DROP30	94PCM02	1C31232G01	M94LAH2366	ACID DAY TANK 2 LVL ALRM	HIGH	NORMAL	DI	1.4.2.2	
DROP30	94PCM02	1C31232G01	M94LAH2336	CAUSTIC DAY TANK 2 LVL ALRM	HIGH	NORMAL	DI	1.4.2.3	
DROP30	94PCM02	1C31232G01	M94LAL2336	CAUSTIC DAY TANK 2 LVL ALRM	NORMAL	LOW	DI	1.4.2.4	
DROP30	94PCM02	1C31232G01	M94LAH2306	SHT DAY TANK 2 LVL ALRM	HIGH	NORMAL	DI	1.4.2.5	
DROP30	94PCM02	1C31232G01	M94LAL2306	SHT DAY TANK 2 LVL ALRM	NORMAL	LOW	DI	1.4.2.6	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.2.7	
DROP30	94PCM02	1C31232G01	M94MI0154	ODOR CNTRL R/C PUMP NO. 4	OFF	RUNNNG	DI	1.4.2.8	
DROP30	94PCM02	1C31232G01	M94QI0154	ODOR CNTRL R/C PUMP NO. 4	LOCAL	INCOMP	DI	1.4.2.9	
DROP30	94PCM02	1C31232G01	M94RI0154	ODOR CNTRL R/C PUMP NO. 4	WAIT	READY	DI	1.4.2.10	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.2.11	
DROP30	94PCM02	1C31232G01	M94PAL2233	OC SCRBR 4 R/C PMP DISCH PRESS	NORMAL	LOW	DI	1.4.2.12	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.2.13	
DROP30	94PCM02	1C31232G01	M94ZD1267	WSTWTR PS DISARGE RELIEF VLV 2	NORMAL	OPENED	DI	1.4.2.14	
DROP30	94PCM02	1C31232G01	M94ZB1267	WSTWTR PS DISARGE RELIEF VLV 2	NORMAL	CLOSED	DI	1.4.2.15	
DROP30	94PCM02	1C31232G01	<b>M30QC4S02</b>	<b>DPU30 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16	

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DROP30	94PCM02	1C31232G01	M94ZD1262	WSTWTR PS DISARGE RELIEF VLV 1	NORMAL	OPENED	DI	1.4.3.1
DROP30	94PCM02	1C31232G01	M94ZB1262	WSTWTR PS DISARGE RELIEF VLV 1	NORMAL	CLOSED	DI	1.4.3.2
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.3.3
DROP30	94PCM02	1C31232G01	M94QI1242	OC CARB ADSBR 2 B/PASS VLV	LOCAL	INCOMP	DI	1.4.3.4
DROP30	94PCM02	1C31232G01	M94RI1242	OC CARB ADSBR 2 B/PASS VLV	WAIT	READY	DI	1.4.3.5
DROP30	94PCM02	1C31232G01	M94ZB1242	OC CRBN ADSBR 2 B/PASS VLV	NORMAL	CLOSED	DI	1.4.3.6
DROP30	94PCM02	1C31232G01	M94ZD1242	OC CARB ADSBR 2 B/PASS VLV	NORMAL	OPENED	DI	1.4.3.7
DROP30	94PCM02	1C31232G01	M94QI1222	OC SCRBR 4 B/PASS DAMPER	LOCAL	INCOMP	DI	1.4.3.8
DROP30	94PCM02	1C31232G01	M94RI1222	OC SCRBR 4 B/PASS DAMPER	WAIT	READY	DI	1.4.3.9
DROP30	94PCM02	1C31232G01	M94ZD1222	OC SCRBR 4 B/PASS DAMPER	NORMAL	OPENED	DI	1.4.3.10
DROP30	94PCM02	1C31232G01	M94ZB1222	OC SCRBR 4 B/PASS DAMPER	NORMAL	CLOSED	DI	1.4.3.11
DROP30	94PCM02	1C31232G01	M94QI1221	OC SCRBR 4 DISCH DAMPER	LOCAL	INCOMP	DI	1.4.3.12
DROP30	94PCM02	1C31232G01	M94RI1221	OC SCRBR 4 DISCH DAMPER	WAIT	READY	DI	1.4.3.13
DROP30	94PCM02	1C31232G01	M94ZD1221	OC SCRBR 4 DISCH DAMPER	NORMAL	OPENED	DI	1.4.3.14
DROP30	94PCM02	1C31232G01	M94ZB1221	OC SCRBR 4 DISCH DAMPER	NORMAL	CLOSED	DI	1.4.3.15
DROP30	94PCM02	1C31232G01	<b>M30QC4S03</b>	<b>DPU30 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP30	94PCM02	1C31232G01	M94QI1223	OC HEAT COIL 6 INLET AIR DMPR	LOCAL	INCOMP	DI	1.4.4.1
DROP30	94PCM02	1C31232G01	M94RI1223	OC HEAT COIL 6 INLET AIR DMPR	WAIT	READY	DI	1.4.4.2
DROP30	94PCM02	1C31232G01	M94ZD1223	OC HEAT COIL 6 INLET AIR DMPR	NORMAL	OPENED	DI	1.4.4.3
DROP30	94PCM02	1C31232G01	M94ZB1223	OC HEAT COIL 6 INLET AIR DMPR	NORMAL	CLOSED	DI	1.4.4.4
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.4.5
DROP30	94PCM02	1C31232G01	M94QI1224	OC HEAT COIL 6 HOT H2O VLV	LOCAL	INCOMP	DI	1.4.4.6
DROP30	94PCM02	1C31232G01	M94RI1224	OC HEAT COIL 6 HOT H2O VLV	WAIT	READY	DI	1.4.4.7
DROP30	94PCM02	1C31232G01	M94QI2221	ODOR CNTRL HT COIL 6 DISCH TMP	LOCAL	INCOMP	DI	1.4.4.8
DROP30	94PCM02	1C31232G01	M94PDAH2222	OC HEAT COIL 6 PRESS DROP	NORMAL	HIGH	DI	1.4.4.9
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.4.10
DROP30	94PCM02	1C31232G01	M94HS2230C	ODOR CNTRL SCRBR 4 PH	LOCAL	INCOMP	DI	1.4.4.11
DROP30	94PCM02	1C31232G01	M94QI2230A	ODOR CNTRL SCRBR 4 PH	OFF	PUMP 2	DI	1.4.4.12
DROP30	94PCM02	1C31232G01	M94QI2230B	ODOR CNTRL SCRBR 4 PH	OFF	PUMP 1	DI	1.4.4.13
DROP30	94PCM02	1C31232G01	M94QI2230C	ODOR CNTRL SCRBR 4 PH	OFF	PUMP 2	DI	1.4.4.14
DROP30	94PCM02	1C31232G01	M94QI2230D	ODOR CNTRL SCRBR 4 PH	OFF	PUMP 1	DI	1.4.4.15
DROP30	94PCM02	1C31232G01	<b>M30QC4S04</b>	<b>DPU30 QC DROP 4 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP30	94PCM02	1C31232G01	M94AAHH2124A	PUMP STN WET WELL GAS MNTRG	HI-HI	NORMAL	DI	1.4.5.1
DROP30	94PCM02	1C31232G01	M94AAH2124A	PUMP STN WET WELL GAS MNTRG	HIGH	NORMAL	DI	1.4.5.2
DROP30	94PCM02	1C31232G01	M94XA2124A	PUMP STN WET WELL GAS MNTRG	FAIL	NORMAL	DI	1.4.5.3
DROP30	94PCM02	1C31232G01	M94AAH2124C	PUMP STN WET WELL GAS MNTRG	HIGH	NORMAL	DI	1.4.5.4
DROP30	94PCM02	1C31232G01	M94AAHH2124C	PUMP STN WET WELL GAS MNTRG	HI-HI	NORMAL	DI	1.4.5.5
DROP30	94PCM02	1C31232G01	M94XA2124C	PUMP STN WET WELL GAS MNTRG	FAIL	NORMAL	DI	1.4.5.6
DROP30	94PCM02	1C31232G01	M94QI1241	OC CARB ADSBR 2 OUT VLV 2	LOCAL	INCOMP	DI	1.4.5.7
DROP30	94PCM02	1C31232G01	M94RI1241	OC CARB ADSBR 2 OUT VLV 2	WAIT	READY	DI	1.4.5.8
DROP30	94PCM02	1C31232G01	M94ZD1241	OC CARB ADSBR 2 OUT VLV 2	NORMAL	OPENED	DI	1.4.5.9
DROP30	94PCM02	1C31232G01	M94ZB1241	OC CRBN ADSBR 2 OUT VLV 2	NORMAL	CLOSED	DI	1.4.5.10
DROP30	94PCM02	1C31232G01	M94LAHH9014	ODOR CNTRL SCRBR 4 LVL SW ALRM	NORMAL	HI-HI	DI	1.4.5.11
DROP30	94PCM02	1C31232G01	M94LAH9014	ODOR CNTRL SCRBR 4 LVL SW ALRM	NORMAL	HIGH	DI	1.4.5.12
DROP30	94PCM02	1C31232G01	M94LAL9014	ODOR CNTRL SCRBR 4 LVL SW ALRM	NORMAL	LOW	DI	1.4.5.13
DROP30	94PCM02	1C31232G01	M94LALL9014	ODOR CNTRL SCRBR 4 LVL SW ALRM	NORMAL	LO-LO	DI	1.4.5.14
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.5.15
DROP30	94PCM02	1C31232G01	<b>M30QC4S05</b>	<b>DPU30 QC DROP 4 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.5.16
DROP30	94PCM02			Spare Module Address				1.4.6
DROP30	94PCM02			Spare Module Address				1.4.7
DROP30	94PCM02			Spare Module Address				1.4.8
DROP30	94PCM02	5A26458G04	M94HS0153	ODOR CNTRL R/C PUMP NO. 3	OFF	RUN	DO	1.5.1.1
DROP30	94PCM02	5A26458G04	M94HS1205A	OC SCRBR 3 FA INLET DMPR	OPEN	CLOSE	DO	1.5.1.2
DROP30	94PCM02	5A26458G04	M94HS1206A	OC SCRBR 3 FA DISCH DMPR	OPEN	CLOSE	DO	1.5.1.3
DROP30	94PCM02	5A26458G04	M94HS1207A	OC SCRBR 3 FA B/PASS DMPR	OPEN	CLOSE	DO	1.5.1.4
DROP30	94PCM02	5A26458G04	SPARE				DO	1.5.1.5
DROP30	94PCM02	5A26458G04	M94QS2210	ODOR CNTRL SCRBR 3 PH	OFF	CMPRDY	DO	1.5.1.6
DROP30	94PCM02	5A26458G04	SPARE				DO	1.5.1.7
DROP30	94PCM02	5A26458G04	M94HS0141B	ACID FD PUMP NO. 1 - TRAIN 2	OFF	RUN	DO	1.5.1.8
DROP30	94PCM02	5A26458G04	M94HS0131B	CSTC FD PUMP NO. 1 - TRAIN 2	OFF	RUN	DO	1.5.1.9
DROP30	94PCM02	5A26458G04	M94HS0121B	SHT FD PUMP NO. 1 - TRAIN 2	OFF	RUN	DO	1.5.1.10
DROP30	94PCM02	5A26458G04	M94HS0172	OC EXHST FAN1 RUN CMD	OFF	RUN	DO	1.5.1.11
DROP30	94PCM02	5A26458G04	M94HS0114	CENTRATE PUMP NO. 3 (FUTURE)	OFF	RUN	DO	1.5.1.12

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DROP30	94PCM02	5A26458G04	M94HS0112	CENTRATE PUMP NO. 2	OFF	RUN	DO	1.6.1.1
DROP30	94PCM02	5A26458G04	M94HS0142B	ACID FD PUMP NO. 2 - TRAIN 2	OFF	RUN	DO	1.6.1.2
DROP30	94PCM02	5A26458G04	M94HS0132B	CSTC FD PUMP NO. 2 - TRAIN 2	OFF	RUN	DO	1.6.1.3
DROP30	94PCM02	5A26458G04	M94HS0122B	SHT FD PUMP NO. 2 - TRAIN 2	OFF	RUN	DO	1.6.1.4
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.1.5
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.1.6
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.1.7
DROP30	94PCM02	5A26458G04	M94HS1242A	OC CARB ADSBR 2 B/PASS VLV	OPEN	CLOSE	DO	1.6.1.8
DROP30	94PCM02	5A26458G04	M94HS1241A	OC CARB ADSBR 2 OUT VLV 2	OPEN	CLOSE	DO	1.6.1.9
DROP30	94PCM02	5A26458G04	M94HS1240A	OC CARB ADSBR 2 OUT VLV 1	OPEN	CLOSE	DO	1.6.1.10
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.1.11
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.1.12
DROP30	94PCM02	5A26458G04	M94HS0154	ODOR CNTRL R/C PUMP NO. 4	OFF	RUN	DO	1.6.2.1
DROP30	94PCM02	5A26458G04	M94QS2230	ODOR CNTRL SCRBR 4 PH	OFF	CMPRDY	DO	1.6.2.2
DROP30	94PCM02	5A26458G04	M94HS1222A	OC SCRBR 4 B/PASS DAMPER	OPEN	CLOSE	DO	1.6.2.3
DROP30	94PCM02	5A26458G04	M94HS1221A	OC SCRBR 4 DISCH DAMPER	OPEN	CLOSE	DO	1.6.2.4
DROP30	94PCM02	5A26458G04	M94HS1220A	OC SCRBR 4 INLET DAMPER	OPEN	CLOSE	DO	1.6.2.5
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.2.6
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.2.7
DROP30	94PCM02	5A26458G04	M94HS1223A	OC HEAT COIL 6 IN AIR DAMPER	OPEN	CLOSE	DO	1.6.2.8
DROP30	94PCM02	5A26458G04	M94QS2221	OC HEAT COIL 6 DISCH TEMP	OFF	CMPRDY	DO	1.6.2.9
DROP30	94PCM02	5A26458G04	M94QS2244	OC EXHAUST FAN 2 INLET PRESS	OFF	CMPRDY	DO	1.6.2.10
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.2.11
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.2.12

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DROP38	80PCM05	5X00419G01		80VDL07 - PRIMARY CONTROLLER (FLOWERVE VALVE NETWORK)			SERIAL	1.1.1	
			80MV1452	STORAGE MIX PUMP DISCHARGE HDR VALVE 1					
			80MV1453	STORAGE MIX PUMP DISCHARGE HDR VALVE 2					
			80MV1472	EM BIO-STORAGE TANK MIX NOZZLE #4					
			80MV1473	EM BIO-STORAGE TANK MIX NOZZLE #3					
			80MV1673	BIO-GAS COMP. #2 OUTLET VALVE					
			<b>80MV1678</b>	<b>BIO-GAS COMP. #3 OUTLET VALVE</b>					
			80MV1671	BIOGAS COMPRESSOR #1 DISCHARGE VALVE					
			80MV1466	RSL INLET EM STORAGE TANK VALVE					
			80MV1465	DSL INLET EM STORAGE TANK VALVE					
			80MV1116	EM BIO-STORAGE SAMPLER VALVE					
			80MV1470	EM BIO-STORAGE TANK MIX NOZZLE #2					
			80MV1471	EM BIO-STORAGE TANK MIX NOZZLE #1					
			80MV1460	EM BIO-STORAGE TANK BIOGAS VALVE					
			80MV1451	STORAGE MIX PUMP INLET HEADER VALVE 2					
			80MV1445	STORAGE MIX PUMP DISCHARGE VALVE					
			80MV1444	STORAGE MIX PUMP SUCTION VALVE					
			80MV1450	STORAGE MIX PUMP INLET HEADER VALVE 1					
			80MV1442	STORAGE MIX PUMP #2 SUCTION VALVE					
			80MV1443	STORAGE MIX PUMP #2 DISCHARGE VALVE					
			80MV1440	STORAGE MIX PUMP #1 SUCTION VALVE					
			80MV1117	BIO-STORAGE TANK SAMPLER					
			80MV1441	STORAGE MIX PUMP #1 DISCHARGE VALVE					
			80MV1762	DIGESTER #3 CAUSTIC SODA ISOLATION VALVE					
			80MV1761	DIGESTER #2 CAUSTIC SODA ISOLATION VALVE					
			80MV1760	DIGESTER #1 CAUSTIC SODA ISOLATION VALVE					
			80MV1766	CAUSTIC FEED PUMP #1 DISCHARGE VALVE					
			80MV1765	CAUSTIC FEED PUMP #1 SUCTION VALVE					
			80MV1751	CAUSTIC SODA DAY TANK #1 OUTLET VALVE					
			80MV1752	CAUSTIC DAY TANK #1 STRAINER VALVE					
			80MV1750	CAUSTIC SODA DAY TANK #1 INLET VALVE					
			80MV1755	CAUSTIC SODA DAY TANK #2 INLET VALVE					
			80MV1757	CAUSTIC DAY TANK #2 STRAINER VALVE					
			80MV1756	CAUSTIC SODA DAY TANK #2 OUTLET VALVE					
			80MV1754	CAUSTIC SODA DAY TANK BYPASS VALVE					
			80MV1715	FERRIC DAY #2 TANK INLET VALVE					
			80MV1716	FERRIC DAY #2 TANK OUTLET VALVE					
			80MV1717	FC3 DAY TANK #2 STRAINER VALVE					
			80MV1714	FERRIC DAY TANK 1&2 BYPASS VALVE					
			80MV1712	FC3 DAY TANK #1 STRAINER VALVE					
80MV1711	FERRIC DAY TANK 1 OUTLET VALVE								
80MV1710	FERRIC DAY TANK 1 INLET VALVE								
80MV1726	FERRIC FEED PUMP #1 DISCHARGE VALVE								
80MV1725	FERRIC FEED PUMP #1 SUCTION VALVE								
DROP38	80PCM05		Spare Module Address						1.1.2
DROP38	80PCM05	5X00106G01	M80FT2640	EM BS STORAGE TANK BIOGAS FLOW	0	170 SCFM	AI - HART	1.1.3.1	
DROP38	80PCM05	5X00106G01	M80FT2673	BIOGAS COMPRESSORS DISCH FLOW	0	3000 SCFM	AI - HART	1.1.3.2	

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP38	80PCM05	5X00106G01	M80ST0180	FERROUS FEED PUMP 1 SPEED	0	100 PCT	AI - HART	1.1.3.3	
DROP38	80PCM05	5X00106G01	M80ST0186	CAUSTIC FEED PUMP 1 SPEED	0	100 PCT	AI - HART	1.1.3.4	
DROP38	80PCM05	5X00106G01	M80FI3005	AREA 80 PROCESS WATER FLOW	0	800 GPM	AI - HART	1.1.3.5	
DROP38	80PCM05	5X00106G01	M80FI3009	AREA 80 UTILITY WATER FLOW	0	1300 GPM	AI - HART	1.1.3.6	
DROP38	80PCM05	5X00106G01	SPARE				AI - HART	1.1.3.7	
DROP38	80PCM05	5X00106G01	SPARE				AI - HART	1.1.3.8	
DROP38	80PCM05	5X00106G01	<b>M80ZI1670</b>	<b>BIOGAS COMPRESSOR NO.1 INLET VALVE POSITION</b>	<b>0</b>	<b>100 PCT</b>	AI - HART	1.1.4.1	
DROP38	80PCM05	5X00106G01	<b>M80ZI1677</b>	<b>BIOGAS COMPRESSOR NO.3 INLET VALVE POSITION</b>	<b>0</b>	<b>100 PCT</b>	AI - HART	1.1.4.2	
DROP38	80PCM05	5X00106G01	M80LT2460	EM BS STORAGE TANK LEVEL 1	0	65 FEET	AI - HART	1.1.4.3	
DROP38	80PCM05	5X00106G01	M80FT2725	FERROUS FEED PUMP 1 DISCH FLOW	0	0.7 GPM	AI - HART	1.1.4.4	
DROP38	80PCM05	5X00106G01	M80LT2710	FERROUS DAY TANK 1 LEVEL	0	8 FEET	AI - HART	1.1.4.5	
DROP38	80PCM05	5X00106G01	SPARE				AI - HART	1.1.4.6	
DROP38	80PCM05	5X00106G01	M80FT2765	CAUSTIC FEED PUMP 1 DISCH FLOW	2	19 PGM	AI - HART	1.1.4.7	
DROP38	80PCM05	5X00106G01	M80LT2750	CAUSTIC DAY TANK 1 LEVEL	0	9 FEET	AI - HART	1.1.4.8	
DROP38	80PCM05		Spare Module Address						1.1.5
DROP38	80PCM05		Spare Module Address						1.1.6
DROP38	80PCM05	5X00167G01	M80SC0180	FERROUS FEED PUMP 1 SPD DMND	0	100 PCT	AO	1.1.7.1	
DROP38	80PCM05	5X00167G01	M80SC0186	CAUSTIC FEED PUMP 1 SPD DMND	0	100 PCT	AO	1.1.7.2	
DROP38	80PCM05	5X00167G01	SPARE				AO	1.1.7.3	
DROP38	80PCM05	5X00167G01	<b>M80ZC1670</b>	<b>BIOGAS COMPRESSOR NO.1 INLET VALVE POSITION CMD</b>	<b>0</b>	<b>100 PCT</b>	AO	1.1.7.4	
DROP38	80PCM05	5X00167G01	<b>M80ZC1677</b>	<b>BIOGAS COMPRESSOR NO.3 INLET VALVE POSITION CMD</b>	<b>0</b>	<b>100 PCT</b>	AO	1.1.7.5	
DROP38	80PCM05	5X00167G01	SPARE				AO	1.1.7.6	
DROP38	80PCM05	5X00167G01	SPARE				AO	1.1.7.7	
DROP38	80PCM05	5X00167G01	SPARE				AO	1.1.7.8	
DROP38	80PCM05	5X00119G01	MDPU38T1	80PCM05 DPU38 CABINET TEMP	32	154 DEG F	RTD	1.1.8.1	
DROP38	80PCM05	5X00119G01	SPARE				RTD	1.1.8.2	
DROP38	80PCM05	5X00119G01	SPARE				RTD	1.1.8.3	
DROP38	80PCM05	5X00119G01	SPARE				RTD	1.1.8.4	
DROP38	80PCM05	5X00119G01	SPARE				RTD	1.1.8.5	
DROP38	80PCM05	5X00119G01	SPARE				RTD	1.1.8.6	
DROP38	80PCM05	5X00119G01	SPARE				RTD	1.1.8.7	
DROP38	80PCM05	5X00119G01	SPARE				RTD	1.1.8.8	



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DROP38	80PCM05			Spare Module Address				1.2.1
DROP38	80PCM05	5X00167G01	M80ZC1672	BIOGAS COMPRESSOR NO.2 INLET VALVE POSITION CMD	0	100 PCT	AO	1.2.2.1
DROP38	80PCM05	5X00167G01	M80ZC1674	BIOGAS COMP. RECIRCULATION VALVE POSITION CMD	0	100 PCT	AO	1.2.2.2
DROP38	80PCM05	5X00167G01	SPARE				AO	1.2.2.3
DROP38	80PCM05	5X00167G01	SPARE				AO	1.2.2.4
DROP38	80PCM05	5X00167G01	SPARE				AO	1.2.2.5
DROP38	80PCM05	5X00167G01	SPARE				AO	1.2.2.6
DROP38	80PCM05	5X00167G01	SPARE				AO	1.2.2.7
DROP38	80PCM05	5X00167G01	SPARE				AO	1.2.2.8
DROP38	80PCM05			Spare Module Address				1.2.3
DROP38	80PCM05			Spare Module Address				1.2.4
DROP38	80PCM05	5X00106G01	M80ZC1672	BIOGAS COMPRESSOR NO.2 INLET VALVE POSITION	0	100 PCT	AI - HART	1.2.5.1
DROP38	80PCM05	5X00106G01	M80ZC1674	BIOGAS COMPRESSOR RECIRCULATION VALVE POSITION	0	100 PCT	AI - HART	1.2.5.2
DROP38	80PCM05	5X00106G01	M80LT2461	EM BS STORAGE TANK LEVEL 2	0	65 FEET	AI - HART	1.2.5.3
DROP38	80PCM05	5X00106G01	M80PT2641	EM BS ST TANK BIOGAS PRS	0	12 INH2O	AI - HART	1.2.5.4
DROP38	80PCM05	5X00106G01	SPARE				AI - HART	1.2.5.5
DROP38	80PCM05	5X00106G01	M80LT2715	FERROUS DAY TANK 2 LEVEL	0	8 FEET	AI - HART	1.2.5.6
DROP38	80PCM05	5X00106G01	SPARE				AI - HART	1.2.5.7
DROP38	80PCM05	5X00106G01	M80LT2755	CAUSTIC DAY TANK 2 LEVEL	0	9 FEET	AI - HART	1.2.5.8
DROP38	80PCM05	5X00106G01	SPARE				AI - HART	1.2.6.1
DROP38	80PCM05	5X00106G01	M80PT2670	BIOGAS COMPRSSRS INLET PRS	0	12 INH2O	AI - HART	1.2.6.2
DROP38	80PCM05	5X00106G01	M80PT2671	BIOGAS COMPRSSRS DISCH PRS	0	40 PSIG	AI - HART	1.2.6.3
DROP38	80PCM05	5X00106G01	M80TT2669	BIOGAS COMPRESSORS INLET TEMP	30	210 DEG F	AI - HART	1.2.6.4
DROP38	80PCM05	5X00106G01	M80TT2672	BIOGAS COMPRESSORS DISCH TEMP	60	120 DEG F	AI - HART	1.2.6.5
DROP38	80PCM05	5X00106G01	M80LI3001	AIR GAP TANK-01 LEVEL	0	20 FEET	AI - HART	1.2.6.6
DROP38	80PCM05	5X00106G01	M80LI3002	HYDROPNEUMATIC TANK LEVEL	0	180 INWC	AI - HART	1.2.6.7
DROP38	80PCM05	5X00106G01	M80PI3003	AREA 80 PRW OUTPUT PRESSURE	0	150 PSI	AI - HART	1.2.6.8
DROP38	80PCM05	1C31166G02		AREA 80 HVAC			SERIAL	1.2.7
DROP38	80PCM05	5X00419G01		80VDL07 - BACKUP CONTROLLER (FLOWSERVE VALVE NETWORK)			SERIAL	1.2.8
DROP38	80PCM05	1C31232G01	M80MI0201	BIOGAS COMPRESSOR NO. 1	OFF	RUNNNG	DI	1.3.1.1
DROP38	80PCM05	1C31232G01	M80QI0201	BIOGAS COMPRESSOR NO. 1	LOCAL	INCOMP	DI	1.3.1.2
DROP38	80PCM05	1C31232G01	M80RI0201	BIOGAS COMPRESSOR NO. 1	WAIT	READY	DI	1.3.1.3
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.1.4
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.1.5
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.1.6
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.1.7
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.1.8
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.1.9
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.1.10



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP38	80PCM05	1C31232G01	M80LAH2714	FC2 DAY TANKS FLOOD ALARM	HIGH	NORMAL	DI	1.3.1.11
DROP38	80PCM05	1C31232G01	M80PDAH2760	ODOR CONTROL FAN 1 NRML PRS DROP	NORMAL	HIDIFF	DI	1.3.1.12
DROP38	80PCM05	1C31232G01	M80MI0191	ODOR CONTROL FAN NO. 1	OFF	RUNNNG	DI	1.3.1.13
DROP38	80PCM05	1C31232G01	M80QI0191	ODOR CONTROL FAN NO. 1	LOCAL	INCOMP	DI	1.3.1.14
DROP38	80PCM05	1C31232G01	M80RI0191	ODOR CONTROL FAN NO. 1	WAIT	READY	DI	1.3.1.15
DROP38	80PCM05	1C31232G01	<b>M38QC3S01</b>	<b>DPU38 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16
DROP38	80PCM05	1C31232G01	<b>M80HS1670</b>	<b>BIOGAS COMPRESSOR NO.1 INLET VALVE</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.3.2.1
DROP38	80PCM05	1C31232G01	<b>M80HS1677</b>	<b>BIOGAS COMPRESSOR NO.3 INLET VALVE</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.3.2.2
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.2.3
DROP38	80PCM05	1C31232G01	M80LAHH2625	CONDENSATE SUMP 1 LEVEL ALARMS	NORMAL	HI-HI	DI	1.3.2.4
DROP38	80PCM05	1C31232G01	M80LALL2625	CONDENSATE SUMP 1 LEVEL ALARMS	NORMAL	LO-LO	DI	1.3.2.5
DROP38	80PCM05	1C31232G01	M80ZB1461	EM BS ST TNK PRS REL 1 ISO VLV	NORMAL	CLOSED	DI	1.3.2.6
DROP38	80PCM05	1C31232G01	M80ZD1461	EM BS ST TNK PRS REL 1 ISO VLV	NORMAL	OPENED	DI	1.3.2.7
DROP38	80PCM05	1C31232G01	M80MI0180	FERROUS FEED PUMP NO. 1	OFF	RUNNNG	DI	1.3.2.8
DROP38	80PCM05	1C31232G01	M80QI0180	FC3 FEED PUMP NO. 1	LOCAL	INCOMP	DI	1.3.2.9
DROP38	80PCM05	1C31232G01	M80RI0180	FC3 FEED PUMP NO. 1	WAIT	READY	DI	1.3.2.10
DROP38	80PCM05	1C31232G01	M80UA0180	FERROUS FEED PMP 1 INLET VLV	NORMAL	FAIL	DI	1.3.2.11
DROP38	80PCM05	1C31232G01	M80LAHH2622	SEDIMENT TRAP 11 LEVEL	NORMAL	HI-HI	DI	1.3.2.12
DROP38	80PCM05	1C31232G01	M80LALL2622	SEDIMENT TRAP 11 LEVEL	NORMAL	LO-LO	DI	1.3.2.13
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.2.14
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.2.15
DROP38	80PCM05	1C31232G01	<b>M38QC3S02</b>	<b>DPU38 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16
DROP38	80PCM05	1C31232G01	<b>M80MI0203</b>	<b>BIOGAS COMPRESSOR NO. 3</b>	<b>OFF</b>	<b>RUNNNG</b>	DI	1.3.3.1
DROP38	80PCM05	1C31232G01	<b>M80QI0203</b>	<b>BIOGAS COMPRESSOR NO. 3</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.3.3.2
DROP38	80PCM05	1C31232G01	<b>M80RI0203</b>	<b>BIOGAS COMPRESSOR NO. 3</b>	<b>WAIT</b>	<b>READY</b>	DI	1.3.3.3
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.3.4
DROP38	80PCM05	1C31232G01	M80FAL0131	STORAGE MIX PUMP NO. 1	NORMAL	LOW	DI	1.3.3.5
DROP38	80PCM05	1C31232G01	M80MI0131A	STORAGE MIX PUMP NO. 1	OFF	ONFAST	DI	1.3.3.6
DROP38	80PCM05	1C31232G01	M80MI0131B	STORAGE MIX PUMP NO. 1	OFF	ONSLow	DI	1.3.3.7
DROP38	80PCM05	1C31232G01	M80QI0131	STORAGE MIX PUMP NO. 1	LOCAL	INCOMP	DI	1.3.3.8
DROP38	80PCM05	1C31232G01	M80RI0131	STORAGE MIX PUMP NO. 1	WAIT	READY	DI	1.3.3.9
DROP38	80PCM05	1C31232G01	M80FAL0133	STORAGE MIX PUMP NO. 3	NORMAL	LOW	DI	1.3.3.10
DROP38	80PCM05	1C31232G01	M80MI0133A	STORAGE MIX PUMP NO. 3	OFF	ONFAST	DI	1.3.3.11
DROP38	80PCM05	1C31232G01	M80MI0133B	STORAGE MIX PUMP NO. 3	OFF	ONSLow	DI	1.3.3.12
DROP38	80PCM05	1C31232G01	M80QI0133	STORAGE MIX PUMP NO. 3	LOCAL	INCOMP	DI	1.3.3.13
DROP38	80PCM05	1C31232G01	M80RI0133	STORAGE MIX PUMP NO. 3	WAIT	READY	DI	1.3.3.14
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.3.15
DROP38	80PCM05	1C31232G01	<b>M38QC3S03</b>	<b>DPU38 QC DROP 3 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.3.16
DROP38	80PCM05	1C31232G01	M80LAH2751	CAUSTIC ST DAY TNK1 LVL ALARMS	HIGH	NORMAL	DI	1.3.4.1
DROP38	80PCM05	1C31232G01	M80LAL2751	CAUSTIC ST DAY TNK1 LVL ALARMS	NORMAL	LOW	DI	1.3.4.2
DROP38	80PCM05	1C31232G01	M80LAHH2635	CONDENSATE SUMP 3 LEVEL ALARMS	NORMAL	HI-HI	DI	1.3.4.3
DROP38	80PCM05	1C31232G01	M80LALL2635	CONDENSATE SUMP 3 LEVEL ALARMS	NORMAL	LO-LO	DI	1.3.4.4
DROP38	80PCM05	1C31232G01	M80LAH2711	FC2 DAY TANK 1 LEVEL ALARMS	HIGH	NORMAL	DI	1.3.4.5
DROP38	80PCM05	1C31232G01	M80LAL2711	FC2 DAY TANK 1 LEVEL ALARMS	NORMAL	LOW	DI	1.3.4.6
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.4.7
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.4.8

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP38	80PCM05	1C31232G01	M80ZB1531	J-TUBE DISCH VLV 3	NORMAL	CLOSED	DI	1.3.4.9
DROP38	80PCM05	1C31232G01	M80ZD1531	J-TUBE DISCH VLV 3	NORMAL	OPENED	DI	1.3.4.10
DROP38	80PCM05	1C31232G01	M80LAHH2632	SEDIMENT TRAP 4 LEVEL	NORMAL	HI-HI	DI	1.3.4.11
DROP38	80PCM05	1C31232G01	M80LALL2632	SEDIMENT TRAP 4 LEVEL	NORMAL	LO-LO	DI	1.3.4.12
DROP38	80PCM05	1C31232G01	M80LAHH3001	AIR GAP TANK 001 LEVEL ALARM	NORMAL	HI-HI	DI	1.3.4.13
DROP38	80PCM05	1C31232G01	M80LALL3001	AIR GAP TANK 001 LEVEL ALARM	NORMAL	LO-LO	DI	1.3.4.14
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.4.15
DROP38	80PCM05	1C31232G01	<b>M38QC3S04</b>	<b>DPU38 QC DROP 3 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.4.16
DROP38	80PCM05	1C31232G01	M80YL096A	PROCESS WATER PUMP P-096	OFF	ON	DI	1.3.5.1
DROP38	80PCM05	1C31232G01	M80ZL096	PW PUMP P-096 STATUS	LOCAL	INCOMP	DI	1.3.5.2
DROP38	80PCM05	1C31232G01	M80YL096	PUMP P-096 POWER AVAILABLE	WAIT	READY	DI	1.3.5.3
DROP38	80PCM05	1C31232G01	M80YA096B	PROCESS WATER PUMP P-096	NORMAL	FAIL	DI	1.3.5.4
DROP38	80PCM05	1C31232G01	M80PAL3096	PUMP P-096 DISCHARGE PRESSURE	LOW	NORMAL	DI	1.3.5.5
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.5.6
DROP38	80PCM05	1C31232G01	M80YL097A	PROCESS WATER PUMP P-097	OFF	ON	DI	1.3.5.7
DROP38	80PCM05	1C31232G01	M80ZL097	PROCESS WATER PUMP P-097	LOCAL	INCOMP	DI	1.3.5.8
DROP38	80PCM05	1C31232G01	M80YL097	PUMP P-097 POWER AVAILABLE	WAIT	READY	DI	1.3.5.9
DROP38	80PCM05	1C31232G01	M80YA097B	PROCESS WATER PUMP P-097	NORMAL	FAIL	DI	1.3.5.10
DROP38	80PCM05	1C31232G01	M80PAL3097	PUMP P-097 DISCHARGE PRESSURE	LOW	NORMAL	DI	1.3.5.11
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.5.12
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.5.13
DROP38	80PCM05	1C31232G01	M80ZL03001	AIR GAP TK PW FILLVALVE	CLOSED	OPENED	DI	1.3.5.14
DROP38	80PCM05	1C31232G01	M80ZLC3001	AIR GAP TANK PW FILL VALVE	NORMAL	CLOSED	DI	1.3.5.15
DROP38	80PCM05	1C31232G01	<b>M38QC3S05</b>	<b>DPU38 QC DROP 3 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.5.16
DROP38	80PCM05			Spare Module Address				1.3.6
DROP38	80PCM05			Spare Module Address				1.3.7
DROP38	80PCM05			Spare Module Address				1.3.8
DROP38	80PCM05	1C31232G01	M80MI0202	BIOGAS COMPRESSOR NO. 2	OFF	RUNNNG	DI	1.4.1.1
DROP38	80PCM05	1C31232G01	M80QI0202	BIOGAS COMPRESSOR NO. 2	LOCAL	INCOMP	DI	1.4.1.2
DROP38	80PCM05	1C31232G01	M80RI0202	BIOGAS COMPRESSOR NO. 2	WAIT	READY	DI	1.4.1.3
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.1.4
DROP38	80PCM05	1C31232G01	<b>M80HS1672</b>	<b>BIOGAS COMPRESSOR NO.2 INLET VALVE</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.4.1.5
DROP38	80PCM05	1C31232G01	<b>M80HS1674</b>	<b>BIOGAS COMP. RECIRCULATION VALVE</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.4.1.6
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.1.7
DROP38	80PCM05	1C31232G01	M80FAL0132	STORAGE MIX PUMP NO. 2	NORMAL	LOW	DI	1.4.1.8
DROP38	80PCM05	1C31232G01	M80MI0132A	STORAGE MIX PUMP NO. 2	OFF	ONFAST	DI	1.4.1.9
DROP38	80PCM05	1C31232G01	M80MI0132B	STORAGE MIX PUMP NO. 2	OFF	ONSLOW	DI	1.4.1.10
DROP38	80PCM05	1C31232G01	M80QI0132	STORAGE MIX PUMP NO. 2	LOCAL	INCOMP	DI	1.4.1.11
DROP38	80PCM05	1C31232G01	M80RI0132	STORAGE MIX PUMP NO. 2	WAIT	READY	DI	1.4.1.12
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.1.13
DROP38	80PCM05	1C31232G01	M80ZB1462	EM BS ST TNK PRS REL 2 ISO VLV	NORMAL	CLOSED	DI	1.4.1.14
DROP38	80PCM05	1C31232G01	M80ZD1462	EM BS ST TNK PRS REL 2 ISO VLV	NORMAL	OPENED	DI	1.4.1.15
DROP38	80PCM05	1C31232G01	<b>M38QC4S01</b>	<b>DPU38 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.2.1
DROP38	80PCM05	1C31232G01	M80LAL2756	CAUSTIC DAY TNK 2 LEVEL ALARMS	NORMAL	LOW	DI	1.4.2.2
DROP38	80PCM05	1C31232G01	M80ZB1464	EM BS STORAGE MIX PUMP VLV	NORMAL	CLOSED	DI	1.4.2.3
DROP38	80PCM05	1C31232G01	M80ZD1464	EM BS STORAGE MIX PUMP VLV	NORMAL	OPENED	DI	1.4.2.4
DROP38	80PCM05	1C31232G01	M80ZB1463	EM BS STORAGE TANK DISCH VLV	NORMAL	CLOSED	DI	1.4.2.5
DROP38	80PCM05	1C31232G01	M80ZD1463	EM BS STORAGE TANK DISCH VLV	NORMAL	OPENED	DI	1.4.2.6
DROP38	80PCM05	1C31232G01	M80LAH2716	FC2 DAY TANK 2 LEVEL ALARMS	HIGH	NORMAL	DI	1.4.2.7
DROP38	80PCM05	1C31232G01	M80LAL2716	FC2 DAY TANK 2 LEVEL ALARMS	NORMAL	LOW	DI	1.4.2.8
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.2.9
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.2.10
DROP38	80PCM05	1C31232G01	M80ZB1532	J-TUBE DISCH VLV 4	NORMAL	CLOSED	DI	1.4.2.11
DROP38	80PCM05	1C31232G01	M80ZD1532	J-TUBE DISCH VLV 4	NORMAL	OPENED	DI	1.4.2.12
DROP38	80PCM05	1C31232G01	M80LAHH2612	SEDIMENT TRAP 6 LEVEL	NORMAL	HI-HI	DI	1.4.2.13
DROP38	80PCM05	1C31232G01	M80LALL2612	SEDIMENT TRAP 6 LEVEL	NORMAL	LO-LO	DI	1.4.2.14
DROP38	80PCM05	1C31232G01	M80ZL3001	AIR GAP TANK -01 PW FILL VALVE	LOCAL	INCOMP	DI	1.4.2.15
DROP38	80PCM05	1C31232G01	<b>M38QC4S02</b>	<b>DPU38 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16
DROP38	80PCM05	1C31232G01	M80LAH2754	CAUSTIC DAY TNKS FLOOD ALARM	HIGH	NORMAL	DI	1.4.3.1
DROP38	80PCM05	1C31232G01	M80MI0186	CAUSTIC FEED PUMP NO. 1	OFF	RUNNING	DI	1.4.3.2
DROP38	80PCM05	1C31232G01	M80QI0186	CAUSTIC FEED PUMP NO. 1	LOCAL	INCOMP	DI	1.4.3.3
DROP38	80PCM05	1C31232G01	M80RI0186	CAUSTIC FEED PUMP NO. 1	WAIT	READY	DI	1.4.3.4
DROP38	80PCM05	1C31232G01	M80UA0186	CAUSTIC FEED PUMP NO. 1	NORMAL	FAIL	DI	1.4.3.5
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.6
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.7
DROP38	80PCM05	1C31232G01	M80LAHH2602	SEDIMENT TRAP 9 LEVEL	NORMAL	HI-HI	DI	1.4.3.8
DROP38	80PCM05	1C31232G01	M80LALL2602	SEDIMENT TRAP 9 LEVEL	NORMAL	LO-LO	DI	1.4.3.9
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.10
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.11
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.12
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.13
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.14
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.15
DROP38	80PCM05	1C31232G01	<b>M38QC4S03</b>	<b>DPU38 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP38	80PCM05			Spare Module Address				1.4.4
DROP38	80PCM05			Spare Module Address				1.4.5
DROP38	80PCM05			Spare Module Address				1.4.6

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP38	80PCM05			Spare Module Address				1.4.7
DROP38	80PCM05			Spare Module Address				1.4.8
DROP38	80PCM05	5A26458G04	M80HS0201	BIOGAS COMPRESSOR NO. 1	OFF	RUN	DO	1.5.1.1
DROP38	80PCM05	5A26458G04	<b>M80HS0203</b>	<b>BIOGAS COMPRESSOR NO. 3</b>	<b>OFF</b>	<b>RUN</b>	DO	1.5.1.2
DROP38	80PCM05	5A26458G04	M80HS0186	CAUSTIC FEED PUMP NO. 1	OFF	RUN	DO	1.5.1.3
DROP38	80PCM05	5A26458G04	M80HS0180	FC3 FEED PUMP NO. 1	OFF	RUN	DO	1.5.1.4
DROP38	80PCM05	5A26458G04	SPARE				DO	1.5.1.5
DROP38	80PCM05	5A26458G04	M80HS0131A	STORAGE MIX PUMP NO. 1	OFF	RUNFST	DO	1.5.1.6
DROP38	80PCM05	5A26458G04	M80HS0131B	STORAGE MIX PUMP NO. 1	OFF	RUNSLW	DO	1.5.1.7
DROP38	80PCM05	5A26458G04	M80HS0191	ODOR CNTRL FAN NO. 1	OFF	RUN	DO	1.5.1.8
DROP38	80PCM05	5A26458G04	M80HS3010A	AIR INLET TO H/P TK VALVE 1	CLOSE	OPEN	DO	1.5.1.9
DROP38	80PCM05	5A26458G04	M80HS0133A	STORAGE MIX PUMP NO. 3	OFF	RUNFST	DO	1.5.1.10
DROP38	80PCM05	5A26458G04	M80HS0133B	STORAGE MIX PUMP NO. 3	OFF	RUNSLW	DO	1.5.1.11
DROP38	80PCM05	5A26458G04	SPARE				DO	1.5.1.12
DROP38	80PCM05	5A26458G04	M80HS0202	BIOGAS COMPRESSOR NO. 2	OFF	RUN	DO	1.6.1.1
DROP38	80PCM05	5A26458G04	SPARE				DO	1.6.1.2
DROP38	80PCM05	5A26458G04	M80HS3001A	AIR GAP TK FILL VALVE	NORMAL	OPEN	DO	1.6.1.3
DROP38	80PCM05	5A26458G04	M80HS096	PROCESS WATER PUMP P-096	STOP	START	DO	1.6.1.4
DROP38	80PCM05	5A26458G04	M80HS097	PROCESS WATER PUMP P-097	STOP	START	DO	1.6.1.5
DROP38	80PCM05	5A26458G04	SPARE				DO	1.6.1.6
DROP38	80PCM05	5A26458G04	M80HS3001B	AIR GAP TK PW FILL VALVE	NORMAL	CLOSE	DO	1.6.1.7
DROP38	80PCM05	5A26458G04	M80HS3010B	AIR OUTLET FROM H/P TK VALVE 2	CLOSE	OPEN	DO	1.6.1.8
DROP38	80PCM05	5A26458G04	SPARE				DO	1.6.1.9
DROP38	80PCM05	5A26458G04	SPARE				DO	1.6.1.10
DROP38	80PCM05	5A26458G04	M80HS0132A	STORAGE MIX PUMP NO. 2	OFF	RUNFST	DO	1.6.1.11
DROP38	80PCM05	5A26458G04	M80HS0132B	STORAGE MIX PUMP NO. 2	OFF	RUNSLW	DO	1.6.1.12

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DELETED DCS INPUT / OUTPUT LIST

DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP7	60PCM05	QID	M7QB6S12	DPU07 QC SL12 HSB6 QID PS MON	ALARM	NORMAL	DI	3.1.12.16
DROP7	60PCM05	QID	M7QC6S11	DPU07 QC SL11 HSC6 QID PS MON	ALARM	NORMAL	DI	3.2.11.16
DROP7	60PCM05	QID	M7QD6S12	DPU07 QC SL12 HSD6 QID PS MON	ALARM	NORMAL	DI	3.2.12.16
DROP7	60PCM05	QID	M7ESL13B	DPU07 SEC 13VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.12
DROP7	60PCM05	QID	M7ESL13A	DPU07 PRI 13VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.13
DROP7	60PCM05	QID	M7ESL24B	DPU07 SEC 24VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.14
DROP7	60PCM05	QID	M7ESL24A	DPU07 PRI 24VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.15
DROP7	60PCM05	QID	M7QE6S11	DPU07 QC SL11 HSE6 QID PS MON	ALARM	NORMAL	DI	3.3.11.16
DROP7	60PCM05	QID	M7QF6S12	DPU07 QC SL12 HSF6 QID PS MON	ALARM	NORMAL	DI	3.3.12.16
DROP7	60PCM05	QID	M7QH3S6	DPU07 QC SL06 HSH3 QID PS MON	ALARM	NORMAL	DI	3.4.6.16

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DELETED DCS INPUT / OUTPUT LIST

DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP8	60PCM06	QID	M73PAH2109	DELETED, NO LONGER NEEDED	NORMAL	NORMAL	DI	1.2.3.1
DROP8	60PCM06	QID	M8QA6S11	DPU08 QC SL11 HSA6 QID PS MON	ALARM	NORMAL	DI	3.1.11.16
DROP8	60PCM06	QID	M8QB6S12	DPU08 QC SL12 HSB6 QID PS MON	ALARM	NORMAL	DI	3.1.12.16
DROP8	60PCM06	QID	M8QD5S10	DPU08 QC SL10 HSD5 QID PS MON	ALARM	NORMAL	DI	3.2.10.16
DROP8	60PCM06	QID	M8QC6S11	DPU08 QC SL11 HSC6 QID PS MON	ALARM	NORMAL	DI	3.2.11.16
DROP8	60PCM06	QID	M8QD6S12	DPU08 QC SL12 HSD6 QID PS MON	ALARM	NORMAL	DI	3.2.12.16
DROP8	60PCM06	QID	M8ESL13B	DPU08 SEC 13VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.12
DROP8	60PCM06	QID	M8ESL13A	DPU08 PRI 13VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.13
DROP8	60PCM06	QID	M8ESL24B	DPU08 SEC 24VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.14
DROP8	60PCM06	QID	M8ESL24A	DPU08 PRI 24VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.15
DROP8	60PCM06	QID	M8QE6S11	DPU08 QC SL11 HSE6 QID PS MON	ALARM	NORMAL	DI	3.3.11.16
DROP8	60PCM06	QID	M8QF6S12	DPU08 QC SL12 HSF6 QID PS MON	ALARM	NORMAL	DI	3.3.12.16
DROP8	60PCM06	QID	M8QH3S6	DPU08 QC SL06 HSH3 QID PS MON	ALARM	NORMAL	DI	3.4.6.16
DROP8	60PCM06	QID	M8QG3S5	DPU08 QC SL05 HSG3 QID PS MON	ALARM	NORMAL	DI	3.4.7.16

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP10	76PCM01	QBO	M76HS0111C	TC SLUDGE FEED PUMP 1 DISABLE	DISABL	ENABLE	DO	3.1.1.7
DROP10	76PCM01	QBO	M76HS0102	THICK CFUGE NO. 2	RUN	OFF	DO	3.1.1.12
DROP10	76PCM01	QBO	M76HS0112C	TC SLUDGE FEED PUMP 2 DISABLE	DISABL	ENABLE	DO	3.1.1.16
DROP10	76PCM01	QBO	M76HS0521B	TC POLY FEED PUMP NO. 1	RUN	OFF	DO	3.1.3.9
DROP10	76PCM01	QBO	M76QS2152	THICK CFUGE 1 SLUDGE FLOW	CMPRDY	OFF	DO	3.1.3.10
DROP10	76PCM01	QLC		TC 1 MOTOR TEMPERATURES			SERIAL	3.1.4
DROP10	76PCM01	QBO	M76HS0111B	TC FEED PUMP NO. 1	RUN	OFF	DO	3.1.5.9
DROP10	76PCM01	QBO	M76QS2156	THICK CFUGE 2 SLUDGE FLOW	CMPRDY	OFF	DO	3.1.5.14
DROP10	76PCM01	QLC		TC 2 MOTOR TEMPERATURES			SERIAL	3.1.8
DROP10	76PCM01	QID	M10QC1S1	DPU10 QC SL1 HSC1 QID PS MON	ALARM	NORMAL	DI	3.2.1.16
DROP10	76PCM01	QID	M10QD1S2	DPU10 QC SL2 HSD1 QID PS MON	ALARM	NORMAL	DI	3.2.2.16
DROP10	76PCM01	QID	M10QC2S3	DPU10 QC SL3 HSC2 QID PS MON	ALARM	NORMAL	DI	3.2.3.16
DROP10	76PCM01	QID	M10QD2S4	DPU10 QC SL4 HSD2 QID PS MON	ALARM	NORMAL	DI	3.2.4.16
DROP10	76PCM01	QID	M76MI0111	TC FEED PUMP NO. 1	RUNNNG	OFF	DI	3.2.5.10
DROP10	76PCM01	QID	M76QI0111B	TC FEED PUMP NO. 1	INCOMP	LOCAL	DI	3.2.5.11
DROP10	76PCM01	QID	M76RI0111	TC FEED PUMP NO. 1	READY	WAIT	DI	3.2.5.12
DROP10	76PCM01	QID	M76UA0111	TC FEED PUMP NO. 1	FAIL	NORMAL	DI	3.2.5.13
DROP10	76PCM01	QID	M76QI0522B	TC POLY FEED PUMP NO. 2	INCOMP	LOCAL	DI	3.2.5.14
DROP10	76PCM01	QID	M10QC3S5	DPU10 QC SL5 HSC3 QID PS MON	ALARM	NORMAL	DI	3.2.5.16
DROP10	76PCM01	QID	M76TAH2193	TC 1 MTR WINDING TMP	HIGH	NORMAL	DI	3.2.6.3
DROP10	76PCM01	QID	M76QI2736	THICK CFUGE 1 POLYMER INLT FLW	INCOMP	LOCAL	DI	3.2.6.8
DROP10	76PCM01	QID	M10QD3S6	DPU10 QC SL6 HSD3 QID PS MON	ALARM	NORMAL	DI	3.2.6.16
DROP10	76PCM01	QID	M76HS0112B	TC FEED PUMP NO. 2	RUNREQ	OFF	DI	3.2.7.15
DROP10	76PCM01	QID	M10QC4S7	DPU10 QC SL7 HSC4 QID PS MON	ALARM	NORMAL	DI	3.2.7.16
DROP10	76PCM01	QID	M10QE1S1	DPU10 QC SL1 HSE1 QID PS MON	ALARM	NORMAL	DI	3.3.1.16
DROP10	76PCM01	QID	M10QF1S2	DPU10 QC SL2 HSF1 QID PS MON	ALARM	NORMAL	DI	3.3.2.16
DROP10	76PCM01	QID	M10QE2S3	DPU10 QC SL3 HSE2 QID PS MON	ALARM	NORMAL	DI	3.3.3.16
DROP10	76PCM01	QID	M76MI0112	TC FEED PUMP NO. 2	RUNNNG	OFF	DI	3.3.4.11
DROP10	76PCM01	QID	M76QI0112B	TC FEED PUMP NO. 2	INCOMP	LOCAL	DI	3.3.4.12
DROP10	76PCM01	QID	M76RI0112	TC FEED PUMP NO. 2	READY	WAIT	DI	3.3.4.13
DROP10	76PCM01	QID	M76UA0112	TC FEED PUMP NO. 2	FAIL	NORMAL	DI	3.3.4.14
DROP10	76PCM01	QID	M76QI2152	THICK CFUGE 1 SLUDGE FLOW	INCOMP	LOCAL	DI	3.3.4.15
DROP10	76PCM01	QID	M10QF2S4	DPU10 QC SL4 HSF2 QID PS MON	ALARM	NORMAL	DI	3.3.4.16
DROP10	76PCM01	QID	M76QI0521B	TC POLY FEED PUMP NO. 1	INCOMP	LOCAL	DI	3.3.5.6
DROP10	76PCM01	QID	M76QI2156	THICK CFUGE 2 SLUDGE FLOW	INCOMP	LOCAL	DI	3.3.5.9
DROP10	76PCM01	QID	M76QI0102	THICK CFUGE NO. 2	INCOMP	LOCAL	DI	3.3.5.14



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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP10	76PCM01	QID	M10QE3S5	DPU10 QC SL5 HSE3 QID PS MON	ALARM	NORMAL	DI	3.3.5.16
DROP10	76PCM01	QID	M76TAH2203	TC 2 MTR WINDING TMP	HIGH	NORMAL	DI	3.3.6.3
DROP10	76PCM01	QID	M76QI2741	THICK CFUGE 2 POLYMER INLT FLW	INCOMP	LOCAL	DI	3.3.6.8
DROP10	76PCM01	QID	M10QF3S6	DPU10 QC SL6 HSF3 QID PS MON	ALARM	NORMAL	DI	3.3.6.16
DROP10	76PCM01	QID	M10ESL13B	DPU10 SEC 13VDC PS MON	NORMAL	ALARM	DI	3.3.7.12
DROP10	76PCM01	QID	M10ESL13A	DPU10 PRI 13VDC PS MON	NORMAL	ALARM	DI	3.3.7.13
DROP10	76PCM01	QID	M10ESL24B	DPU10 SEC 24VDC PS MON	NORMAL	ALARM	DI	3.3.7.14
DROP10	76PCM01	QID	M10ESL24A	DPU10 PRI 24VDC PS MON	NORMAL	ALARM	DI	3.3.7.15
DROP10	76PCM01	QID	M10QE4S7	DPU10 QC SL7 HSE4 QID PS MON	ALARM	NORMAL	DI	3.3.7.16
DROP10	76PCM01	QAX	M76AT2191	TC NO.1 SUSPENDED SOLIDS	0	2 gr/L	AI	3.3.9.1
DROP10	76PCM01	QAX	M76ST0111	TC FEED PUMP NO. 1 SPEED	0	100 PCT	AI	3.3.9.5
DROP10	76PCM01	QAX	M76VT2190X	TC 1 BEARING 1 VIBRTN X-AXIS	0	3 IN/SEC	AI	3.3.9.7
DROP10	76PCM01	QAX	M76VT2190Y	TC 1 BEARING 1 VIBRTN Y-AXIS	0	4 IN/SEC	AI	3.3.9.8
DROP10	76PCM01	QAX	M76VT2192X	TC 1 BEARING 2 VIBRTN X-AXIS	0	5 IN/SEC	AI	3.3.9.9
DROP10	76PCM01	QAX	M76VT2192Y	TC 1 BEARING 2 VIBRTN Y-AXIS	0	6 IN/SEC	AI	3.3.9.10
DROP10	76PCM01	QAX	M76VT2190Z	TC 1 BEARING 1 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.3.10.1
DROP10	76PCM01	QAX	M76VT2192Z	TC 1 BEARING 2 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.3.10.2
DROP10	76PCM01	QAX	M76VT2200Z	TC 2 BEARING 1 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.3.10.3
DROP10	76PCM01	QAX	M76VT2202Z	TC 2 BEARING 2 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.3.10.4
DROP10	76PCM01	QBO	M76QS2736	THICK CFUGE 1 POLYMER INLT FLW	CMPRDY	OFF	DO	3.4.1.9
DROP10	76PCM01	QID	M76QI0101	THICK CFUGE NO. 1	INCOMP	LOCAL	DI	3.4.2.2
DROP10	76PCM01	QID	M76HS0522B	TC POLY FEED PUMP NO. 2	RUNREQ	OFF	DI	3.4.2.15
DROP10	76PCM01	QID	M10QH1S2	DPU10 QC SL2 HSH1 QID PS MON	ALARM	NORMAL	DI	3.4.2.16
DROP10	76PCM01	QBO	M76QS2741	THICK CFUGE 2 POLYMER INLT FLW	CMPRDY	OFF	DO	3.4.5.9
DROP10	76PCM01	QBO	M76HS0101	THICK CFUGE NO. 1	RUN	OFF	DO	3.4.5.14
DROP10	76PCM01	QAO	M76FC2152	THICK CFUGE FD PMP1 SPD DMND	0	100 PCT	AO	3.4.8.2
DROP10	76PCM01	QAO	M76FC2736	TC POLYMER FD P1 SPD DMND	0	100 PCT	AO	3.4.8.3
DROP10	76PCM01	QAX	M76AT2201	TC NO.2 SUSPENDED SOLIDS	0	2 gr/L	AI	3.4.9.1
DROP10	76PCM01	QAX	M76VT2200X	TC 2 BEARING 1 VIBRTN X-AXIS	0	3 IN/SEC	AI	3.4.9.4
DROP10	76PCM01	QAX	M76VT2200Y	TC 2 BEARING 1 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.4.9.5
DROP10	76PCM01	QAX	M76VT2202X	TC 2 BEARING 2 VIBRTN X-AXIS	0	3 IN/SEC	AI	3.4.9.6
DROP10	76PCM01	QAX	M76VT2202Y	TC 2 BEARING 2 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.4.9.7
DROP10	76PCM01	QAX	M76ST0112	TC FEED PUMP NO. 2 SPEED	0	100 PCT	AI	3.4.9.8
DROP10	76PCM01	QAO	M76FC2156	THICK CFUGE FD PMP2 SPD DMND	0	100 PCT	AO	3.4.12.1
DROP10	76PCM01	QAO	M76FC2741	TC POLYMER FD P2 SPD DMND	0	100 PCT	AO	3.4.12.3



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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP11	76PCM02	QBO	M76HS0103	THICKENING CENTRIFUGE NO. 3	OFF	RUN	DO	3.1.1.1
DROP11	76PCM02	QBO	M76HS0104	THICKENING CENTRIFUGE NO. 4	OFF	RUN	DO	3.1.1.2
DROP11	76PCM02	QBO	M76QS2161	THICK CENTRIFUGE 3 SLUDGE FLOW	OFF	CMPRDY	DO	3.1.1.10
DROP11	76PCM02	QBO	M76QS2166	THICK CENTRIFUGE 4 SLUDGE FLOW	OFF	CMPRDY	DO	3.1.1.11
DROP11	76PCM02	QBO	M76QS2746	THICK CFUGE3 POLYMER INLT FLW	OFF	CMPRDY	DO	3.1.1.12
DROP11	76PCM02	QBO	M76QS2751	THICK CFUGE4 POLYMER INLT FLW	OFF	CMPRDY	DO	3.1.1.13
DROP11	76PCM02	QBO	M76HS0113C	TC SLUDGE FEED PUMP 3 DISABLE	ENABLE	DISABL	DO	3.1.1.14
DROP11	76PCM02	QBO	M76HS0114C	TC SLUDGE FEED PUMP 4 DISABLE	ENABLE	DISABL	DO	3.1.1.15
DROP11	76PCM02	QLC		TC 3 MOTOR TEMPERATURES			SERIAL	3.1.3
DROP11	76PCM02	QLC		TC 3 DATA			SERIAL	3.1.5
DROP11	76PCM02	QLC		TC 4 MOTOR TEMPERATURES			SERIAL	3.1.7
DROP11	76PCM02	QLC		TC 4 DATA			SERIAL	3.1.9
DROP11	76PCM02	QID	M76HS0113B	TC FEED PUMP NO. 3	OFF	RUNREQ	DI	3.2.1.2
DROP11	76PCM02	QID	M76HS0523B	TC POLY FEED PUMP NO. 3	OFF	RUNREQ	DI	3.2.1.3
DROP11	76PCM02	QID	M76TAH2223	THICK CFUGE 4 MTR WINDING TMP	HIGH	NORMAL	DI	3.2.1.14
DROP11	76PCM02	QID	M76UA0114	TC FEED PUMP NO. 4	NORMAL	FAIL	DI	3.2.1.15
DROP11	76PCM02	QID	M11QC1S1	DPU11 QC SL1 HSC1 QID PS MON	ALARM	NORMAL	DI	3.2.1.16
DROP11	76PCM02	QID	M76HS0114B	TC FEED PUMP NO. 4	OFF	RUNREQ	DI	3.2.2.2
DROP11	76PCM02	QID	M76HS0524B	TC POLY FEED PUMP NO. 4	OFF	RUNREQ	DI	3.2.2.3
DROP11	76PCM02	QID	M76QI0103	THICKENING CENTRIFUGE NO. 3	LOCAL	INCOMP	DI	3.2.2.4
DROP11	76PCM02	QID	M76QI0113B	TC FEED PUMP NO. 3	LOCAL	INCOMP	DI	3.2.2.5
DROP11	76PCM02	QID	M76QI0523B	TC POLY FEED PUMP NO. 3	LOCAL	INCOMP	DI	3.2.2.7
DROP11	76PCM02	QID	M76QI2161	THICK CENTRIFUGE 3 SLUDGE FLOW	LOCAL	INCOMP	DI	3.2.2.8
DROP11	76PCM02	QID	M76QI2746	THICK CFUGE 3 POLYMER INLT FLW	LOCAL	INCOMP	DI	3.2.2.9
DROP11	76PCM02	QID	M76RI0113	TC FEED PUMP NO. 3	NORMAL	READY	DI	3.2.2.10
DROP11	76PCM02	QID	M76TAH2213	THICK CFUGE 3 MTR WINDING TMP	HIGH	NORMAL	DI	3.2.2.13
DROP11	76PCM02	QID	M76UA0113	TC FEED PUMP NO. 3	NORMAL	FAIL	DI	3.2.2.14
DROP11	76PCM02	QID	M11QD1S2	DPU11 QC SL2 HSD1 QID PS MON	ALARM	NORMAL	DI	3.2.2.16
DROP11	76PCM02	QID	M11QC2S3	DPU11 QC SL3 HSC2 QID PS MON	ALARM	NORMAL	DI	3.2.3.16
DROP11	76PCM02	QID	M11QD2S4	DPU11 QC SL4 HSD2 QID PS MON	ALARM	NORMAL	DI	3.2.4.16
DROP11	76PCM02	QID	M76MI0113	TC FEED PUMP NO. 3	OFF	RUNNNG	DI	3.3.1.2
DROP11	76PCM02	QID	M11QD1S1	DPU11 QC SL1 HSE1 QID PS MON	ALARM	NORMAL	DI	3.3.1.16
DROP11	76PCM02	QID	M11ESL13B	DPU11 13VDC SEC PS MON	NORMAL	ALARM	DI	3.3.2.12
DROP11	76PCM02	QID	M11ESL13A	DPU11 13VDC PRI PS MON	NORMAL	ALARM	DI	3.3.2.13
DROP11	76PCM02	QID	M11ESL24B	DPU11 24VDC SEC PS MON	NORMAL	ALARM	DI	3.3.2.14
DROP11	76PCM02	QID	M11ESL24A	DPU11 24VDC PRI PS MON	NORMAL	ALARM	DI	3.3.2.15
DROP11	76PCM02	QID	M11QF1S2	DPU11 QC SL2 HSF1 QID PS MON	ALARM	NORMAL	DI	3.3.2.16

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP11	76PCM02	QID	M76QI0114B	TC FEED PUMP NO. 4	LOCAL	INCOMP	DI	3.3.3.11
DROP11	76PCM02	QID	M11QE2S3	DPU11 QC SL3 HSE2 QID PS MON	ALARM	NORMAL	DI	3.3.3.16
DROP11	76PCM02	QAO	M76FC2161	THICK CFUGE FD PMP3 SPD DMND	0	100 PCT	AO	3.3.4.1
DROP11	76PCM02	QAO	M76FC2746	TC POLYMER FD P3 SPD DMND	0	100 PCT	AO	3.3.4.2
DROP11	76PCM02	QAX	M76AT2211	THICK CFUGE 3 SUSPENDED SOLIDS	0	2 gr/L	AI	3.3.6.1
DROP11	76PCM02	QAX	M76ST0113	TC FEED PUMP NO. 3 SPEED	0	100 PCT	AI	3.3.6.4
DROP11	76PCM02	QAX	M76VT2210X	TC 3 BEARING 1 VIBRTN X-AXIS	0	3 IN/SEC	AI	3.3.6.6
DROP11	76PCM02	QAX	M76VT2212X	TC 3 BEARING 2 VIBRTN X-AXIS	0	4 IN/SEC	AI	3.3.6.7
DROP11	76PCM02	QAX	M76VT2220X	TC 4 BEARING 1 VIBRTN X-AXIS	0	5 IN/SEC	AI	3.3.6.8
DROP11	76PCM02	QAX	M76VT2222X	TC 4 BEARING 2 VIBRTN X-AXIS	0	6 IN/SEC	AI	3.3.6.9
DROP11	76PCM02	QAX	M76VT2210Z	TC 3 BEARING 1 VIBRTN Z-AXIS	0	7 IN/SEC	AI	3.3.6.10
DROP11	76PCM02	QAX	M76VT2212Z	TC 3 BEARING 2 VIBRTN Z-AXIS	0	8 IN/SEC	AI	3.3.6.11
DROP11	76PCM02	QID	M76MI0114	TC FEED PUMP NO. 4	OFF	RUNNNG	DI	3.4.1.2
DROP11	76PCM02	QID	M76QI0104	THICKENING CENTRIFUGE NO. 4	LOCAL	INCOMP	DI	3.4.1.10
DROP11	76PCM02	QID	M76QI0524B	TC POLY FEED PUMP NO. 4	LOCAL	INCOMP	DI	3.4.1.11
DROP11	76PCM02	QID	M76QI2166	THICK CENTRIFUGE 4 SLUDGE FLOW	LOCAL	INCOMP	DI	3.4.1.12
DROP11	76PCM02	QID	M76QI2751	THICK CFUGE 4 POLYMER INLT FLW	LOCAL	INCOMP	DI	3.4.1.13
DROP11	76PCM02	QID	M76RI0114	TC FEED PUMP NO. 4	NORMAL	READY	DI	3.4.1.14
DROP11	76PCM02	QID	M11QG1S1	DPU11 QC SL1 HSG1 QID PS MON	ALARM	NORMAL	DI	3.4.1.16
DROP11	76PCM02	QID	M11QH1S2	DPU11 QC SL2 HSH1 QID PS MON	ALARM	NORMAL	DI	3.4.2.16
DROP11	76PCM02	QID	M11QG2S3	DPU11 QC SL3 HSG2 QID PS MON	ALARM	NORMAL	DI	3.4.3.16
DROP11	76PCM02	QAO	M76FC2166	THICK CFUGE FD PMP4 SPD DMND	0	100 PCT	AO	3.4.4.1
DROP11	76PCM02	QAO	M76FC2751	TC POLYMER FD P4 SPD DMND	0	100 PCT	AO	3.4.4.2
DROP11	76PCM02	QAX	M76AT2221	THICK CFUGE 4 SUSPENDED SOLIDS	0	2 gr/L	AI	3.4.6.1
DROP11	76PCM02	QAX	M76ST0114	TC FEED PUMP NO. 4 SPEED	0	100 PCT	AI	3.4.6.4
DROP11	76PCM02	QAX	M76VT2210Y	TC 3 BEARING 1 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.4.6.6
DROP11	76PCM02	QAX	M76VT2212Y	TC 3 BEARING 2 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.4.6.7
DROP11	76PCM02	QAX	M76VT2220Y	TC 4 BEARING 1 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.4.6.8
DROP11	76PCM02	QAX	M76VT2222Y	TC 4 BEARING 2 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.4.6.9
DROP11	76PCM02	QAX	M76VT2220Z	TC 4 BEARING 1 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.4.6.10
DROP11	76PCM02	QAX	M76VT2222Z	TC 4 BEARING 2 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.4.6.11

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP12	76PCM02A	QLC		TC 1 DATA			SERIAL	3.3.11
DROP12	76PCM02A	QLC		TC 2 DATA			SERIAL	3.3.12

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP13	76PCM03	QBO	M76QS2171	THICK CENTRIFUGE 5 SLUDGE FLOW	CMPRDY	OFF	DO	3.1.1.1
DROP13	76PCM03	QBO	M76QS2756	THICK CFUGE 5 POLYMER INLT FLW	CMPRDY	OFF	DO	3.1.1.2
DROP13	76PCM03	QBO	M76HS0105	THICKENING CENTRIFUGE NO. 5	RUN	OFF	DO	3.1.1.3
DROP13	76PCM03	QBO	M76HS0115C	TC SLUDGE FEED PUMP 5 DISABLE	DIABL	ENABLE	DO	3.1.1.16
DROP13	76PCM03	QLC		TC 5 DATA			SERIAL	3.1.2
DROP13	76PCM03	QLC		TC 5 MOTOR TEMPERATURES			SERIAL	3.1.4
DROP13	76PCM03	QID	M76QI0105	THICKENING CENTRIFUGE NO. 5	INCOMP	LOCAL	DI	3.2.1.2
DROP13	76PCM03	QID	M76QI2171	THICK CENTRIFUGE 5 SLUDGE FLOW	INCOMP	LOCAL	DI	3.2.1.3
DROP13	76PCM03	QID	M76QI2756	THICK CFUGE 5 POLYMER INLT FLW	INCOMP	LOCAL	DI	3.2.1.4
DROP13	76PCM03	QID	M76TAH2233	THICK CFUGE 5 MTR WINDING TMP	NORMAL	HIGH	DI	3.2.1.5
DROP13	76PCM03	1C31232G01	M13QC1S1	DPU13 QC HSC1 SL1 QID PS MON	NORMAL	ALARM	DI	3.2.1.16
DROP13	76PCM03	QID	M76HS0525B	TC POLY FEED PUMP NO. 5	RUNREQ	NORMAL	DI	3.2.2.1
DROP13	76PCM03	QID	M76QI0525B	TC POLY FEED PUMP NO. 5	INCOMP	LOCAL	DI	3.2.2.6
DROP13	76PCM03	1C31232G01	M13QD1S2	DPU13 QC HSD1 SL2 QID PS MON	NORMAL	ALARM	DI	3.2.2.16
DROP13	76PCM03	QAX	M76AT2231	THICK CFUGE 5 SUSPENDED SOLIDS	0	2 gr/L	AI	3.2.5.1
DROP13	76PCM03	QAX	M76ST0115	TC FEED PUMP NO. 5 SPEED	3	100 PCT	AI	3.2.5.4
DROP13	76PCM03	QAX	M76VT2230X	TC 5 BEARING 1 VIBRTN X-AXIS	0	3 IN/SEC	AI	3.2.5.6
DROP13	76PCM03	QAX	M76VT2230Y	TC 5 BEARING 1 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.2.5.7
DROP13	76PCM03	QAX	M76VT2232X	TC 5 BEARING 2 VIBRTN X-AXIS	0	3 IN/SEC	AI	3.2.5.8
DROP13	76PCM03	QAX	M76VT2232Y	TC 5 BEARING 2 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.2.5.9
DROP13	76PCM03	QAX	M76VT2230Z	TC 5 BEARING 1 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.2.5.10
DROP13	76PCM03	QAX	M76VT2232Z	TC 5 BEARING 2 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.2.5.11
DROP13	76PCM03	1C31232G01	M13QE1S1	DPU13 QC HSE1 SL1 QID PS MON	NORMAL	ALARM	DI	3.3.1.16
DROP13	76PCM03	QID	M13ESL13B	DPU13 SEC 13VDC PS MON	OPENED	NORMAL	DI	3.3.2.12
DROP13	76PCM03	QID	M13ESL13A	DPU13 PRI 13VDC PS MON	OPENED	NORMAL	DI	3.3.2.13
DROP13	76PCM03	QID	M13ESL24B	DPU13 SEC 24VDC PS MON	OPENED	NORMAL	DI	3.3.2.14
DROP13	76PCM03	QID	M13ESL24A	DPU13 PRI 24VDC PS MON	OPENED	NORMAL	DI	3.3.2.15
DROP13	76PCM03	1C31232G01	M13QF1S2	DPU13 QC HSF1 SL2 QID PS MON	NORMAL	ALARM	DI	3.3.2.16
DROP13	76PCM03	QAO	M76FC2171	THICK CFUGE FD PMP5 SPD DMND	0	100 PCT	AO	3.3.3.1
DROP13	76PCM03	QAO	M76FC2756	TC POLYMER FD P5 SPD DMND	0	100 PCT	AO	3.3.3.2

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP13	76PCM03	QID	M76HS0115B	TC FEED PUMP NO. 5	RUNREQ	NORMAL	DI	3.4.1.1
DROP13	76PCM03	QID	M76MI0115	TC FEED PUMP NO. 5	RUNNNG	OFF	DI	3.4.1.2
DROP13	76PCM03	QID	M76QI0115B	TC FEED PUMP NO. 5	INCOMP	LOCAL	DI	3.4.1.6
DROP13	76PCM03	QID	M76RI0115	TC FEED PUMP NO. 5	READY	WAIT	DI	3.4.1.7
DROP13	76PCM03	QID	M76UA0115	TC FEED PUMP NO. 5	FAIL	NORMAL	DI	3.4.1.8
DROP13	76PCM03	1C31232G01	M13QG1S1	DPU13 QC HSG1 SL1 QID PS MON	NORMAL	ALARM	DI	3.4.1.16
DROP13	76PCM03	1C31232G01	M13QH1S2	DPU13 QC HSH1 SL2 QID PS MON	NORMAL	ALARM	DI	3.4.2.16

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP17	76PCM07	QBO	M76QS2806	DC 8 POLYMER INLET FLOW	OFF	CMPRDY	DO	3.1.1.11
DROP17	76PCM07	QBO	M76QS2541	DC 8 SLUDGE FLOW	OFF	CMPRDY	DO	3.1.1.12
DROP17	76PCM07	QBO	M76QS2626	DC 8 INLET SLUDGE TEMP	OFF	CMPRDY	DO	3.1.5.5
DROP17	76PCM07	QBO	M76HS1380A	SCREENING CONVEYOR 1 LIME GATE	OFF	OPEN	DO	3.1.5.14
DROP17	76PCM07	QBO	M76HS1380B	SCREENING CONVEYOR 1 LIME GATE	OFF	CLOSE	DO	3.1.5.15
DROP17	76PCM07	QBO	M76HS1112A	GRIT SEPARATOR 3 GRIT VALVE 2	OFF	OPEN	DO	3.1.9.3
DROP17	76PCM07	QBO	M76HS1112B	GRIT SEPARATOR 3 GRIT VALVE 2	OFF	CLOSE	DO	3.1.9.4
DROP17	76PCM07	QBO	M76HS1381A	SCREENING CONVEYOR 2 LIME GATE	OFF	OPEN	DO	3.1.9.8
DROP17	76PCM07	QBO	M76HS1381B	SCREENING CONVEYOR 2 LIME GATE	OFF	CLOSE	DO	3.1.9.9
DROP17	76PCM07	QAX	M76VT2627X	DC 8 BEARING 1 VIBRATN X-AXIS	0	3 IN/SEC	AI	3.2.1.4
DROP17	76PCM07	QAX	M76VT2627Y	DC 8 BEARING 1 VIBRATN Y-AXIS	0	3 IN/SEC	AI	3.2.1.5
DROP17	76PCM07	QAX	M76VT2629X	DC 8 BEARING 2 VIBRATN X-AXIS	0	3 IN/SEC	AI	3.2.1.6
DROP17	76PCM07	QAX	M76VT2629Y	DC 8 BEARING 2 VIBRATN Y-AXIS	0	3 IN/SEC	AI	3.2.1.7
DROP17	76PCM07	QAX	M76AT2628	DEWAT CFUGE 8 SUSPENDE SOLIDS	0	2 gr/L	AI	3.2.1.8
DROP17	76PCM07	QAX	M76VT2627Z	DC 8 BEARING 1 VIBRATN Z-AXIS	0	3 IN/SEC	AI	3.2.2.5
DROP17	76PCM07	QAX	M76VT2629Z	DC 8 BEARING 2 VIBRATN Z-AXIS	0	3 IN/SEC	AI	3.2.2.6
DROP17	76PCM07	QID	M17QD3S6	DPU17 QC SL6 HSD3 QID PS MON	ALARM	NORMAL	DI	3.2.6.16
DROP17	76PCM07	QID	M17QC4S7	DPU17 QC SL7 HSC4 QID PS MON	ALARM	NORMAL	DI	3.2.7.16
DROP17	76PCM07	QID	M76QI0208	DEWAT CFUGE NO. 8	LOCAL	INCOMP	DI	3.2.8.1
DROP17	76PCM07	QID	M76QI2626	DC 8 INLET SLUDGE TEMP	LOCAL	INCOMP	DI	3.2.8.15
DROP17	76PCM07	QID	M17QD4S8	DPU17 QC SL8 HSD4 QID PS MON	ALARM	NORMAL	DI	3.2.8.16
DROP17	76PCM07	QID	M17QC5S9	DPU17 QC SL9 HSC5 QID PS MON	ALARM	NORMAL	DI	3.2.9.16
DROP17	76PCM07	QID	M76ZD1381	SCREENING CONVEYOR 2 LIME GATE	NORMAL	OPENED	DI	3.2.10.10
DROP17	76PCM07	QID	M76QI1381	SCREENING CONVEYOR 2 LIME GATE	LOCAL	INCOMP	DI	3.2.10.7
DROP17	76PCM07	QID	M76RI1381	SCREENING CONVEYOR 2 LIME GATE	WAIT	READY	DI	3.2.10.8
DROP17	76PCM07	QID	M76ZB1381	SCREENING CONVEYOR 2 LIME GATE	NORMAL	CLOSED	DI	3.2.10.9
DROP17	76PCM07	QID	M76MI0412	SCREENINGS CONVEYOR NO. 2	OFF	RUNNNG	DI	3.2.10.11
DROP17	76PCM07	QID	M76NAH0412	SCREENINGS CONVEYOR NO. 2	NORMAL	HIGH	DI	3.2.10.12
DROP17	76PCM07	QID	M76RI0412	SCREENINGS CONVEYOR NO. 2	WAIT	READY	DI	3.2.10.13
DROP17	76PCM07	QID	M76LAH2381	SCREENINGS HOPPER LEVEL	NORMAL	HIGH	DI	3.2.10.14
DROP17	76PCM07	QID	M17QD5S10	DPU17 QC SL10 HSD5 QID PS MON	ALARM	NORMAL	DI	3.2.10.16

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DROP17	76PCM07	QID	M76UA0931	LIME DAY TANK UNLOADING SHAKER	NORMAL	FAIL	DI	3.2.11.15
DROP17	76PCM07	QID	M17QC6S11	DPU17 QC SL11 HSC6 QID PS MON	ALARM	NORMAL	DI	3.2.11.16
DROP17	76PCM07	QID	M76ZB0421	SCREENING HOPPER BOMBAY DOORS	NORMAL	CLOSED	DI	3.3.4.9
DROP17	76PCM07	QID	M76ZD0421	SCREENING HOPPER BOMBAY DOORS	NORMAL	OPENED	DI	3.3.4.10
DROP17	76PCM07	QID	M17QF2S4	DPU17 QC SL4 HSF2 QID PS MON	ALARM	NORMAL	DI	3.3.4.16
DROP17	76PCM07	QID	M17QE3S5	DPU17 QC SL5 HSE3 QID PS MON	ALARM	NORMAL	DI	3.3.5.16
DROP17	76PCM07	QID	M17ESL13B	DPU17 SEC 13VDC PS MON	NORMAL	ALARM	DI	3.3.6.12
DROP17	76PCM07	QID	M17ESL13A	DPU17 PRI 13VDC PS MON	NORMAL	ALARM	DI	3.3.6.13
DROP17	76PCM07	QID	M17ESL24B	DPU17 SEC 24VDC PS MON	NORMAL	ALARM	DI	3.3.6.14
DROP17	76PCM07	QID	M17ESL24A	DPU17 PRI 24VDC PS MON	NORMAL	ALARM	DI	3.3.6.15
DROP17	76PCM07	QID	M17QF3S6	DPU17 QC SL6 HSF3 QID PS MON	ALARM	NORMAL	DI	3.3.6.16
DROP17	76PCM07	QID	M17QE4S7	DPU17 QC SL7 HSE4 QID PS MON	ALARM	NORMAL	DI	3.3.7.16
DROP17	76PCM07	QID	M76TAH2630	DC 8 MOTOR WINDING TEMP	HIGH	NORMAL	DI	3.3.8.1
DROP17	76PCM07	QID	M76QI2806	DC 8 POLYMER INLET FLOW	LOCAL	INCOMP	DI	3.3.8.10
DROP17	76PCM07	QID	M76QI2541	DC 8 SLUDGE FLOW	LOCAL	INCOMP	DI	3.3.8.11
DROP17	76PCM07	QID	M17QF4S8	DPU17 QC SL8 HSF4 QID PS MON	ALARM	NORMAL	DI	3.3.8.16
DROP17	76PCM07	QID	M76QI1112	GRIT SEPARATOR 3 GRIT VALVE 2	LOCAL	INCOMP	DI	3.3.9.5
DROP17	76PCM07	QID	M76RI1112	GRIT SEPARATOR 3 GRIT VALVE 2	WAIT	READY	DI	3.3.9.6
DROP17	76PCM07	QID	M76ZB1112	GRIT SEPARATOR 3 GRIT VALVE 2	NORMAL	CLOSED	DI	3.3.9.7
DROP17	76PCM07	QID	M76ZD1112	GRIT SEPARATOR 3 GRIT VALVE 2	NORMAL	OPENED	DI	3.3.9.8
DROP17	76PCM07	QID	M17QE5S9	DPU17 QC SL9 HSE5 QID PS MON	ALARM	NORMAL	DI	3.3.9.16
DROP17	76PCM07	QAX	M76LT2381	SCREENINGS HOPPER LEVEL	0	6	AI	3.4.1.1
DROP17	76PCM07	QID	M76QI1380	SCREENING CONVEYOR 1 LIME GATE	LOCAL	INCOMP	DI	3.4.4.7
DROP17	76PCM07	QID	M76RI1380	SCREENING CONVEYOR 1 LIME GATE	WAIT	READY	DI	3.4.4.8
DROP17	76PCM07	QID	M76ZB1380	SCREENING CONVEYOR 1 LIME GATE	NORMAL	CLOSED	DI	3.4.4.9
DROP17	76PCM07	QID	M76ZD1380	SCREENING CONVEYOR 1 LIME GATE	NORMAL	OPENED	DI	3.4.4.10
DROP17	76PCM07	QID	M17QH2S4	DPU17 QC SL4 HSH2 QID PS MON	ALARM	NORMAL	DI	3.4.4.16
DROP17	76PCM07	QID	M17QG3S5	DPU17 QC SL8 HSD4 QID PS MON	ALARM	NORMAL	DI	3.4.5.16
DROP17	76PCM07	QID	M17QG4S7	DPU17 QC SL7 HSG4 QID PS MON	ALARM	NORMAL	DI	3.4.7.16
DROP17	76PCM07	QID	M76MI0901	LIME DAY TNK DUST COLLECTR FAN	OFF	RUNNNG	DI	3.4.8.3
DROP17	76PCM07	QID	M76QI0901	LIME DAY TNK DUST COLLECTR FAN	LOCAL	INCOMP	DI	3.4.8.4
DROP17	76PCM07	QID	M76RI0901	LIME DAY TNK DUST COLLECTR FAN	WAIT	READY	DI	3.4.8.5
DROP17	76PCM07	QID	M76LAH9301	LIME DAY TANK LEVEL SWITCHES	NORMAL	HIGH	DI	3.4.8.6
DROP17	76PCM07	QID	M76LAL9301	LIME DAY TANK LEVEL SWITCHES	NORMAL	LOW	DI	3.4.8.7
DROP17	76PCM07	QID	M76LAM9301	LIME DAY TANK LEVEL SWITCHES	NORMAL	MID	DI	3.4.8.8
DROP17	76PCM07	QID	M76ZI9301	LIME DAY TANK LEVEL SWITCHES	NORMAL	OPENED	DI	3.4.8.9

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP17	76PCM07	QID	M76MI0921	LIME DAY TANK UNLOADING SHAKER	OFF	RUNNNG	DI	3.4.8.10
DROP17	76PCM07	QID	M76MI0931	LIME DAY TANK UNLOADING SHAKER	OFF	RUNNNG	DI	3.4.8.11
DROP17	76PCM07	QID	M76QI0921	LIME DAY TANK UNLOADING SHAKER	LOCAL	INCOMP	DI	3.4.8.12
DROP17	76PCM07	QID	M76QI0931	LIME DAY TANK UNLOADING SHAKER	LOCAL	INCOMP	DI	3.4.8.13
DROP17	76PCM07	QID	M76RI0921	LIME DAY TANK UNLOADING SHAKER	WAIT	READY	DI	3.4.8.14
DROP17	76PCM07	QID	M76RI0931	LIME DAY TANK UNLOADING SHAKER	WAIT	READY	DI	3.4.8.15
DROP17	76PCM07	QID	M17QH4S8	DPU17 QC SL8 HSH4 QID PS MON	ALARM	NORMAL	DI	3.4.8.16



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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP18	76PCM08	QID	M18QA1S1	DPU18 QC SL1 HSA1 QID PS MON	ALARM	NORMAL	DI	3.1.1.16
DROP18	76PCM08	QID	M18QB1S2	DPU18 QC SL2 HSB1 QID PS MON	ALARM	NORMAL	DI	3.1.2.16
DROP18	76PCM08	QID	M18QA2S3	DPU18 QC SL3 HSA2 QID PS MON	ALARM	NORMAL	DI	3.1.3.16
DROP18	76PCM08	QID	M18QB2S4	DPU18 QC SL4 HSB2 QID PS MON	ALARM	NORMAL	DI	3.1.4.16
DROP18	76PCM08	QID	M18QA3S5	DPU18 QC SL5 HSA3 QID PS MON	ALARM	NORMAL	DI	3.1.5.16
DROP18	76PCM08	QBO	M76HS0401	SCREEN NO. 1	OFF	RUN	DO	3.1.9.9
DROP18	76PCM08	QBO	M76HS1308A	SCREEN1 SCREENING DIVERTR GATE	OFF	OPEN	DO	3.1.9.10
DROP18	76PCM08	QBO	M76HS1308B	SCREEN1 SCREENING DIVERTR GATE	OFF	CLOSE	DO	3.1.9.11
DROP18	76PCM08	QBO	M76HS1309A	SCREEN 1 SOLIDS DISCH VALVE	OFF	OPEN	DO	3.1.9.12
DROP18	76PCM08	QBO	M76HS1309B	SCREEN 1 SOLIDS DISCH VALVE	OFF	CLOSE	DO	3.1.9.13
DROP18	76PCM08	QAX	M76PT9041A	SCREEN NO. 1 PRESS	0	20 PSIG	AI	3.2.1.1
DROP18	76PCM08	QAX	M76PT9041B	SCREEN NO. 1 PRESS	0	20 PSIG	AI	3.2.1.2
DROP18	76PCM08	QID	M18QD1S2	DPU18 QC SL2 HSD1 QID PS MON	ALARM	NORMAL	DI	3.2.2.16
DROP18	76PCM08	QID	M18QD2S4	DPU18 QC SL4 HSD12QID PS MON	ALARM	NORMAL	DI	3.2.4.16
DROP18	76PCM08	QID	M18QC3S5	DPU18 QC SL5 HSC3 QID PS MON	ALARM	NORMAL	DI	3.2.5.16
DROP18	76PCM08	QID	M18QE1S1	DPU18 QC SL1 HSE1 QID PS MON	ALARM	NORMAL	DI	3.3.1.16
DROP18	76PCM08	QID	M18QF1S2	DPU18 QC SL2 HSF1 QID PS MON	ALARM	NORMAL	DI	3.3.2.16
DROP18	76PCM08	QID	M18QE2S3	DPU18 QC SL3 HSE2 QID PS MON	ALARM	NORMAL	DI	3.3.3.16
DROP18	76PCM08	QID	M18QF2S4	DPU18 QC SL4 HSF2 QID PS MON	ALARM	NORMAL	DI	3.3.4.16
DROP18	76PCM08	QID	M18QE3S5	DPU18 QC SL5 HSE3 QID PS MON	ALARM	NORMAL	DI	3.3.5.16
DROP18	76PCM08	QID	M18ESL13B	DPU18 SEC 13VDC PS MON	NORMAL	ALARM	DI	3.3.6.12
DROP18	76PCM08	QID	M18ESL13A	DPU18 PRI 13VDC PS MON	NORMAL	ALARM	DI	3.3.6.13
DROP18	76PCM08	QID	M18ESL24B	DPU18 SEC 24VDC PS MON	NORMAL	ALARM	DI	3.3.6.14
DROP18	76PCM08	QID	M18ESL24A	DPU18 PRI 24VDC PS MON	NORMAL	ALARM	DI	3.3.6.15
DROP18	76PCM08	QID	M18QF3S6	DPU18 QC SL6 HSF3 QID PS MON	ALARM	NORMAL	DI	3.3.6.16
DROP18	76PCM08	QID	M76AI9081	SCREEN 1 SLUDGE PROBE	NORMAL	BRKTHR	DI	3.4.1.1
DROP18	76PCM08	QID	M76MI0401	SCREEN NO. 1	OFF	RUNNNG	DI	3.4.1.2
DROP18	76PCM08	QID	M76NAH0401	SCREEN NO. 1	NORMAL	HIGH	DI	3.4.1.3
DROP18	76PCM08	QID	M76QI0401	SCREEN NO. 1	NORMAL	INCOMP	DI	3.4.1.4
DROP18	76PCM08	QID	M76QI1308	SCREEN1 SCREENING DIVERTR GATE	NORMAL	INCOMP	DI	3.4.1.5
DROP18	76PCM08	QID	M76QI1309	SCREEN 1 SOLIDS DISCH VALVE	NORMAL	INCOMP	DI	3.4.1.6
DROP18	76PCM08	QID	M76RI0401	SCREEN NO. 1	WAIT	READY	DI	3.4.1.7
DROP18	76PCM08	QID	M76RI1308	SCREEN1 SCREENING DIVERTR GATE	WAIT	READY	DI	3.4.1.8
DROP18	76PCM08	QID	M76RI1309	SCREEN 1 SOLIDS DISCH VALVE	WAIT	READY	DI	3.4.1.9

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP18	76PCM08	QID	M76ZB1305	SCREEN 1 ISOLATION VALVE	NORMAL	CLOSED	DI	3.4.1.10
DROP18	76PCM08	QID	M76ZB1308	SCREEN1 SCREENING DIVERTR GATE	NORMAL	CLOSED	DI	3.4.1.11
DROP18	76PCM08	QID	M76ZB1309	SCREEN 1 SOLIDS DISCH VALVE	NORMAL	CLOSED	DI	3.4.1.12
DROP18	76PCM08	QID	M76ZD1305	SCREEN 1 ISOLATION VALVE	NORMAL	OPENED	DI	3.4.1.13
DROP18	76PCM08	QID	M76ZD1308	SCREEN1 SCREENING DIVERTR GATE	NORMAL	OPENED	DI	3.4.1.14
DROP18	76PCM08	QID	M76ZD1309	SCREEN 1 SOLIDS DISCH VALVE	NORMAL	OPENED	DI	3.4.1.15
DROP18	76PCM08	QID	M18QG1S1	DPU18 QC SL1 HSG1 QID PS MON	ALARM	NORMAL	DI	3.4.1.16
DROP18	76PCM08	QID	M18QH1S2	DPU18 QC SL2 HSH1 QID PS MON	ALARM	NORMAL	DI	3.4.2.16
DROP18	76PCM08	QID	M18QG2S3	DPU18 QC SL3 HSG2 QID PS MON	ALARM	NORMAL	DI	3.4.3.16
DROP18	76PCM08	QID	M18QH2S4	DPU18 QC SL4 HSH2 QID PS MON	ALARM	NORMAL	DI	3.4.4.16
DROP18	76PCM08	QID	M18QG3S5	DPU18 QC SL5 HSG3 QID PS MON	ALARM	NORMAL	DI	3.4.5.16

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP29	94PCM01	QID	M29QA5S9	DPU29 QC SL9 HSA5 QID PS MON	ALARM	NORMAL	DI	3.1.9.16
DROP29	94PCM01	QID	M29QB5S10	DPU29 QC SL10 HSB5 QID PS MON	ALARM	NORMAL	DI	3.1.10.16
DROP29	94PCM01	QID	M29QA6S11	DPU29 QC SL11 HSA6 QID PS MON	ALARM	NORMAL	DI	3.1.11.16
DROP29	94PCM01	QID	M29QB6S12	DPU29 SLOT 12 HS B6 QID PWR MN	ALARM	NORMAL	DI	3.1.12.16
DROP29	94PCM01	QID	M29QC5S9	DPU29 QC SL9 HSC5 QID PS MON	ALARM	NORMAL	DI	3.2.9.16
DROP29	94PCM01	QID	M29QD5S10	DPU29 QC SL10 HSD5 QID PS MON	ALARM	NORMAL	DI	3.2.10.16
DROP29	94PCM01	QID	M29QC6S11	DPU29 QC SL11 HSC6 QID PS MON	ALARM	NORMAL	DI	3.2.11.16
DROP29	94PCM01	QID	M29QD6S12	DPU29 QC SL12 HSD6 QID PS MON	ALARM	NORMAL	DI	3.2.12.16
DROP29	94PCM01	QID	M29QE5S9	DPU29 QC SL9 HSE5 QID PS MON	ALARM	NORMAL	DI	3.3.9.16
DROP29	94PCM01	QID	M29QF5S10	DPU29 QC SL10 HSF5 QID PS MON	ALARM	NORMAL	DI	3.3.10.16
DROP29	94PCM01	QID	M29ESL13A	DPU29 PRI 13VDC PS MON	NORMAL	ALARM	DI	3.3.11.12
DROP29	94PCM01	QID	M29ESL13B	DPU29 SEC 13VDC PS MON	NORMAL	ALARM	DI	3.3.11.13
DROP29	94PCM01	QID	M29ESL24A	DPU29 PRI 24VDC PS MON	NORMAL	ALARM	DI	3.3.11.14
DROP29	94PCM01	QID	M29ESL24B	DPU29 SEC 24VDC PS MON	NORMAL	ALARM	DI	3.3.11.15
DROP29	94PCM01	QID	M29QE6S11	DPU29 QC SL11 HSE6 QID PS MON	ALARM	NORMAL	DI	3.3.11.16
DROP29	94PCM01	QID	M29QF6S12	DPU29 QC SL12 HSF6 QID PS MON	ALARM	NORMAL	DI	3.3.12.16
DROP29	94PCM01	QID	M29QG3S5	DPU29 QC SL5 HSG3 QID PS MON	ALARM	NORMAL	DI	3.4.5.16
DROP29	94PCM01	QID	M29QH3S6	DPU29 QC SL6 HSH3 QID PS MON	ALARM	NORMAL	DI	3.4.6.16
DROP29	94PCM01	QID	M29QH4S8	DPU29 QC SL8 HSH4 QID PS MON	ALARM	NORMAL	DI	3.4.8.16

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DELETED DCS INPUT / OUTPUT LIST

DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP30	94PCM02	QID	M30QD4S8	DPU30 QC SL8 HSD4 QID PS MON	ALARM	NORMAL	DI	3.2.8.16
DROP30	94PCM02	QID	M30QC5S9	DPU30 QC SL9 HSC5 QID PS MON	ALARM	NORMAL	DI	3.2.9.16
DROP30	94PCM02	QID	M30QD5S10	DPU30 QC SL10 HSD5 QID PS MON	ALARM	NORMAL	DI	3.2.10.16
DROP30	94PCM02	QID	M30QC6S11	DPU30 QC SL11 HSC6 QID PS MON	ALARM	NORMAL	DI	3.2.11.16
DROP30	94PCM02	QID	M30QD6S12	DPU30 QC SL12 HSD6 QID PS MON	ALARM	NORMAL	DI	3.2.12.16
DROP30	94PCM02	QID	M30QF4S8	DPU30 QC SL8 HSF4 QID PS MON	ALARM	NORMAL	DI	3.3.8.16
DROP30	94PCM02	QID	M30QE5S9	DPU30 QC SL9 HSE5 QID PS MON	ALARM	NORMAL	DI	3.3.9.16
DROP30	94PCM02	QID	M30QF5S10	DPU30 QC SL8 HSF5 QID PS MON	ALARM	NORMAL	DI	3.3.10.16
DROP30	94PCM02	QID	M30ESL13A	DPU30 PRI 13VDC PS MON	NORMAL	ALARM	DI	3.3.11.12
DROP30	94PCM02	QID	M30ESL13B	DPU30 SEC 13VDC PS MON	NORMAL	ALARM	DI	3.3.11.13
DROP30	94PCM02	QID	M30ESL24A	DPU30 PRI 24VDC PS MON	NORMAL	ALARM	DI	3.3.11.14
DROP30	94PCM02	QID	M30ESL24B	DPU30 SEC 24VDC PS MON	NORMAL	ALARM	DI	3.3.11.15
DROP30	94PCM02	QID	M30QE6S11	DPU30 QC SL11 HSE6 QID PS MON	ALARM	NORMAL	DI	3.3.11.16
DROP30	94PCM02	QID	M30QF6S12	DPU30 QC SL12 HSF6 QID PS MON	ALARM	NORMAL	DI	3.3.12.16
DROP30	94PCM02	QID	M30QG2S3	DPU30 QC SL3 HSG2 QID PS MON	ALARM	NORMAL	DI	3.4.3.16

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DELETED DCS INPUT / OUTPUT LIST

DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP32	80PCM01	QLC	M80MV1151	DIG 1 AXIAL PUMP 1 NOZZLE VLV 1 DATA			SERIAL	3.2.3
DROP32	80PCM01	QLC	M80MV1161	DIG 1 AXIAL PUMP 2 NOZZLE VLV 1 DATA			SERIAL	3.2.3
DROP32	80PCM01	QLC	M80MV1171	DIG 1 AXIAL PUMP 3 NOZZLE VLV 1 DATA			SERIAL	3.2.3
DROP33	80PCM02	QLC	M80MV1251	DIG 2 AXIAL PUMP 1 NOZZLE VLV 1 DATA			SERIAL	3.2.5
DROP33	80PCM02	QLC	M80MV1261	DIG 2 AXIAL PUMP 2 NOZZLE VLV 1 DATA			SERIAL	3.2.5
DROP33	80PCM02	QLC	M80MV1271	DIG 2 AXIAL PUMP 3 NOZZLE VLV 1 DATA			SERIAL	3.2.5
DROP35	80PCM03	QLC	M80MV1351	DIG 3 AXIAL PUMP 1 NOZZLE VLV 1 DATA			SERIAL	3.3.7
DROP35	80PCM03	QLC	M80MV1361	DIG 3 AXIAL PUMP 2 NOZZLE VLV 1 DATA			SERIAL	3.3.7
DROP35	80PCM03	QLC	M80MV1371	DIG 3 AXIAL PUMP 3 NOZZLE VLV 1 DATA			SERIAL	3.3.7

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DELETED DCS INPUT / OUTPUT LIST

DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP38	80PCM05	QID	M38QA6S11	DPU38 QC SL11 HSA6 QID PS MON	ALARM	NORMAL	DI	3.1.11.16
DROP38	80PCM05	QID	M38QB6S12	DPU38 QC SL12 HSB6 QID PS MON	ALARM	NORMAL	DI	3.1.12.16
DROP38	80PCM05	QID	M38QC6S11	DPU38 QC2 SL11 HSB6 QID PS MON	ALARM	NORMAL	DI	3.2.11.16
DROP38	80PCM05	QID	M38QD6S12	DPU38 QC SL12 HSD6 QID PS MON	ALARM	NORMAL	DI	3.2.12.16
DROP38	80PCM05	QID	M38QE6S11	DPU38 QC SL11 HSE6 QID PS MON	ALARM	NORMAL	DI	3.3.11.16
DROP38	80PCM05	QID	M38ESL24B	DPU38 SEC 24VDC PS MON	ALARM	NORMAL	DI	3.3.12.12
DROP38	80PCM05	QID	M38ESL24A	DPU38 PRI 24VDC PS MON	ALARM	NORMAL	DI	3.3.12.13
DROP38	80PCM05	QID	M38ESL13B	DPU38 SEC 13VDC PS MON	ALARM	NORMAL	DI	3.3.12.14
DROP38	80PCM05	QID	M38ESL13A	DPU38 PRI 13VDC PS MON	ALARM	NORMAL	DI	3.3.12.15
DROP38	80PCM05	QID	M38QF6S12	DPU38 QC SL12 HSF6 QID PS MON	ALARM	NORMAL	DI	3.3.12.16

**SECTION 40 94 43**  
**PROGRAMMABLE LOGIC CONTROLLER SYSTEM**

**PART 1 GENERAL**

1.01 GENERAL

- A. Function: Used for process monitoring and control, by emulating functions of conventional panel mounted equipment such as relays, timers, counters, current switches, calculation modules, proportional-integral-derivative (PID) controllers, stepping switches, and drum programmers.
- B. Programmable logic controller (PLC)-based systems are typically used in wastewater collection, pumping stations, package systems provided by equipment vendor.
- C. DCSP shall provide integration services to integrate all PLCs used in the Project. Integration services include, but are not limited to the following:
  - 1. Lead all integration activities such as coordination meetings, joint testing and site commissioning etc.
  - 2. Provide information necessary for PLC configuration such as IP, port assignment, and others.
  - 3. Define data exchange requirements between PLC and DCS, and send the requirements to Package Systems vendor.
  - 4. Establish and test communication between PLC and DCS.
  - 5. Map PLC data into DCS database.
  - 6. Create and monitor diagnostic info of the communication between PLC and DCS.

1.02 APPLICABLE SECTIONS

- A. The Work described in the following sections also applies to the Work in this section. Other sections of the specifications not referenced below shall also apply to the extent required for proper performance of this Work.
  - 1. Division 01, General Requirements.
  - 2. Division 26, Electrical.
  - 3. Division 40, Process Interconnections.
- B. Codes and Standards: The Work shall comply with the current editions of the publication and codes as adopted by the City of San Diego.

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1.03 SUBMITTALS

- A. PLC Component Data: All submittals shall be in accordance with Section 01 33 00, Submittal Procedures.
- B. PLC Design:
  - 1. In addition to the submittal requirements, the DCSP shall provide all layout and Shop Drawings, including the following:
    - a. Panel layout, including fully dimensioned and detailed external spatial views and internal layout.
    - b. Electrical schematics, including, new panel wiring, instrument wiring, and power and grounding.
    - c. Layout of relays, breakers, switches and instrumentation provided, and applicable single line and wiring diagrams.
    - d. I/O card placement and layout.
    - e. Enclosures, including all associated hardware devices.
    - f. Detailed description and associated diagrams of all software components and firmware of the PLC.
- C. Operations and Maintenance Manuals: PLC O&M manual shall be provided as part of its package systems in accordance with applicable sections.

1.04 COORDINATION AND PROGRESS MEETING

- A. DCSP shall be responsible for the scheduling of meetings/workshops with parties that supplied package systems to coordinate the PLC integration and complete PLC integration into DCS system.
- B. The purpose of the meetings shall be to review the requirements of data exchange, define data mapping between PLC and DCS and testing.
- C. Representatives at the meetings shall have the competence and authority to make any and all necessary decisions.

**PART 2 PRODUCT**

2.01 TYPE

- A. PLC shall be Allen-Bradley Logix family including ControlLogix, or CompactLogix, to match existing City standard.
- B. PLC shall be capable to communicate with Emerson Ovation DCS system directly over Ethernet using Ethernet/IP protocol.



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2.02 PARTS

- A. The PLC based systems shall include, as a minimum: Central processing unit (CPU), power supplies, input/output modules, controllers, I/O bases (chassis/rack), and factory assembled interconnecting cables. Provide all components required to make a complete and operational system.
- B. PLC system shall include the following as a minimum:
1. CPU: Latest version of AB Logix family with appropriate memory size. Provide redundancy CPUs if required by the contract document.
  2. Power Supply Module: Shall use the latest version, 120V ac, 60-Hz or 24V dc. Provide redundant power supply module if required by the contract document.
  3. Input/Output:
    - a. Discrete Input Modules:
      - 1) Voltage: 120V ac, 60-Hz or 24V dc.
      - 2) Operating Power: 2 watts.
      - 3) Points per Module: 16 maximum.
      - 4) LED status indicator for each point.
      - 5) Isolation: Between input point and PLC, 1,500 volts rms.
    - b. Discrete Output Modules:
      - 1) Voltage: 120V ac, 60-Hz or 24V dc.
      - 2) Operating Power: 2 watts.
      - 3) Load Rating: 2 amps continuous.
      - 4) Isolation: Between PLC and output point, 1,500 volts rms.
      - 5) Points per Module: 16 maximum.
      - 6) LED status indicator for each point
    - c. Isolated Discrete Output Modules:
      - 1) Type: Isolated Form C relay.
      - 2) Voltage: 120V ac, 60-Hz or 24V dc.
      - 3) Isolated Outputs per Module: 8.
      - 4) Load Rating: 5 amps continuous.
      - 5) Operating Power: 2.5 watts.
      - 6) Points Per Module: 8 maximum.
      - 7) LED status indicator and fuse for each point.
      - 8) Isolation: Between PLC and output point, 1,500 volts rms.
    - d. Analog Input/Output Modules:
      - 1) Voltage: 4 to 20 mA and 1 to 5 volts.
      - 2) Power: 3 watts.
      - 3) Differential Analog Points per Module: 8 maximum.
      - 4) Isolated Analog Output Points per Module: 8 maximum.

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- 5) Isolation: Between PLC and I/O point and between I/O points, 1,500 volts rms.
- 6) Inputs modules shall be HART compatible.
- e. Pulse Input Modules:
  - 1) Input Voltage: 5V or 12V to 24V (user selectable).
  - 2) Input Current: 7 mA at 5V; 7 mA to 1.5 mA at 12V to 24V.
  - 3) Points per Module: 4 maximum.
  - 4) Maximum Input Frequency: 100 KHz in counter mode.
  - 5) Maximum Count Value: 0 to 999,999 (programmable).
- f. Communication Network Module: Latest version of Ethernet Network module from AB Logix family product line for Ethernet/IP protocol.
- g. Interface Products: Provide any hardware, such as interfacing cables required for accessing/programming/modifying logic or I/O configuration.
- h. PLC Programming:
  - 1) PLC Programming Software Tool:
    - a) Provide one copy of the latest Version AB Studio 5000 PLC programming software.
    - b) Provide all licenses to facilitate the communications, such as, Modbus, EIP, etc.
    - c) Provide all development software used to create the application software, such as Studio 5000, containing the exact software revision level used to develop the logic.
  - 2) Application Program: Provide final PLC application program at the end of the project to the City. If it is password protected, the password shall be provided. Provide complete annotated soft copies of the developed application software complete with I/O assignments and network configurations.
  - 3) Application program shall be programmed based on City's standard using IEC 1131-3 standard languages including FB, ladder logic, structured text, and sequential flow chart.
- i. Spare Parts:
  - 1) CPU: One.
  - 2) Power Supply: Three.
  - 3) Communication/Network Module: One.
  - 4) Spare I/O Cards Installed in I/O racks: For each type of I/O card, quantity equals 10 percent of each type and size used, minimum one each.
  - 5) Spare I/O Cards Provided Loose (Shelf Spares): For each type of I/O card, quantity 10 percent of each type and size used, minimum one each.
  - 6) I/O Rack: One.

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- C. Controller: The controller shall have its control strategies programmed in a "ladder logic" language. It shall be easily reprogrammed with a laptop computer as specified below. The PLC system shall be programmed by the Contractor to perform the specified control strategies and monitoring functions. Two documented copies, in hardcopy and electronic format, of the operating PLC program(s) shall be furnished to the Owner which shall allow direct, step-by-step, reloading of the PLC system program(s). The ladder logic shall reflect equipment name designations used in the PLC as well as the Contract Drawing equipment name designations (i.e., timer "Q" in the Contract Drawing may become timer OL in PLC program).
- D. Communications: If the PLC is required to interface with the DCS via a datalink, it shall be done so by an Ethernet IP link. The serial link type used shall be determined by distances. The PLC system shall be provided with all appurtenances to support this requirement. The communications protocol shall be Modbus with the PLC configured in a slave mode. The DCS will operate in the master mode.
- E. Programming Laptop: All programming shall be accomplished with a laptop computer loaded with all necessary software provided for each "type" of PLC provided. The PLC programming may be performed via a network connection or locally at the PLC. The laptop, software, PLC program, manuals, and passwords will be turned over to the City upon PLC commission. All programming, all monitoring, all searching, and all editing shall be accomplished with the laptop. These functions shall be capable of being done both "on line" while the PLC processor is scanning or "off line" while the PLC processor is not scanning. The laptop shall display multiple series and parallel contacts, coils, timers, counters, and calculation functions. The laptop shall also be able to monitor the status of all inputs, all outputs, all timers, all counters, and all coils. It shall have the capability to disable/force all inputs, all outputs, and all coils to simulate system operation. It shall also indicate "power flow" through all elements and include a search function to locate any element and its program location. The PLC processor status information, such as error indication and amount of memory remaining, shall be shown on the laptop screen. The Contractor shall provide one new laptop complete with manuals to the Owner to enable future system support. The laptop shall be turned over to the Owner at startup. No proprietary software, logic, passwords, etc., will be used that are not disclosed and turned over to the City upon Project completion. The City will retain all rights to use any programs, logic, graphic code, etc., created by the Contractor or DCSP in the everyday maintenance of installed equipment.

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- F. PLC Control System Software: This section covers furnishing standard and customized software, fully installed and fully configured, in the control systems specified herein. It is the intent of this specification to have the PLC system supplier furnish latest generation, standard, field-proven, fully debugged and supported software package for this application with a minimum of additions or changes. Customized or specially written software shall be furnished if required to meet all functional requirements specified herein. Any custom applications software required shall be fully integrated into the basic software and shall not require unique command structures. Software specified herein is described in broad, functional categories. System supplier shall furnish a complete software package including the functional requirements specified herein along with whatever additional software is required by the supplier for proper and efficient operation of the PLC control system. All logic developed must be fully annotated with point tag names that match or comply with City standards and DCS I/O. Program subroutines will contain useful descriptions as to the functionality of the logic. Special programming to accommodate other systems will be fully annotated. All points, I/O and internal will have meaningful English descriptions to identify the purpose of the point. All network paths and IP parameters will be fully identified, all serial connections (if any) will be fully disclosed and identified. No attempt has been made to list all software or list all characteristics of software required by the system supplier to meet the functional requirements specified herein.
1. General: The software package shall provide a system capable of controlling system level activities and a higher level process control language allowing the operator to monitor and control the process through an interactive human interface. The software environment shall support a multi-programming atmosphere allowing concurrent execution of more than one program in a background/foreground mode or multi-tasking mode.
  2. Throughout the execution of all software modules, the operator shall be presented with all command or operation choices available at that point in the program. using sufficient verbiage or symbols to make choices self-explanatory and unambiguous. Question and answer or fill-in-the-blank requests shall only be permitted where file names, tag names, or other unique text or numerical information is required.
  3. System-level software shall include a real-time operating system, a calendar/time program, a file management program and a system of diagnostic routines in addition to any compilers, editors, loaders, or assemblers required to support the process control software language.
  4. All programs shall be self-configuring, such that they obtain the size and configuration of the system from parameters contained in the various files created during system generation. No parameters related to the hardware configuration shall be hard coded into any of the software.

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5. System Level Software: System-level software shall include a complete and unmodified operating system furnished by the system supplier that provides system-level functions as specified herein. Operating system software shall function automatically without operator intervention, except as required to establish file names and similar information.
6. Operating System Software:
  - a. The real-time operating system software shall be the standard uncorrupted product of the host computer and shall provide the following minimum functions:
    - 1) Respond to demands from a program request or to demands from an operator.
    - 2) Dynamic allocation of resources available in the system. These resources shall include main memory usage, computation time, peripheral usage, and I/O channel usage.
    - 3) Allotment of system resources on the basis of task priority levels such that a logical allocation of resources and suitable response times are assured.
    - 4) Queuing of requests in order of priority if one or more requested resources are unavailable.
    - 5) Resolution of contending requests for the same resource in accordance with priority.
    - 6) Service requests for execution of one program by another.
    - 7) Transfer data between programs as requested.
    - 8) Management of all information transfers to and from peripheral devices.
    - 9) Control and recovery from all program fault conditions.
    - 10) Diagnose and report real-time hardware device errors.
7. Program execution shall be scheduled on a priority basis. A multilevel priority interrupt structure is required. A program interrupted by a higher priority program shall be entered into a list of pending programs. Its execution shall be resumed once it becomes the currently highest priority program. Initiation of programs shall, as a minimum, be activated in the following ways:
  - a. In response to external interrupts.
  - b. At a scheduled time of the day.
  - c. On an elapsed-time interval basis.
  - d. On request by another program.
  - e. On request from the data access panel.
8. The system shall allow periodic programs to be scheduled. The allocation of resources to a time scheduled program shall be based on its relative priority and the availability of computer system resources.

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9. Startup and Restart:
  - a. Software shall be provided that initializes and brings a computer or any microprocessor based hardware unit from an inactive condition to a state of operational readiness.
  - b. Initialization shall include determination of computer system status prior to startup of initializing operating system software and initializing application software. Initialization shall also include the loading of all memory resident software, initialization of timers, counters, and queues, and initialization of all dynamic database values.
10. Shutdown: The software shall provide an orderly shutdown capability for shutdowns resulting from equipment failure, including computer processor failure, primary power failure, or a manually entered shutdown command. When the loss of primary power is sensed, a high-priority hardware interrupt shall initiate software for an immediate, orderly shutdown. When a shutdown occurs in response to a command or malfunction, the software shall control the affected hardware quickly and automatically to a secure state.
11. Diagnostics:
  - a. Diagnostic programs shall be furnished with the software package to detect and isolate hardware problems and assist maintenance personnel in discovering the causes for system failures. The system manufacturer's standard diagnostic routines shall be used as much as possible. Diagnostic software and test programs shall be furnished for each significant component in the system.
  - b. Diagnostic routines shall test for power supply, central processing unit, memory, and I/O bus failures as a minimum.
12. Calendar/Time Program: The calendar/time program shall update the second, minute, hour, day, month and year in the operating system and transfer accurate time and date information to all system level and application software. Variations in the number of days in each month and in leap years shall be handled automatically by the program. The operator shall be able to set or correct the time and date from the data access panel, only at the highest security level.

G. Operator Interface:

1. System-level software shall provide for creation and modification of alphanumeric displays, compression of display information for storage, and linking of dynamic files to database variables. Each display screen shall be able to be made up of static and dynamic alphanumeric information. The system shall be furnished with standard displays as specified herein. The system shall be capable of storing and using all standard display formats.

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2. Additionally, all display screens shall include a dedicated area that shall display the current time and date, and at least one line for system-level messages.

H. Standard Displays:

1. The operator interface systems shall include at least the following standard, nonconfigurable displays:
  - a. Current Alarm Summary: As specified in the alarm processing section of this Document.
  - b. System Overview: Displaying the current status of major systems hardware components including the I/O hardware.
  - c. Menu Displays: Indicating the various displays and application level choice available to the operator.
  - d. Point Displays: Detailed displays in a standard format for all types of points in the system. Any point in the system shall be able to be displayed indicating all parameters associated with the point. Each entry in the display shall be labeled in engineering units.

I. Algorithms:

1. System software shall support the implementation of algorithms for the determinations of control actions and special calculations involving analog and discrete inputs. These algorithms shall be capable of outputting positional or incremental control outputs or providing the product of calculations. The algorithms shall include alarm checks where appropriate. As a minimum, the following types of algorithms shall be provided:
  - a. A calculator algorithm which performs functions such as summing several variables, raising to a power, roots, dividing, multiplying, and subtracting.
  - b. A switch algorithm that reads the current value from its input address and stores it as the value of its output address. Two types of switches shall be accommodated, two outputs with one input and one output with two inputs.
  - c. A 3-mode PID controller algorithm, with each of the 3 modes independently adjustable. The algorithm shall support both direct and reverse acting modes.
  - d. Algorithms for lead, lag, dead time, and ration compensators.
  - e. Algorithms to perform integration and totalization of analog process variables.
  - f. Algorithms that drive the setpoint of a controller shall include provisions for bumpless transfer, which shall be implemented by use of a bias value.

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- g. Algorithms shall be implemented and modified in the system at any time through the use of interactive software modules in a manner consistent with other interactive modules and shall not require any direct source of code changes.
- J. Alarm Processing:
- 1. Alarm processing software shall be provided to recognize and report alarm events and conditions to the local control panel in an organized, unambiguous, clear, and convenient manner. Alarms shall be classified into at least two priority levels and at least two independent classes.
  - 2. Alarm processing software shall generate alarms for the following conditions:
    - a. Discrete input or output change of state is defined as an alarm in the control software.
    - b. Analog value exceeding alarm limits defined in the control software.
    - c. Analog rate of change exceeding limits defined in the control software.
    - d. Failure of the PLC processor, mass memory device, process input/output hardware, or other major hardware component.
    - e. Alarms shall be generated in each case above at the time of occurrence and at the time the condition returns to normal.
- K. Testing: The City's representative shall witness testing of the PLC system. Solid-state logic systems shall be tested as complete assemblies. Testing of individual components or modules shall not be acceptable. Testing shall include a simulated test with the DCS interface to ensure accurate passing of data between systems.
- L. Training: A manufacturer's representative shall supply two 8-hour days of onsite training for the Owner's personnel. The training shall include but not be restricted to, operation of programming unit, troubleshooting of system hardware and software, and program development.
- M. 30-day Acceptance Test:
- 1. After startup has been completed, the system shall undergo a 30-day acceptance test. The system must run continuously for 30 consecutive days. During this period, all system functions shall be exercised. Any system interruption and accompanying component, subsystem, or program failure shall be logged for cause of failure, as well as time of occurrence and duration of each failure. A failure shall cause termination of the 30-day acceptance test. When the cause of a failure has been corrected, a new 30-day acceptance test shall be started.



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2. Each time the Contractor's technician is required to respond to a system malfunction, the technician must complete a report, which shall include details concerning the nature of the complaint or malfunction and the resulting repair action required and taken.
3. The 30-day acceptance test shall be performed jointly with the DCSP during its 30-day DCS acceptance test.

N. Operation and Maintenance Manuals:

1. The Contractor shall furnish to the Owner 5 complete sets of operation and maintenance manuals. The manuals shall include data, information drawings, etc., for the system, subsystem, and all components, and shall include names, addresses and telephone numbers of equipment suppliers, representatives and repair facilities.
2. This shall include a complete description of the recommended operating procedures, maintenance procedures, and spare/replacement parts list for equipment items with catalog data, diagrams, and drawings or cuts describing the equipment. Each set shall include full size assembly and wiring diagrams; drawings showing "as-build" conditions shall be furnished to the Owner.
3. This shall include backup programming on disc or thumb drive, all programming hardware and software (including all software packages must be licensed to the City). All configuration parameters, IP addresses, settings, network paths and gateways, serial port connection parameters, IO tag descriptors (and/or register addresses) will be identified.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Where shown on Drawings, or specified, the DCSP shall furnish all materials, tools, equipment, consumables and supplies, hardware, firmware, software, and shall perform all labor required to integrate all PLCs in conjunction with the DCS.
- B. The DCSP shall connect all PLCs to a network access point switch associated with the process control area, or nearest physical PCMs approved by the City's representative.
- C. DCS shall connect each PLC via Ethernet link controller (ELC), as specified in Article PCM Requirements, of Section 40 94 23, Process Control Module (PCM).

3.02 TRAINING

- A. Training shall be provided in accordance with Section 40 98 06, Distributed Control System Training.

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3.03 CABINETY ENCLOSURES

- A. PLC field cabinetry hardware and submittal requirements shall conform to the requirements of Section 40 95 13, Field Cabinetry.

**END OF SECTION**

**SECTION 40 95 13  
FIELD CABINETRY**

**PART 1 GENERAL**

1.01 GENERAL

- A. The DCSP shall provide a complete and operational, turn-key, distributed control system (DCS) capable of supporting all process operations for the Project as specified in these Contract Documents.
- B. The distributed control system provider (DCSP) shall furnish all materials, tools, equipment, consumables, and supplies and shall perform all labor required to complete the Work in this Specification.
- C. This section identifies the different types of DCS cabinets to be provided under this Specification, e.g., the process control module (PCM) cabinet, remote input/output (RIO) cabinet, patch panels, and field termination cabinets.
  - 1. As the names imply, the PCM cabinet shall house the DCS processors and related equipment, including redundant power supplies, electrical protective devices, electrical grounding strips, and fiber optic patch panels (specified elsewhere – if DCSPS equipment allows).
  - 2. The RIO cabinet shall house DCS remote I/O modules, applicable redundant power supplies and related hardware, electrical grounding strips and electrical protective devices.
  - 3. The PCM or termination cabinets shall contain all terminals and related hardware for termination of field I/Os. This cabinet will provide terminal isolation between discrete I/O (DI and DO) and analog I/O (AI and AO) and shall contain all required I/O electrical protective devices for field wiring. The termination cabinet, when used, will contain screw-type termination (spring-pressure termination is not allowed) for all I/O wiring (including analog shields) under the screw terminal. All I/O wiring shall be crimped to snap-tight type spade lugs as manufactured by T&B. No alternate is allowed.
  - 4. It is the intent that each PCM and RIO cabinet shall be provided with an associated termination cabinet (as needed) to isolate the DCS hardware from the field hardware and to provide orderly single-point termination of all I/O. Direct termination of field wiring to the I/O modules is allowed without the written consent of the City's representative.
- D. This section provides specific requirements for each cabinet and includes the design, testing and shipping of the hardware described herein.

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1.02 RELATED SECTIONS

- A. The Work described in the following sections also applies to the Work in this section. Other sections of the specifications not referenced below shall also apply to the extent required for proper performance of this Work.
  - 1. Division 01, General Requirements.
  - 2. Division 26, Electrical.
  - 3. Division 40, Process Interconnections.
- B. Codes and Standards: The Work shall comply with the current editions of the publication and codes as adopted by the City of San Diego.

1.03 REQUIREMENT

- A. The DCSP, as part of their final design, shall be responsible for providing seismic analysis reports for each cabinet for the applicable seismic zone, and shall provide all required seismic bracing of cabinets.
  - 1. The DCSP shall submit six hard copies and one soft copy of all seismic reports to the City's representative prior to beginning any installation of cabinets. Submission shall be made in accordance with Section 01 33 00, Submittal Procedures.
- B. The DCSP shall be responsible for design review of all concrete 'house-keeping pads' required by the cabinets and any other structural modification necessary for installation. In the event the DCSP finds the housekeeping pad design is deficient, they shall immediately notify the City's representative and the Prime Contractor.

1.04 DESIGN CRITERIA

- A. Environmental Conditions:
  - 1. Unless otherwise noted, provide cabinets suitable for the following environmental conditions:
    - a. Indoor Environment – Process Area:
      - 1) Temperature: 50 to 120 degrees F.
      - 2) Relative Humidity: 10 to 60 percent noncondensing.
  - 2. Enclosure Rating: NEMA 4X, Type 316 stainless steel.
    - a. Classification: Nonhazardous.
    - b. Indoor Environment: Electrical/control room.
    - c. Temperature: 50 to 78 degrees F.
    - d. Relative Humidity: 10 to 60 percent, noncondensing.
    - e. Enclosure Rating: NEMA 12, painted steel.
    - f. Classification: Nonhazardous.

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B. Outdoor Environment:

1. Temperature: 20 to 120 degrees F.
2. Relative Humidity: 0 to 95 percent, noncondensing.
3. Enclosure Rating: NEMA 4X, Type 316 stainless steel.
4. Classification: Nonhazardous.
5. Hazardous (classified) Environment:
  - a. Temperature: 20 to 120 degrees F.
  - b. Relative Humidity: 0 to 100 percent noncondensing.
  - c. Enclosure Rating: NEMA 7 or NEMA 4X (explosion proof) Class 1 Divisions I and II, Class A, B, C, or D, Type 316 stainless steel or Aluminum rated for a corrosive environment.
  - d. Classification Area: Hazardous.

1.05 CODES AND REGULATORY REQUIREMENTS

A. Fabricate and install cabinet and enclosures to the following industrial standards:

1. American Petroleum Institute (API).
2. American National Standards Institute (ANSI).
3. IEC 529, Classification of Degrees of Protection provided by enclosures.
4. Institute of Electrical and Electronic Engineers (IEEE).
5. Instrument Society of America (ISA).
6. Military Standards (MIL Standards).
7. National Fire Protection Association (NFPA).
8. NEMA Standards Publication ICS6, Enclosures for Industrial Controls and Systems.
9. NFPA 79, Electrical Standards for Industrial Machinery.
10. OSHA Standard 1920.147: The Control of Hazardous Energy (Lockout/Tagout).
11. UL, 508A, Industrial Control Cabinet and/or CSA Standard C22.2.

B. Perform the design, and provide all enclosure work in compliance with the requirement of UL Bulletin 508A.

C. All electrical equipment, components, devices, etc. installed within the cabinet, shall be UL certified.

D. The DCSP shall install cabinets in compliance with requirements of all state and local codes with respect to clearances and area classifications, and in accordance with seismic requirements.

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- E. The DCSP shall obtain seismic calculations and mounting details for each cabinet. Seismic calculations and mounting details shall be stamped, on each page of the submittal, by a registered structural engineer in the State of California. Coast for all seismic certifications shall be borne by the DCSP. Seismic calculations and mounting drawings shall be submitted in accordance with Section 01 33 00, Submittal Procedures. No DCS-related cabinet shall be installed on site until seismic submittals have been returned “Approved.”

1.06 DELIVERY, STORAGE, AND HANDLING

- A. The DCSP shall provide protection for materials, components, and equipment against loss or damage and from the effect of weather while in fabrication and at the approved staging area. Upon delivery to Site, the Prime Contractor is responsible for protection of the DCS equipment during construction and installation. Prior to shipment to Project Site, the DCSP shall store items in an indoor dry location, inclusive of corrosive-inhibitive vapor capsules in shipping containers, and related equipment as recommended by the capsule manufacturer. Provide a suitable controlled environment in storage areas for items subject to corrosion under damp conditions.
- B. Provide protection for cabinets against loss or damage from effects of weather upon receipt, and a suitable controlled environment for storage of cabinets, while stored in the approved staging area.

1.07 SUBMITTALS

- A. The hardware submittal shall be in accordance with Section 01 33 00, Submittal Procedures. The submittal shall be provided in a singular, all-inclusive submittal, which shall include but not be limited to:
  - 1. The DCSP shall provide all submittals in accordance with all requirements of the Specifications and shall submit hardware catalog information and specification sheets with selected model numbers identified.
  - 2. The DCSP shall provide six hard copies and one soft copy of complete cabinet shop drawings prior to fabrication of cabinets. The DCSP shall not begin cabinet fabrication until City’s representative approval is obtained for its design. Details shall include location and dimensions of cabinet cutouts, location of any/all back of cabinet stiffeners and cabinet face to exact scale, terminations with their identification indicated, and the location and size of all equipment and devices to be mounted within and on the cabinet. The allowable conduit entrance area shall also be depicted. All shall be drawn to scale and accurately depict all information in sufficient detail to allow City’s representative to determine compliance with the Contract requirements. Poorly drawn details and/or lack of accuracy shall be grounds for rejection.

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3. Bill of Materials (BOM):
  - a. Contractor will provide a complete and detailed BOM for each field-mounted device and assembly as well as cabinet assemblies and subassemblies.
  - b. BOM shall include all items within an enclosure. Each BOM shall be delineated by process segment and on a PCM/RIO unique basis. Incomplete submittals may be rejected without further review.
4. Schematic and Wiring Diagrams:
  - a. DCSP will provide six hard copies and one soft copy of all drawings showing both schematic and wiring diagrams for all circuits. Complete details on the circuit interrelationship of all internal, and external, devices associated with each enclosure shall be submitted first, using schematic control diagrams.
  - b. Subsequent to return of this first submittal, the DCSP shall submit six hard copies and one soft copy of all cabinet wiring diagrams. The diagrams shall be submitted in accordance with Section 01 33 00, Submittal Procedures, and shall contain:
    - 1) Component layout drawings (proportional layout), showing numbered terminals on components together with the unique number of the wire to be connected to each terminal.
    - 2) Wiring diagrams shall show terminal assignments including tagging identifying field primary and final measurement and control devices.
  - c. As-constructed Drawings made during the Project which differ from the original drawings, and/or the shop drawings shall be documented and shall be submitted to the Prime Contractor as “red-lined Record Drawings.”
  - d. Record Drawings shall be reviewed by City’s representative prior to the acceptance of the Project. The DCSP shall respond to all comments on shop drawings made by City’s representative either by making required corrections, or stating why corrections were not possible.
5. Assembly and Construction Drawings:
  - a. DCSP shall provide six hard copies and one soft copy of assembly and construction drawings for each DCS enclosure to facilitate field installation: These drawings shall include dimensions, identification of all components, surface preparation, and finish data, nameplates, safety placarding, etc. These drawings also shall include room identification and enough other details, including prototype photographs, to define exactly the style and overall appearance of the assembly.

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6. Installation, Mounting, and Anchoring Details: The DCSP shall provide six hard copies and one soft copy of installation, mounting and anchoring details, including housekeep pad size requirements and details, for all components and assemblies to be field-mounted, including conduit connection and entry details. Seismic calculations for the cabinet and mounting details shall be included as specified elsewhere.
7. Uninterruptible Power Supply (UPS):
  - a. Complete product literature.
  - b. Electrical load calculations showing the electrical loads and battery backup time under full loading.
  - c. Wiring and connection diagrams.
  - d. The UPS submittal shall include Modbus addressing and network configuration data for monitoring the status of the UPS.
8. Calculations for Sizing of Cabinetry UPS and Air-conditioning Units:
  - a. The DCSP will provide six hard copies and one soft copy of all calculations, as a submittal to determine the requirements for:
    - 1) UPS.
    - 2) Thermal Management System: DCSP to provide six hard copies and one soft copy (CD/DVD) of submittals depicting calculated heat gain for each PCM, RIO, termination cabinet or local cabinet which contains electronics. Calculations shall take into account the maximum ambient air temperature anticipated.
      - a) Where DCSP heat gain calculations indicate that cabinet temperatures for PCM, RIO, and termination cabinets containing electronics cannot be held at or below 75 degrees F, the DCSP shall provide a thermal management system for the cabinet. In the case of local cabinets containing electronics, the temperature shall be held 10 degrees F below the maximum temperature rating of the lowest-rated piece of cabinet electronics.
      - b) All thermal management systems provided shall be housed in enclosures of the same material used for its associated electronics cabinet.
      - c) If cabinet-mounted air conditioners are used, the DCSP shall provide a means acceptable to the City's representative for disposal of any condensate generated.
      - d) A separate, non-UPS source of power (utility power), fed from an existing lighting or power panel, to feed thermal management systems shall be provided by others under Division 26, Electrical. Thermal management systems using 'plant air' shall not be used.



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1.08 QUALITY ASSURANCE

- A. The DCSP shall achieve product quality assurance by possessing the following:
1. System of traceability of the manufactured unit throughout production and testing in compliance with applicable standards or other approved quality assurance programs.
  2. System of “burn-in” for all components and available supportive documents in compliance with applicable standards or other approved quality assurance programs.
  3. Demonstrated record of prompt positive response to field failures.
  4. Documented program of failure analysis.
  5. Proof of compliance with relevant regulations, standards, specifications, and/or codes of the following sources: ISA, API, UL, NEMA, OSHA, ANSI, MIL, NFPA, JIC, IEEE, NEC, ICEA, and any other national state, municipal, and local laws, regulations, and codes.
  6. Documented product safety policy relevant to all products intended to be furnished under this Contract.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. All cabinets to be located in process areas or outdoors shall be provided with an integral thermostatically controlled thermal management system as required under Part 1. Indoor cabinets mounted in conditions areas, or conditioned electrical rooms, may contain cleanable/replaceable filters and circulation fans to maintain cabinet temperature.
- B. Field I/O wiring shall be terminated in the PCM cabinet, by others, or preferably. termination in termination cabinets adjacent to or integral to, the PCM or RIO cabinet. For integral configurations, two completely separate compartments must be maintained with individually lockable doors. All internal hardware to the individual cabinets shall be designed as if they were standalone cabinets.
- C. Enclosures shall contain only those openings required for cabling and ventilation in accordance with area classification.
- D. The cabinets shall be free from waves and other imperfections. Cabinet fronts shall not be recessed at the base. Adjoining cabinet sections shall be accurately shop-fitted to ensure satisfactory assembly in the field.
- E. Check with the design drawings to determine where front-only, or front and rear, opening cabinets can be used based on space availability. All equipment and wiring shall be accessible from the front and rear of the enclosure as appropriate.

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- F. Field wire entry capability shall be from the top and the bottom of the cabinet as required by the specific application and in accordance with DCSP submittal showing acceptable conduit entrance areas. Each cabinet shall, wherever possible, be one of the DCSP's standard sizes; however, the height shall not exceed 96 inches. All indoor cabinets shall be sized so that they can be moved through a 36-inch-wide doorway.
- G. Ventilation openings in enclosures in all areas, based on area classification, shall be provided with dust filters and insect screens. Ventilation shall be provided with cleanable/replaceable filter backed louvers at top and bottom. Thermostatically controlled fans shall be located at air inlets so that the enclosure interior is pressurized. Filters shall be capable of removal and reinstallation without the use of tools. Exhaust vents shall contain the same dust filters and insect screens and shall be placed so as to facilitate cabinet top heat gain. Where area classification precludes ventilation opening, a recirculation type thermal management system shall be used.
- H. Cabinets shall be of adequate strength to support mounted components during shipment and to support a concentrated load of 200 pounds on their top after erection, and shall be rated for Seismic Zone 4 requirements.
- I. Each freestanding enclosure shall be mounted on a concrete housekeeping pad that elevates the cabinet in accordance with the design Engineer's standard pad design.
- J. Utility and UPS branch power shall be installed and terminated by others under Division 26, Electrical. Each cabinet, as specified below, shall have an externally-mounted, weatherproof, modular (plug in) RJ-45 type data jack to support connection of the industrial hardened workstations (FHS). Addition of the data jack shall not violate the NEMA integrity of the cabinet. Where possible, data jacks shall be mounted 12 inches above grade.
- K. All cabinets shall be provided with a temperature sensor to monitor cabinet temperature. The sensor shall provide a hardwired analog input signal to the DCS.
- L. All cabinet doors shall be provided with limit switches which shall activate when the door is opened. Switches shall be double-pole; one pole operating the cabinet light and the other pole providing supervised, 'door-open' indication to the DCS I/O. These points shall provide a hardwired digital input signal to the DCS.
- M. Control panels, including those furnished by equipment manufacturers shall be provided according to the following requirements:
  - 1. Where indicated, control panels shall be provided with all required taps, fittings, rotameters, regulation and alarm interlocks to enable the implementation of a purge system which is in conformance with

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ISA S12.4 Type Z requirements. Dimensions shall be in accordance with manufacturer's requirements. Elevations and horizontal spacing shall be subject to City's representative approval.

2. All workstation control panels which require NEMA 3 or 4 ratings will be provided with window kits to preserve the panel's integrity and enable operations ready access to information.
3. Panels shall be fabricated, piped and wired by fully qualified panel shop who are properly trained, experienced and supervised.
4. See Section 40 90 07, Scope of Work, for control panels to be provided under this Contract.

N. Materials:

1. Panel section faces shall be No. 10 gauge minimum thickness steel for freestanding panels and No. 14 gauge minimum thickness steel for smaller panels. All materials shall be selected for levelness and smoothness.
2. Relay rack high density type panels shall use standard relay racks with No. 14 gauge steel frame and supports.
3. Structural Shapes and Strap Steel: ASTM A283.
4. Bolting Material: Commercial quality carbon steel bolts, nuts and washers, all 1/2-inch diameter with UNC threads. Carriage bolts shall be used for attaching end plates. All other bolts shall be hex head machine bolts. All nuts shall be hot pressed hex, American Standard, heavy. Standard wrought washers shall be used for foundation bolts and attachments to building structures. All other bolted joints shall have S.A.E. standard lock washers.

O. Fabrication:

1. End plates, top plates and top closure panels shall be furnished when required. End plates, top plates and top closure panels shall be removable with countersunk bolts to match panels. Top closure panels shall be furnished in lengths which match the widths of standard panels, except that one top closure panel may extend across two 4 feet 6 inches wide or five 2 feet 0 inches wide standard panels. The vertical joints of these panels shall align with the vertical joints of the standard panels.
2. End closure or rear closure doors shall be provided. Such doors shall be flush fitting and gasketed and be of the hinged lift-off type with lockable door handles. A common key shall be provided for all doors on one panel assembly. Where removable access panels are indicated, they shall be furnished with dished handle fasteners. Screw driver 1/4 turn type fasteners are not acceptable.
  - a. The flanged edges of all panels shall be straight and smooth. Corners shall be welded and ground smooth.
  - b. The face of the panel shall be true and level after flanging.

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- c. All panel cut-outs and holes may be cut or drilled by any standard method that will not cause deformation. Burrs shall be ground smooth.
- d. Adjacent panels shall be assembled with faces flush. Gaps or cracks shall not be visible from the front of the assembled instrument board.
- e. Stiffeners shall be welded to the back of panels, as required to prevent panel deformation due to the weight of front of panel mounted instruments.
- f. Panels shall be self-supporting as defined below.

P. Framework and Supports:

- 1. The rear of each panel section shall have a steel framework for supporting conduit, tubing, wireways, switches, air piping, and all instrument accessory items such as relay or terminal enclosures, transducers, pressure switches, valves and air relays. The main frame work shall be constructed of standard structural shapes. Special shapes such as "Unistrut" may be used for secondary supports. Framework must not interfere with instrument connections or access needed for maintenance or adjustments.
- 2. Steel framework shall extend 2 feet 8 inches back of the panel face unless otherwise required. Where indicated, individual adjustable leg supports shall be provided at the back of the framework so that the entire panel shall be self-supporting.

Q. Finish:

- 1. Preparation:
  - a. Front and rear face of the panel, both sides and the edges of all flanges, and the periphery of all openings shall be prepared as follows:
    - 1) All high spots, burrs, and rough spots shall be ground smooth.
    - 2) The surfaces shall be sanded or sandblasted to a smooth, clean bright finish.
    - 3) All traces of oil shall be removed with a solvent.
- 2. Finishing:
  - a. A 3-mil dry coat of Amercoat 185, "or approved equal" primer shall be applied over the entire panel surface immediately after solvent cleaning.
  - b. Wet sand, dry, then quick glaze spot putty on the front of the panel only. Dry, then wet sand again and dry.
  - c. Apply a second 3-mil dry coat of alkyd enamel primer to the front of the panel.
  - d. Wet sand to smooth clear finish, then dry.

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- e. At least two 3-mil dry coats of air-dry, satin finish, alkyd enamel shall be applied over the entire surface. Color to be as selected by City's representative.
  - f. The Contractor shall furnish two 1-pint containers of the enamel to the City's representative.
3. Instrument Finishing: The final coats applied to painted surface of instrument cases, doors, or bezels which are visible from the front of panels shall be manufacturer's standard unless otherwise indicated. Black japan or "crinkle" finishes on instrument cases are not acceptable.

R. Mounting of Instruments:

1. The Contractor shall provide cut-outs, and shall mount all instrument items indicated to be panel mounted, including any instruments indicated to be furnished by other manufacturers.
2. The Contractor shall also mount, behind the panels, other instrument accessory items as indicated.
3. Rear of panel-mounted equipment shall be installed with due regard to commissioning adjustments, servicing requirements, and cover removal.
4. Wiring shall be kept clear of spare space to give maximum space for future additions.

S. Piping Requirements for Control Panels:

1. General:
  - a. The Contractor shall provide terminal connections near the top, rear of the panel for all tubing and piping which connect to instruments, valves, air supply, and other pressure leads external to the panel. Terminal connections for tubing shall be bulkhead tube unions. Those for pipe shall be threaded couplings, plugged for shipping purposes.
  - b. Each terminal connection shall have an engraved metal or plastic plate with a terminal and instrument tag number affixed nearby.
  - c. The Contractor shall provide the air supply pressure reducing station, all instrument and supply piping and all pneumatic tubing or piping to terminal connections and between instruments located within the confines of the panel and supporting framework.
2. Air Supply Piping:
  - a. The Contractor shall provide air supply piping from a point near the top of the panel framework to the inlet side of the pressure-reducing station, or alternately to the inlet side of individual filter regulators.
  - b. Piping, fittings, and valves downstream of the filters at the air supply reducing station shall be brass or copper. Headers may be extruded aluminum if the tube wall section is thick enough to accept threaded connections.

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- c. The low-pressure instrument air supply header shall extend from the downstream side of the main pressure reducing valves across the length of panel which includes air users. Where the header must be broken for shipping purposes, brass unions shall be provided at panel section junctions.
- d. A separate air supply take-off consisting of a 1/4-inch brass connection braced into the air header (if brass or copper) shall be furnished for each instrument requiring an air supply. An additional 10 percent of the take-offs shall also be provided. Take-offs for 3/4-inch size headers may be made by using 3/4-inch by 3/4-inch by 1/4-inch reducing tees.
- e. Each take-off shall be fitted with a 1/4-inch brass diaphragm of needle type shut-off valve. Provide circular type handle with tag number shown thereon.
- f. The dead end of the air header opposite the supply end shall be fitted with a plugged 1/2-inch brass gate valve.
- g. The connection from shut-off valves air head to the instruments shall be by means of 1/4- or 3/8-inch O.D. tubing as required.

T. Electrical Requirements for Control Panels:

- 1. The Contractor shall provide all wiring, conduit, wireways, and switches required to make instruments and other panel electrical devices operational.
- 2. Conduit, wireways, junction boxes and fittings shall be installed for all signal wire, all thermocouple and resistance thermometer lead wire including those between temperature sensors and temperature indicators.
- 3. Each terminal connection shall have a plastic plate with a terminal and instrument tag number. All wiring shall be identified with stamped tubular wire markers.
- 4. Freestanding panels shall be provided with switched 100-watt incandescent back-of-panel lights which are powered from a source independent from that which powers the panel devices. One light shall be provided for every 4 feet of panel width and shall be mounted inside in the top of the back-of-panel area.
- 5. Freestanding panels shall be provided with a 15-amp, 120-volt service outlet circuit within the back-of-panel area which are powered from a source independent from that which powers the panel devices. The circuit shall be provided with one 3-wire, 120-volt, 15-amp, duplex receptacle for every 4 feet of panel width spaced evenly along the back-of-panel area. As a minimum, two duplex outlets shall be provided for each panel.
- 6. Smaller panels shall be sized to adequately dissipate heat generated by equipment mounted in or on the panel.
- 7. Where smaller panels are mounted outside or in unshaded areas, they shall be provided with thermostatically controlled heaters capable of maintaining inside temperatures above 40 degrees F.

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8. Smaller panels shall be provided with a hand-switch controlled 100-watt incandescent light and a breaker protected 120-volt, 15-amp duplex receptacle.
9. Wiring Methods: Wiring methods and materials for all panels shall be in accordance with the NEC requirements for General Purpose unless otherwise indicated. Opening wiring in close cabinet type panels is allowed when indicated.
10. Construction:
  - a. Wire for 115-volt circuits shall be No. 14 AWG stranded with Type THWN or THHN insulation. All terminals for external wiring connections shall be suitable for No. 12 AWG wire.
  - b. Flexible conduit is not acceptable.
  - c. Conduit fittings shall be cast fittings.
  - d. Soldered or pressure crimped wire splicing in conduits shall be acceptable.
  - e. For case grounding, panels shall be provided with a 1/4-inch by 1-inch copper ground buss completed with solderless connector for one No. 4 AWG bare stranded copper cable. The Contractor shall connect the copper cable to a system ground loop.
  - f. Single case annunciator units with no remote logic that are installed at the top of a panel may be considered as being a terminal box when top of panel wire entry is indicated. If bottom of panel entry is indicated, terminal box shall be provided at the bottom of the panel and wired to the annunciator. Terminals shall be identified with plastic marker strips.
  - g. Terminal boxes for incoming and outgoing signal leads shall be located at the top or bottom of the panel as indicated or as otherwise required.
11. Power Supply Wiring:
  - a. Unless otherwise indicated, all instruments, all alarm systems, and all motor controls shall operate on 24V dc circuits.
  - b. The Contractor shall furnish terminal box connections for the main power supply entry as indicated.
  - c. Power supply switches for alarm units shall be 3-pole type, arranged to open both the power and alarm circuits. Each annunciator shall be equipped with a separate switch.
  - d. Instruments located on a single panel section which serve one process unit may be connected to a common branch power circuit. The number of branch circuits shall be such that no circuit load exceeds 10 amps. Different panel sections and instruments serving different process units shall not use common branch circuits. A 15-amp, 2-pole circuit breaker shall be provided in each branch circuit. When instruments do not come equipped with integral fuses, the panel fabricator shall furnish and install fuses as required for the protection of individual instrument against fault currents. Fuses shall be mounted

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- on the back of the panel, in a fuse holder, with each fuse identified by a service name tag.
- e. Each potentiometer type instrument, electronic transducer, controller or analyzer shall have an individual disconnect switch. Disconnect switches shall have metal or plastic tags listing the associated instrument tag numbers. Individual plug and cord set power supply connections may be used without switches when indicated.
  - f. Where alarm units are single unit types, one switch may be used to disconnect not more than six alarm units located on the same or adjacent panels.
12. Alarm Wiring: The Contractor shall provide all alarms including light cabinets, audible signal units, test and acknowledge switches, and remote logic units as indicated. Interconnecting wiring to panel-mounted initiating devices shall also be provided. Wiring from external initiating devices shall be provided by the Contractor. Where plug and cord sets are provided for component interconnection, the Contractor shall harness and support the cables in a neat and orderly fashion. Where separate wire is required, the Contractor shall install 16 AWG with THWN or THHN insulation between all components.
13. Signal Wiring:
- a. Computer and Noncomputer Use: Signal wire shall be twisted shielded pair or triads in conduit or troughs. Cable shall be constructed of No. 16 AWG copper signal wires with THWN or THHN insulation. Color code for instrument signal wiring shall be:
    - 1) Positive: Black (+).
    - 2) Signal Ground Negative: White (-).
    - 3) Equipment Ground: Green.
    - 4) Ungrounded: Red.
    - 5) Energized by Voltage Sound External to Panel: Yellow.
    - 6) Dc Circuit: Blue.
  - b. Multiconductor cables where indicated shall consist of No. 16 AWG copper signal wires twisted in pairs, with 600-volt fault insulation. A copper drain wire shall be provided for the bundle with a wrap of aluminum polyester shield. The overall bundle jacket shall be PVC.
  - c. Multi-conductor cables, wireways and conduit shall provide for 10 percent allocation of spare, unused signal wires in addition to the indicated requirements.
14. Thermocouple Wiring:
- a. The Contractor shall provide metal wire troughs, pull boxes, and thin-walled conduit for duplex thermocouple lead wire in a manner that will facilitate field installation of lead wire without splices or terminal connections. The Contractor shall also provide the lead wire connections between multipoint temperature sensors and temperature indicators when indicated. When a thermocouple junction box is indicated, it shall be located with the approval of the City's



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representative. The panel manufacturer shall install conduit and troughs and lead wires between the junction box and the instruments. Terminal material shall be compatible with extension wire used.

- b. Thermocouple lead wire shall be No. 16 AWG with high temperature PVC insulation on each wire and PVC jacket overall, and shall conform to the latest ISA Specification for standard grade.
- c. Conduit for thermocouple lead wire shall be in accordance with the following:

Conduit Size	1/2"	3/4"	1"	1-1/2"	2"
No. of Duplex Leads	1	4	6	16	26

- d. Where the number of duplex lead wires exceeds 26, the wires shall be installed in rectangular ducts filled to not more than 40 percent capacity.
  - e. All thermocouple wireways and main conduits shall be sized to allow for 10 percent spare thermocouple leads.
  - f. Each signal, control, alarm, and indicating circuit conductor shall be designated by a single unique number which shall be shown on shop drawings. These numbers shall be marked on all conductors at every terminal using white numbered wire markers which shall be plastic-coated cloth, or shall be permanently marked heat-shrink plastic.
15. Terminal Blocks: Terminal blocks shall be molded plastic with barriers and box lug terminals, and shall be rated 15 amperes at 600 volts. White marking strips, fastened securely to the molded sections, shall be provided and wire numbers or circuit identifications shall be marked thereon with permanent marking fluid.

U. Color Conventions. Lens covers for indicating lights on all panels will be colored as follows:

- 1. Red ON when:
  - a. Motor not running (STOPPED).
  - b. Valve CLOSED (not fully opened).
  - c. Circuit breaker CLOSED.
- 2. Green ON when:
  - a. Motor running in forward direction (fast speed for multi-speed motors).
  - b. Valve OPEN (not fully closed).
  - c. Circuit breaker OPENED.
- 3. White ON when:
  - a. Power available.
  - b. System in AUTOMATIC mode.
  - c. Monitoring taking place.

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4. Amber ON when:
  - a. Malfunction trip.
  - b. Equipment locked out.
  - c. Alarm condition.
  
- V. Nameplates: Nameplates shall be provided for instruments, function titles for each group of instruments, and other components mounted on the front panel(s) as indicated. A nameplate shall be provided for each signal transducer, signal converter, signal isolator, and electronic trip mounted inside the panel(s). Nameplates shall be descriptive to define the function and system of such element. These nameplates shall be of the same material as those on the front of the panel(s). Adhesives shall be used for attaching nameplates. Nameplates shall be fabricated from black face white-center laminated engraving plastic. Painted surfaces shall be prepared to allow permanent bonding of adhesives. Colors, lettering, styles, abbreviations and sizes shall be in conformance with ISA-RP60.6 with an intended viewing distance of 3 feet to 6 feet.
  
- W. Factory Inspection:
  1. Panels shall be inspected for compliance with requirements at the factory before shipment to the Site. The Contractor shall notify the City's representative 2 weeks in advance of the testing date. A representative of the City's representative will visit the factory to make the inspection.
  2. Contractor shall perform the following tests prior to arrival of the City's representative:
    - a. All air lines adequately tested for leaks.
    - b. All alarm circuits rung out to determine their operability.
    - c. Electrical circuits checked for continuity and where applicable, operability.
    - d. Nameplates checked for correct spelling and correct size of letters.
    - e. Other test required to place the panel in an operating condition.
  3. It shall be the responsibility of the Contractor to furnish all necessary testing devices and sufficient manpower to perform the tests required by the City's representative to determine conformance to the requirement of the Contract Documents.
  4. If the above tests have not been performed prior to the arrival of the City's representative, the Contractor shall reimburse the Owner for the cost of the extra time required for the inspector's services and travel expenses.
  
- X. Shipment: Panels shall be crated for shipment using a heavy framework and skids. Panel sections shall be cushioned to protect the finish of the instruments and panel during shipment. Instruments that are shipped with the panel shall have suitable shipping stops and cushioning material installed to protect instrument parts from mechanical shock damage during shipment. Each panel crate shall be provided with removable lifting lugs to facilitate handling.

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2.02 PROCESS CONTROL MODULE (PCM) CABINETS

- A. PCM cabinets shall be provided to house the DCS PCM hardware which interfaces to the DCS network and RIO, PLC, or termination cabinets.
- B. Cabinet shall be as required by area classification, gasketed, floor standing (minimum 72 inches wide by 96 inches high by 24 inches deep), with double doors and access from the front, and rear where applicable, of the cabinet. Doors shall have a three-point, key-locking, 1/4 turn latching mechanism. Doors shall be 36 inches wide and hung by continuous full height piano hinges at the outside edges (integral cabinet configuration dimensions shall not exceed 72 inches wide). Cabinet shall be provided with cable entry from the top and bottom (where applicable) as needed for entry of cables from cable trays and/or conduits. Cabinet shall be able to incorporate:
1. One set redundant PCM.
  2. Redundant power supplies.
  3. Redundant communications modules.
  4. Redundant RIO communications modules if applicable.
  5. I/O cards or modules and all required appurtenances to function as a stand-alone node within the DCS.
  6. Any cabinet and raceway shall be sized to accommodate equipped, spare, and future growth requirements of I/O and wiring, as well as for cables from I/O cards to the termination cabinet if used.
  7. Weatherproof, exterior mounted, RJ-45 data jack, which shall be wired back to the closest port on the data highway/LAN switch.
  8. UPS to power DCS PCM and loop-powered instruments.
- C. Cabinet Layout:
1. PCM and I/O rack and cards shall be accessible from the front of the cabinet. Access for card I/O cable connections shall be from the front or rear of the cabinet, based on area requirements. A separate wire-way shall be used to carry 120V ac signals. 120V ac power shall be separately routed within the enclosure for shielding and isolation from low-voltage signal wiring. Power entry to the cabinet and UPS shall be grouped together in an area of the cabinet that is separated from PCM processors and I/O wiring assemblies.
  2. Cabinet Power Distribution: Provide circuit breakers in the number and capacity required to protect all internal power circuits from overload and damage due to abnormal power conditions and/or device failure. Follow requirements for power circuits contained elsewhere in the Specifications. Group the circuit breakers together in a part of the cabinet adjacent to power supplies. Associated wiring shall be routed in wireway and/or conduit provided for 120V ac power only. A main circuit breaker/disconnect shall

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also be provided for the cabinet, which shall switch electrical power to all internal cabinet equipment.

3. Wireway: Internal cabinet wiring shall be contained in wireway, or where this is not possible, wiring shall be bundled and tied with nylon ties and secured to the nearby cabinet walls with approved affixed mounts.

2.03 REMOTE INPUT/OUTPUT (RIO) CABINETS

- A. RIO cabinets shall be provided to house the DCS RIO hardware that interfaces to the DCS PCM and termination cabinets (if provided).
- B. Cabinet shall be as required by area classification, gasketed, floor standing (minimum 36 inches wide by 96 inches high by 24 inches deep), with single or double doors as appropriate, and access from the front, and rear of the cabinet where applicable based onsite conditions. Doors shall have a 3-point, key-locking, 1/4-turn latching mechanism. Doors shall be 36 inches wide and hung by continuous full height piano hinges at the outside edges. (Integral cabinet configuration dimensions shall not exceed 72 inches wide). Cabinet shall be provided with cable entry from the top and bottom as needed for entry of cables from cable trays and/or conduits. Cabinet shall be able to incorporate:
  1. Redundant PCM communications modules.
  2. Redundant power supplies.
  3. A minimum of 32 I/O cards or modules and all required appurtenances to function as a RIO node within the DCS.
  4. Any cabinet and raceway shall be sized to accommodate equipped, spare, and future growth requirements of I/O and wiring, as well as for cables from I/O cards to the termination cabinet.
  5. Weatherproof, exterior mounted, RJ-45 data jack, which shall be wired back to the closest port on the data highway/LAN switch.
  6. UPS to power DCS RIO and loop-powered instruments.
  7. Cabinet shall be sized to accommodate expansion and growth of 20 percent of the I/O.
- C. Cabinet Layout:
  1. RIO PCM communications modules and I/O rack and cards shall be accessible from the front of the cabinet. Access for card I/O cable connections shall be from the front and rear of the cabinet where applicable based onsite conditions. Separate wireways shall be used to carry 120V ac signals. 120V ac power shall be separately routed within the enclosure for shielding and isolation from low voltage signal wiring.
  2. Power entry to the cabinet and UPS power supplies shall be grouped together in an area of the cabinet that is separated from PCM processors and I/O racks assemblies.

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3. Cabinet Power Distribution: Provide circuit breakers in the number and capacity required to protect power circuits from overload and damage due to abnormal power conditions and/or device failure. Follow requirements for power circuits contained elsewhere in the Specifications. Group the circuit breakers together in a part of the cabinet adjacent to power supplies. Associated wiring shall be routed in wireway and/or conduit provided for 120V ac power. A main circuit breaker/disconnect shall also be provided for the cabinet, which shall switch electrical power to all internal cabinet equipment.
4. Wireway: Internal cabinet wiring shall be contained in wireway, or where this is not possible, wiring shall be bundled and tied with nylon ties and secured to the nearby cabinet walls with adhesive mounts.

2.04 FIELD TERMINATION CABINETS

- A. Field Termination Cabinets, if required, shall be provided to interface between the DCS PCM/RIO cabinets housing the DCS system hardware and the field mounted instruments and devices. In addition to providing terminal blocks for connection of wiring, the cabinets may also provide electrical isolation between DCS discrete output signals and the equipment being controlled, and between the DCS and any field signal operating at a voltage level other than 24V dc. Where necessary to ensure analog signal compatibility and/or isolate ground loops, signal isolators shall be provided and installed in the termination cabinets.
- B. Cabinet shall be front access only, and shall provide openings at the top, or bottom, as needed for entry of cables from cable trays and/or conduits. The cabinet shall be as required by area classification, gasketed, floor standing (minimum 72 inches wide by 96 inches high by 24 inches deep), with double doors and 3-point latching mechanism, and key locking 1/4-turn. Doors shall be 36-inches wide and hung by continuous full height piano hinges at the outside edges. Cabinet shall incorporate:
  1. Knife-blade fused terminal blocks shall be provided on every wire connection for convenient isolation of circuits without de-terminating wiring.
  2. Interposing Relays: Slave/pilot relays shall be provided in the termination cabinet for the electrical isolation of discrete output signals. Where 120-volt wetting voltages are present, interposing relays shall be isolated from relays handling low voltage.
  3. Signal Isolators: Provide in the termination cabinet as mentioned above.
  4. Power supplies: Provide a redundant power system for the cabinet consisting of individual power supplies and automatic failover with alarm light, located in the bottom of the termination cabinets. All electronics power supplies and loop-powered instruments shall be powered by the UPS as specified elsewhere.

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5. Provide three terminal blocks for each two-wire signal (two conductors and shield), and four terminals for each three-wire signal for landing field wiring and DCS wiring entering/exiting the termination cabinets. Also, provide all terminal blocks required for internal cabinet wiring and connections such as power supply, interposing relays, signal isolators, grounding and similar requirements. Provide terminals for all other wiring entering/leaving the termination cabinets as needed for landing connections. No wire splicing shall be used for connections in the termination cabinets.
6. Every wire conductor shall be individually labeled with its unique ISA identifying wire number in accordance with the requirements of the Contract Documents. Similar labels shall be attached to every terminal block.
7. Each conductor will be terminated in one of the following manners:
  - a. Conductor may be terminated in a safety-type forked, spade terminal of appropriate size for the screw on the termination block. All conductors shall be crimp-type spade terminal as manufactured by T&B. Substitution is not allowed.
  - b. If Phoenix Contact compression-type terminal blocks are used, each wire shall be ferruled or soldered tinned prior to terminating under the compression pawl.
  - c. Conductor may be terminated in a ferruled terminal type of appropriate size for the screw on the termination block. All conductors shall be crimp-type ferruled terminal.
8. Labels and nameplates shall be provided for identification of each active component contained within the termination cabinets (i.e., interposing relays, power supplies, terminal blocks, and similar items).
9. Grounding: Provide an electrical cabinet ground bus and ground wiring system.
10. Signal Grounding: Provide an isolated signal ground path and buss within the cabinet. All shields from signal wiring shall be grounded in the termination cabinets. Grounding and signal grounding shall be terminated to the ground buses and connected to the DCS ground grid by other under Division 26, Electrical.

C. Cabinet Layout:

1. Cabinets shall be arranged with vertical columns of terminal blocks bounded on both sides by wireways. Wherever possible, DCS wiring shall be separated from field wiring within the wireways. DCS wiring shall be routed to the left side of terminal blocks and field wiring to the right side of terminal blocks. Separate wireways shall be used to carry 120V ac signals. 120V ac power shall be separately routed in conduit within the enclosure for shielding and isolation from signal wiring.

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2. Interposing relays shall be housed in an area of the cabinet that is separate from terminal blocks. Within this area, relays shall be separated according to whether they carry 24V dc or 120V ac signals. Relays shall be arranged so that all 120V ac signal wiring is contained in separate wireways from 24V dc signals.
  3. Power supplies shall be grouped together in an area of the cabinet that is separated from terminal blocks and relays, but may be located in adjacent areas on the DIN rail in order to facilitate interconnecting wiring.
  4. Cabinet Power Distribution: Provide DIN rail-mounted circuit breakers in the number and capacity required to protect power circuits from overload and damage due to abnormal power conditions and/or device failure. Follow requirements for power circuits contained elsewhere in the Specifications. Group the circuit breakers together in a part of the cabinet that is separated from terminal blocks and relays, but is adjacent to power supplies. Associated wiring shall be routed in wireway and/or conduit provided for 120V ac power. A main circuit breaker/disconnect shall also be provided for the termination cabinets, which shall switch electrical power to all internal cabinet equipment.
  5. Cabinet Power Supply: The cabinet power supplies shall be provided from two independent sources, UPS and utility power. These shall be distributed separately within the cabinet to provide the sources of power as described herein.
- D. Wireway: Internal cabinet wiring shall be contained in plastic wireway, or where this is not possible, wiring shall be bundled and tied with nylon ties and secured to the nearby cabinet walls with adhesive mounts. Wireways shall also be provided at the top and bottom of the cabinets to collect the wiring from the vertical wireways and direct it to the proper location.
- E. Separate areas shall be provided on the DIN rail terminal blocks for each type of input / output points (i.e., analog input – AI, analog output – AO, discrete input – DI, and discrete output – DO). Separate areas shall also be provided in the Cabinets for interposing relays.
- F. Cabinet shall be sized to accommodate expansion and growth of 20 percent of the I/O.
- 2.05 UNINTERRUPTIBLE POWER SUPPLY (UPS)
- A. UPS supply systems shall be provided by the DCSP for each PCM, RIO, termination cabinet and any local cabinet containing electronics, in this contract. The UPS shall be installed and terminated under Division 26, Electrical by others.

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- B. UPS systems shall be sized to match area supply voltages and will provide, as a minimum, 2-hour of standby power, at the full rated load of the cabinet plus 20 percent spares.
- C. UPS shall be provided with external bypass mechanism to allow removal of the UPS for service without interrupting the PCM, etc.
- D. Each UPS shall be provided with its own electrical protective load center, provided and installed by others under Division 26, Electrical. Load center will contain adequate number and ampacity of circuit breakers to facilitate all loads fed from that UPS. Load center will be of appropriate voltage and have a main protective breaker of appropriate ampacity to match the KVA rating of the UPS.
- E. UPSs shall be floor mounted adjacent to the cabinet being served. They shall be mounted on a rack above a minimum of 6 inches above finished floor. If requirements dictate, UPS shall have additional, self-contained battery capacity to ensure minimum standby times.
- F. The UPS shall be provided with a network communications module capable of Modbus and SNMP that will transmit UPS environmental data to the DCS.
- G. Manufacturer and Products:
  - 1. Liebert; GXT4 with IS-Unity communications card.
  - 2. Or approved equal.

2.06 SHOP PAINTING

- A. Powdered epoxy resin coatings applied in the shop shall protect all ferrous metal surfaces. Surfaces that will be inaccessible after assembly shall be hot-dip galvanized and flood coated with two-part epoxy paint. All surfaces shall be cleaned and prepared in the shop prior to painting/coating. All mill scale, rust, lubricants, and other coatings shall be removed. Exposed surfaces shall be finished smooth, thoroughly cleaned, and filled as necessary to provide a smooth, uniform base for painting. All surfaces shall be treated with primer to resist rust and to form a bond between the metal and the paint.
- B. As an alternative to powder coating, PCM and RIO enclosures shall be given one or more coats of rust-inhibiting primer and two coats of high-grade oil-resistant enamel, lacquer, epoxy or polyurethane finish both inside and out. Paint films that show sags, checks, blisters, teardrops, or fat edges will not be acceptable. Any such defects shall be repaired by the DCSP prior to shipping.



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- C. The DCSP shall include touch-up paint and primer with the equipment he is furnishing that shall be of the same type and color as the factory-applied finish paint and primer. One quart of finish color shall be furnished for future touch-up. Complete application instructions shall be furnished. The paint and instructions shall be boxed or crated to prevent damage and shall be clearly labeled.
- D. The exterior finish colors of the enclosures shall be the DCSP's standard colors. Interior color shall be white. Where stainless steel enclosures are used, powder coating or painting is not required.
- E. Where area classification dictates, or at the option of the DCSP all cabinets may be provided in Type 316 stainless steel as opposed to painting and epoxy coating.

2.07 WIRING REQUIREMENTS

- A. General: The cabinets shall be provided with top or bottom terminal box connections for the main power supply entry. Each electronic component shall be equipped with a separate switch or disconnect means. Signal and low voltage wiring shall be run separately from power and 120-volt control wiring. Intrinsically safe wiring shall be run separately from non-intrinsically safe wiring.
- B. Power Supplies: Low-voltage dc power supplies shall be supplied. Low-voltage direct-current power supplies for bulk instrumentation power shall be convection-cooled switching type. Line regulation shall be 0.4 percent for input line variations from 105V to 132V ac, and load regulation shall be 0.4 percent for load variations from 0 to full load. Ripple and noise shall not exceed 100 mV peak-to-peak. Hold-up time at maximum load shall not be less than 16 milliseconds. Efficiency shall be better than 70 percent. Power supply shall be designed for continuous duty at full rated capacity operating in ambient temperatures from 0 to 50 degrees C. In addition, power supplies shall be sized so that they do not exceed 60 percent of their rated capacity, when operating under the full calculated electrical load of the connected control system equipment. Output shall be electronically current limited, and overvoltage shutdown shall be provided. Power supply output voltages shall be rated as required and adjustable plus or minus 5 percent.
- C. Provide UPS power to all control cabinets to supply all DCS components and instrumentation, via UPS provided by the DCSP and installed by others as part of Division 26, Electrical.
- D. Cabinet Power Supply: The cabinet power supplies shall be provided from two independent sources, UPS and utility power. These shall be distributed separately within the cabinet to provide the sources of power as described herein.

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- E. Interposing Relays: Interposing relays (IR) shall be 115V ac or 24V dc coils and have a minimum of 10-amp rated contacts and be suitable for the application. Mounting dimensions and drilling for ac and dc relays shall be identical.
1. Manufacturer:
    - a. Phoenix Contact.
    - b. Or approved equal.
- F. Surge Protectors:
1. Surge protectors shall be nominal 120V ac with a nominal clamping voltage of 200 volts. Surge protectors shall be non-faulting and un-interrupting design with a response time of not more than 5 nanoseconds.
  2. Manufacturers:
    - a. Islatrol.
    - b. L.E.A. Dynatech.
    - c. Or approved equal.
- G. Enclosure Lights and Receptacles: Enclosures shall be internally lighted by LED lamps, provided with guards and a door activated switch. One duplex GFCI, grounded twist lock type receptacle shall, also, be provided in each cabinet enclosure section. Lights and receptacles shall be wired to outgoing terminal blocks for normal (utility, non-UPS) 120V, 60-Hz, single-phase utility power supply. Power branch circuits will be installed by others under Division 26, Electrical.
- H. Limit Switches: Switches mounted on all cabinet enclosure doors for intrusion detection and light activation, shall be proximity type and shall be self-contained, side or end sensitive as required. Output shall be a closed contact with no intrusion (supervised).
1. Manufacturer and Products:
    - a. Square D; Class 9007 Type C.
    - b. Allen-Bradley; 802T Series.
    - c. Or approved equal.
- I. Terminal Blocks:
1. Quantity:
    - a. For external connections.
    - b. Wire spare or unused cabinet mounted elements to their cabinets' terminal blocks.

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2. General: Group to keep 120V ac circuits separate from 24V dc circuits.
  - a. Connection Type: Screw connection clamp.
  - b. Compression Clamp:
    - 1) Hardened steel clamp with transversal grooves penetrating wire strands providing a vibration-proof connection.
    - 2) Guides strands of wire into terminal.
  - c. Screws: Hardened steel, captive, and self-locking.
  - d. Current Bar: Copper or treated brass.
  - e. Insulation:
    - 1) Thermoplastic rated for minus 55 degrees C to plus 110 degrees C.
    - 2) Two funnel shaped inputs to facilitate wire entry.
  - f. Mounting:
    - 1) Rail.
    - 2) Terminal block can be extracted from an assembly without displacing adjacent blocks.
    - 3) End Stops: One at each end of rail, minimum.
  - g. Wire Preparation: Stripping only.
  - h. Jumpers: Allow jumper installation without loss of space on terminal or rail.
  - i. Marking System:
    - 1) Terminal number shown on both sides of terminal block.
    - 2) Allow use of preprinted and field marked tags.
    - 3) Terminal strip numbers shown on end stops.
  - j. Mark terminal block and terminal strip numbers as required.
3. Terminal Block, 120-Volt Power:
  - a. Rated Voltage: 600V ac.
  - b. Rated Current: 30-amp.
  - c. Wire Size: 22-10 AWG.
  - d. Rated Wire Size: 10 AWG.
  - e. Color: Gray body.
  - f. Spacing: 0.25 inch, maximum.
  - g. Manufacturer and Product:
    - 1) Entrelec; Type M4/6.
    - 2) Or approved equal.
4. Terminal Block, Ground:
  - a. Wire Size: 22-12 AWG.
  - b. Rated Wire Size: 12 AWG.
  - c. Color: Green and yellow body.
  - d. Spacing: 0.25 inch, maximum.
  - e. Grounding: Ground terminal blocks electrically grounded to the mounting rail.
  - f. Manufacturer and Product:
    - 1) Entrelec; Type M4/6.P.
    - 2) Or approved equal.

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5. Terminal Block, Blade Disconnect Switch:
    - a. Use: Provide one for each discrete input and output field interface wire.
    - b. Rated Voltage: 600V ac.
    - c. Rated Current: 10-amp.
    - d. Wire Size: 22-12 AWG.
    - e. Rated Wire Size: 12 AWG.
    - f. Color: Gray body, orange switch.
    - g. Spacing: 0.25 inch, maximum.
    - h. Manufacturer and Product:
      - 1) Entelec; Type M4/6.SN.
      - 2) Or approved equal.
  6. Terminal Block, Fused, 24V dc:
    - a. Rated Voltage: 600V dc.
    - b. Rated Current: 6.3-amp.
    - c. Wire Size: 22-12 AWG.
    - d. Rated Wire Size: 12 AWG.
    - e. Color: Gray body.
    - f. Fuse: 5 by 20 GMA fuses.
    - g. Fuse Marking: Fuse amperage rating shown on top of terminal block.
    - h. Indication: LED diode 24V dc.
    - i. Leakage Current: 5.2 mA, maximum.
    - j. Spacing: 0.32 inch, maximum.
    - k. Manufacturer and Product:
      - 1) Entelec; Type M4/6.SFD.
      - 2) Or approved equal.
  7. Terminal Block, Fused, 120V ac:
    - a. Rated Voltage: 600V ac.
    - b. Rated Current: 6.3-amp.
    - c. Wire Size: 22-12 AWG.
    - d. Rated Wire Size: 12 AWG.
    - e. Color: Gray body.
    - f. Fuse: 5 by 20 GMA fuses.
    - g. Fuse Marking: Fuse amperage rating shown on top of terminal block.
    - h. Indication: Neon lamp 110V ac.
    - i. Leakage Current: 1.8 mA, maximum.
    - j. Spacing: 0.32 inch, maximum.
    - k. Manufacturer and Product:
      - 1) Entelec; Type M4/6.SFL.
      - 2) Or approved equal.
- J. Grounding: Internal copper grounding bus for ground connections on cabinets, consoles, racks, and cabinets.

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K. Intrinsic Safety Barriers:

1. Intrinsically Safe Relays:
  - a. Monitor discrete signals that originate in hazardous area and are used in a safe area.
  - b. Manufacturer and Product:
    - 1) MTL, Inc.; Series MTL 2000.
    - 2) Or approved equal.
2. Intrinsically Safe Barriers:
  - a. Interface analog signals as they pass from hazardous area to safe area.
  - b. Manufacturer and Product:
    - 1) MTL, Inc.; Series MTL 6000.
    - 2) Or approved equal.

2.08 NAMEPLATES

- A. Nameplates shall be provided for all I/O, PCM, RIO and miscellaneous DCS racks, and shall include function titles for each group of components mounted within the enclosures. A nameplate with identifying tag numbers coded to City's DCS numbering system shall be provided for each signal isolator, electronic trip, and other components mounted inside the enclosure(s). The nameplates shall be descriptive to define the equipment number, function, and system of each element. All nameplates shall be engraved phenolic, black-on white labels. Adhesive labels are not acceptable. The DCSP shall be select lettering, style, and sizes for approval by City's representative. Unless otherwise noted, mount all labels with stainless steel screws, nuts, bolts, etc. Before being produced the DCSP shall submit a list indicating the wording and tag numbers of all equipment identification name plates to City's representative for approval in accordance with Section 01 33 00, Submittal Procedures.

**PART 3 EXECUTION**

3.01 PACKAGING FOR SHIPMENT/STORAGE

- A. Enclose copies of the cabinet layout, wiring diagrams and installation detail documentation within manila envelopes and secure inside of each cabinet in a door pocket made for this purpose.
- B. During the construction period, periodically provide and replace cabinetry and air conditioning filters. Replace the filters just prior to City's representative's final acceptance of the equipment.
- C. During the construction period, provide and replace blown cabinet fuses.

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3.02 INSTALLATION

- A. DCSP shall perform a complete factory acceptance test (FAT) in accordance with these Specifications for all cabinet configurations in accordance with the Specifications. FAT shall be executed at the approved staging area and witnessed by the City representative.
- B. DCSP shall provide jobsite delivery of enclosures in accordance with the requirements of these Contract Documents.
- C. During the installation of DCS cabinets it shall be the responsibility of the DCSP to provide personnel to oversee proper installation of all DCS cabinetry, grounding, peripherals and systems components in addition to termination of I/O wiring, all of which is executed by others under Division 26, Electrical.
- D. The DCSP shall furnish the services of factory trained engineer(s) to check the completed installation and to perform all loop testing jointly with others, functional testing and make all necessary adjustments for satisfactory operation of the DCS.
- E. All Work, including installation oversight, calibration, testing, adjustment, startup and maintenance, shall be done by qualified experienced personnel who are technically skilled in their trade, are thoroughly instructed, and are competently supervised.

3.03 CABINET GROUNDING

- A. Rack Framework Grounding Conductor:
  - 1. Each DCS equipment cabinet and equipment rack framework requires its own grounding connection to the grounding infrastructure. A minimum of a No. 6 AWG copper conductor shall be used for this purpose. The recommended conductor types are:
    - a. Bare copper.
    - b. Insulated green, UL VW1 flame rated.
- B. Rack grounding connection point: Each DCS cabinet or rack shall have a suitable connection point to which the rack framework grounding conductor can be bonded. A dedicated rack ground bus, a 1-inch by 1/4-inch by rack width, copper ground bar or copper strip, shall be attached to the rack. A bond between the ground bar or strip and the rack shall exist. The mounting screws shall be of the thread-forming type, self-tapping or sheet metal screws are prohibited.

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C. Bonding to the Rack:

1. When bonding the rack framework grounding conductors to the busbars on the cabinet or rack, two-hole irreversible compression lugs listed by a nationally recognized testing laboratory (NRTL) shall be used to ensure that the ground connection does not become loose due to excessive vibration or movement of the attaching cable. Paint or other surface contact inhibitors should be removed before bonding straps are directly attached to metal enclosures or cabinet surfaces. Subsequently, the connections should be properly treated to inhibit rust, corrosion, and moisture.
2. The connection to the rack should have the following characteristics:
  - a. Bare metal-to-metal contact.
  - b. Antioxidant recommended.

D. Bonding to the Grounding Infrastructure: Attach the opposite end of the rack framework or equipment grounding conductor (EGC) to the grounding infrastructure (CBN). The connection should use a compression type, through-bolt lug which is UL listed. All DCS equipment, should be connected to the signal reference grid busbar with low-inductance bonding straps or jumpers. Grounding straps should be as short as practicable to minimize inductive reactance in the path.

E. Rack Continuity:

1. Every structural member of the cabinet or rack shall be grounded. This is achieved by assembling the cabinet or rack in such a way that there is electrical continuity throughout its structural members, as described below:
  - a. For Welded Racks: The welded construction serves as the method of bonding the structural members of the rack together.
  - b. Bolt Together Racks: Special consideration should be taken while assembling bolted racks. Removing paint at the point of contact with assembly hardware is an acceptable method of bonding. An alternate method is the use of two internal-external tooth lock washers: one under the bolt head contacting and cutting paint and one under the nut.
  - c. Even in equipment lineups where the cabinets are bolted together, bond each enclosure to the signal reference grid with its own strap.
  - d. All enclosure doors shall have independent ground straps which bridge the hinge point, providing grounding of the door to the main enclosure frame, or ground buss bar.

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F. Grounding the Equipment Chassis:

1. All rack-mounted equipment shall be bonded and grounded via the chassis, in accordance with the manufacturer's instructions. The equipment chassis should be bonded to the rack using one of the following methods:
  - a. To meet the chassis grounding requirements; the manufacturer may supply a separate grounding hole or stud. This should be used with a conductor of proper size to handle any fault currents up to the limit of the circuit protection device feeding power to the equipment unit. One end of this chassis grounding conductor will be bonded to the chassis hole or stud, and the other end will be properly bonded to the cabinet copper ground bar or strip.
  - b. If the equipment manufacturer suggests grounding via the chassis mounting flanges and the mounting flanges are not painted, the use of thread-forming tri-lobular screws and normal washers will provide an acceptable bond to the rack.
  - c. If the equipment mounting flanges are painted, the paint can be removed, or the use of the same thread-forming screws and aggressive internal-external tooth lock washers, designed for this application, will supply an acceptable bond to safety ground through the rack.
  - d. Assuming adequate grounding, solely through the equipment ac (alternating current) power cables containing a ground wire, is not allowed.

- G. Electrostatic Discharge Wrist Straps: The use of static discharge wrist straps when working on or installing network or computer hardware is specified in most manufacturers' installation guidelines. Wrist strap ports shall be provided at each DCS enclosure and shall be permanently attached to the rack grounding busbar by a means that ensures electrical continuity to ground.

3.04 FIELD TESTS

- A. Perform all field tests in accordance with Section 26 08 00, Commissioning of Electrical Systems, on "Electrical Tests."

B. DCS Grounding:

1. Ground resistance testing shall be performed by an independent testing laboratory.
2. Measurement of ground resistance shall be in accordance with IEEE Standard 81.
3. Measurements of all grounding electrodes shall not exceed 25 ohms in accordance with Section 250.56 of the NEC. Resistance testing shall take place after installation but before connecting the earth grounding electrode to the remaining grounding system, but at no other time. The ground



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resistance tests shall be conducted with a fall-of-potential method instrument.

4. Verify that the impedance level of the EGC does not exceed the values in Table 1 below, based on the amperage rating of the over-current device for the feeder or branch circuit.
5. An “open ground” indication reveals no EGC connection. A high-impedance measurement indicates poor-quality connections in the equipment grounding system or an improperly installed EGC and must be repaired and retested by the Contractor at no extra cost.

<b>Table 1</b>		
<b>Overcurrent Device Rating (A)</b>	<b>Circuit Voltage to Ground</b>	
	<b>120V</b>	<b>220/240/277V</b>
10	1.6	-----
15	1.0	1.0
20	0.8	0.7
25	0.6	0.6
30	0.5	0.5
40	0.4	0.3
60	0.10	0.10
100	0.10	0.07
125	0.06	-----
150	0.05	-----
200	0.04	-----

6. The Contractor shall verify that the ground reading through the ground bond conductor from the rack or enclosure, to the independent tri-ground system, or alternately to the UFER ground grid, is 1 ohm or less. Testing shall be provided by an independent ground testing agency in accordance with a City-approved ground testing plan. Failure to achieve proper signal grounding, shall require the Contractor to add additional tri-ground systems and larger bonding conductors, and retest to acceptable levels.
  - a. At the conclusion of Ground Testing, the Contractor shall submit copies of the certified testing report in accordance with Section 01 33 00, Submittal Procedures.

**END SECTION**

**SECTION 40 95 33**  
**DISTRIBUTED CONTROL SYSTEM NETWORK**

**PART 1 GENERAL**

1.01 NAMED TYPES

- A. DCS network shall consist of the facility information network (FIN), the process information network (PIN), and the DCS WAN, consisting of the district information network (DIN).
- B. Remote network is a network other than a DCS network. A DCS network shall not be directly connected to a remote network.
- C. DCS LAN: Consists of two elements, the FIN and the PIN.
  - 1. FIN: Fiber network connecting root switches to fan-out switches.
  - 2. PIN: Category 6 cabling between fan-out switches and DCS drops.
- D. DCS WAN (DIN): Inter-plant-wide area network (provided by City COMNET group).
- E. Business network Ethernet TCP/IP communication network (provided by City), which is also a remote network.
- F. City intranet is a remote network.
- G. Internet is a remote network.
- H. Wireless networks are defined as remote networks.

1.02 RELATED SECTIONS

- A. The Work described in the following sections also applies to the Work in this section. Other sections of the specifications not referenced below shall also apply to the extent required for proper performance of this Work.
  - 1. Division 01, General Requirements.
  - 2. Division 26, Electrical.
  - 3. Division 40, Process Interconnections.
- B. Codes and Standards: The Work shall comply with the current editions of the publication and codes as adopted by the City of San Diego.

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1.03 REQUIREMENT

- A. The DCSP shall interface all DCS components to the DCS LAN at Project plant, which is designed by the design Engineer and installed by others, under Division 26, Electrical.
- B. Assumptions made for the Work involved in this section include:
  - 1. Each DCS LAN communications network shall be capable of Gbit/sec Ethernet communications system linking all DCS stations.
  - 2. DCSP shall coordinate with City for IP address assignments.
  - 3. Cabling shall be provided, installed, and tested as specified.

1.04 SUBMITTALS

- A. The DCSP shall submit six hard copies and one soft copy (CD/DVD) of detailed proposed final LAN design diagrams detailing network components, hardware, interfaces, etc. in accordance with Section 01 33 00, Submittal Procedures.
- B. Based on the design Engineer's network design, the DCSP shall develop and submit six hard copies and one soft copy (CD/DVD) of a link budget evaluation that calculates the total loss suffered by a transmitted signal across the various components and fiber channels with reference to the minimum receiver power required to maintain normal operation. The purpose of this submittal is to verify adequacy of network design and memorialize the expected signal budgets. The link budget for all point-to-point transmissions shall include the following parameters:
  - 1. The minimum transmit power guaranteed (minTx), expressed in dBm.
  - 2. The minimum receive power required (minRx), expressed in dBm.
  - 3. The loss of optical connectors and adapters (L), expressed in dBm.
  - 4. The number of connectors and adapters (n).
  - 5. The normalized fiber loss (FL), expressed in dB/km.
  - 6. The reach or distance to be achieved (d), expressed in km.
  - 7. The link budget and loss shall be calculated as follows:
    - a. Link Budget in dB (LB) = (minTx)-(minRx).
    - b. The total loss (TL) suffered by the transmitted signal along the given link, in dB: (TL) = n\*(L) +d\*(FL).
    - c. Any amplifier gain or dispersion unit loss shall be taken into account in the calculations.

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1.05 CODES AND REGULATORY REQUIREMENTS

- A. Each communication network has been designed around the International Standards Organization's open system interconnection (OSI) model, IEEE 802.3 industry standards, and support a hierarchical communications network.
- B. All Work shall comply with:
  - 1. ISO/IEC 11801:2000.
  - 2. ISO/IEC 15802-3:1998.
  - 3. ISO/IEC 17799:2005.
  - 4. ANSI/EIA/TIA-568-B.

1.06 DEFINITIONS

- A. Definitions of acronyms are identified in Section 40 90 05, Definitions.

**PART 2 PRODUCTS**

2.01 NETWORK ELEMENTS

- A. All network elements shall consist of routers and switches, provided by the DCSP from a single vendor.
- B. Network Elements shall be compliant with industrial standards for network managed network elements in harsh environments. This includes the following characteristics:
  - 1. Tolerance to high EMI/RFI.
  - 2. Tolerance to temperature ranges from 0 degree C to 50 degrees C.
  - 3. Tolerance to 95 percent relative humidity, noncondensing.
  - 4. Tolerance to electrical power voltage variations.
  - 5. Tolerance to vibration and physical shock.
  - 6. Supports DIN rail mounting or rack mounting.
  - 7. Powered by 24V dc.
  - 8. Network elements shall support security features such as authentication, authorization, and auditing. Security shall include password protection and access control lists. Network elements shall be capable of port disabling.
  - 9. Network elements shall support a browser based administration. Network administrators shall be able to log in to the network elements and provision the network elements.

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2.02 FIBER OPTIC PATCH PANELS

- A. Fiber optic patch panels shall be provided by the DCSP, wall or rack mountable, and designed to provide termination facilities for 24 fibers. Fiber optic patch panels used shall match the existing Enterprise-wide DCS installations wherever possible. Existing patch panels are the products of AT&T and Corning, or approved equal.

2.03 NETWORK SWITCHES AND ROUTERS

- A. The DCSP shall use industrial network switches and routers from Cisco and the DCSP shall guarantee the performance based on its choice of switch or router model. If possible the switches and routers selected shall match that of the existing Enterprise DCS, or shall be of a family that is a successor to the switches originally used. Switches and routers shall be fully backwards compatible with the existing network and network hardware.
- B. All switches shall have an IP address on the network. IP addressing scheme will be provided by City COMNET Group to the DCSP, at time of network setup.
- C. All switches and routers shall provide built-in support for SNMP.
- D. All fan-out switches shall support fiber links to the root switches via SFP hardware.
- E. Multicast traffic shall be allowed on all switches on the DCSLAN.
- F. Port status shall be visible on LEDs.
- G. External media converters shall not be used between root and fan-out switches.

**PART 3 EXECUTION**

3.01 DCSLAN

- A. The Design Engineer has designed each DCSLAN for each plant process segment to support the performance requirements and operating characteristics of the DCS. However, it is the responsibility of the DCSP to verify functionality of the DCSLAN and shall immediately notify the Prime Contractor and the City's representative of all operational problems found on the DCSLAN.

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- B. The DCSLAN shall consist of a dual redundant communications network at each facility.
- C. The DCSLAN shall facilitate communications between devices using fiber optic and Cat 6 cables.
- D. Each networked DCS device shall be dual ported onto the DCSLAN.
- E. The DCSLAN, in its installed configuration, shall be fault tolerant.
- F. The DCSLAN provides connectivity between the WSSs, PCMs, RIOs, and facility historian system (FHS) to enable the timely update and archiving of process information and timely control response.
  - 1. To provide support of FHS, the DCSP will provide exterior-mounted Data Jacks on each PCM and RIO cabinet, as a minimum, as specified elsewhere in these documents. Based on process functionality, or safety considerations, the design Engineer may have added additional data jacks to support FHS, which are shown on Drawings.
  - 2. Each data jack will be wired back to the nearest port on the appropriate data highway/LAN network switch. Cat 6 LAN cabling shall be provided and installed by others, under Division 26, Electrical.
- G. The DCSLAN designs, and associated documentation, provide the configuration and equipment inventory requirements of a fully dual redundant Ethernet network for all process segments, which shall operate independently of the other plants LANs.
- H. VLANs shall conform to standard IEEE 802.1Q.
- I. VLAN designs segment traffic onto the appropriate VLAN. VLANs are independent from each other, in particular, with regards to bandwidth control and segmentation. Typical traffic segmentation strategies include defining VLANs and traffic priority schemes. Other VLANs and network traffic prioritization schemes can be defined for administration traffic and operational traffic. Operational traffic may be further subdivided into file transfer traffic (backups) and non-file transfer traffic. Non-FTP traffic shall include VLANs to support applications such as trouble ticket, work management, and other operational applications. Network design shall provide traffic segmentation and prioritization capabilities to support work cells, where required by Specifications.
- J. Classic DMZ network design uses firewalls to isolate the DCS network from remote networks.

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- K. Network design shall use standard Cat 6 cables or fiber optic cables for links between Network Elements as specified in the TIA/EIA 568-B set of standards. Cat 6 and fiber optic link cables are provided and installed by others, under Division 26, Electrical.
- L. All network devices shall be included in the sizing calculations of the UPS systems. All network devices shall be powered and backed up by DCSP-supplied UPS systems provided under Division 40, Process Interconnections, and installed by others in Division 26, Electrical.
- M. Laminated plastic nameplates conforming to standard ASTM D709 shall be provided for all network hardware. Nameplates shall include the function, network address, and identifier (ISA tag) of the device.
- N. PCM Data Highway Performance:
  - 1. Networks are designed with due consideration for quality of services (QoS), bandwidth, latency, and high performance within a plant automation application.
  - 2. LAN networks shall be robust, scalable, secure, and manageable; and must provide high availability (24 by 7 by 365) for single points of failure.
  - 3. Communication speed shall be capable of 1.0 Gbit/second.
  - 4. Operating Length: 6,000 feet, minimum.
  - 5. Stations Supported per Highway: 256, minimum.
  - 6. Time Synchronization interval shall be every 1 minute, minimum, using multicast messaging.
- O. Redundancy and Reliability:
  - 1. The network design supports a network topology design that is fault tolerant. Fault tolerance shall be defined as 99.999 percent system uptime of critical network equipment consisting of the network backbone and associated servers.
  - 2. The design is to ensure continuing communications between servers and workstations (WSs) under any of the following conditions:
    - a. A port on a network adapter fails.
    - b. A network cable fails.
    - c. A port on a switch fails.
    - d. A switch fails.
  - 3. Communications system are fully redundant; no single failure of communications component results in loss of communications to any DCS station.

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4. Redundant Components: Including, but not limited to, communications controllers, modems, power supplies, data highway cables, and cable connectors.
5. The DCSLAN design shall incorporate automatic detection of communications system component failure.
6. The DCSLAN design shall incorporate automatic switchover from failed communications system component to backup component without any interruptions to normal operations.
7. The DCSLAN shall alarm switchover and identify the failed component in alarm message to the NMS.
8. Communication system shall not be affected by connection, disconnection, and failure of DCS distributed processing stations (PCMs).

P. Network Elements Performance Requirements:

1. Network elements shall be able to monitor and alarm for network performance.
2. Excessive loss of packets and elevated network congestion issues shall be alarmed via standard network administration protocols such as SNMP. Network congestion, loss of packets, CRC errors, collisions, IGMP Snooping, defective frames, and the number of packets sent/received and other QoS levels shall be defined for various traffic types.

3.02 DCSWAN

- A. The DCSWAN shall be provided by the City COMNET Group.

3.03 INDIVIDUAL FACILITIES

A. Treatment Plant Communications:

1. The new design includes all process segments of the plant on one physical LAN.
2. Fiber optic cables in support of the LANs are routed in separate new conduits, raceways, or duct banks.
3. Redundant paths are provided in separate conduit so as to provide no single point of network failure in the event of a cable strike, or failure.

**END OF SECTION**



**SECTION 40 96 00**  
**APPLICATIONS SOFTWARE**

**PART 1 GENERAL**

**1.01 WORK INCLUDED**

- A. The DCSP shall design, develop, and start up the DCS application process control software.
- B. The Work of this section shall include:
  - 1. Project management and revision control.
  - 2. Applications software workshop, if and when required by City's representative.
  - 3. Applications software submittals.
  - 4. Applications software development.
  - 5. Software testing.
  - 6. Software installation.
  - 7. Startup.
- C. All application software developed for this Project shall fully conform with and be integrated into the existing Enterprise-wide COMNET DCS. New application software development shall follow, as closely as possible, the control scheme application software of the existing system(s).
- D. The DCSP shall provide all loop tuning and software modifications employed throughout the startup and testing period with actual process to provide operation exhibiting stable and controllable response to all process changes, steady state operation, and alteration of control parameters such as set point, with robust and fault tolerant functionality, all in accordance with the requirements of these Specifications.
- E. All application software developed for this Project shall follow the best practices for designing control as defined in Emerson's "Control Builder User Guide for Ovation" documentation.
- F. All application software developed by DCSP for the City's DCS becomes the property of City of San Diego and may be modified, deleted, copied, and reused for other functions or in other drops or other plants. The City will not retransmit any application software beyond the exclusive use in the COMNET DCS.

1.02 RELATED SECTIONS

- A. The Work described in the following sections also applies to the Work in this section. Other sections of the specifications not referenced below shall also apply to the extent required for proper performance of this Work.
  - 1. Division 01, General Requirements.
  - 2. Division 26, Electrical.
  - 3. Division 40, Process Interconnections.
- B. Codes and Standards: The Work shall comply with the current editions of the publication and codes as adopted by the City of San Diego.

1.03 DIVISION OF WORK

- A. The DCSP shall provide and implement the applications software required to complete the Work.
- B. The DCSP shall have overall system responsibility and shall provide all Work necessary to satisfy all requirements of this and related sections.
- C. Software of this section at a minimum shall include software, programming and configuration of: PCM control code, graphics code, trend groups and reports.
- D. Definition of Software Types:
  - 1. Standard Software: Software packages that are independent of the project on which they are used. Standard software includes system software and process monitoring and control software.
    - a. System Software: Application independent software developed by Microsoft. Includes, but is not limited to Microsoft operating systems, file management utilities, text editors, debugging aids, and diagnostics.
    - b. DCS Software (DCSS): Software packages independent of the specific process control project on which they are used. Includes, but is not limited to, providing capability for, data acquisition, monitoring, alarming, human-machine interface (HMI), data collection, data retrieval, trending, report generation, control, and diagnostics.
  - 2. Application Software:
    - a. Software to provide functions unique to this Work and that are not provided by standard software alone.
    - b. Configuring databases, tables, displays, reports, parameter lists ladder logic, and control strategies required to implement functions unique to this Project.

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1.04 WORK SEQUENCE AND SCHEDULE

- A. DCSP shall integrate all elements of this section to their P6 fragnet schedule and integrate this schedule information into the Prime DCSPs master baseline schedule.

1.05 CODES AND REGULATORY REQUIREMENTS

- A. City of San Diego, COMNET Graphic Display Standards, 1995.

1.06 PREREQUISITES FOR SOFTWARE DEVELOPMENT

- A. Process and Instrumentation Diagrams (P&IDs): DCSP shall use P&ID drawings developed by the design Engineer. Should the DCSP determine errors or omissions in the P&IDs that would affect software development schedules, he shall immediately notify the City's representative and the Prime DCSP. DCSP shall keep diligent red-line markups of all P&ID modifications, additions or clarifications.
- B. Loop Diagrams and Specifications: DCSP shall use loop drawings developed by the General Contractor. However, the DCSP is responsible for providing DCS-level details e.g., I/O termination identification, software level addresses, etc., to the design Engineer to allow him to finalize the Project as-constructed loop drawings.
- C. Fully Attributed I/O Lists and Attributed Control Narratives: DCSP shall annotate and attribute the design Engineer's I/O list, and shall annotate design Engineer's control narratives with all assumptions, corrections and changes, for each process segment of the Project. The DCSP shall maintain red-line markups of all changes to facilitate final as-constructed documentation.
- D. Control Strategies: The DCSP shall review project control strategies for completeness. Should the DCSP find any errors or omissions, or have questions as to functionality, he shall immediately notify the City's representative.
- E. The DCSP shall develop process graphics descriptions for all graphics programming, for all process segments, as part of the software submittal(s) for that process segment. The DCSP shall ensure that new graphics development conforms with existing COMNET DCS standards and will function with, and be integrated onto, the existing Enterprise wide DCS.
  - 1. At a minimum, the process graphics descriptions will include:
    - a. Graphic hierarchy.
    - b. Navigation/paging.
    - c. Operator inputs and control templates.

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- d. Action buttons and menus.
  - e. Color coding, alarming, background fills, animation.
2. New graphics developed for the Metropolitan Biosolids Center will maintain the existing DCS standards and will not be updated to the new graphic standards used at the City's other facilities.

1.07 SOFTWARE DESIGN WORKSHOPS

- A. DCSP may request software design workshops for the work in this section on a process area by process area basis to clarify any questions or confirm compliance with City DCS standards. Should the DCSP require workshops, they shall submit the request through their Prime DCSP to be processed through the City's representative.

1.08 DCS SOFTWARE SUBMITTALS

- A. The DCS software submittal (DCSSS) shall be singular and all inclusive, submitted in accordance with Section 01 33 00, Submittal Procedures. The DCSSS shall include, but not be limited to:
- 1. The DCSP shall provide all Submittals in accordance with Section 01 33 00, Submittal Procedures. DCSP shall provide six hard copies and one soft copy (CD/DVD) of all submittals.
  - 2. Logic Diagrams: The DCSP shall develop and submit logic diagrams for all new PCM codes for City's representative approval. Diagrams shall be organized and bundled in a way that facilitates optimum review by the City's representative. All PCM codes shall be annotated with comments.
  - 3. Graphic Diagrams: An English narrative of each data acquisition or control loop mission and anticipated action. Narratives shall enumerate the signal point name, signal descriptor, associated PCM number, associated system template displays, system functions activated by signal (i.e., interlocks, alarms, logs, etc.).
  - 4. I/O Database: The DCSP shall develop and submit a fully attributed I/O database. The I/O database shall be organized and bundled in a way that facilitates optimum review by the City. The complete listing of the DCS database shall list each data point's relevant parameters such as range, contact orientation, limits, incremental limits, I/O card type, I/O hardware address and assignment as minimum.
  - 5. Reports: The DCSP shall document and submit all reports being developed units this Contract.
  - 6. PCM Software Standards: The DCSP shall develop PCM software standards based on the function blocks listed in this section.

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7. DCS Standards: The DCSP shall use the existing City COMNET software standards to the greatest degree possible.
8. A complete set of PCM configuration sheets depicting each loop linkage. Each loop shall be on its own 11 inch by 17-inch sheet.

1.09 DCS GRAPHIC SUBMITTAL

- A. The DCS graphic submittal (DCSGS) shall be singular and all-inclusive, submitted in accordance with Section 01 33 00, Submittal Procedures. The DCSGS shall include, but not be limited to:
  1. One complete set of all WS-accessible displays which are unique to this Project (i.e., process global, system global, process regional, systems regional, process group, process loop, process component, integrated tutorials, integrated process tutorials, integrated documentation, user assistance.)
  2. The DCSP shall ensure that all graphics development, and graphics submittal, conform to the existing graphics layouts, linkages and formats used throughout the COMNET Enterprise.
  3. DCSGSs shall contain displays in full size color graphic format and replicate the proposed screen contents. All background colors shall be identical to that of the screen content. All displays shall be arranged in a hierarchical order with references to associated WSs.
  4. A system display linkage diagram which defines the hierarchical order and the linkages via page, down, left, right commands.
  5. A definition of each display's data fields by tag numbers, using City's standard.
  6. A definition of each display's dynamic elements which shall blink, change color, rotate or change shape in response to process changes, and conforms to the City's standard.
  7. A listing of all "help" text associated with each display screen, arranges in conformance to the City's standard.

**PART 2 PRODUCTS**

2.01 PCM APPLICATION SOFTWARE DESIGN CRITERIA

- A. PCM Program Design:
  1. DCSP shall develop and submit PCM application software in strict accordance with these requirements and following existing City COMNET software standards.
  2. The PCM shall be used to provide each process segment automatic control, alarm functions, and continuous loop control. Specific PCM functional requirements are described in the control narratives of source code for the current system provided as part of the Contract Document.

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3. The DCSP shall organize the PCM application software into:
  - a. Sections:
    - 1) Contains all logic for a specific unit operation.
    - 2) Each section consists of a general logic subsections and, followed by unit operation subsections.
    - 3) Subsections: Contains logic for specific equipment such as a pump, valve or loop.
  - b. Functional Blocks:
    - 1) Building block for pumps, valves, loop control, analog processing, and alarm switches.
    - 2) Requirements for standard DCS/PCM function blocks to be provided are specified herein.
4. Program Documentation:
  - a. Note and describe start of a new program section.
  - b. Briefly describe control objectives.
  - c. Identify subsections.
  - d. Subsection documentation includes brief description of control objective followed by a description and tag of the equipment being controlled.
5. The DCSP shall provide an organizational index for PCM applications software that can be used to quickly search and locate a specific process section.

B. Program Flow Diagram:

1. Develop program flow diagrams (PFDs) showing software sections, subsections and functions blocks, subprograms, and their interrelationships. Provide written description of each section subsection and function block that will be used in the actual program.
2. PFD for each analog loop and PID loop configuration to include written descriptions of setpoint ramps, loop initialization, interface with DCS, etc.
3. PFD submittals shall follow SAMA Standards.

2.02 DCS APPLICATION SOFTWARE DESIGN REQUIREMENTS

A. General:

1. DCSP shall develop and submit PCM application software in strict accordance with these requirements, and conforming as closely as possible with existing City COMNET standards.

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2. The DCSP shall develop the DCS design to convey accurate information to the plant operations staff so they can make informed process control decisions and provide the platform to execute the control decisions.
  3. The following outlines key objectives in designing the DCS graphics displays:
    - a. New graphics will be developed with the application of Graphic User Groups.
    - b. Graphic user groups will consist of representatives from the City operations/management staff, COMNET engineers, design engineers (optional) and qualified graphic experts representing the DCSP.
    - c. Additional members may be included as required.
    - d. Established formats, look and feel will be followed unless re-designed by the graphic user group.
- B. General Display Organizational Philosophy: Graphic displays provide the vehicle for Operations to accomplish supervisory control over the entire treatment process. Organization of these graphics displays into a consistent homogeneous hierarchy that permits fast, easy and intuitive navigation between the displays is essential for plan operations. The DCSP shall use its standard graphic and library together with existing City COMNET displays and standards to generate the new displays for the DCS.

2.03 DCS/PCM I/O DATABASE

- A. DCS/PCM I/O Database:
1. The DCSP shall provide a database tool that has the following functions:
    - a. Coordinate, manage and document all PCM points.
    - b. Access to all database points and attributes (including live data) shall be accessible and maintainable thru standard query language.
    - c. A comprehensive database listing shall be provided that contains the following as minimum: Point tag, English description, set/reset descriptions, limits, engineering units, wire tag designations to be used on loop diagrams and when landing I/O wires in PCM cabinets, alarm priorities, alarm limits, alarm delays, alarm cutout points, hardware addresses, third-party I/O linkage details including protocols and addressing packed group point usage and descriptions, point origination.
- B. Configuring the DCS Controller: The DCS controller shall be configured from an EWS using a standard Emerson Process Management (EPM) studio, DCS controller configuration shall conform to City COMNET standards and shall integrate into the existing Enterprise-wide COMNET DCS.

2.04 TOTALIZATION REQUIREMENTS

- A. DCSP shall provide diagnostic totalization for all field assets and DCS components, in accordance with existing COMNET DCS standards. Totalization may include:
1. All runtimes and start/stops for rotating equipment greater than 5 hp including, but not limited to: Pumps, conveyers, augers, fans, blowers, and rakes.
  2. All successful open/closes of all motor operated valves, gates and other mission critical valves.
  3. The runtime for each DCS components and UPS.
  4. Accumulated analog values of power monitoring for all UPS, switchgear and motor control centers where said devices are capable of interfacing to DCS.
  5. Totalization code shall be resident in the PCM in which the I/O is attached.
  6. A reset of the totalization shall only be initiated by authorized personnel.
  7. Each totalizer IO value shall be attributed with the asset ID associated with the piece of equipment.
  8. Totalization accumulations shall be based on EWS input ranging between 1 minute and 1 year.
- B. At a minimum, upon totalization reset, the previous total shall be recorded in the historian.

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**



**SECTION 40 98 00**  
**PROJECT MANAGEMENT SERVICES**

**PART 1 GENERAL**

1.01 REQUIREMENTS

- A. The Work of the DCS requires all project management services to complete the tasks specified in these RFP documents for the Project.
- B. Notwithstanding the requirements of the Contracts Documents the DCSPs Project Manager and representatives shall perform the Work of this section.

1.02 REFERENCES

- A. The Work described in the following sections also applies to the Work in this section. Other sections of the specifications not referenced below shall also apply to the extent required for proper performance of this Work.
  - 1. Division 01, General Requirements.
  - 2. Division 26, Electrical.
  - 3. Division 40, Process Interconnections.
- B. Codes and Standards: The Work shall comply with the current editions of the publication and codes as adopted by the City of San Diego.

1.03 SPECIFICATIONS

- A. Definitions:
  - 1. Definitions of acronyms are identified in Division 40, Process Interconnections.
  - 2. A DCSP Project Manager and the team shall be established and shall be comprised of personnel who are familiar with this type of DCS work and the existing City Enterprise-wide DCS. The PM and the team shall oversee the design, implementation, construction, and support of the DCS Work.
  - 3. Project Manager (PM) and the team shall perform the necessary DCSP project management services to ensure that the DCS provided under this contract is fully functional in accordance with Contract requirements, and works seamlessly integrating into the City's Enterprise-wide COMNET DCS.

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4. Process Segments: The implementation of this project may include multiple process segments comprising the overall Distributive Control System for this portion of the Project. Each process segment may require separate engineering design(s), design approvals, procurement, staging, programming/configuration, readiness testing, and installation, and commissioning of the DCS at the Project site.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 PROJECT MANAGEMENT

- A. The DCSP shall provide a Project Manager to perform the necessary project management services. The DCSP shall provide all project management services required to complete the DCS Work specified in these documents. DCSP Project Management and administrative services shall be performed at the approved staging site and Project site, as required. The required minimal project management services are defined in the following sections.

3.02 PROJECT COMMUNICATIONS

- A. Communications Structure:
  1. A communication structure and escalation procedure will be developed between the DCSP, Prime Contractor and the City as part of the Prime Contract.
  2. The DCS Project Manager (PM) will coordinate and communicate project activities with the Contractor and City's representative.
  3. The PM shall coordinate new DCS upgrades, as well as existing DCS modifications (when specified) with the City's representative and Plant staff.
  4. The PM shall have strong verbal and written communication skills and be fluent in English.

3.03 PROJECT SCHEDULE

- A. The DCS Work of the process segments shall be initiated and completed in accordance with the Contractors Master Baseline Schedule, as required by Division 01, General Requirements.
- B. The DCSP shall develop within their P6 fragnet schedule, sufficient granularity, inclusive of goals, internal DCSP milestones and contractual milestones to demonstrate proper schedule coordination with the Contractors Master Schedule.

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3.04 PM TASKS

- A. The DCSP shall take full responsibility for DCS-related project management services required to meet the requirements of the RFP documents. At a minimum, the DCSP shall perform the tasks below as required by the Work:
1. Regular coordination meetings with the Contractor and City's representative review progress, as scheduled by the Contractor.
  2. The DCSP shall provide weekly status reports to the Contractor, depicting DCS development and readiness, through the construction phase of the project.
  3. Project delivery plan (PDP), which defines the overall delivery of each process segment of the Project. The PDP shall include the following items:
    - a. Delivery philosophy.
    - b. Control system architecture, device networks, local networks and communications interfaces.
    - c. Design approach.
    - d. Software development and testing criteria.
    - e. Procurement plan.
    - f. Construction coordination plan.
    - g. Document management and revision control strategy.
    - h. Communication network plan.
    - i. FAT, field testing, (including ORT) startup and commissioning plan.
    - j. Operations and maintenance manual criteria.
    - k. Training requirements criteria.
    - l. Health and safety plan.
    - m. QA/QC plan requirements.
  4. Scheduling: The DCSP shall be responsible for updating the DCS portion of the project schedule as necessary.
  5. Schedule of values/detailed cost breakdown.
  6. Scheduling of training.
  7. Invoicing to Contractor, on a monthly schedule.
  8. The DCSP shall execute periodic quality reviews of delivery of the DCS, including management QA/QC and delivery of:
    - a. Record management and document control.
    - b. Testing records.
    - c. Acceptance records.
    - d. Inspection records.
    - e. Maintenance records.
  9. Prepare outage requests forms or plant permits as required.
  10. Prepare and provide operation and maintenance manuals.

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3.05 PROJECT IMPLEMENTATION

- A. General: Project implementation is generally defined as the actual implementation of the Work required under the Contract. During the implementation of each of the five segments, the DCSP is required to fulfill a number of project management requirements. The delivery of each segment shall be based on four phases, including the engineering/design phase, procurement, staging, programming and testing phase, field construction/commissioning phase, maintenance phase. It is expected that the phases for each segment will be performed in order as identified below. The following project management services are required to be performed by the DCSP for each of the five segments.
- B. Engineering/Design Phase:
1. In the engineering/design phase, the DCSP shall complete the detailed design of the DCS as specified in the contract documents. The DCSP is also responsible for the following project management services during the engineering and design phase:
    - a. The DCSP shall coordinate all activities related to the DCS design of the Project.
    - b. The DCSP shall review and confirm requirements as necessary with the Prime Contractor and the City's representative.
- C. Procurement, Staging, Programming and Testing Phase:
1. In the procurement, staging, programming and testing phase, the DCSP shall procure the equipment required in the final design documents and stage the system at the approved staging site. Project management services related to these activities include, but are not limited to:
    - a. The DCSP shall coordinate and schedule the procurement, delivery and storage of all required equipment and materials on a timely basis.
    - b. Procurement of hardware and software shall be based upon requirements defined within these Project Specifications and refined during the engineering/design phase.
    - c. Procurement schedules shall be communicated to the Prime Contractor and the City's representative.
    - d. The DCSP shall be responsible for the development of the approved staging area.
    - e. The DCSP shall be responsible for all permitting activities related to the staging area construction, if any.

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- f. The DCSP shall coordinate the moving and storage of all materials between manufacturing site and staging area and between the staging area and the Project Site. DCSP shall be responsible for coordinating delivery of DCS components at Site with the Prime Contractor.
- g. The City's representative and the Prime Contractor shall be provided the opportunity to inspect inventory and staging set-up.
- h. DCSP shall manage all licensed software and the development of all controls, graphics, and database programming and DCS configuration.
- i. Factory acceptance testing (FAT) shall be witnessed and signed-off by the City's representative prior to installation of the system.

D. Field Construction/Commissioning Phase:

- 1. In the field construction/commissioning phase, the DCSP shall coordinate installation, construction, and commissioning activities of all DCS-related components in accordance with these Specifications. Project management services related to these activities include:
  - a. The DCSP shall coordinate the overall sequence and schedule of control systems construction and installation.
  - b. The DCSP shall coordinate and participate in preconstruction safety conference, and shall adhere to the Prime Contractor's safety plan at all times.
  - c. The DCSP shall coordinate the ORT, system, software and performance testing.
  - d. The DCSP shall establish a health and safety plan for construction activities which adheres to the Prime Contractor's safety plan as well as the City's safety standards.
  - e. The DCSP shall perform loop check and commissioning activities. The DCSP shall be responsible for manning all PCM locations, main control room(s) and workstation locating in performance of loop testing. The Prime Contractor shall be responsible for coordinating and manning at all field device, instruments and foreign device (skid-mounted and package system) in support of loop testing.
  - f. The DCSP shall coordinate system cutover and outage requests and permits, as related to DCS operation.
  - g. City's representative shall be provided the opportunity to inspect system installation prior to cutover.

E. Maintenance Phase:

- 1. In the maintenance phase, the DCSP shall provide ongoing support services and warranty repair in accordance with Division 01 of the Contract.
- 2. The DCSP shall establish warranty and maintenance procedures to meet operations and maintenance criteria of the plant.

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3. The DCSP shall coordinate operations and maintenance activities with City's representative and plant operations staff.
4. The DCSP shall monitor system performance and perform corrective maintenance as required.
5. The DCSP shall provide warranty service reports to the City's representative or City COMNET staff, within 48 hours of the completion of each service or warranty event.

**END OF SECTION**

**SECTION 40 98 01**  
**ENGINEERING AND DESIGN SERVICES**

**PART 1 GENERAL**

1.01 SUBMITTALS

- A. The DCSP shall take full responsibility for developing an approved DCS design that meets the Specifications set forth in these Contract Documents. The hardware and software design shall be developed by the DCSP and submitted using a submittal review process in accordance with Section 01 33 00, Submittal Procedures.
- B. The DCSP shall group or arrange submittals in a methodical and logical fashion such that the City's representative and design engineers have all the required information to perform its review. For example, grouping of all hardware including workstations, PCM, field cabinets, networking and the like, for a process area, would be acceptable.
- C. The DCSP shall develop a complete list of all submittals (technical and administrative) required by all Contract Documents for all process segments in accordance with the Prime Contractor schedule requirements of the Contract.
- D. The DCSP shall plan for a pre-submittal conference to finalize the needs of the City's representative and design engineers to eliminate as much rework as possible. DCSP shall present an outline and samples of the proposed submission to the City's representative in this conference.
- E. The DCSP shall provide adequate time in their schedule to accommodate the review of the City's representative and any and all resubmittals.
- F. Loop Diagram Submittals:
  - 1. Loop Diagrams: The preparation of loop diagrams is the responsibility of the Contractor. However, the DCSP is responsible for providing to the Contractor all the DCS-level information, including termination designation, software addressing levels, I/O card assignments, etc. on a timely basis to facilitate development of these documents. DCSP portions of the loop diagrams shall be submitted in accordance with Section 01 33 00, Submittal Procedures.
  - 2. In addition to other DCS-related construction level as-built drawings, DCSP shall be responsible for providing red-line mark-ups of the loop diagrams and P&IDs, as required. Red-line mark-ups shall be provided on a timely basis to allow Engineers and Contractor time to finalize as-built documentation.

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1.02 RELATED SECTIONS

- A. The Work described in the following sections also applies to the Work in this section. Other sections of the specifications not referenced below shall also apply to the extent required for proper performance of this Work.
1. Division 01, General Requirements.
  2. Division 26, Electrical.
  3. Division 40, Process Interconnections.
- B. Codes and Standards: The Work shall comply with the current editions of the publication and codes as adopted by the City of San Diego.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 ENGINEERING AND DESIGN TASKS

- A. The list below is intended to be used as a guide for DCSP and not intended to be all-inclusive and complete. At a minimum, DCSP shall perform the tasks below as required by the Work:
1. Workshop participation; as may be required for development of software, operations training, special maintenance requirements, etc.
  2. Submittals (Refer to Division 40, Process Interconnections, and Section 01 33 00, Submittal Procedures).
  3. Develop and submit DCS-PCM-related termination information.
  4. Develop and submit DCS-related portions of loop drawings.
  5. Develop and submit DCS-related portions of P&IDs.
  6. Develop and submit mounting details for all DCS equipment, including seismic calculations and certifications.
  7. Civil design, if and when required.
  8. Structural design, if and when required.
  9. Electrical design requirements for DCS-related equipment.
  10. Mechanical design requirements for DCS-related equipment.
  11. Develop and submit control system block design.
  12. DCS design.
  13. Work scopes for DCS-related subcontractors.
  14. Historian format designs, if and when specified.
  15. I/O database design including point attributes.
  16. Technical calculations.
  17. Control strategy review and functional verification.
  18. Control strategy programming.
  19. Graphic design workshops, and graphics development.
  20. System security design.



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21. Red-line markups of all As-built documents.
22. As-built documentation updated red-lines during construction.
23. Review and coordinate all submittals from DCSP subcontractor.
24. Coordinate information among DCSP and Prime Contractor subcontractors' submittals.
25. Coordinate panel drawing design.
26. Develop and submit panel drawings.
27. Approved staging area design and build-out.
28. DCSP staging area equipment and furniture.

3.02 DCSP QA/QC AND DESIGN ASSISTANCE REQUIREMENTS

- A. As the DCSP is operating under and 'assigned subcontractor', 'sole-source provider' arrangement with the City, various items of quality control and of design assistance to the project design engineers is required of the DCSP. Some, but not all, of the assistance items required of the DCSP are as follows:
1. The DCSP shall be responsible for thorough review of the project design documents, annotating any DCS related errors, omissions, size conflicts, environmental difficulties, etc. and so notifying the Project design engineer on a timely basis.
  2. The DCSP may be called upon by the City, or the design engineers to participate in RFI responses related to the DCS or I&C-related questions posed by other subcontractors. The DCSP shall provide immediate responses to such RFIs.
  3. The DCSP may be called upon by the design engineers to provide technical detail, review and/or approval of designs being executed via change-order to the Project. DCSP shall promptly provide such services.
  4. During the course of construction, the DCSP shall have their field engineers verify various aspects of installation are being installed within the Project specification and DCS manufacturer's requirements. This is particularly true of I/O and fiber optic conduit, raceway or duct bank installation, conduit cabinet entrance locations, physical obstructions to the DCS and environmental requirements. Inspection and notification requirements are stated throughout Division 40, Process Interconnections Specifications.
  5. The DCSP shall verify that special DCS grounding requirements and installation, as specified in Division 40, Process Interconnections are performed correctly and in accordance with the Specifications and DCS manufacturer's requirements.

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6. The DCSP shall verify that the UPS provided under the DCS portion of the Contract, but install by others under Division 26, Electrical, is placed, wired, installed and tested in accordance with Specifications and DCS manufacturer requirements.
  7. The DCSP shall be responsible for oversight of I/O wiring installation to ensure subcontractor does not combine conduits, or route dis-similar I/O wiring in common conduits e.g., analog I/O with discrete I/O.
  8. The DCSP shall be responsible for coordinating with package system suppliers or other foreign device manufacturer's equipment to ensure that data-links are installed correctly, communications protocols are coordinated, etc.
  9. The DCSP shall be responsible for oversight of all I/O wiring termination, being provided by others under Division 26, Electrical, to ensure that I/O wiring is tagged correctly, routed and dressed neatly and terminated on correct locations, at the DCS end I/O wiring only.
  10. Integration of new configuration across all multi-networked DCS installations.
  11. Field verification of existing installations to confirm proper engineering designs.
  12. Removal of logic, graphics, database, field wiring, and hardware related to changes in the design where these items will no longer be used, unless otherwise specified by the Statement of Work. Removal of abandoned graphics includes the down loaded source code on all workstations across all networks.
  13. All wiring that is abandoned in place will have to be tagged such that it is clear where the wiring originates. Likewise by the contractor that removes field instrumentation on the field side of the wiring.
  14. AI systems that have been removed but still have wiring abandoned in place shall have a notated loop diagram that shows what was removed. No data from the loop diagram shall be erased, rather it will be notated with the changes.
- B. The costs for all QA/QC engineering service above shall be borne solely by the DCSP under this assigned subcontract.

**END OF SECTION**

**SECTION 40 98 02**  
**PROCUREMENT, STAGING, PROGRAMMING**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Equipment: Tools, products, items, devices, or machines needed for the correct functioning of the DCS and its supporting systems.
- B. Materials: Materials are physical substances used as inputs to production or manufacturing of the DCS. The definition of materials also includes finished materials, which includes equipment.
- C. Procurement: DCSP manufactures DCS equipment and procures third-party equipment in accordance with contract documents.
- D. Staging: Approved site that receives shipments of equipment and materials to be set up or staged, used for programming all equipment as a system and for factory acceptance testing.
- E. Programming: Programming of all software systems.
- F. Testing: All testing required prior to shipping to each facility.

1.02 RELATED SECTIONS

- A. The Work described in the following sections also applies to the Work in this section. Other sections of the Specifications not referenced below shall also apply to the extent required for proper performance of this Work.
  - 1. Division 01, General Requirements.
  - 2. Division 26, Electrical.
  - 3. Division 40, Process Interconnections.
- B. Equipment, materials, etc. shall be certified as UL compliant.

1.03 PROCUREMENT

- A. The DCSP is responsible for procuring all materials related to the delivery of the Work.
- B. The DCSP shall coordinate procurement to meet the Project schedule and the needs of the City representative.

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- C. The manufacturer's standard equipment suitable for applicable service conditions shall be provided, unless otherwise specified in the individual Specifications.
- D. Like items of products furnished and installed in the Work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, manufacturer's services, and implement same or similar process instrumentation and control functions in same or similar manner.
- E. Interchangeable components of the same manufacturer shall be provided for similar components, unless otherwise specified.
- F. Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable OSHA, state, and local health and safety regulations.
- G. Coating materials shall meet federal, state, and local requirements limiting the emission of volatile organic compounds and for worker exposure.

1.04 PREPARATION FOR SHIPMENT

- A. Systems may be manufactured at remote facilities, but shall be assembled at the DCSP approved staging site. The DCSP shall:
  - 1. Mark or tag, using ISA tagging scheme, the separate parts and assemblies for field assembly.
  - 2. Cover machined and unpainted parts that may be damaged by elements with a strippable protective coating.
  - 3. Products shall be packaged or crated to provide protection from damage during shipping, handling, and storage.
  - 4. Packages and crates shall be marked or tagged to indicate its purchase order number, bill of lading number, contents by name, name of project, seller, equipment number, and approximate weight.
  - 5. Spare parts and special tools shall be delivered at same time as products delivery.
  - 6. Accessories shall be delivered at same time as products delivery.
  - 7. Accessories shall be furnished so that each item of equipment may be placed in full operation.
  - 8. Accessories include, but are not limited to, light bulbs/LEDs, fuses, enclosure keys, special tools, and other items as required for initial operation.
- B. Delivery of Products:
  - 1. Deliver products in accordance with accepted current Project schedule and coordinate to avoid conflict with the Work and conditions at Site.

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2. Deliver products in undamaged condition, in original container or packaging, with identifying labels intact and legible. Include on label, date of manufacture and shelf life, where applicable.
3. DCSP shall record receipt of products at the approved staging site, and upon receipt of products shall inspect for completeness and evidence of damage during shipment. Receipt and inventory of products must be witnessed by the City representative.
4. Should there appear to be damage, DCSP shall inform the City's representative and the project Prime Contractor and shall immediately make necessary arrangements to repair or replace the item.
5. DCSP shall expedite replacement of damaged, incomplete, or lost items, so as not to delay progress of the Work.

1.05 MOVING AND STORAGE OF EQUIPMENT

A. General:

1. The DCSP is responsible for the movement, as well as the safe storage, of all material from the factory, to the approved staging area and ultimately to its installed location. To adhere to this requirement, the DCSP must perform the following:
  - a. Unloading of Products: Unless otherwise specified, after acceptance by inspecting party products will be unloaded by DCSP in accordance with manufacturer's instructions.
  - b. Handling, Storage, and Protection:
    - 1) Products shall be handled and stored in accordance with manufacturer's written instructions and in a manner to prevent damage.
    - 2) Products shall be stored in an approved environment within the staging area and at each installation site.
    - 3) Storage shall be arranged in a manner to provide easy access for inspection.
    - 4) Periodic inspections of stored products shall be performed by the DCSP to assure that products are maintained under specified conditions, and free from damage or deterioration.
    - 5) A running account of products in storage shall be kept by the DCSP to facilitate inspection.
    - 6) Electrical, instrumentation, control products, and equipment containing bearings shall be stored in weather-tight structures maintained between 60 and 120 degrees F, with humidity control.
    - 7) Electrical, instrumentation, and control products, shall be protected and insulated against moisture, water, and dust damage.

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- 8) Products that are ready for installation shall be stored in dry and well-ventilated areas that are not subject to extreme changes in temperature or humidity.

1.06 DCS APPROVED STAGING SITE

- A. The proposed staging site shall be submitted to the City in accordance with Section 01 33 00, Submittal Procedures. The City shall approve the staging site in writing. The DCSP shall also perform project management, engineering, programming, assembly, testing and support services at the approved staging site.
- B. The DCSP shall be responsible for providing all utility power source, potable water (tap) and sanitary sewer services at the approved staging site. The DCSP shall bear the cost of power, water and sewer.
- C. The DCSP shall provide necessary tenant improvement for the approved staging site space, power/ground and acceptable environmental conditions.
- D. The DCSP shall be responsible for provide parking space for the DCSP staff City inspection staff. Where required, the DCSP shall pay for parking.
- E. The DCSP shall provide the necessary equipment at the staging site to perform the required programming, DCS setup, testing and support activities, furnish and build-out the staging site, and disassemble after Final Completion.
- F. FAT results shall be reviewed and accepted by the City's representative before systems are transported to the various sites for installation.
- G. The DCSP shall establish security measures, and pay all security costs, to protect the equipment at the approved staging. Prime Contractor shall be responsible for DCS security once transported to the Project Site.
- H. The staging site shall meet environmental requirements established in article Moving and Storage of Equipment of this Specification.
- I. The staging site shall be accessible to the appropriate DCSP, DCSP subcontractor, and City staff.
- J. The staging site shall adequately accommodate DCSP staff, storage of equipment, and setup of system for testing purposes in accordance with building codes, ADA requirements and OSHA requirements.

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- K. The staging site shall meet the City’s workplace safety requirements as well as the Prime Contractor’s safety plan.
1. The DCSP shall provide a plan and schedule for the construction and setup of the approved staging site.
  2. The DCSP shall provide lighting to meet applicable safety requirements to allow erection, application, or installation of materials and equipment, and observation or inspection of the Work.
  3. The DCSP shall make the necessary provisions to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified conditions for installation of materials, and to protect materials, equipment, and finishes from damage due to impact, temperature or humidity.
  4. The DCSP shall provide adequate forced air ventilation of enclosed areas to cure installed materials, to dispense humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases.
  5. The DCSP shall pay all costs of installation, maintenance, operation, removal, and fuel consumed at the approved staging area prior to transport and installation.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

**3.01 PROJECT DELIVERY SERVICES - PROCUREMENT AND STAGING**

- A. The DCSP shall take full responsibility for the procurement, delivery and staging of all equipment and materials required by these Contract Documents. The list below is intended to be used as a guide for DCSP and not intended to be all inclusive and complete. At a minimum, DCSP shall deliver the following to achieve a complete delivery, including procurement, staging, installation, testing, maintenance, upgrades and warranty, as required by the Work such as:
1. All COTS and DCSP software and firmware.
  2. All hardware for DCS.
  3. All DCS-related LAN and required network equipment.
  4. All UPS for all DCS and LAN equipment.
  5. All required cabinetry for DCS equipment.
  6. All DCS network connectivity.
  7. All DCS PCM-related cabling including copper, fiber optic, conduits, interducts, etc.
  8. All control system databases.
  9. All integration equipment.
  10. All security equipment.
  11. All specified spare parts and tools.

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3.02 PROGRAMMING

- A. The DCSP shall take full responsibility for the configuration and programming of all software, and firmware required by these Contract Documents. The list below is intended to be used as a guide for DCSP and not intended to be all-inclusive and complete. At a minimum, DCSP shall deliver the following to achieve a complete operating DCS:
1. All coordination of software development.
  2. All control strategy programming.
  3. All system software development and programming and configuration.
  4. All control system database programming.
  5. All integration to “other,” foreign device systems as required by these Specifications.
  6. All local historian configuration and programming, when and where specified.
  7. All security configuration and access programming.
  8. All graphics programming/ configuration.
  9. All trending and alarm configuration.
- B. All detailed programming requirements are specified in other sections.

**END OF SECTION**



**SECTION 40 98 03**  
**INSPECTION AND TESTING SERVICES**

**PART 1 GENERAL**

1.01 GENERAL

- A. The DCSP is responsible for all testing of all software and hardware and their operation together in project segments and the overall Enterprise-wide DCS, as a complete system.
- B. The DCSP is responsible for supplying all testing tools, such as operating systems and test software, testing tools, simulation hardware and software, and equipment.
- C. Inspections and tests shall be carried out to demonstrate that the Work complies with the requirements detailed in these specifications.
- D. Test results shall be measurable; the performance of the test object shall be clearly specified in terms of conditions, inputs, and outputs. The specification of the whole system or relevant part shall be the starting point in all cases.
- E. All testing must be accomplished in accordance with Division 01, General Requirements.

1.02 SUBMITTALS

- A. The DCSP shall develop and submit to the City's representative, test procedures for all testing required by these Contract Documents in accordance with Section 01 33 00, Submittal Procedures.

1.03 REFERENCES

- A. The Work described in the following sections also applies to the Work in this section. Other sections of the specifications not referenced below shall also apply to the extent required for proper performance of this Work.
  - 1. Division 01, General Requirements.
  - 2. Division 26, Electrical.
  - 3. Division 40, Process Interconnections.
- B. Codes and Standards: The Work shall comply with the current editions of the publication and codes as adopted by the City of San Diego.

**PART 2 PRODUCT**

2.01 TYPES OF INSPECTION AND TESTING

- A. The DCSP shall provide the following types of tests:
1. Factory acceptance testing (FAT).
  2. Operational readiness testing (ORT).
  3. Contractor functional testing and commissioning support.
  4. Thirty-day performance acceptance testing.
  5. Integration period testing support.

**PART 3 EXECUTION**

3.01 EXECUTION SERVICES

- A. For all types of inspections and testing the DCSP shall provide experienced personnel and management in field (staging Site and plant Site) to coordinate and complete all aspects of the Work in this specification.
- B. At the Staging Site:
1. The DCSP shall maintain distributed control system (DCS) hardware and standard software by completing the following:
    - a. Preventive maintenance.
    - b. Demand maintenance.
    - c. Replacement of failed components and parts.
    - d. Replenishment of spare parts, where applicable.
    - e. Recordkeeping.
- C. Startup and Testing Team:
1. Provide a team, as required by Project, of experienced DCS systems engineers, hardware maintenance, and software configuration staff at the plant Site during the total period required to:
    - a. Check the installation, termination, and adjustment of all subsystems and their components.
    - b. Perform complete onsite tests.
    - c. Provide startup assistance to the Prime Contractor and City staff.

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3.02 FACTORY ACCEPTANCE TEST (FAT)

- A. General: The complete system, including all DCS equipment, peripheral devices and interconnecting cables shall be assembled on the DCS manufacturer's test floor or City pre-approved staging site, and all programs shall be completely tested under simulated operating conditions. Further tests shall be performed in the field at time of startup, with external sensors and field wiring connected to determine final Specification compliance.
- B. Four certified copies of all test data and results shall be submitted to the City. All test documentation and results shall comply with ISA RP55.1 (R1983) Type 2 and Type 3 documentation standard.
- C. The equipment shall be operationally tested for compliance with the conditions of these Specifications. FAT setup shall include simulated inputs. On line configuration of the monitoring and control loops using simulated inputs shall be demonstrated without error or malfunction. Logs and report generation capability shall be demonstrated by simulating process inputs and manually entering data.
- D. The DCSP shall submit a detailed FAT specification to the City at least 6 weeks in advance of commencement of the FAT. The City shall be notified at least 30 days in advance of the FAT and reserves the right to have representatives in attendance.
- E. Each item of equipment shall be fully inspected, calibrated and tested for function, operation and continuity of circuits as applicable. Exceptions shall be approved in writing from the City.
- F. System performance shall be tested using a complete integrated system including all peripheral devices and interconnecting cables assembled on the test floor, complete operational programs loaded, and simulated inputs applied. The DCSP shall carry out a 100-hour full system test during which the entire system shall operate continuously without failure, all in accordance with the requirements of the Specifications and Drawings. If a system component fails during the test, the 100-hour test period shall be restarted after its operation is restored.
- G. After successful completion of the FAT, four certified copies of all test results shall be furnished to the City together with a clear and unequivocal statement that all FAT requirements have been met. The City will give written notice of the acceptability of the FAT within 30 days of receipt of the FAT results.

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- H. City's representatives shall witness the FAT and at least 30 days written notice shall be given prior to date of starting tests. One copy of each acceptance test procedure shall be submitted to the City 20 days prior to the start of the acceptance test.
- I. In the event that the system does not function as specified, it shall be modified to meet the Specification requirements, and shall be retested as specified herein. Costs for all such retesting and witnessing shall also be borne by the DCSP.
  - 1. All of the City's representatives travel and per diem costs associated with all FAT testing and retesting shall be borne by the DCSP.
- J. Prior to installation, all PIN, FIN, and DIN cable shall be factory tested by the DCSP to verify that the attenuation does not exceed prescribed limits and to ensure that concealed or internal discontinuities which could cause reflections do not exist. In conformance with the submittal requirements of these specifications, the DCSP shall submit certified test reports which contain the following data:
  - 1. Dielectric constant.
  - 2. Outside diameter of inner conductor.
  - 3. Inside diameter of outer conductor.
  - 4. Attenuation constant.
  - 5. Plot of each cable attenuation frequency response per 100 feet of cable.
  - 6. All data links, which shall be the final hardware, application software, and node addresses installed in the field shall be tested during the operational readiness test.

3.03 PACKAGE SYSTEM FACTORY ACCEPTANCE TESTS

- A. The DCSP shall coordinate with the following package system vendors the communications link between the DCS and the individual package system control panels:
  - 1. Section 44 22 23, Thickening Centrifuges.
  - 2. Section 44 46 20, Digester Gas Safety Equipment and Specialties (Bio Gas Flare).
- B. Factory acceptance tests (FAT) will be conducted at the respective package system's factory.
- C. Communications shall be tested by the DCSP between the DCS and the package system equipment using a complete integrated system, including all peripheral devices and interconnecting cables. This also includes complete operational programs loaded and simulated inputs applied.

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- D. The DCSP shall pay for all costs associated with travel to the package system FAT.

3.04 INSTALLATION

- A. Physical installation of the DCS PCM assemblies may be accomplished by the DCSP or as required others, under the contract. The DCSP shall provide all labor required for oversight of the installation and to verify proper installation of all equipment.
- B. Subsequent to the installation of all DCS equipment, the DCSP shall certify to the City's representative that the DCS has been properly installed.
- C. The DCSP shall furnish the services of trained engineer(s) to check the completed installation and to make all necessary adjustments for satisfactory operation of the DCS.
- D. There shall also be furnished complete installation drawings and instructions in accordance with these Specifications. Final as-built drawings, and loop diagrams are the responsibility of the Prime Contractor and/or design engineer. The DCSP shall furnish all drawings and technical assistance to these parties to complete these Drawings.
- E. If any device (including network cables) has been installed by others in a faulty manner, the DCSP shall notify the City's representative immediately.

3.05 OPERATIONAL READINESS TESTING

- A. The DCSP shall time the complete DCS system testing after installation.
  - 1. This shall ensure that those components provided under this Contract, having adjustable features are set carefully for the specific conditions and applications of this installation and that the components and systems are within the specified limits of accuracy.
  - 2. The DCSP, as part of this process, shall furnish qualified engineers to assist City Operations staff with the tuning of P&ID loops to ensure proper operation of process equipment.
  - 3. The DCSP shall notify the City's representative if any existing components, including field devices or instruments provided by others, are found to be defective.
  - 4. Defective DCS elements which were provided under this Contract, which cannot achieve proper calibration or accuracy, either individually or within the system, or subsystem, shall be replaced and the City's representative shall be notified.

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5. The DCSP shall be responsible for performing all DCSP related portions of loop checks and testing procedures. DCSP shall be responsible for manning all PCMs, control room, remote workstation locations, etc. Prime Contractor shall be responsible for manning all field devices, instruments, etc. in order to ensure a complete end-to-end loop test.
  6. Analog input channels shall be verified at a minimum of five points: 0, 25, 50, 75 and 100 percent of span by applying simulated analog test signals (using a calibrated signal generator). Applied test data shall be processed by the associated PCM using programs assigned to the particular data channels being simulated with the resulting engineering unit data presented on a display.
- B. A complete DCS test shall be performed by the DCSP, including interfaces with, foreign devices and networks. All modes of operation and HMI interactions shall be exercised. All data communication equipment shall be thoroughly tested for function and accuracy. DCSP shall be responsible for DCS related items during this test and the prime contractor shall be responsible for all field devices and instruments.
- C. Upon the satisfactory completion of all DCS installation tests, six hard copies and one soft copy in a format acceptable to the City of a certified report, including all test documentation, shall be furnished to the City's representative together with a clear and unequivocal statement that the installed system has been successfully calibrated, tuned, inspected and tested. These documents shall be submitted in accordance with Section 01 33 00, Submittal Procedures. The City's representative will give acceptance of the installation tests within 21 days of receipt of the test report if the results of the installation tests are acceptable.
- D. The DCSP shall submit six hard copies and one soft copy of a procedure for field hardware and software tests. In addition, a full functional procedure that pertains to the control system logic and graphic displays shall be submitted for approval by the City's representative. The procedure shall include:
1. The object to be tested.
  2. The aspects of the object to be tested.
  3. The kind of tests to be carried out.
  4. The conditions under which the tests shall be performed.
  5. The procedures to be followed.
  6. The expected results and how the results will be evaluated.
  7. When the tested aspect has passed the test.

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- E. Systems shall be exercised through operational tests in the presence of the City's representative in order to demonstrate achievement of the specified performance.
- F. The equipment shall be operationally tested for compliance with the conditions of these Specifications. Online configuration of the monitoring and control loops shall be demonstrated without error or malfunction. Logs and report generation capability shall be demonstrated by simulating process inputs if actual inputs are not available from process components with City approval.
- G. The proper control of all final control elements and control panels shall be verified by tests conducted in accordance with the requirements specified herein. Where feasible, system commissioning activities shall include the use of water to establish service conditions that simulate, to the greatest extent practicable, normal final control element operating ranges and environmental conditions. Final control elements, control panels, and ancillary equipment shall be tested under start-up and steady-state operating conditions to verify that proper and stable control is achieved using the DCS and local field mounted control circuits. All hardwired control circuit interlocks and alarms shall be operational. The control of final control elements and ancillary equipment shall be tested using both manual and automatic (where provided) control modes.
- H. All control stations incorporating proportional, integral and/or differential (P&ID) control circuits shall be initially tuned using mathematical methods such as Ziegler-Nichols or Tyreus-Luyben rules in order to establish the initial parameters for closed loop control. The tuning parameters shall be refined experimentally, by applying control signal disturbances and adjusting the gain, reset and/or rate setting(s) as required to achieve a proper response. Measured final control element variable position/speed setpoint settings shall be compared to measured final control element position/speed values at 10, 50 and 90 percent of span and the results checked against specified accuracy tolerances. Specified accuracy tolerances are defined as the root-mean-square-summation of individual component accuracy requirements. Individual component accuracy requirements shall be as specified in the contract or as specified by published manufacturer accuracy specifications whenever contract accuracy requirements are not specified.
- I. Completion of all system commissioning and test activities shall be documented by a certified report, including all test forms with tests data entered, delivered to the City's representative with a clear and unequivocal statement that all system commissioning and test requirements have been satisfied. The City's representative will give written acceptance of the system commissioning and test activities.

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- J. In the event that the system does not function as specified, it shall be modified to meet the specification requirements, and shall be retested as specified herein. Costs for all such retesting and witnessing shall be borne by the DCSP.
- K. Six hard copies and one soft copy of certified test data and results shall be submitted to the City's representative in accordance with Section 01 33 00, Submittal Procedures.

3.06 DCS PERFORMANCE TEST

- A. DCS performance testing shall commence after ORT and inspections have been conducted and accepted in accordance with the following B, C, D, and E, and shall demonstrate that all components of the control system can meet all contract requirements with the equipment operating over full operating ranges under actual operating conditions.
- B. All commissioning and test activities shall follow detailed test procedures, and check lists, previously submitted by Contractor and approved by the City. All tests data shall be acquired using equipment as specified and recorded on test forms, previously submitted by Contractor and approved by the City.
- C. The proper control of all final control elements and control panels shall be verified by tests conducted in accordance with the requirements specified herein. Where feasible DCS performance testing activities shall include the use of water to establish service conditions that simulate, to the greatest extent practicable, normal final control element operating ranges and environmental conditions. Final control elements, control panels, and ancillary equipment shall be tested under start up and steady state operating conditions to verify that proper and stable control is achieved using the DCS and local field mounted control circuits. All hardwired control circuit interlocks and alarms shall be operational. The control of final control elements and ancillary equipment shall be tested using both manual and automatic (where provided) control modes. The stable steady state operation of final control elements running under the control of field mounted automatic analog controllers shall be assured by adjusting the controllers, as required, to eliminate oscillatory final control element operation. The transient stability of final control elements operating under the control field mounted automatic analog controllers shall be verified.
- D. All control stations incorporating proportional, integral and/or differential control circuits shall be tuned experimentally, by applying control signal disturbances and adjusting the gain, reset and/or rate setting(s) as required to achieve a proper response. Measured final control element variable position/speed set point settings shall be compared to measured final control element position/speed values at 25,



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50, and 75 percent of span and the results checked against specified accuracy tolerances.

1. Various tests required during testing may require the presence and control of a licensed wastewater operator. It is incumbent on Contractor to coordinate all tests are conducted within the regulations.
  2. Contractor and its subcontractors are responsible for the field-end testing and operation of all equipment, which may require manipulation by a licensed wastewater operator.
  3. The DCSP shall be responsible for staffing at PCM cabinets, DCS peripheral equipment locations and the main control room, during commissioning phases.
- E. During the commissioning phase, and possibly beyond, as may be required, the DCSP shall be responsible for coordinating, and working with Operations, in providing fine tuning of the of PID controllers to ensure proper process operation. The DCSP shall also aid in setting alarm limits, top of scale setting etc., in concert with Operations.
- F. Subsequent to the commissioning and performance testing of process equipment furnished by others, the DCSP shall conduct a successful 30-day performance acceptance test for the DCS furnished under this Contract. In the test, the entire DCS shall be continuously operated and maintained (i.e., 7 days per week, 24 hours per day) during the test period with zero downtime resulting from DCS system failures. If a system failure occurs, the 30-day test shall be considered a failure and not acceptable. The DCSP shall reinitiate the 30-day test. The DCS shall be acceptable only after all equipment has satisfied the performance test requirements and demonstrated a system availability of 99.98 percent.
- G. The system availability shall be calculated based on the following equation:
1. System Availability equals  $(MTBF \times 100\%) / (MTBF + MTTR)$ , where:
    - a. A equals system availability in percent.
    - b. MTBF equals average time interval between consecutive system failures.
    - c. MTTR equals average time required to repair system failure.
- H. Thirty-day Acceptance Test: During this period, all system functions shall be exercised. Any system interruption and accompanying component, subsystem, or program failure shall be logged for cause of failure, as well as time of occurrence and duration of each failure. A failure may be categorized as “minor” so long as the fundamental monitoring and control functions of the system are not affected. For example, failure of a peripheral equipment, such as a printer, would fall in the minor failure category. A minor failure shall halt the 30-day acceptance test. Upon correction of the failure, the test may continue for the remaining during. If a

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component failure causes disruption to proper operation of the system, it shall be considered a “major” failure. A major failure shall cause termination of the 30-day acceptance test. When the cause of a failure has been corrected, a new 30-day acceptance test shall start.

- I. The DCSP shall submit a performance test completion report which shall state that all contract requirements have been met and which shall include (1) a listing of all DCS equipment maintenance/repair activities conducted during testing and (2) a listing of all components which were unable to operate successfully. The performance testing report shall be submitted in accordance with Section 01 91 14, Testing, Integration, and Startup. Final acceptance, in writing, of the DCS will be provided by the City.

3.07 SYSTEM CUTOVER

- A. In case of migrating or upgrading from legacy DCS to the latest version of DCS, a system cutover plan must be developed first with City Operation staff and COMNET staff. Cutover activities shall not start until an approved Cutover Plan is in place.
- B. Cutover will be executed as per the ‘Cutover Plan’ a set of detailed, sequenced tasks to cutover I/Os, convert and migrate control strategies, configure the newer version of DCS system and decommission legacy systems. Cutover plan shall also include a fallback plan in case the cutover failed.
- C. Newer version of the DCS shall be fully tested prior to cutover.
- D. Cutover shall be completed in an orderly manner, closely coordinated with Operation staff to minimize interruption to the plant process. Schedule of cutover shall be approved by all parties involved.

3.08 INTEGRATION PERIOD TESTING SUPPORT

- A. The DCSP shall provide support during the integration period. The support shall be as described in Section 01 91 14, Testing, Integration, and Startup.

**END OF SECTION**

**SECTION 40 98 04**  
**FIELD CONSTRUCTION/COMMISSIONING SERVICES**

**PART 1 GENERAL**

1.01 REQUIREMENTS

- A. The DCSP shall be responsible for all distributed control system (DCS) related field construction/commissioning services for the facilities within this contract document.
- B. The DCSP shall be responsible for monitoring Contractor field construction/commissioning services, to ensure that no negative impact to DCS commissioning is occurring. In the event of such impacts, the DCSP shall immediately notify the City's representative of the impact.

1.02 REFERENCES

- A. The Work described in the following sections also applies to the Work in this section. Other sections of the specifications not referenced below shall also apply to the extent required for proper performance of this Work.
  - 1. Division 01, General Requirements.
  - 2. Division 26, Electrical.
  - 3. Division 40, Process Interconnections.
- B. Specifications:
  - 1. Codes and Standards: The Work shall comply with the current editions of the publication and codes as adopted by the City of San Diego.

1.03 SUBMITTALS

- A. The list below is intended to be used as a guide for DCSP and not intended to be all-inclusive and complete. At a minimum, DCSP shall be responsible for the submittals below as required by the Work:
  - 1. Technical, operational, and administrative submittals.
  - 2. DCS systems construction and installation schedule to be included and incorporated into the Contractor's master baseline schedule.
  - 3. Installation details for new UPS systems, load centers and both utility and UPS power and grounding, for those portions provided by the DCSP.

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4. Details for installation of all DCSP provided systems, including:
  - a. All network communications.
  - b. I/O wiring and termination schemes.
  - c. Utility and UPS power and grounding for all DCS equipment.
5. The Design Engineer is responsible for generating a complete set of P&ID Drawings for the project. However, the DCSP is responsible for providing the Design Engineer with the DCS design, termination architecture, etc. required to complete the DCS P&ID redlines. The Contractor shall be responsible for producing the loop drawings with support from the DCSP.
6. Health and safety plan.
7. Results of all field verification of existing conditions and documentation, where applicable.
8. System and unit process cutover plan and schedule(s).
9. All test results including, but not limited to, network communications, including fiber optic cable tests, DCS calibration, loop checks, ground tests, and system tests.
10. Verification that each training class/course has been successfully completed, in accordance with Section 40 98 05, Quality Control.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

**3.01 OUTAGE FORMS**

- A. The DCSP shall ensure that all City required outage forms, or City/plant work permits are completed prior to commencement of any construction.
  1. All outage request/permits shall be submitted with three hard copies and one soft copy to the City's representative.
- B. General:
  1. The DCSP shall coordinate installation, construction and commissioning activities with the City's representative in accordance with the Contract Documents.
  2. The DCSP shall coordinate and participate in preconstruction safety conference as specified in Division 01, General Requirements.
  3. The DCSP shall coordinate the overall sequence of control systems construction and installation, by the Contractor, with the City's representative.
  4. The DCSP shall establish a health and safety plan for construction activities, for integration into the Contractor's health and safety plan.
  5. The DCSP shall perform all DCSP related loop checking, functional testing and commissioning in accordance with these Contract Documents.

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6. The DCSP shall coordinate system cutover and outage requests through the City's representative.
  7. City's representative shall inspect all DCS and I&C system installation prior to cutover.
  8. The DCSP shall coordinate the DCS system, software and performance testing with the City's representative.
- C. The DCSP shall pay particular attention to both Contractor construction sequencing and commissioning scheduling as the complexities of the unit processes cutover timing may create conflicts and predecessors that could adversely affect plant operation or adversely affect process compliance.
1. To ensure that the DCSP is closely monitoring and coordinating these efforts, he shall participate in weekly commissioning and startup meetings with the City's representative and the Contractor, including attendance in the joint test group meetings.
  2. The DCSP shall provide a fragnet Type P6 Schedule, excerpted from the Contractor's master baseline status schedule, updated monthly, which shows progress and all planning activities for individual and overall Segment activities. The City's representative will review and approve/disapprove the fragnet schedule and may require additional granularity in the schedule, if in the sole opinion of the City's representative there is not sufficient granularity in the schedule.

**END OF SECTION**

**SECTION 40 98 05**  
**QUALITY CONTROL**

**PART 1 GENERAL**

**1.01 QUALITY PROGRAM**

- A. The DCSP shall institute a Quality Control Plan (QCP) which utilizes organized methodologies and industry standards. All manufacturing, design, development, production, installation, and field service resources of the DCSP shall be certified as conforming to all of the requirements of international quality management standard ISO 9001. The certification shall be submitted to the City's representative in accordance with Section 01 33 00, Submittal Procedures. This certification shall be a "Certification of Quality" from an internationally recognized certification agency. The plan shall include the following aspects at a minimum:
1. Quality assurance organization which complies with ISO 9001 guidelines.
  2. System of traceability of manufactured unit and system software throughout development, production and testing.
  3. System of "burn-in" for all components and available supportive documents.
  4. Record of prompt shipments in accordance with contract obligations.
  5. Documented program of failure analysis.
  6. Documented product safety policy relevant to all products intended to be furnished under this Contract.
  7. Demonstrated record of prompt positive response to field failures.
- B. Provide DCS of rugged construction design for the site conditions. Provide only new, standard, first-grade materials throughout, conforming to standards established by UL, and so marked or labeled, together with manufacturer's brand or trademark.
- C. Provide material and equipment in accordance with applicable codes and standards, except as modified by the specifications.
- D. Refer to Section 01 45 16.13, Contractor Quality Control.

**1.02 SUBMITTALS**

- A. DCSP Project Specific Quality Control Plan (CQP): Submit, not later than 30 days after receipt of Notice to Proceed.

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1.03 RISK MANAGEMENT PLAN

- A. The DCSP shall assess and document all potential project risks. Risk assessment and mitigation shall include:
1. Risks shall be documented in a format to be communicated to the City's representative.
  2. Each risk shall be classified in terms of probability, impact, and status.
  3. High impact risks shall be discussed at project progress meetings.
  4. Each risk shall have an associated mitigation plan.

1.04 DCSP QUALITY CONTROL PLAN (QCP)

A. General:

1. Plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used.
2. DCS Construction will be permitted to begin only after acceptance of the Quality Control Plan (CQP).

B. Content:

1. Plan shall cover the intended quality control organization for the entire Contract and shall include the following, as a minimum:
  - a. Organization: Description of the quality control organization, including a chart showing lines of authority.
  - b. Quality Control Staff: The name, qualifications, duties, responsibilities, and authorities of each person assigned a QC function.
  - c. Submittals: Procedures for scheduling, reviewing, certifying, and managing submittals, including those of sub DCSPs, offsite fabricators, suppliers, and purchasing agents.
  - d. Testing: Control, verification, and acceptance testing procedures for each specific test to include the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests is required.
  - e. Procedures for tracking preparatory, initial, and follow-up control steps and control verification, and acceptance tests, including documentation.
  - f. Procedures for tracking deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.
  - g. Reporting procedures, including proposed reporting formats; include a copy of the CQC report form.

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- C. Acceptance of Plans: Acceptance of the DCSP's basic and addendum QC plans is required prior to the start of DCS construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The City reserves the right to require DCSP to make changes in the QC plan and operations including removal of personnel, as necessary, to obtain the quality specified.
- D. Notification of Changes: After acceptance of the QC plan, DCSP shall notify City's representative, in writing, a minimum of 7 calendar days prior to any proposed change in the plan. Proposed changes are subject to acceptance by the City's representative.

1.05 SUBMITTAL QUALITY CONTROL

- A. The QC organization shall be responsible for certifying that all submittals are in compliance with the Contract requirements. City's representative will furnish copies of test report forms upon request by DCSP, or DCSP may use other forms as approved by City representative.

1.06 TESTING QUALITY CONTROL

- A. Testing Procedure:
  - 1. Perform tests specified or required to verify that control measures are adequate to provide a product which conforms to Contract requirements. Perform the following activities and record the following data:
    - a. Verify testing procedures comply with contract requirements.
    - b. Verify facilities and testing equipment are available and comply with testing standards.
    - c. Check test instrument calibration data against certified standards and provide certification to City's representative.
    - d. Verify recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
    - e. Documentation:
      - 1) Record results of all tests taken, both passing and failing, on the QC report for the date taken.
      - 2) Include specification paragraph reference, location where tests were taken, and the sequential control number identifying the test.
      - 3) Actual test reports may be submitted later, if approved by City's representative, with a reference to the test number and date taken.



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- 4) Provide directly to City's representative an information copy of tests performed by an offsite, or commercial test facility, if applicable. Test results shall be signed by an engineer registered in the state where the tests are performed.

1.07 COMPLETION INSPECTION

- A. QC System Manager shall conduct an inspection of the DCS Work at the completion of all Work or any contract milestone established by a completion time stated in the Contract.
- B. Punch List:
  1. QC System Manager shall develop a punch list of DCS items which do not conform to the Contract requirements.
  2. Include punch list in the QC report, indicating the estimated date by which the deficiencies will be corrected.
  3. The QC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the City's representative.
  4. These inspections and any deficiency corrections required will be accomplished within the time stated for completion of the entire Work or any particular increment thereof if the Project is divided into increments by separate completion dates.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

**SECTION 40 98 06**  
**DISTRIBUTED CONTROL SYSTEM TRAINING**

**PART 1 GENERAL**

1.01 REQUIREMENTS

- A. The DCSP shall develop and implement a training program that will allow personnel to develop the skills and knowledge necessary to safely and efficiently operate and maintain the all systems of the DCS and related ancillary items.
- B. The DCSP shall furnish all tools, equipment, materials and supplies, and shall perform all functions and service required to complete the work as specified herein.
- C. All training shall be a prerequisite to the Statement of Partial Completion of the Segment, CIP or project. Applicable training specific to any given process area shall be completed prior to cut-over and Beneficial Use of the equipment in that process area.
- D. Training shall be provided in the operation and maintenance of equipment manufactured by the DCSP, by the manufacturer, and by the manufacturer of specific associated equipment items, other than DCS components. Each of the courses shall be taught by authorized representatives of each respective equipment manufacturer, at the DCSP approved staging site, City Operations facility, or other local facility as determined by the City's representative. Each manufacturer's representative shall be fully knowledgeable in the operations and maintenance of their equipment and shall be a full-time instructor under the employ of the respective manufacturer.
- E. The DCSP shall prepare a complete Training Plan. The Training Plan shall be submitted in accordance with Section 01 33 00, Submittal Procedures. The DCS Training Plan will provide the structure and syllabus for training sessions as follows:
  - 1. In accordance with Division 01, General Requirements, the DCSP shall submit a training plan which contains, as a minimum, course outlines and schedules for training to be provided. The training plan shall include:
    - a. Course descriptions and syllabuses.
    - b. Schedule of training courses including dates, durations, and locations of each class.
    - c. Resumes of the instructors who will actually implement the plan.
  - 2. Courses shall be scheduled in series so as to allow the same personnel to attend more than one training course.

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3. The training shall be scheduled in accordance with Division 01, General Requirements.
4. Proposed training materials, including a detailed training agenda itemizing relative emphasis on various topics of each course and support materials shall be submitted to the City's representative in accordance with of Division 01, General Requirements, and Section 01 33 00, Submittal Procedures.
5. City's representative shall review this outline and provide comments that shall be incorporated into the course.
6. Dedicated hardware and software shall be assigned for training purposes. The live system shall NOT be used for training purposes.
7. Training shall be developed so that home study is not required.
8. Training shall combine classroom and field hands-on training that is structured and scheduled to facilitate trainee comprehension on subject material.
9. The training shall be provided by qualified instructors of the equipment manufacturers or their representative, as approved by the City's representative based on technical and instructional qualifications.
10. Training shall be structured to develop comprehension of the process theory for each system, its component subsystems, and the interrelationship of the operating variables, the responses required for various types of abnormalities, safety precautions, procedures for safe start-up and shutdown, equipment maintenance overview and troubleshooting.
11. Following completion of the training, the DCSP shall provide the City's representative six complete hardcopy sets, and one soft copy, of training materials, such as lesson plan, student manual, and support materials for each course.
12. Training shall be provided using the equipment of the same model and family being supplied as part of this Project.
13. Training shall be conducted so as not to impact normal plant operations, or the construction schedule.
14. No course shall be provided at the same time as another unless otherwise permitted by the City's representative.
15. All training shall be monitored and approved by the City's representative. Any session or portion thereof deemed unsatisfactory, based on evaluation of the training shall be repeated by the DCSP at no additional cost to the City.
16. Each course shall be for up to eight people.
17. Training shall utilize actual graphics for each individual plant segment control services. The use of 'canned' or 'typical' training systems shall be limited to a minimum.

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1.02 REFERENCES

- A. The Work described in the following sections also applies to the Work in this section. Other sections of the specifications not referenced below shall also apply to the extent required for proper performance of this Work.
1. Division 01, General Requirements.
  2. Division 26, Electrical.
  3. Division 40, Process Interconnections.

**PART 2 PRODUCTS**

2.01 COURSE DESCRIPTIONS

- A. Training courses shall be tailored to Operations and Maintenance staff who are already generally familiar with the COMNET DCS. The DCSP is responsible for developing several training courses. For each course, the DCSP is responsible for developing a curriculum and course materials. The DCSP may use its standard training material where applicable.
- B. The DCSP shall submit a project specific training plan for City review, comment, and approval prior to implementing the training.

**PART 3 EXECUTION**

3.01 REQUIRED TRAINING

- A. Training is required to educate all system users and selected City representative members. The trainings will occur locally at the DCSP approved staging site, Wastewater Operations building or other City facility as directed by the City's representative. Any training aids and/or materials are the responsibility of the DCSP.

**END OF SECTION**

**SECTION 40 99 90**  
**PACKAGE CONTROL SYSTEMS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. The Institute of Electrical and Electronics Engineers, Inc. (IEEE): C62.41, IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.
  2. International Society of Automation (ISA): S50.1, Compatibility of Analog Signals for Electronic Process Instruments.
  3. National Electrical Manufacturers Association (NEMA):
    - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
    - b. AB 1, Molded Case Circuit Breakers and Molded Case Switches.
    - c. ICS 2, Industrial Control Devices, Controllers and Assemblies.
  4. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
  5. UL: 508A, Standards for Safety, Industrial Control Panels.

1.02 SYSTEM DESCRIPTION

- A. Assemble panels and install instruments, plumbing, and wiring in equipment manufacturer's factories.
- B. Test panels and panel assemblies for proper operation prior to shipment from equipment manufacturer's factory.

1.03 SUBMITTALS

- A. Action Submittals:
1. Bill of material, catalog information, descriptive literature, wiring diagrams, and shop drawings for components of control system.
  2. Catalog information on electrical devices furnished with system.
  3. Shop drawings, catalog material, and dimensional layout drawings for control panels and enclosures.
  4. Panel elementary diagrams of prewired panels. Include in diagrams control devices and auxiliary devices, for example, relays, alarms, fuses, lights, fans, and heaters.
  5. Plumbing diagrams of preplumbed panels and interconnecting plumbing diagrams.

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6. Interconnection wiring diagrams that include numbered terminal designations showing external interfaces.
7. Seismic anchorage and bracing data sheets and drawings as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

1. Programmable Controller Submittals:
  - a. Complete set of user manuals.
  - b. Fully documented ladder logic listings.
  - c. Function listing for function blocks not fully documented by ladder logic listings.
  - d. Cross-reference listing.
  - e. Modbus Data Table:
    - 1) All soft points passed between the DCS and PLC must be referenced with Modbus addressing and format.
    - 2) PLC will act as a slave to the DCS using Modbus TCP/IP.
  - f. Communications hardware and configuration.
2. Manufacturer's list of proposed spares, expendables, and test equipment.
3. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Prior to shipment, include corrosive-inhibitive vapor capsules in shipping containers and related equipment as recommended by capsule manufacturer.

1.05 EXTRA MATERIALS

- A. Spares, Expendables, and Test Equipment:
  1. Selector Switch, Pushbutton, and Indicating Light: 20 percent, one minimum, of each type used.
  2. Light Bulb: 100 percent, two minimum, of each type used.
  3. Fuse: 100 percent, five minimum, of each type used.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. Section 40 90 00, Instrumentation and Control.

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2.02 INSTRUMENT TAG NUMBERS

A. A shorthand tag number notation is used. For example:

12FIT345 [pH]

<u>Notation</u>	<u>Explanation</u>
12	Unit process number
FIT	ISA designator for flow indicating transmitter
345	Loop number
[pH]	Same notation shown at 2 o'clock position on ISA circle symbol on process and instrument diagram

2.03 SIGNAL CHARACTERISTICS

A. Analog Signals:

1. 4 mA to 20 mA dc, in accordance with compatibility requirements of ISA S50.1.
2. Unless otherwise specified or shown, use Type 2, two-wire circuits.
3. Transmitters: Load resistance capability conforming to Class L.
4. Fully isolate input and output signals of transmitters and receivers.

B. Discrete Signals:

1. Two-state logic signals.
2. Utilize 120V ac sources for control and alarm signals.
3. Alarm signals shall be normally open, close to alarm isolated contacts rated for 5-ampere at 120V ac and 2-ampere at 30V dc.

2.04 CORROSION PROTECTION

A. Corrosion-Inhibiting Vapor Capsule Manufacturers:

1. Northern Instruments; Model Zerust VC.
2. Hoffmann Engineering; Model A-HCI.
3. Or approved equal.

2.05 CONTROL PANEL

A. Panel Construction and Interior Wiring: In accordance with the National Electrical Code (NEC), UL 508, state and local codes, and applicable sections of NEMA, ANSI, and ICECA.

B. Conform to NEMA ratings as specified in individual equipment sections.

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- C. Minimum Metal Thickness: 14-gauge.
- D. NEMA 250, Type 4X Panels: Type 316 stainless steel construction unless otherwise specified.
- E. Doors:
  - 1. Three-point latching mechanisms in accordance with NEMA 250 Type 1 and Type 12 panels with doors higher than 18 inches.
  - 2. For other doors, stainless steel quick release clamps.
- F. Cutouts shall be cut, punched, or drilled and finished smoothly with rounded edges.
- G. Access: Front, suitable for installation with back and sides adjacent to or in contact with other surfaces, unless otherwise specified.
- H. Temperature Control:
  - 1. Size panels to adequately dissipate heat generated by equipment mounted on or in the panel.
  - 2. Furnish cooling fans with air filters if required to dissipate heat.
  - 3. For panels outdoors or in unheated areas, furnish thermostatically controlled heaters to maintain temperature above 40 degrees F.
- I. Push-to-Test Circuitry: For each push-to-test indicating light, provide a fused push-to-test circuit.
- J. Lighting: Minimum of one hand switch controlled internal 100-watt incandescent light for panels 12 cubic feet and larger.
- K. Minimum of one 120-volt GFCI duplex receptacle for panels 3 cubic feet and larger or any enclosure containing a processor that is capable of communicating with a laptop computer.
- L. Finish:
  - 1. Metallic External Surfaces (Excluding Aluminum and Stainless Steel): Manufacturer's standard gray unless otherwise specified.
  - 2. Internal Surfaces: White enamel.
- M. Panel Manufacturers:
  - 1. Hoffman.
  - 2. Rittal.
  - 3. Or approved equal.



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- N. Breather and Drains: Furnish with NEMA 250, Type 4 and 4X panels.
  - 1. Manufacturer and Product:
    - a. Cooper Crouse-Hinds; ECD Type 4X Drain and Breather; Drain Model ECD1-N4D, Breather Model ECD1-N4B.
    - b. Or approved equal.

2.06 PROGRAMMABLE CONTROLLERS/HMI HARDWARE

- A. Refer to Section 40 94 43, Programable Logic Controller System.

2.07 CONTROL PANEL ELECTRICAL

- A. UL Listing Mark for Enclosures: Mark stating “Listed Enclosed Industrial Control Panel” in accordance with UL 508A.
- B. I&C and electrical components, terminals, wires, and enclosures UL recognized or UL listed.
- C. Control Panels without Motor Starters:
  - 1. Furnish main circuit breaker and a circuit breaker on each individual branch circuit distributed from power panel.
  - 2. Locate to provide clear view of and access to breakers when door is open. Group on single subpanel. Provide typed directory.
  - 3. Circuit Breakers:
    - a. Coordinate for fault in branch circuit trips, branch breaker, and not main breaker.
    - b. Branch Circuit Breakers: 15 amps at 250V ac.
    - c. Breaker Manufacturers and Products:
      - 1) Heineman Electric Co.; Series AM.
      - 2) Airpax/North American Philips Controls Corp.; Series 205.
      - 3) Or approved equal.
- D. Control Panels with Three-phase Power Supplies and Motor Starters:
  - 1. Interlock Main Circuit Breaker with Panel Door:
    - a. Mount logic controls, branch circuit breakers, overload reset switches, and other control circuit devices.
    - b. Mount operator controls and indications on front access door.
  - 2. Circuit Breakers:
    - a. In accordance with NEMA AB 1.
    - b. 18,000-ampere RMS symmetrical rating, minimum at 480 volts, unless otherwise specified.
    - c. Breakers, except Motor Branch Breakers: Molded case thermal magnetic.

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- d. 14,000-ampere RMS symmetrical rating, minimum at 480 volts, unless otherwise specified in package system equipment specification sections.
- e. Tripping: Indicate with operator handle position.
- 3. Magnetic Motor Starters:
  - a. Full voltage, NEMA ICS 2, Class A, Size O minimum.
  - b. Include three-pole bimetallic or eutectic alloy thermal overload relays sized for each motor.
  - c. Manual reset type with reset button mounted on panel door.
- 4. Motor Control: 120V ac (except intrinsically safe circuits where applicable).
  - a. Power Control Transformer:
    - 1) Sufficient capacity to serve connected load, including 200VA for duplex outlet plus 100VA (minimum).
    - 2) Limit voltage variation to 15 percent during contact pickup.
    - 3) Fuse one side of secondary winding and ground the other.
    - 4) Furnish primary winding fuses in ungrounded conductors.
- 5. Power Monitoring Relay:
  - a. Protect three-phase equipment from single phasing, phase imbalance, or phase reversal.
  - b. Separate, isolated contact outputs to stop motors and activate alarm light during abnormal conditions.
  - c. Transient Voltage Protection: 10,000 volts.
  - d. Manufacturers and Products:
    - 1) Furnas; Class 47.
    - 2) Or approved equal.
- 6. Power Distribution Blocks: Furnish to parallel feed tap on branch circuit protective devices. Do not “leap frog” power conductors.
- 7. Terminations for Power Conductors: Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.

E. Wiring:

- 1. ac Circuits:
  - a. Type: 600-volt, Type MTW stranded copper.
  - b. Size: For current to be carried, but not less than 14 AWG.
- 2. Analog Signal Circuits:
  - a. Type: 600-volt, Type 2 stranded copper, twisted shielded pairs.
  - b. Size: 18 AWG, minimum.
- 3. Other dc Circuits.
  - a. Type: 600-volt, Type MTW stranded copper.
  - b. Size: 18 AWG, minimum.
- 4. Separate analog and other dc circuits by at least 6 inches from ac power and control wiring, except at unavoidable crossover points and at device terminations.

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5. Enclose wiring in sheet metal raceways or plastic wiring ducts.
  6. Wire Identification: Numbered and tagged at each termination.
    - a. Wire Tags: Machine printed, heat shrink.
    - b. Manufacturers and Product:
      - 1) Brady; PermaSleeve.
      - 2) Tyco Electronics.
      - 3) Or approved equal.
- F. Wiring Interface:
1. For analog and discrete signal, terminate at numbered terminal blocks.
  2. For special signals, terminate power (240 volts or greater) at manufacturer's standard connectors.
  3. For panel, terminate at equipment on/with which it is mounted.
- G. Terminal Blocks:
1. Quantity:
    - a. For external connections.
    - b. Wire spare or unused panel mounted elements to their panels' terminal blocks.
    - c. Spare Terminals: 20 percent of connected terminals, but not less than 10.
  2. General: Group to keep 120V ac circuits separate from 24V dc circuits.
    - a. Connection Type: Screw connection clamp.
    - b. Compression Clamp:
      - 1) Hardened steel clamp with transversal grooves penetrating wire strands providing a vibration-proof connection.
      - 2) Guides strands of wire into terminal.
    - c. Screws: Hardened steel, captive, and self-locking.
    - d. Current Bar: Copper or treated brass.
    - e. Insulation:
      - 1) Thermoplastic rated for minus 55 to 110 degrees C.
      - 2) Two funnel shaped inputs to facilitate wire entry.
    - f. Mounting:
      - 1) Rail.
      - 2) Terminal block can be extracted from an assembly without displacing adjacent blocks.
      - 3) End Stops: One at each end of rail, minimum.
    - g. Wire Preparation: Stripping only.
    - h. Jumpers: Allow jumper installation without loss of space on terminal or rail.
    - i. Marking System:
      - 1) Terminal number shown on both sides of terminal block.
      - 2) Allow use of preprinted and field marked tags.

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- 3) Terminal strip numbers shown on end stops.
    - 4) Mark terminal block and terminal strip numbers as shown.
  3. Manufacturers:
    - a. Entrelec.
    - b. Phoenix Contact.
    - c. Or approved equal.
- H. Grounding: Internal copper grounding bus for ground connections on panels, consoles, racks, and cabinets.
- I. Relays:
  1. General:
    - a. Relay Mounting: Plug-in type socket.
    - b. Relay Enclosure: Provide dust cover.
    - c. Socket Type: Screw terminal interface with wiring.
    - d. Socket Mounting: Rail.
    - e. Furnish holddown clips.
  2. Manufacturer:
    - a. Potter and Brumfield.
    - b. Or approved equal.
- J. Intrinsic Safety Barriers:
  1. Intrinsically Safe Relays: Monitor discrete signals that originate in hazardous area and are used in a safe area.
    - a. Manufacturers and Products:
      - 1) MTL, Inc.; Series MTL 5000.
      - 2) Or approved equal.
  2. Intrinsically Safe Barriers: Interface analog signals as they pass from hazardous area to safe area.
    - a. Manufacturers and Products:
      - 1) MTL, Inc.; Series MTL 5000.
      - 2) Or approved equal.
- K. Front-of-Panel Devices in Conjunction with NEMA 250, Type 1 and 12 Panels:
  1. Potentiometer Units:
    - a. Three-terminal, oiltight construction, resolution of 1 percent and linearity of plus or minus 5 percent.
    - b. Single-hole, panel mounting accommodating panel thicknesses between 1/8 inch and 1/4 inch.
    - c. Include legend plates with service markings.

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- d. Manufacturers and Products:
  - 1) Allen-Bradley; Model 800T.
  - 2) Eaton/Cutler-Hammer; Model 10250T.
  - 3) Or approved equal.
2. Indicating Lights:
  - a. Heavy-duty, push-to-test type, oiltight, industrial type with integral transformer for 120V ac applications.
  - b. Screwed on prismatic glass lenses in colors noted and factory engraved legend plates for service legend.
  - c. Manufacturers and Products:
    - 1) Eaton/Cutler-Hammer; Type 10250T.
    - 2) General Electric; CR2940U.
    - 3) Or approved equal.
3. Pushbutton, Momentary:
  - a. Heavy-duty, oiltight, industrial type with full guard and momentary contacts rated for 10 amperes continuous at 120V ac.
  - b. Standard size legend plates with black field and white markings for service legend.
  - c. Manufacturers and Products:
    - 1) Square D; Class 9001, Type K.
    - 2) Eaton/Cutler-Hammer; Type T.
    - 3) General Electric; Type CR-2940.
    - 4) Or approved equal.
4. Selector Switch:
  - a. Heavy-duty, oiltight, industrial type with contacts rated for 120V ac service at 10 amperes continuous.
  - b. Standard size, black field, legend plates with white markings, for service legend.
  - c. Operators: Black knob type.
  - d. Single-hole mounting, accommodating panel thicknesses from 1/16 inch to 1/4 inch.
  - e. Manufacturers and Products for Units with up to Four Selection Positions:
    - 1) Eaton/Cutler-Hammer; Type T.
    - 2) Square D; Type K.
    - 3) Or approved equal.
  - f. Manufacturers and Products for Units with up to 12 Selection Positions:
    - 1) Rundel-Idex; Standard Cam Switch.
    - 2) Electroschwitch; 31.
    - 3) Or approved equal.

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- L. Front-of-Panel Devices Used in Conjunction with NEMA 250, Type 4X Panels:
1. Potentiometer, Watertight:
    - a. Three-terminal, heavy-duty NEMA 250, Type 4X watertight construction, resolution of 1 percent and linearity of plus or minus 5 percent.
    - b. Single-hole, panel mounting accommodating panel thicknesses between 1/8 inch and 1/4 inch.
    - c. Include engraved legend plates with service markings.
    - d. Manufacturer and Product:
      - 1) Allen-Bradley; Bulletin 800H.
      - 2) Or approved equal.
  2. Indicating Lights, Watertight:
    - a. Heavy-duty, push-to-test type, NEMA 250, Type 4X watertight, industrial type with integral transformer for 120V ac applications and corrosion-resistant service.
    - b. Screwed on prismatic lenses and factory engraved legend plates for service legend.
    - c. Manufacturers and Products:
      - 1) Square D; Type SK.
      - 2) Allen-Bradley; Type 800H.
      - 3) Or approved equal.
  3. Pushbutton, Momentary, Watertight:
    - a. Heavy-duty, NEMA 250, Type 4X watertight, industrial type with momentary contacts rated for 120V ac service at 10 amperes continuous and corrosion-resistant service.
    - b. Standard size, black field, legend plates with white markings for service legend.
    - c. Manufacturers and Products:
      - 1) Square D; Type SK.
      - 2) Allen-Bradley; Type 800H.
      - 3) Or approved equal.
  4. Selector Switch, Watertight:
    - a. Heavy-duty, NEMA 250, Type 4X watertight, industrial type with contacts rated for 120V ac service at 10 amperes continuous and corrosion-resistant service.
    - b. Standard size, black field, legend plates with white markings, for service legend.
    - c. Operators: Black knob type.
    - d. Single-hole mounting, accommodating panel thicknesses from 1/16 inch to 1/4 inch.

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- e. Manufacturer and Products:
  - 1) Square D; Class 9001, Type SK.
  - 2) Allen-Bradley; Type 800H.
  - 3) Or approved equal.

2.08 NAMEPLATES, NAMETAGS, AND SERVICE LEGENDS

- A. Nametags: Permanently mounted bearing entire ISA tag number.
  - 1. Panel Mounted: Plastic, mounted to instrument behind panel face.
  - 2. Field Mounted: Engraved Type 316 stainless steel, 22-gauge minimum thickness, attached with stainless steel.
  
- B. Service Legends (Integrally Mounted with Instrument) and Nameplates:
  - 1. Engraved, rigid, laminated plastic type with adhesive back. Furnish service legends and nameplates to adequately describe functions of panel face mounted instruments.
  - 2. Color: White with black letters.
  - 3. Letter Height: 3/16 inch.
  - 4. For each panel, face mounted laminated nameplate inscribed with the panel name and tag number. Color shall be white with black letters 1/2 inch high.
  
- C. Standard Light Colors and Inscriptions:
  - 1. Unless otherwise specified in individual equipment specifications, use the following color code and inscriptions:

<b>Tag</b>	<b>Inscription(s)</b>	<b>Color</b>
ON	ON	Green
OFF	OFF	Red
OPEN	OPEN	Green
CLOSED	CLOSED	Red
LOW	LOW	Amber
FAIL	FAIL	Amber
HIGH	HIGH	Amber
AUTO	AUTO	White
MANUAL	MANUAL	Yellow
LOCAL	LOCAL	White

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<b>Tag</b>	<b>Inscription(s)</b>	<b>Color</b>
REMOTE	REMOTE	Yellow
FORWARD	FORWARD	Red
REVERSE	REVERSE	Blue

2. Lettering: Black on white and amber lenses; white on red and green lenses.
3. Standard Pushbutton Colors and Inscriptions:
  - a. Use following unless otherwise noted:

<b>Tag Function</b>	<b>Inscription(s)</b>	<b>Color</b>
OO	ON OFF	Black Black
OC	OPEN CLOSE	Black Black
OCA	OPEN CLOSE AUTO	Black Black Black
OOA	ON OFF AUTO	Black Black Black
MA	MANUAL AUTO	Black Black
SS	START STOP	Black Black
RESET	RESET	Black
EMERGENCY STOP	EMERGENCY STOP	Red

- b. Lettering Color:
  - 1) Black on white and yellow buttons.
  - 2) White on black, red, and green buttons.

2.09 ELECTRICAL SURGE AND TRANSIENT PROTECTION

- A. Equip control panels with surge-arresting devices to protect equipment from damage as a result of electrical transients induced in interconnecting lines from lightning discharges and nearby electrical devices.



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B. Suppressor Locations:

1. At point of connection between an equipment item, including ac powered transmitters, and power supply conductor (direct-wired equipment).
2. On analog pairs at each end when the pair travels outside of building.
3. In other locations where equipment sensitivity to surges and transients requires additional protection beyond that inherent to design of equipment.

C. Suppressor Design:

1. Construction: First-stage, high-energy metal oxide varistor and second-stage, bipolar silicon avalanche device separated by series impedance; includes grounding wire, stud, or terminal.
2. Response: 5 nanoseconds maximum.
3. Recovery: Automatic.
4. Temperature Range: Minus 20 to 85 degrees C.
5. Enclosure Mounted: Encapsulated inflame retardant epoxy.

D. Suppressors on 120V ac Power Supply Connections:

1. Occurrences: Tested and rated for a minimum of 50 occurrences of IEEE C62.41 Category B test waveform.
2. First-Stage Clamping Voltage: 350 volts or less.
3. Second-Stage Clamping Voltage: 210 volts or less.
4. Power Supplies for Continuous Operation:
  - a. Four-Wire Transmitter or Receiver: Minimum 5 amps at 130V ac.
  - b. All Other Applications: Minimum 30 amps at 130V ac.

E. Suppressors on Analog Signal Lines:

1. Test Waveform: Linear 8-microsecond rise in current from 0 amp to a peak current value followed by an exponential decay of current reaching one-half the peak value in 20 microseconds.
2. Surge Rating: Tested and rated for 50 occurrences of 2,000-amp peak test waveform.
  - a. dc Clamping Voltage: 20 to 40 percent above operating voltage for circuit.
  - b. dc Clamping Voltage Tolerance: Plus or minus 10 percent.
  - c. Maximum Loop Resistance: 18 ohms per conductor.

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F. Manufacturers and Products:

1. Analog Signals Lines:
  - a. Emerson Edco; PC-642 or SRA-64 series.
  - b. Or approved equal.
2. 120V ac Lines:
  - a. Emerson Edco; HSP-121.
  - b. Or approved equal.
3. 480-Volt, Three-phase Power Supplies:
  - a. Square D; Model SDSA3650.
  - b. Or approved equal.
4. Field Mounted at Two-wire Instruments:
  - a. Encapsulated in stainless steel pipe nipples.
  - b. Emerson Edco; SS64 series.
  - c. Or approved equal.
5. Field-mounted at Four-wire Instruments: With 120V ac outlet, ac circuit breaker, and 10-ohm resistor on signal line, all in enclosure.
  - a. Enclosure:
    - 1) NEMA 4X, Type 316 stainless steel with door.
    - 2) Maximum Size: 12 inches by 12 inches by 8 inches deep.
  - b. Emerson Edco; SLAC series.
  - c. Or approved equal.

G. Grounding:

1. Coordinate surge suppressor grounding in field panels and field instrumentation as specified in Section 26 05 26, Grounding and Bonding for Electrical Systems, and suppressor manufacturer's requirements.
2. Provide control panels with an integral copper grounding bus for connection of suppressors and other required instrumentation.

**PART 3 EXECUTION**

3.01 ELECTRICAL POWER AND SIGNAL WIRING

- A. Restrain control and signal wiring in control panels by plastic ties or ducts. Secure hinge wiring at each end so bending or twisting will occur around the longitudinal axis of wire. Protect bend area with a sleeve.
- B. Arrange wiring neatly, cut to proper length, and remove surplus wire. Install abrasion protection for wire bundles passing through holes or across edges of sheet metal.

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- C. Use manufacturer's recommended tool with sized anvil for crimp terminations. No more than one wire may be terminated in a single crimp lug. No more than two lugs may be installed on a single screw terminal.
- D. Do not splice or tap wiring except at device terminals or terminal blocks.

3.02 PROTECTION

- A. Protect enclosures and other equipment containing electrical, instrumentation and control devices, including spare parts, from corrosion through the use of corrosion-inhibiting vapor capsules.
- B. During Work, periodically replace capsules in accordance with capsule manufacturer's recommendations. Replace capsules at Substantial Completion.

**END OF SECTION**

**SECTION 44 22 23  
THICKENING CENTRIFUGES**

**EQUIPMENT AND COMPONENT NUMBERS**

Centrifuges	76-TC-01 through 76-TC-05
Control Panels	76-TC-01.LCP through 76-TC-05.LCP
VFD Panels	76-TC-01.VFD through 76-TC-05.VFD

**PART 1 GENERAL**

1.01 WORK OF THIS SECTION

- A. This section covers the Work necessary to provide five thickening centrifuges, including centrifuge control and variable frequency drive (VFD) panels and all appurtenances as specified herein.

1.02 GENERAL

A. Related Sections:

1. Section 26 20 00, Low-Voltage AC Induction Motors.
2. Section 26 29 23, Low-Voltage Variable Frequency Drive System.
3. Section 40 99 90, Package Control Systems.

- B. Unit Responsibility: A single centrifuge manufacturer shall be responsible for supplying the centrifuge equipment, complete with all accessories and appurtenances (including, but not necessarily limited to, electric motors, variable speed drives, control panels, VFD panels, shafting, safety guards, speed reducers, and spare parts) and for the design, assembly, delivery, installation supervision, startup, and testing of the centrifuge equipment. The centrifuge manufacturer shall furnish all components and accessories of the system to enhance compatibility, ease of operation and maintenance, and as necessary to place the equipment in operation in conformance with the specified performance, features, and functions. The centrifuge equipment shall be produced and assembled by the manufacturer at a facility owned and operated by the manufacturer and under the direct supervision and control of the manufacturer.

- C. Like items of equipment provided hereunder shall be the end products of one manufacturer in order to achieve standardization for operation, maintenance, spare parts, and manufacturers' services.

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- D. General Requirements: See Division 1, General Requirements, which contains information and requirements that apply to the Work specified herein and are mandatory for this project.
- E. AC Induction Motor Requirements: Conform to the requirements of Section 26 20 00, Low-Voltage AC Induction Motors.
- F. Variable Frequency Drive Requirements: Conform to the requirements of Section 26 29 23, Low-Voltage Variable Frequency Drive System. Coordination shall include a letter from the VFD supplier verifying the compatibility of the VFDs with the motor and coordination of VFD sizing requirements.
- G. Control System Requirements: Conform to the requirements of Section 40 99 90, Package Control Systems.
- H. The control functions contained and described herein are intended to provide proposed minimum performance requirements. They do not necessarily identify each and every control function, connection, communications, or equipment to achieve the requirements. Additional specificity and details shall be coordinated at time of submittals.

### 1.03 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
  - 1. Anti-Friction Bearing Manufacturers Association (AFBMA).
  - 2. American Gear Manufacturers Association (AGMA).
  - 3. American National Standards Institute (ANSI).
  - 4. American Society of Mechanical Engineers (ASME): PTC-36, Measurement of Industrial Sound.
  - 5. American Welding Society (AWS).
  - 6. ASTM International (ASTM): G65, Procedure A, Standard Practice for Conducting Dry Sand/Rubber Wheel Abrasion Tests.
  - 7. British Standards Institute (BSI): BS 5490.
  - 8. German Industrial Standards (DIN).
  - 9. Institute of Electrical and Electronics Engineers (IEEE).
  - 10. Instrument Society of American (ISA).
  - 11. National Electric Code (NEC).
  - 12. Occupational Safety and Health Act (OSHA).

### 1.04 SUBMITTALS

- A. Submittals shall be made in accordance with Section 01 33 00, Submittal Procedures. In addition, the specific information listed below shall be provided.

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B. Action Submittals:

1. Shop Drawings:
  - a. Documentation of modifications to the manufacturer's standard design to meet the requirements specified in this Section and where the manufacturer's standard design does not comply with the specified performance, features, functions, and materials of construction specified herein.
  - b. Make, model, weight, and horsepower of each equipment assembly.
  - c. Manufacturer's catalog information, descriptive literature, specifications, and identification of materials of construction for the centrifuge, drive motor, backdrive motor, variable speed drives, control panel, VFD panel, power supply, lubrication system, and flexible connectors. Provide listing of materials of construction to match the listing in Article Materials.
  - d. Data on the characteristics and performance of the units to indicate ability to meet the system performance specified herein, including back drive gear box rated torque capacity and torque capacity required to meet performance requirements.
  - e. Detailed mechanical drawings showing the equipment fabrications and interface with other items. Include:
    - 1) Dimensions, size, and locations of connections to other work, and weights of equipment associated therewith.
    - 2) Foundation drawings showing anchor bolt layouts and locations with seismic anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.
    - 3) Recommended anchor bolt sizes.
    - 4) Weights of individual pieces of equipment and live (dynamic loads) created by the total weight of each centrifuge and ancillary equipment.
    - 5) Scroll hard surfacing materials and coverage.
    - 6) Sizes and locations of space for incoming and outgoing conduits.
    - 7) Minimum clearance distances around equipment required to access equipment for service/repair/removal and high hook elevation necessary for hoisting equipment.
    - 8) Control panel and VFD panel drawings showing panel size and sizes and locations of raceway connections.
  - f. Bill of materials listing major system components, special tools, and spare parts.
  - g. Outside utility requirements such as air, water, power, drain, etc., for each component.

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- h. Calculated AFBMA L-10 bearing life and type of lubrication recommended for all equipment.
- i. Design data for the following:
  - 1) Main drive motor sizing.
  - 2) Backdrive motor sizing.
  - 3) Main drive sheave and belt sizing.
  - 4) Variable frequency drive sizing.
  - 5) Main bearings.
  - 6) Maximum measured sound power levels at 3 feet, all sides of equipment.
  - 7) Heat transfer to room from centrifuge, control panel, and VFD panel.
- j. Motor submittals in conformance with Section 26 20 00, Low-Voltage AC Induction Motors.
- k. VFD submittals in conformance with Section 26 29 23, Low-Voltage Variable Frequency Drive System.
- l. Certificate(s) demonstrating that the centrifuge production and assembly facilities are currently ISO 9001 certified.
- m. Functional description of internal and external instrumentation and controls to be supplied including list of parameters monitored, controlled, or alarmed.
- n. Sequential description of operation under various modes of control, describing the complete control circuit and equipment operation and logic, including interlocks and permissives.
- o. Description of all automatic shutdown features and interfaces with the plant instrumentation and control systems, in both word and schematic form. Standard Instrument Society of America symbols shall be used on all schematics.
- p. Control and VFD Panel interconnection diagrams showing wiring interconnections between all centrifuge system components and between centrifuge system components and remote components provided by others.
- q. Control and VFD Panel Elevation Drawings showing construction and placement of operator interface devices and other elements.
- r. Instrumentation and Control Submittals: In conformance with Section 40 99 90, Package Control Systems.
- s. Power and control wiring diagrams including terminals and numbers.
- t. Shop and field painting systems proposed: Include Manufacturer's descriptive technical catalog literature and specifications, and hazardous communication data sheets.

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2. Samples:
  - a. Submit the following items with the Shop Drawings:
    - 1) Scroll abrasive resistant tile, quantity of two.

C. Informational Submittals:

1. Factory Quality Control Submittals:
  - a. Obtain Engineer's review and approval of the information listed below prior to equipment shipment.
  - b. Manufacturer's Certificate of Compliance.
  - c. Factory test results, reports, and certifications. Include:
    - 1) Functional Test Reports and Certificates.
    - 2) Vibration Test Reports and Certificates.
    - 3) Noise Test Reports and Certificates.
    - 4) For each ac motor, provide a certified copy of a test report for an identical motor tested in accordance with NEMA MG 1-12.53a and IEEE Standard 112, Test Method B. The test report shall show full-load efficiency and power factor meeting or exceeding the specified minimum guaranteed values. Motors not as specified will be rejected.
    - 5) Certified Scratch Abrasion Test results of the abrasion protection tiles.
  - d. Submit certified copies of mill test results for the stainless steel castings and abrasion-resistant materials. The test reports shall certify that the materials supplied are in accordance with the applicable standards and shall include:
    - 1) The actual material analysis.
    - 2) Applicable standards.
    - 3) Date of manufacture.
    - 4) Place of manufacture.
    - 5) Manufacturer's name.
    - 6) Markings on the materials to denote the batch number.
    - 7) Mechanical property test for parts of the rotating assembly subject to stress.
  - e. Test results of the control panels and VFD panels for proper operation, construction, electrical connection, and function.
  - f. Shipping, storage and protection, and handling instructions.
  - g. Manufacturer's written/printed installation instructions.
  - h. Routine maintenance requirements prior to plant startup.
2. Operation and Maintenance Manual with Maintenance Summary Form shall be provided in accordance with Section 01 78 23, Operation and Maintenance Data, and the following requirements:
  - a. Operation, maintenance, recommended spare parts, and renewal parts information for all equipment furnished under this Section.



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- b. Set of complete as-reviewed Shop Drawing submittals.
  - c. As-built electric and instrumentation and control wiring diagrams and equipment drawings.
  - d. Index of all equipment suppliers listing current names, addresses, and telephone numbers of those who should be contacted for service, information, and assistance.
  - e. Detailed operational procedures including step-by-step startup, normal operation, shutdown, and troubleshooting procedures.
  - f. Detailed preventative maintenance requirements and recommended schedule.
3. Seismic anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
4. Equipment Testing Procedure Submittals: Centrifuge manufacturer shall submit test procedures for the following tests for review, comment, and approval at least 30 days in advance of the notice to conduct the testing:
- a. Functional Testing.
  - b. Pre-Performance Testing.
  - c. Performance Testing.
  - d. Optimization.
5. Field Quality Control Submittals:
- a. Obtain Engineer’s review and approval of the information listed below prior to Project completion. Centrifuge manufacturer shall submit test reports within 20 days after completing field testing.
  - b. Field test results, reports, and certifications. Include:
    - 1) Functional Test Report and Certificates.
    - 2) Manufacturer’s Certificate of Equipment Installation Services.
    - 3) Pre-Performance Test Report and Certificates.
    - 4) Performance Test Report and Certificates.
    - 5) Vibration Test Certificates.

1.05 EXTRA MATERIALS

A. Spare Parts and Special Tools:

<u>Item</u>	<u>Quantity</u>
Plate Dams	One complete set per centrifuge
Sheaves	One complete set
Drive Belts	Two complete sets
Main Bearings	Two complete sets
Scroll Conveyor Bearings	Two complete sets

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<u>Item</u>	<u>Quantity</u>
Thrust Bearings, Seals, and Lock Washers	Two complete sets
Gaskets, O-rings, and Seals	Two complete sets
Speed Proximity Sensors	Two complete sets
Scroll Conveyor Tiles	Twenty (20)
Replacement Indicating Lamps	One complete set

B. Tools and Accessories:

1. Provide manufacturer’s recommended special tools and accessories required to assemble and disassemble installed centrifuges, including the minimum following items:
  - a. Bowl lifter, including spreader beam, shackles, and ratchet straps, suitable for bowl removal.
  - b. Bowl truck.
  - c. Conveyor lifter.
  - d. Straps for lifting of machine top case.
  - e. Straps for lifting of drive motor assembly.
  - f. Straps for lifting of gearbox.
  - g. Tools for removal/installation of conveyor and thrust bearings.
  - h. Tools for plate dam adjustment/replacement.
  - i. Lifting eyes for hoisting of main drive pillow block bearings.
  - j. Set of Universal Tools:
    - 1) Set of spanners.
    - 2) Set of hex-keys.
    - 3) Standard pliers.
    - 4) Needle-nose pliers.
    - 5) Large standard screwdriver.
    - 6) Small standard screwdriver.
    - 7) Large Phillips screwdriver.
    - 8) Small Phillips screwdriver.
    - 9) Socket set with ratchet.
    - 10) Open-end wrench set.
    - 11) Snap-ring remover.
    - 12) Torque wrench, clicker type.

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- C. Lubricants: All necessary lubricants shall be provided for the initial startup of the centrifuge equipment. Lubricants and filters shall be provided and changed by the manufacturer as frequent as required during the period between successfully completed functional testing and equipment acceptance, up to a maximum period of 12 months. New lubricants and filters shall be furnished and installed by manufacturer at Substantial Completion. After acceptance and substantial completion, the Owner will be responsible for changing the lubricants according to the schedule provided by the manufacturer.
- D. Delivery: In accordance with Section 01 61 00, Common Product Requirements.

1.06 SAFETY REQUIREMENTS

- A. All equipment furnished shall be designed and manufactured with due regard to safety of operation, accessibility, and durability of parts, and shall comply with all applicable Occupational Health and Safety Act, federal, state, and local safety regulations.

1.07 SPECIAL GUARANTEE

- A. Provide manufacturer's extended guarantee or warranty, with Owner named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or removal and replacement of Work provided under this Specification section (including but not limited to the centrifuge, drive motors, gear box or scroll drive, control panel, VFD panel, and variable frequency drives) found defective during a warranty period of 3 years. With the exception of warranty period, all other requirements specified in Article 36 of the General Conditions remain in effect. Duties and obligations for correction or removal and replacement of defective Work shall be as specified in the General Conditions.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. Each centrifuge system shall consist of a solid bowl, horizontal, continuous feed, scroll type unit, and shall be specifically designed to meet the performance requirements for the sludges specified herein. Each unit shall be capable of continuous operations with a minimum of maintenance.
- B. Each centrifuge system shall be equipped with:
  - 1. Variable speed electric main drive motor assembly.
  - 2. Belt guards.
  - 3. Variable speed electrical backdrive.

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4. Lubrication system for the rotating assembly's main bearings.
  5. Vibration isolators.
  6. Flexible connectors, necessary for all mechanical and electrical connections.
  7. Feed, Polymer, Centrate and Thickened Solids sampling provisions.
  8. Control and VFD panel and instrumentation and controls specified herein.
  9. Main drive and backdrive variable frequency drives.
- C. All equipment shall be suitable and rated for the electrical classification required as shown in the Area Classification Table on Drawings and the Area Classification envelopes shown on Drawings.
- D. The centrifuge equipment shall be suitable for installation in the existing building. In addition, the removal and replacement of the largest centrifuge components for maintenance shall be able to be accomplished with the existing building's 20-ton overhead crane and utilizing the dimensioned floor openings shown on Drawings.

2.02 MANUFACTURER

- A. Centrifuge manufacturer's production and assembly facilities shall be ISO 9001 certified.
- B. The centrifuge manufacturer shall have experience providing centrifuges meeting the requirements of this Specification.
- C. Modifications to Standard Equipment Model Offerings:
  1. Listing of a centrifuge manufacturer within this section shall not be justification for acceptance of the manufacturer's standard centrifuge model offering.
  2. Equipment provided by a listed manufacturer shall be furnished, modified as necessary, to conform to the performance, functions, features, and materials of construction as specified herein.
- D. The centrifuges shall be from one manufacturer: Alfa-Laval, Inc.

2.03 SERVICE CONDITIONS

- A. The centrifuges, control panels, and VFD panels, and appurtenances shall be suitable for exposure to continuous 95 percent relative humidity conditions, for operation in ambient air temperature from 50 to 104 degrees F, for exposure to intermittent water or sludge splash and spill conditions, and for continuous operation at a site elevation of approximately 400 feet above sea

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level. Equipment shall be rated for the area classification in which it is located. Refer to Drawings for delineation of area classification.

- B. Design Feed Sludge: This is the sludge that will be available during performance testing to meet the performance requirements specified herein. The sludge will be a mixture of raw waste activated sludge (WAS) and chemically enhanced primary sludge (PS). The characteristics of the sludge are summarized in the table below:

Parameter	Value
Nominal Sludge Composition, Total Dry Solids Weight Basis	75% chemically enhanced primary sludge, 25% raw WAS
Sludge Feed Concentration, % Total Dry Solids Exclusive of Polymer	0.5 % to 1.3 %
Sludge Volatile Solids Concentration, % Volatile Solids Dry Weight Basis	75 % to 90%

- C. The sludge to be processed will be fed to each centrifuge from a dedicated, adjustable speed progressing cavity feed pump. Polymer solution will be pumped by a dedicated polymer feed pump and injected at the centrifuge feed tube.

## 2.04 PERFORMANCE REQUIREMENTS

- A. The centrifuges shall continuously receive, condition, and thicken the feed sludges specified herein, and continuously discharge the thickened solids into the thickened sludge wet well. Each unit shall be able to operate continuously on demand; shall be suitable for thickening the specified sludges continuously for up to 24 hours per day, 7 days per week; and shall operate without spillage of sludge beyond the nominal solids discharge chute and piping envelope or spillage of centrate beyond the liquid (centrate) discharge chute and piping envelope.
- B. Manufacturer shall guarantee that the centrifuge equipment shall be capable of the minimum performance requirements specified below for Design Feed Sludge, to be confirmed via the field performance testing specified herein while operating with that sludge stream.
- C. The goal of the specified Optimization Testing is to maximize the percent total dry solids produced and minimize polymer dose used by the centrifuge equipment. This will reduce the Owner’s operating cost of sludge thickening. The target performance criteria for this effort are listed in the table below under appropriate performance targets using Design Feed Sludge.

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D. Performance Requirements:

Parameter	Design Feed 75% CEPT – 25% WAS
Feed Hydraulic Loading Rates <sup>(1)</sup> , gpm	1,200 gpm @ 0.5%
Minimum Thickened Solids Concentration, % Total Dry Solids	6.5%
Minimum Total Solids Capture, %	92%
Maximum Polymer Dose, lbs Active per Dry Ton of Feed Solids	8 lbs active / dry ton
Maximum Hydraulic loading rate <sup>(1)</sup> , gpm	1,200 gpm
1. Operating hydraulic loading range per centrifuge of 600 to 1,200 gpm at 0.5 to 1.3% solids.	

E. Solids Capture:

$$\% \text{ Capture} = \frac{T}{F} \times \frac{F - C}{T - C} \times 100$$

Where: T = Thickened solids total solids concentration (mg/L).  
 F = Feed sludge total solids concentration, excluding any dilution due to polymer solution addition (mg/L).  
 C = Centrate total suspended solids concentration, excluding any dilution due to polymer solution addition and centrifuge purge water (mg/L).

F. Polymer: Make-down of a polymer solution will be from only bulk Mannich cationic polymers. A different polymer may be used for each of the sludge streams specified in Article Service Conditions.

2.05 EQUIPMENT DESCRIPTION

A. The centrifuges shall be of the high-speed, dry solids, solid bowl horizontal, continuous feed, scroll conveyor type specifically configured for thickening only applications and intended to produce thickened solids with a higher solids content than that produced with conventional centrifuges. No disc type or nozzle bowl type or basket type centrifuges will be allowed. The centrifuges shall be designed to limit air leakage into or from the body of the centrifuges by providing gaskets on the casing flange and labyrinth-type seals on both hub ends. The centrifuge equipment shall be designed and built to operate continuously. A variable frequency drive (VFD) main drive system shall be provided to drive each centrifuge rotating assembly. An VFD

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backdrive system shall be supplied with each centrifuge to provide speed variation between the conveyor and the centrifuge bowl. The centrifuges shall be designed to be mounted on a steel frame allowing discharge into a discharge chute directly beneath the centrifuge bowl.

## 2.06 MATERIALS

A. Materials of Construction: Unless otherwise specified, materials shall conform to the following:

1. Bowl: Stainless steel, Type 316 or 317 or ANSI SC-2205 duplex stainless steel centrifugal castings.
2. Bowl Wear Strips: Stainless steel, Type 316, and/or replaceable ribbed bowl liner or bowl strips (stainless steel, Type 316, minimum 3 mm thickness), or longitudinal grooves.
3. Scroll Conveyor: Stainless steel, Type 316 or ANSI SC-2205 duplex stainless steel.
4. Scroll Conveyor Tips: Sintered Tungsten Carbide tiles<sup>(1)</sup> and flame sprayed tungsten carbide hard surfacing.
5. Feed Tube: Stainless steel, Type 316.
6. Base: Fabricated carbon steel or cast steel with replaceable stainless steel cladding on all surfaces in contact with process material.
7. Upper Case: Stainless steel, Type 316 or fiberglass reinforced plastic (FRP).
8. Bottom Case: For all surfaces in contact with the process material, from the liquid to solids discharge shall be stainless steel or fabricated carbon steel with stainless steel cladding or cast steel with stainless steel cladding.
9. Main Centrifuge Bearings: Grease lubricated, L-10 life of 100,000 hours minimum.
10. Scroll Conveyor Bearings: Grease lubricated, L-10 life of 100,000 hours minimum.
11. Feed Compartment: Stainless steel, Type 316 or 317 or duplex stainless steel.
12. Feed Compartment Liner: Either constructed of corrosion resistant, hardened material or equipped with field replaceable Adiprene, ceramic or Urethane liner or Flame Sprayed Coast 53C, or equal, including axial walls.
13. Sludge Feed Nozzles: Replaceable Solid Sintered Tungsten Carbide<sup>(1)</sup>.
14. Solids Discharge Nozzles: Replaceable Solid Sintered Tungsten Carbide<sup>(1)</sup>.
15. Case Protection, Solids Discharge End: Field Replaceable Adiprene, Urethane, or Type 316 stainless steel liner, or equal.

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16. Fasteners (Wetted): Minimum Type 316 stainless steel.
17. Anchor Bolts, Nuts and Washers: Stainless steel, Type 316, minimum 3/4 inch in diameter for all anchor bolts under the centrifuge frame.
18. Solids and Centrate Discharge Hoppers: Stainless steel, Type 316 with a UHMW liner no less than 1/4-inch thick.

(1) All sintered tungsten carbide abrasion resistant materials shall be tested in accordance with the ASTM G65, Procedure A, Standard Practice for Conducting Dry Sand/Rubber Wheel Abrasion Tests with volume loss less than 3 cubic millimeters.

## 2.07 BOWL

- A. The bowl shall be designed to withstand, with an adequate factor of safety, all forces encountered during operation. The bowl shall be supported on each end by pillow block bearings.

1. Bowl Inside Diameter: Minimum 39 inches.
2. Bowl Inside Length: Minimum 149.
3. Bowl Length to Diameter Ratio: Minimum 3.75.
  - a. G-volume: Minimum 450,000 gallons, as calculated using the formula shown below:
  - b. G-volume calculated by the following formula:

$$\text{G-volume} = K\omega^2 D_b L_c (D_b^2 - D_d^2)$$

Where:  $K$  = constant equal to  $4.83 \times 10^{-8}$   
 $\omega$  = operating speed, rpm  
 $D_b$  = bowl diameter, inches  
 $D_d$  = thickened solids discharge diameter, inches  
 $L_c$  = length of bowl cylinder, inches

Provide values for each variable for the given centrifuge unit.

4. Normal Operating Speed: Minimum 2,200 rpm to maximum 3,000 rpm.
5. The minimum bowl wall thickness shall be 0.7 inches. All surfaces shall be examined for cracks, shrinkage, porosity, or other defects by means of a liquid penetrant test.
6. Pool depth level must be readily adjustable via power tubes located at the large diameter end of the bowl where liquid is discharged.
7. Solids shall be conveyed through a conical section of the bowl and discharged from the small diameter end of the bowl through multiple solids discharge ports spaced evenly around the bowl end. Solids discharge ports shall be protected against abrasion by field replaceable, weight balanced, mechanically attached wear nozzles manufactured of Sintered Tungsten Carbide.



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8. Centrifugally cast bowls shall be 100 percent dye penetrant inspected. Casting certificates for each component will be required. Rolled and welded or statically cast bowls shall not be allowed.
9. A replaceable ribbed liner from two wraps beyond the feed zone (towards the liquid end), or minimum of eight evenly spaced longitudinal bowl strips the entire length of the bowl, or longitudinal grooves the entire length of the bowl, to trap solids and form a layer to protect the bowl from wear shall be provided.
10. Material to be processed shall be introduced to the bowl through a compartment which shall evenly distribute the feed. The feed compartment shall be protected against abrasion.

2.08 SCROLL CONVEYOR

- A. Each centrifuge shall include a horizontal cylindrical-conical scroll conveyor supported by anti-friction bearings and equipped with helical flights independently mounted concentrically within the centrifuge bowl. Bearings shall have externally greased fittings.
- B. Conveyor shall include solids feed ports protected against abrasion by field replaceable, weight balanced, mechanically attached wear nozzles manufactured of Sintered Tungsten Carbide.
- C. The conveyor edge and face of the flights shall be protected against abrasion by a series of welded-on sintered tungsten carbide tile assemblies, with coverage from two wraps beyond the feed zone (towards the liquids discharge end) through to the solids discharge end. Each tile assembly shall be weight correct, and consist of a solid sintered tungsten carbide wear part attached to a stainless steel backup holder. Spray hard surfacing applied to a backup plate is not allowed. Each assembly shall be individually replaceable, and shall include the ability to monitor wear by means of visual inspection. The tile assemblies shall extend a minimum of 0.3 inches beyond the radial edge of the conveyor flight. The remaining scroll conveyor edge and face shall be protected from abrasion by flame sprayed hard surfacing containing a minimum of 40 percent tungsten carbide particles.
- D. After attachment of the abrasion protection tiles on the back up plate flighting, each tile shall be individually torque tested at a minimum shear stress of 5,000 psi, by the means of a torque wrench, or other equivalent method. No total detachment, visible or residual deformation, or carbon cracking shall be noticed after the test. If not so, the tile shall be removed and a new one attached in its place and the torque test repeated. The manufacturer shall keep and submit a record of this test.

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- E. All sintered tungsten carbide tiles shall be able to meet ASTM G65 Test Procedure A with a volume loss as specified in Article Factory Tests.

2.09 CASE

- A. Each centrifuge shall be enclosed in a fabricated case, the purpose of which shall be to contain and direct the solids and liquid discharge from the centrifuge, to act as a protective guard, and to provide complete enclosure for noise reduction and odor control. The casing assembly shall be provided with a Type 304/316 stainless steel or FRP upper case per manufacturer's standard, specifically designed for rigidity and noise reduction, and Type 304/316 stainless steel cladding on wetted parts in the lower casing. The case top shall be bolted in place. Lifting eyes shall be provided for lifting of the case top.
- B. A flanged and gasketed seal shall be provided between the upper and lower case components. Flange bolts shall be stainless steel.

2.10 FRAME

- A. Each centrifuge shall be supported individually on a fabricated carbon steel or combination cast iron and steel base which shall in turn be mounted on vibration isolators. The centrifuge frame shall not be artificially weighted to dampen vibration.
- B. The vibration isolators shall be provided to isolate the centrifuge from the building structure. The number, capacity, and vibration constant of the isolators shall be selected by the manufacturer for the load and impact resulting from operation of the centrifuge provided.
- C. The bottom portion of the frame shall be provided with machined outlets for the attachment of the solids and centrate flexible connectors.

2.11 MAIN DRIVE SYSTEM

- A. For each centrifuge system, the bowl drive system shall consist of an electric main drive motor with variable frequency drive and direct drive system complete with necessary vibration isolators for the individual support of the motor and centrifuge.

2.12 GEAR BOX

- A. Gear Box: Either 1) a two-gear conveyor drive system consisting of a primary cyclo gear and a secondary cyclo gear; or 2) a one-stage cyclo reducer; or 3) a two-stage planetary gear unit shall maintain a differential speed between the conveyor and bowl. Each of the above devices shall be suitable for 24-hour per day continuous service. The gear box shall have a torque capacity

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to meet the specified service conditions and performance requirements with the design required torque not to exceed 80 percent of the gear box full rated torque capacity. Gear boxes shall be capable of withstanding a 500 percent momentary overload and 150 percent intermittent overload. A torque overload control shall be provided to initiate centrifuge shutdown in the event of conveyor overload. Manufacturer shall select the reduction gear ratio as required for the solids to be handled and to be consistent with satisfactory operation. The gear unit shall be oil lubricated with its housing serving as a lubricant reservoir.

2.13 BACKDRIVE SYSTEMS

- A. Provide an variable frequency drive (VFD) backdrive system for each centrifuge. Backdrives utilizing hydraulic drives shall not be acceptable. If a regenerative type backdrive system is provided, the motor sizes specified herein may change as well as the associated electrical supply. The Contractor shall be responsible for all required changes.
- B. An inverter duty backdrive motor shall be supplied and connected to the pinion shaft of the differential gear box, if a gear box is supplied. Backdrive system shall provide step-wise or infinite speed variation between the conveyor and the bowl shell of the centrifuge.
- C. The backdrive systems shall be capable of operating in a DIFFERENTIAL or TORQUE control mode that provides for operation at specific adjustable scroll/bowl differential speeds or backdrive torque values. In the DIFFERENTIAL control mode, the backdrive system shall provide for operation at a specific, adjustable scroll differential speed with internal torque allowed to vary up to the maximum allowable scroll shaft torque. In the TORQUE control mode, the backdrive system shall continuously monitor changes in internal torque created by variations in influent feed solids and automatically maintain a preset torque input to the scroll by allowing the differential speed to vary.
- D. The backdrive control system shall provide for automatic shutdown in the event that excessive torque is detected. Torque shall be measured as a function of input in the drive unit. In the event that torque exceeds the normal operating range, monitoring instrumentation shall detect this condition and stop the sludge feed to allow the machine to clear itself. The torque monitoring system shall automatically reset when the torque approaches the normal operating range. In the event that the torque approaches the limit of the backdrive, the centrifuge's controller shall initiate centrifuge shutdown and shutdown of both sludge and polymer feeds.

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2.14 FASTENERS

- A. All internal fasteners furnished with the centrifuges which are subject to contact with sludge, centrate, or vapors of wash water and wastewater shall be a minimum Type 316 stainless steel.

2.15 BEARINGS

- A. The entire rotating assembly of each centrifuge shall be supported by two main bearings. Each main bearing shall be grease lubricated ball or cylindrical roller type bearings. Main bearings shall be housed in one piece pillow blocks with dowel pins for proper alignment. Provide each pillow block bearing with a threaded female connection to permit the use of a lifting eye to facilitate inspection and maintenance.
- B. Scroll conveyor bearings shall be anti-friction ball or roller type bearings sealed from process contamination. Bearings shall have external grease fitting for lubrication. Permanently lubricated bearings shall not be allowed.
- C. Bearings shall have an DIN ISO 281 life of 100,000 hours minimum.

2.16 GUARDS

- A. Fabricated guards shall be provided for all gear boxes, pulleys, and belt drives.
  - 1. Guards shall be 11-gauge minimum thickness Type 304 stainless steel.
  - 2. The guards shall meet OSHA standards and completely enclose the rotating parts of drive system and shall be designed to minimize vibration and noise.
  - 3. Guards, except for the main drive motor, shall have 1-inch diameter holes coincident with the shafts of all equipment to allow the shaft speed to be checked.
  - 4. Fasteners shall be externally accessible.

2.17 FEED TUBE

- A. Sludge shall be fed to the centrifuge by means of a removable feed tube suitable to minimize turbulence. The feed connection to the centrifuge shall be a 6-inch, 150-pound ASME flange connection. The maximum inlet pressure required at the centrifuge inlet flange shall be 35 psig at 1,200 gpm (when based on water with the viscosity of 1 Centipoise). The feed tube shall also include a NPT connection for polymer.

2.18 FLEXIBLE CONNECTIONS

- A. All mechanical and electrical connections to the centrifuge equipment, including, but not necessarily limited to, the feed sludge, polymer, centrate and thickened solids connections, sample line, vents, and electrical raceways shall be equipped with flexible connections. All flexible connections shall isolate centrifuge vibrations from fixed, rigid external connections. No exterior loads shall be transferred to a centrifuge by external connections to the machine. Centrate and thickened solids flexible connections shall be flanged and fabricated from neoprene, with Type 316 stainless steel bolts with Type 316 stainless steel retainer plates at each end. Piping flexible connectors shall be metal reinforced elastomer with flanged connections. Tubing flexible connectors shall be metal reinforced hose with Type 316 stainless steel hose clamps. Flexible electrical connections shall be provided in accordance with Section 26 05 33, Raceway and Boxes.

2.19 SAMPLE CONNECTIONS

- A. Provide sampling connection for centrifuge feed sludge after polymer addition and before it enters the bowl.
- B. Centrate Sample Connection: Provide centrate discharge chute extension with integral functional centrate sample provisions/connection. Sample connection shall enable representative sampling while not interfering with the rotating elements of the centrifuge. Chute extension shall be located below the centrate flexible connection, flanged and fabricated from 1/4-inch thick Type 316 stainless steel, with flange to flange length of 6 inches. The sample connection shall be horizontal, centered vertically in the chute extension, and located in order to interface with the existing centrate sample sump. Sample connection shall be 2-inch, Type 316 stainless steel pipe. Provide tubing flexible connector between the sample piping and the sample sump piping connection. Coordinate tubing flexible connector length with Contractor.
- C. Thickened Sludge Sample Connection: Provide functional thickened sludge sample connection from the centrifuge case or manufacturer-provide chute extension bolted directly to the centrifuge discharge flange. Sample connection shall allow sampling from the centrifuge operating floor. Sample connection shall be a pipe inset integrally mounted through the centrifuge case or discharge chute extension located to enable representative sampling while not interfering with the rotating elements of the centrifuge. Thickened solids sample connection shall have a hinged cap and pipe insertion device.

2.20 NOISE

- A. Centrifuge shall be designed such that when running at the normal operating speed, the average noise level measured at 3 feet around the periphery of the

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complete centrifuge assembly shall not exceed 90 dBA, when tested at the manufacturing facility, without feed and with inlet and discharge connections sealed.

2.21 VIBRATION MONITORING SYSTEM

- A. A vibration monitoring system shall be provided for each centrifuge to perform the following functions:
1. Convert vibration into velocity.
  2. Sound a warning and initiate stop of sludge feed if the velocity reaches a certain preset level (HIGH).
  3. Sound a warning and shut the centrifuge down if the velocity reaches a separate pre-set level (HIGH HIGH).
  4. Provide an adjustable time delay during centrifuge startup to account for initial acceleration and feed induced vibration.
  5. Provide an adjustable time delay, not to exceed 5 seconds, during operation to account for momentary excursions due to process changes.
- B. Provide one sensor per pillow block bearing for each centrifuge and wired to a common terminal junction box.
- C. Each centrifuge, when running at the normal operating speed, shall not produce vibration velocities greater than 6.5 mm/sec at the main bearings when tested at the manufacturing facility without feed.

2.22 ELECTRICAL

- A. General:
1. Conform with Division 26, Electrical.
  2. Provide all necessary electrical components and wiring for a complete, functional system.
  3. All motor variable frequency drives for each centrifuge system shall be provided in associated VFD panel provided as part of this Section.
  4. Control panel and VFD panel and interior components shall be rated for continuous operation in 40 degrees C (104 degrees F) ambient conditions.
- B. Wiring: Size conductors and conduits for power circuits to the main and backdrive motors. Factory prewire (size, furnish, install, and connect) all skid mounted equipment control conductors and instrumentation cables to skid mounted terminal junction boxes for connection to the associated control panel and VFD panel by Division 26, Electrical. The electrical wiring requirements and proper documentation shall be included as part of the package system scope of supply. All conductors shall be stranded copper, and

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all wiring shall meet the requirements of NFPA 70, the 2008 National Electrical Code. Insulation shall be rated 600 volts, minimum. Low-voltage (24V) signals shall be run in 600-volt twisted shielded pair cable. Analog circuits shall not be mixed with power or discrete control circuits.

- C. Electrical Raceways: All conductors and cables not subject to vibration between prewired devices and skid-mounted terminal junction boxes shall be installed in PVC-coated rigid galvanized steel conduits. Flexible, nonmetallic, liquid-tight conduits shall be provided where flexible conduits are required. Conductors shall be stranded copper.
- D. Terminal Junction Boxes: All skid-mounted devices, except for motor leads, shall be prewired to skid-mounted terminal junction boxes (TJBs). Separate TJBs shall be provided for (a) 120V power and (b) 4 mA to 20 mA analog and 24V dc discrete signals. Size, furnish, and install NEMA 4X, Type 316 stainless steel TJBs on the centrifuge skid.
- E. Main Drive Motors:
  - 1. Provide squirrel-cage ac induction motors meeting the requirement of Section 26 20 00, Low-Voltage AC Induction Motors, and as specified herein.
  - 2. Motor shall meet the following specific requirements:
    - a. Motor Horsepower: 300.
    - b. Synchronous Speed: 1,800 rpm.
    - c. Voltage Rating: 460V, three-phase.
    - d. Enclosure Type: TEFC per Section 26 20 00, Low-Voltage AC Induction Motors.
    - e. Mounting: Horizontal.
    - f. Inverter duty rated motor.
  - 3. Provide motor modifications as follows:
    - a. With the motor at ambient temperature (COLD), it shall be capable of making two complete starts in succession with coasting to rest between starts within a 1-hour time period. With the motor running (HOT), it shall be capable of at least one restart within 1 hour after any shutdown. The motor insulation temperature classification shall not be exceeded.
    - b. The motor shall be of the quiet type design. The noise level shall not exceed 85 dBA sound pressure measured at 3 feet from the motor in all directions.
    - c. A motor thermal protection system consisting of six (two per phase) three-wire 100-ohm platinum resistance temperature detectors (RTDs) or bi-metallic thermostat. Bring the RTD leads out to a Type 316 stainless steel NEMA Type 4X junction box.

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- Provide temperature monitoring and overtemperature relay at the main drive VFD enclosure.
- d. Provide motor bearing temperature protection on each motor bearing. Provide 100 ohm three-wire platinum resistance temperature detectors (RTDs). Bring the RTD leads out to terminal blocks in a threaded cast aluminum junction box. Provide temperature monitoring and overtemperature relay at the main drive VFD enclosure.
- F. Main Drive VFDs: Each main drive motor shall be controlled by an variable frequency drive.
1. The system shall be sized in accordance with manufacturer's design requirements and shall be as specified in Section 26 29 23, Low-Voltage Variable Frequency Drive System.
  2. The motor shall be capable of delivering full load torque across a 10:1 turndown ratio.
  3. Drive system shall be capable of flying restart.
- G. Backdrive Motors:
1. Provide squirrel-cage ac induction motors meeting the requirements of Section 26 20 00, Low-Voltage AC Induction Motors, and as specified herein.
  2. Motor shall meet the following specific requirements:
    - a. Motor Horsepower: 40.
    - b. Synchronous Speed: 1,800 rpm.
    - c. Voltage Rating: 460V, three-phase.
    - d. Enclosure Type: TEFC per Section 26 20 00, Low-Voltage AC Induction Motors.
    - e. Mounting: Horizontal.
    - f. Inverter duty rated motor.
  3. Provide motor modifications as follows:
    - a. Provide bi-metallic thermostat for thermal protection.
    - b. Attach the motor to the pinion shaft of the differential gearbox via a coupling.
- H. Backdrive VFDs: Each backdrive motor shall be controlled by an variable frequency drive.
1. The backdrive system shall provide infinite speed variation between the scroll conveyor and bowl shell of the centrifuge.
  2. The system shall be sized in accordance with manufacturer's design requirements and shall be as specified in Section 26 29 23, Low-Voltage Variable Frequency Drive System.



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3. The motor shall be capable of delivering full load torque across a 10:1 turn down ratio.
4. Drive systems shall be capable of flying restart.

I. VFD Panels: Provide an VFD Panel for each centrifuge.

Panel Nos.	Name	NEMA Enclosure	Material
76-TC-01.VFD through 76-TC-05.VFD	Centrifuge VFD Panel	12	Painted Steel

1. Each VFD Panel shall be a freestanding enclosure, each containing the following:
  - a. A main circuit breaker with a through the door lockable handle.
  - b. VFD controls for main drive.
  - c. VFD controls for backdrive.
  - d. E-stop pushbutton.
  - e. Provide VFD panel with an external air conditioning device, to sustain the control panel in ambient air temperature conditions up to 115 degrees F. Air conditioning device shall be powered by a single 480V, 60-Hz circuit. Provide thermostat to control operation of the air conditioning device, so that device only provides cooling when panel interior temperature exceeds a preset and adjustable limit. The purpose of this device shall be to sustain the panel in the event that the building air conditioning system is out of service.
2. Variable frequency drives shall be sized in accordance with NEC and Division 26, Electrical.
3. The main circuit breaker shall be a 65,000 symmetrical amp thermal magnetic breaker sized in accordance with centrifuge system requirements.
4. Power Supply: 480-volt, three-phase, three-wire, 60-Hz.

2.23 CONTROLS

A. General:

1. In accordance with general control requirements specified in Section 40 99 90, Package Control Systems.
2. Instrumentation component qualities shall be in accordance with components specified in Section 40 90 00, Instrumentation and Control.
3. Provide centrifuge controls equipment in a dedicated compartment of the Control and VFD Panel specified herein, in Article Electrical.

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4. Control Panels: Provide a control panel for each centrifuge.

Panel Nos.	Name	NEMA Enclosure	Material
76-TC-01.LCP through 76-TC-05.LCP	Centrifuge Control Panels	4X	Type 304/316 Stainless Steel

5. The controls for all components of each centrifuge shall be provided by a dedicated programmable logic controller (PLC), mounted in each of the respective control panels. The PLC shall provide all control and monitoring functions as required for the operation and monitoring of the centrifuge including, but not limited to, timing, interlocks, startup sequencing, normal and emergency shutdowns, and permissive functions required for safe operation of each centrifuge.
- Programming Standards: All PLC programming for the centrifuge system shall not be proprietary in nature.
  - Critical field alarm instruments and contacts will be wired for failsafe operation where an open circuit will alarm. PLC communications and faults shall be monitored.
  - All indicating lights shall be in accordance with Section 40 99 90, Package Control Systems, with equipment tag numbering as specified herein and as shown on Drawings.
6. Provide uninterruptible power supply (UPS) backup power for all PLC and instrument components of the centrifuge control system. Size UPS to supply power for a minimum of 20 minutes.
7. PLC Manufacturer and Products: As specified in Section 40 99 90, Package Control Systems.
8. Provide Application software for all digital, programmable components of the centrifuge systems as specified in Section 40 99 90, Package Control Systems.
9. Provide Ethernet TCP/IP 100 Mbps network communications module to support communications between the PLC and the Owner’s Plant Control System network.

B. Control Panel Functions:

- Operator Interface Terminal (OIT):
  - Provide a panel-mounted OIT on each centrifuge control panel.
  - OIT Manufacturer and Product: As specified in Section 40 99 90, Package Control Systems.
  - The OIT for each centrifuge shall provide the primary method for an operator to monitor the status of the centrifuge and to affect its operation by command or directive entry. The OIT shall provide

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- the graphics-based interface between the operator and the centrifuge controller. The graphics and their layout/presentation shall be manufacturer's standard.
- d. The OIT shall provide all displays and control screens needed to safely and efficiently monitor and control the associated centrifuge system.
  - e. The OIT shall provide for selection of the following:
    - 1) Centrifuge Control Mode: LOCAL/REMOTE.
    - 2) Backdrive Control Mode: TORQUE/DIFFERENTIAL (in Local mode).
    - 3) Centrifuge Start (in Local mode).
    - 4) Centrifuge Stop (in both LOCAL and REMOTE modes).
    - 5) Centrifuge Clean-In-Place (CIP) initiation (In Local mode).
  - f. Display (at a minimum):
    - 1) Alarms.
    - 2) Status and control of each system component.
    - 3) Bowl speed.
    - 4) Backdrive gear shaft speed, if gearbox is supplied.
    - 5) Main drive motor amperage (rms value).
    - 6) Differential Speed: Scroll versus bowl.
    - 7) Bearing temperatures.
    - 8) Backdrive torque.
    - 9) Vibration.
    - 10) Centrifuge Control Mode: LOCAL/REMOTE.
    - 11) Backdrive Control Mode: TORQUE/DIFFERENTIAL.
    - 12) The specific shutdown condition.
    - 13) Sludge and polymer flow rates.
    - 14) All inputs from and outputs to the plant SCADA system.
  - g. The OIT shall have operator adjustable parameters for backdrive control. In addition, there should be one set of backdrive control parameters for use during cleaning or flush cycles. Backdrive control should be automatically changed to cleaning parameters in auto shutdown of the centrifuge or in CIP mode and return to the previous parameter set afterwards.
2. Controller Sequencing: Each centrifuge PLC shall contain all programming necessary to safely start and stop the associated centrifuge, in either the Local or Remote mode. The following minimum sequences and control shall be provided.
- a. Local/Remote: In the Local mode, centrifuge control shall only be available through the centrifuge control and VFD panel. All outputs to the plant SCADA system shall still be available in Local mode. In the Remote mode, Start, Stop, Backdrive Control mode, torque set point, differential set point, and other specified centrifuge controls shall be from the plant SCADA system.

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- b. Start: This command shall instruct the centrifuge control system to begin its start sequence. The centrifuge control system shall confirm the successful initiation and/or completion of each step in the startup sequence before continuing with the next step in the sequence.
- 1) The start sequence can only begin when the centrifuge feed pump and polymer feed pump are not running (OFF status).
  - 2) Provided all interlocks are in the normal state, the centrifuge control system shall bring the bowl and scroll up to speed and signal when proper conditions have been attained to begin feeding polymer and sludge.
  - 3) Initiate start of polymer and centrifuge feed pumps.
  - 4) Upon reaching an operator entered torque setpoint, initiate closing of the thickened solids transfer screw slide gate.
  - 5) If the start sequence is interrupted for any reason, including, but not limited to equipment failure, interlock failure, or manual (operator initiated) interrupt, the centrifuge controller shall generate a FAIL TO START alarm. Stop the centrifuge and polymer feed pumps, and allow the machine to coast to a standstill.  
If the start sequence is successful, discontinue monitoring interlock status of polymer feed and sludge feed.
- c. Normal Stop: This command shall instruct the centrifuge control system to begin its normal stop sequence. The centrifuge control system shall confirm the successful initiation and/or completion of each step in the stop sequence. If any step in the sequence fails, the centrifuge controller shall generate an alarm specifying the failed step.
- 1) Stop the centrifuge feed pump and polymer feed pump (disable ENABLE commands).
  - 2) Maintain a preset differential speed to clear the remaining thickened solids from the bowl.
  - 3) On the Stop Command, initiate opening the flush water valve to discharge to the centrate piping.
  - 4) Close the flush water valve after the machine reaches a preset bowl speed. The machine shall then coast to a standstill.
- d. The control system shall cause a “Shutdown” of the centrifuge and alert this condition to the plant SCADA system in the event that any of the following interlocks are triggered. These automatic shutdown interlocks shall include, but are not limited to:
- 1) Backdrive controller malfunction.
  - 2) Left/right bearing HIGH HIGH temperature alarms.
  - 3) Backdrive malfunction.
  - 4) HIGH HIGH torque.

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- 5) HIGH HIGH vibration.  
In the event that shutdown is caused by any of the above conditions, the control system shall require operator intervention to determine the cause of the shutdown and for restarting the system.
- e. The control system may also cause an automatic “Shutdown” sequence of the centrifuge and alert this condition to the plant SCADA system in the event that any of the following interlocks are triggered. These automatic shutdown interlocks shall include, but are not limited to:
- 1) Backdrive HIGH temperature alarm.
  - 2) Drive motor over temperature.
  - 3) Drive motor overload.
- f. During normal operation, an excessive solids build-up shall be detected by the centrifuge control system as a higher than normal torque requirement or by sensing excessive vibration. Should the torque or vibration exceed a preset point, the HIGH torque or vibration switch shall close, sending a signal to the centrifuge control system which shall initiate shutdown of the sludge and polymer feeds. When the torque or vibration falls to an acceptable limit, operator may reinitiate start of sludge and polymer feeds upon determining that the solids build-up is no longer a problem. The high torque control shall be not more than twice the normal operating torque or pressure. The controls shall also allow operation at a set differential speed allowed to vary within the normal operating limits. Controls shall include adjustable timers and or a count of HIGH torque or vibration events in order to initiate an automatic “Normal Stop” in the event of repeated torque or vibration excursions.
- g. In the event that the above clearing action fails to remedy the high torque or vibration situation and the torque or vibration continues to increase, the centrifuge control system shall respond by issuing a torque or vibration HIGH HIGH alarm at the control panel and similar signal to the plant SCADA system in addition to initiating a “Controlled Shutdown”.
- h. Controlled Shutdown: Controlled Shutdown shall require reset action at the control panel before the unit can be restarted.
- 1) This command shall de-energize the centrifuge main drive motor. The centrifuge shall be allowed to coast to a standstill. If available, the backdrive shall remain active until the bowl has coasted to a standstill, controlled to clear as much solids as possible from the bowl.
  - 2) The sludge and polymer feeds shall be stopped (disable ENABLE commands).

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- 3) Initiate the bowl flush water valve open for flushing and subsequently initiate close after an achieving a preset bowl speed.
  - i. Emergency Stop: Emergency Stop initiated via E-stop pushbutton at the centrifuge control and VFD panel or from the plant SCADA system shall stop the centrifuge and all associated equipment instantaneously with no flush water.
    - 1) This command shall stop the centrifuge system.
    - 2) The sludge and polymer feeds shall be stopped (disable ENABLE commands).
  - j. Provide clean-in-place (CIP) function to clean solids out of the bowl. In a CIP cycle a “CIP Start” pushbutton is pressed, the flush water valve OPEN is initiated, the backdrive energized and begin to rotate in the reverse (if required by the manufacturer’s particular design) direction at a low speed for a predetermined time. At the end of the set time, the backdrive shall toggle direction, causing a water “sloshing” effect within the centrifuge bowl and conveyor. The process shall continue until the predetermined overall times ends, a “CIP Stop” key is depressed, or a fault occurs. Any shutdown fault shall terminate the CIP cycle.
3. Controller Interface (Data Exchange with the plant SCADA system):  
Provide provisions to make available and receive in contiguous registers the following data to and from the plant control system, through the centrifuge PLC Ethernet network communication module.
- a. Discrete outputs to the plant control system:
    - 1) Centrifuge LOCAL/REMOTE status.
    - 2) Centrifuge READY status.
    - 3) Centrifuge RUNNING status.
    - 4) Backdrive TORQUE/DIFFERENTIAL control mode status.
    - 5) Sludge feed ENABLE signal.
    - 6) Polymer feed ENABLE signal.
    - 7) Bowl flush water valve OPEN/CLOSE command.
    - 8) Chute flush water valve OPEN/CLOSE command.
    - 9) Emergency Stop alarm.
    - 10) HIGH vibration (warning) alarm.
    - 11) HIGH-HIGH vibration (shutdown) alarm.
    - 12) HIGH torque (warning) alarm.
    - 13) HIGH-HIGH torque (overload) alarm.
    - 14) Main bearing HIGH temperature alarm.
    - 15) Bowl motor HIGH temperature alarm.
    - 16) Scroll motor HIGH temperature alarm.
    - 17) Bowl motor VFD FAIL alarm.
    - 18) Scroll motor VFD FAIL alarm.
    - 19) Lube oil system alarm.

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- 20) Centrifuge common alarm.
- 21) Scroll motor bearing temperature.
- 22) Quantity of six spare discrete outputs.
- b. Analog outputs to the plant control system:
  - 1) Bowl speed.
  - 2) Scroll gearbox shaft speed.
  - 3) Bowl/scroll differential speed.
  - 4) Backdrive torque.
  - 5) Bowl motor amperage (rms value).
  - 6) Solids-side main bearing vibration value.
  - 7) Liquids-side main bearing vibration value.
  - 8) Solids-side main bearing temperature.
  - 9) Liquids-side main bearing temperature.
  - 10) Bowl motor winding temperature.
  - 11) Bowl motor bearing temperature.
  - 12) Scroll motor bearing temperature.
  - 13) Quantity of three spare analog outputs.
- c. Discrete inputs from the plant control system:
  - 1) Emergency stop command.
  - 2) Centrifuge START command.
  - 3) Centrifuge SHUTDOWN command.
  - 4) Centrifuge CIP START command.
  - 5) Backdrive control mode (TORQUE/DIFFERENTIAL).
  - 6) Centrifuge feed pump ON status.
  - 7) Polymer feed pump ON status.
  - 8) Bowl flush water valve OPEN/CLOSE status.
  - 9) Chute flush water valve OPEN/CLOSE status.
  - 10) Quantity of six spare discrete inputs.
- d. Analog inputs from the plant control system:
  - 1) Backdrive torque set point (in TORQUE control mode).
  - 2) Differential speed set point (in DIFFERENTIAL control mode).
  - 3) Bowl speed set point.
  - 4) Quantity of three spare analog inputs.

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- e. Polymer pump START/STOP and flow control loop will be controlled by the plant SCADA system. The centrifuge PLC shall communicate ENABLE (start) signal for polymer pump as specified for centrifuge startup and shutdown functions.
- f. Sludge feed pump START/STOP and flow control loop will be controlled by the plant SCADA system. The centrifuge PLC shall communicate ENABLE (start) signal for sludge feed pump as specified for centrifuge startup and shutdown functions.

2.24 ACCESSORIES

- A. Equipment Identification Plates: Provide a 16-gauge stainless steel identification plate for all equipment, valves, appurtenances, and instruments with equipment/component numbers, securely mounted on the equipment in a readily visible location. The plate shall bear the 1/4-inch die-stamped equipment identification numbers indicated in this Specification and as shown on Drawings.

2.25 CENTRIFUGE FACTORY TESTS

- A. The Owner reserves the right to witness the tests specified herein and to inspect the fabrication procedures at any time during the fabrication stage(s) of the centrifuges and associated equipment. Owner's travel expenses will be borne by the Owner.
- B. Perform manufacturer's standard functional tests on each centrifuge system as follows:
  - 1. Gather and furnish test information necessary to show conformance to specified requirements.
  - 2. Manufacturer's Test Representative shall certify test results.
  - 3. Perform tests on all components and actually furnished.
  - 4. Vibration measurement with bowl empty.
  - 5. Vibration measurement with bowl filled with water.
  - 6. Operation of machine for minimum of 4 hours with water.
  - 7. Motor starting amperage.
  - 8. Notify Engineer of the test schedule not less than 45 days in advance.
  - 9. Obtain acceptance of test reports from Engineer prior to shipment of equipment.
- C. Noise Test: Measure noise levels with dBA meter of centrifuge running at the normal operating speed with bowl empty.
- D. Motor Tests: See Section 26 20 00, Low-Voltage AC Induction Motors.



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E. Scratch Abrasion Test:

1. A representative sample of each batch of the sintered tungsten carbide tiles to be used on the wearing face of the conveyor shall be subjected to a dry sand rubber wheel abrasion test. This test shall be conducted in accordance with the current ASTM G65 Procedure A. The test shall be conducted with the following requirements:
  - a. Wheel Load: 30 pounds.
  - b. Grit: AFS 50/70.
  - c. Grit Flow Rate: 250 to 350 grams per minute.
  - d. Shape of Sand Curtain: Streamlined.
  - e. Test Duration: 6,000 revolutions.
  - f. Rubber Wheel: Chlorobutyl rubber with a Durometer A of 58-62.
  - g. Wheel Speed: 200 rpm (plus or minus 10 rpm).
  - h. Wheel Diameter: 8.50 to 9 inches.
  - i. Linear Abrasion Distance: 14,138 feet.
  - j. Sand Nozzle: Special fabricated design.
2. Test one tile from each lot of tiles used in manufacturing the centrifuges, or four tiles total, whichever requires the greater number of tiles to be tested. The following laboratories are equipped to conduct these tests in accordance with the ASTM Standards and can provide certification of the results:
  - a. Colorado School of Mines, Golden, Colorado 80401.
  - b. Falex Corp., Aurora, Illinois 60505.
  - c. FMC Corp., 1205 Coleman Avenue, Santa Clara, California.
3. The volume loss of the proposed wear resistant material shall not exceed 3 cubic millimeters per tile during the 30-minute test period. Any material that exceeds 3.0 cubic millimeters loss in 30 minutes will not be allowed.

2.26 PANEL FACTORY TESTS

- A. The Owner reserves the right to witness the tests specified herein and to inspect the fabrication procedures at any time during the fabrication stage(s) of the centrifuge control and VFD panel and associated equipment. Owner's travel expenses will be borne by the Owner.
- B. Notify the Owner as specified below and Owner will travel to the factory and inspect and witness the panel factory testing.
- C. Perform manufacturer's standard functional tests on each centrifuge control and VFD panel as follows:
  1. Gather and furnish test information necessary to show conformance to specified requirements.

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2. Manufacturer's Test Representative shall certify test results.
  3. Perform tests on panels actually furnished with each associated centrifuge at the manufacturer's facility.
  4. Test panel for proper construction, electrical connection, and function.
  5. Check all alarms, shutdown conditions, and automatic sequences to verify proper function.
  6. Simulate interlocks and signals from other connected equipment in order to demonstrate specified operator interface functions and controls.
  7. Notify Engineer of the test schedule not less than 45 days in advance.
  8. Obtain acceptance of test reports from Engineer prior to shipment of equipment.
- D. VFD Tests: See Section 26 29 23, Low-Voltage Variable Frequency Drive System.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install equipment in conformance with the manufacturer's written instructions, with supervision and inspection performed by manufacturer's representative.
- B. Equipment anchoring and mounting shall be in accordance with manufacturer's requirements for the load criteria specified in Section 01 61 00, Common Product Requirements.
- C. Accurately place anchor bolts per the drawings furnished by the manufacturer in accordance with Section 05 50 00, Metal Fabrications.

**3.02 FIELD QUALITY CONTROL**

- A. The timing and scheduling for testing shall be coordinated with and be dependent upon the Owner's schedule and quantity of sludge available for testing.
- B. Coordination and testing shall be in accordance with Sections 01 31 13, Project Coordination, and 01 91 14, Testing, Integration and Startup.
- C. Functional Test (and clean water test):
  1. Prior to startup, all equipment described herein shall be inspected for proper alignment, quiet operation, proper connection, and satisfactory performance of all components by means of a functional test conducted by the manufacturer's representative, assisted by the installing contractor and Owner, and as approved by the Engineer.

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2. Functional testing shall be conducted after the installation of the centrifuge and all appurtenances.
3. Perform on the completed centrifuge system without sludge feed prior to startup.
4. Each unit shall be submitted to complete normal start and normal stop cycles. Each unit shall then be submitted to a 2-hour running test. At the beginning and end of the test, and at periodic intervals between, all thermometers shall be observed and recorded. The belt tension shall be adjusted at the start of the test, checked and readjusted if necessary at the end of the test. All safety devices and the differential speed control for the backdrive unit shall be checked for satisfactory operation. Instrumentation and control systems shall be checked for conformance with the specifications.
5. After approximately 1 hour of runtime, each centrifuge shall be measured for proper vibration. Vibration velocities shall not exceed 7 mm/sec RMS at the main bearings. If units exhibit vibration in excess of the limits specified, manufacturer shall adjust or modify the unit as necessary. After adjustment and/or modification, unit shall be retested to prove conformance.
6. As part of the test, each centrifuge shall be operated with water feed for a minimum of 30 minutes. At the beginning and end of the 30-minute water test, observe and record all thermometers, pressure gauges, and flow indicator readings.
7. Proposed test procedures shall be developed by the centrifuge manufacturer and submitted to the Engineer for review, comment, and approval. Testing shall not begin until the test procedures have been approved by the Engineer.
8. A qualified representative of the manufacturer shall supervise each test, analyze data, and certify the centrifuge's performance during the test.
9. Submit test log to Engineer upon completion of each test.
10. Complete and sign Manufacturer's Certificate of Equipment Installation Services, as specified in Section 01 43 33, Manufacturers' Field Services.
11. Complete successful functional testing prior to pre-performance testing.

D. Pre-Performance Test:

1. Manufacturer's representative, assisted by the installing contractor and Owner, shall conduct testing to demonstrate continuous, reliable operation, not performance, while thickening the Design Feed Sludge.
2. Centrifuge manufacturer shall notify Owner in writing at least 14 days prior to when the Pre-Performance Test will occur. Prior to any testing, the centrifuge manufacturer shall have provided complete Operation and Maintenance Manuals and conducted Pre-Startup classroom training on the centrifuges. Field training may occur during the Pre-Performance

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- Test. The Functional Test shall be successful before the Pre-Performance Test may be conducted.
3. Pre-Performance Test shall include operation of the centrifuges for a period of 5 working days (one 5-day week with 10-hour working days) without shutdown due to equipment or system failures.
  4. Stoppages due to any failure of provided equipment and instrumentation, such as the centrifuge control and VFD panel, shall not exceed 30 minutes, and such stoppages shall not number more than three over the 5-day period for all centrifuges. A greater number of stoppages or a stoppage longer than 30 minutes shall be deemed a failure of the Pre-Performance Test and the test will stop. Stoppages caused by the Owner may occur without causing failure of the test.
  5. Proposed test procedures shall be developed by the centrifuge manufacturer and submitted to the Engineer for review, comment, and approval. Testing shall not begin until the test procedures have been approved by the Engineer.
  6. A qualified representative of the manufacturer shall supervise each test, analyze data, and certify the centrifuge's performance during the test.
  7. If, in the opinion of the Engineer, the Pre-Performance Test is successful and meets the requirements specified herein, the Engineer will recommend to the Owner, by letter, the acceptance of the Pre-Performance Test and that the centrifuges may begin the Performance Test, providing other requirements for the Performance Test to begin are satisfied.
  8. Should the centrifuges be unable to achieve the Pre-Performance Test requirements as a result of failure(s) of the equipment or systems provided by the centrifuge manufacturer, the centrifuge manufacturer shall perform whatever equipment modifications are deemed necessary such that the equipment can achieve the performance specified. All modifications shall be documented and submitted to the Engineer. Following completion of the equipment modifications, the Pre-Performance Test shall be run again in its entirety. For any Pre-Performance Test performed after the first Pre-Performance Test that are needed due to failure(s) of the equipment or systems provided by the centrifuge manufacturer, the centrifuge manufacturer shall pay for the Owner and Engineer to observe the Pre-Performance Test. This cost will be \$3,000 for the Engineer and \$3,000 for the Owner for each additional Pre-Performance Test, regardless of the length of the test.
  9. For the initial and any subsequent Pre-Performance Tests, the costs for polymer, power, feed sludge, and solids disposal shall be borne by the Owner. Centrifuge manufacturer shall be responsible for recommending the Mannich polymer to use and centrifuge operational settings, and submit to the Owner at least 30 days prior to the test.

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E. Performance Test:

1. Performance testing shall be done to demonstrate the actual system operating conditions and verify that the centrifuges meet or exceed the minimum performance requirements specified in Article Performance Requirements while thickening the Design Feed Sludge stream specified in Article Service Conditions. Performance testing shall be performed at the solids loading rates specified in Article Performance Requirements.
2. Centrifuge manufacturer shall notify the Owner in writing at least 14 days prior to when the Performance Test will occur. Performance Test shall not proceed until after the Pre-Performance Test is successfully concluded.
3. Manufacturer's representative, assisted by the installing contractor and Owner, shall startup and operate each centrifuge on the sludge stream specified herein, for a period of 8 hours per day for 2 days, with no interruptions allowed during the 8-hour period. All centrifuge operations and associated manufacturer's field services required to adjust machine settings shall be performed prior to and exclusive of the above specified performance test duration.
4. Proposed test procedures shall be developed by the centrifuge manufacturer and submitted to the Engineer for review, comment and approval. Testing shall not begin until the test procedures have been approved by the Engineer.
5. A qualified representative of the manufacturer shall supervise each test, analyze data, and certify the centrifuge's performance during the test.
6. Steady state operation at the specified sludge feed solids rates shall be maintained throughout the test and all hourly quantities shall be the average during the test period. The centrifuge shall maintain acceptable performance while thickening feed sludge with properties within plus or minus 10 percent of the specified criteria listed in Article Service Conditions.
7. During each performance test, take measurements and collect all required samples for analysis in order to make the following determinations:
  - a. Sludge Feed Rate: gpm.
  - b. Sludge Feed Concentration: The total dry solids concentration of the feed sludge entering the centrifuge (percent TS).
  - c. Thickened Solids Concentration: The total dry solids concentration of the thickened solids discharged from the centrifuge (percent TS). Take two duplicate samples per sample interval.
  - d. Centrate Concentration: The total suspended solids concentration of the centrate discharged from the centrifuge (percent TSS).
  - e. Solids Capture: Percent.
  - f. Feed Hydraulic Loading Rate (Exclusive of Polymer): gpm.

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- g. Feed Solids Loading Rate (Exclusive of Polymer): lbs/hr of total dry solids.
        - h. Polymer Feed Rate: gpm.
        - i. Polymer Dose: Pounds active per dry ton of feed solids.
- 8. Collect samples at approximate 1 hour intervals.
- 9. Variations in sludge feed characteristics
  - a. Make compensating calculations for the effects if feed sludge characteristics are not within the ranges specified herein. Provide supporting data to be considered by the Engineer in determining conformance with the specified design conditions. The Engineer will be sole judge of conformance with performance testing requirements.
  - b. If retesting to document compliance is required due solely to feed sludge characteristics outside of the specified range, The Owner may waive retesting or may compensate the Supplier for reasonable costs to witness retesting at the Owner's sole option.
- 10. Performance will be based upon the arithmetic average of the test results obtained during the test period. The Owner reserves the right to discard obviously high or low erroneous test results. As specified below, laboratory testing will be performed by the Owner. Turnaround time for thickened solids concentration samples are approximately 24 hours. Performance results shall be based on the laboratory standard methods results.
- 11. Prepare a formal test report including all laboratory analysis reports, all measured flows, the mass balance calculations, and the percent capture. Six copies of the final report shall be submitted to the Engineer within 20 days after completion of the test.
- 12. In the event that a centrifuge does not meet the requirements of the specifications during the performance test, the representative of the manufacturer shall make such changes in the equipment and methods of operation as deemed necessary and as approved by the Engineer. The necessary adjustments shall be made as soon as practical, but within a period not to exceed 30 days. Following the adjustments, make a second test run similar to the first run. In the event that the centrifuge still does not achieve specified performance during the second test, then the equipment will be subject to rejection. The centrifuge manufacturer shall retain responsibility for the centrifuges until the acceptance test has been successfully completed. However, after initial startup the Owner shall have the right to use the centrifuge as needed to process sludge.
- 13. If, after a maximum of two test runs, in the opinion of the Engineer, a centrifuge meets the performance requirements specified herein, the Engineer will recommend the acceptance of the centrifuge. If, in the opinion of the Engineer, the performance test results do not meet the

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requirements specified herein, the Engineer will notify the centrifuge manufacturer and the Owner of the nonacceptable performance.

14. The cost of all laboratory tests necessary to confirm the sludge characteristics for the initial performance test on a centrifuge will be borne by the Owner. All laboratory tests for performance testing shall be performed by the Owner in conformance with the applicable portions of standard methods. If retesting is required, the centrifuge manufacturer shall pay the Owner for all laboratory tests subsequent to the initial test.
15. Mannich polymer used shall be as recommended by the centrifuge manufacturer. Polymer costs for initial testing and for one retest shall be borne by the Owner. Polymer costs for all subsequent testing required shall be the responsibility of the centrifuge manufacturer unless the retesting is a result of other equipment failure or the Owner. Polymer costs for operation of the centrifuges after successful performance testing shall be borne by the Owner.
16. The cost of power, water, feed sludge, and disposal shall be borne by the Owner.

F. Optimization Testing:

1. Optimization Testing shall not begin until 6 weeks after successful completion of the Performance Test on the Design Feed Sludge stream.
2. A qualified representative of the manufacturer, assisted by the Owner, shall operate the centrifuges on the Design Feed Sludge stream and optimize machine settings to maximize thickened solids concentration while maintaining acceptable centrate capture efficiency, dry solids throughput rate, and polymer dose. Optimization period shall be 15 working days.
3. The performance targets for this testing are indicated in the table in Article Performance Requirements, as Enhanced Performance Targets.
4. Proposed test procedures shall be developed by the centrifuge manufacturer and submitted to the Engineer for review, comment, and approval. Testing shall not begin until the test procedures have been approved by the Engineer.
5. A qualified representative of the manufacturer shall supervise the testing, analyze data, and provide a report summarizing trials, measured performance, and recommendations.
6. During optimization testing, take measurements as specified for performance testing, collecting samples at approximately 2-hour intervals, or when operation has stabilized at each trial condition.
7. The cost of all laboratory tests will be borne by the Owner. All laboratory tests for performance testing shall be performed by the Owner in conformance with the applicable portions of standard methods.

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8. Emulsion polymer used shall be as recommended by the centrifuge manufacturer. Polymer costs shall be borne by the Owner.
9. The cost of power, water, feed sludge, and disposal shall be borne by the Owner.

G. Manufacturer's Field Services:

1. Manufacturer's Authorized Representative: Present at Work site or classroom designated by the Owner, for the minimum person-days listed below, travel time excluded. A minimum of four trips shall be required.
2. Minimum services to include:
  - a. 4 person-days for installation assistance, inspection, and certification of installation.
  - b. 3 person-days for functional testing.
  - c. 3 person-days for prestartup classroom or jobsite training.
  - d. 5 person-days for pre-performance testing.
  - e. 5 person-days for performance testing and operator training during facility startup.
  - f. 15 person-days for optimization testing (optional).
  - g. 5 person-days for post-startup training within 1 year of initial startup.
3. Manufacturer shall video-record all classroom training sessions and provide original video-recordings and three copies of recordings on CD or DVD.
4. The periods stated above are minimums only and the manufacturer is required to be onsite for all of the functions listed above to the extent that is required to complete those functions to the satisfaction of the Owner and Engineer.
5. For additional field services regarding the VFDs, see Section 26 29 23, Low-Voltage Variable Frequency Drive System.

**END OF SECTION**



**SECTION 44 42 56.05**  
**CHOPPER PUMPS AND MIXING NOZZLES**

**EQUIPMENT AND COMPONENT NUMBERS**

80-P-01: Digester No. 1 Axial Mixing Pump No. 1.  
80-P-02: Digester No. 1 Axial Mixing Pump No. 2.  
80-P-03: Digester No. 1 Axial Mixing Pump No. 3.  
80-P-04: Digester No. 2 Axial Mixing Pump No. 1.  
80-P-05: Digester No. 2 Axial Mixing Pump No. 2.  
80-P-06: Digester No. 2 Axial Mixing Pump No. 3.  
80-P-07: Digester No. 3 Axial Mixing Pump No. 1.  
80-P-08: Digester No. 3 Axial Mixing Pump No. 2.  
80-P-09: Digester No. 3 Axial Mixing Pump No. 3.  
80-P-21: Digester No. 1 Mix Pump No. 1.  
80-P-22: Digester No. 1 Mix Pump No. 2.  
80-P-23: Digester No. 1 Mix Pump No. 3.  
80-P-24: Digester No. 2 Mix Pump No. 1.  
80-P-25: Digester No. 2 Mix Pump No. 2.  
80-P-26: Digester No. 2 Mix Pump No. 3.  
80-P-27: Digester No. 3 Mix Pump No. 1.  
80-P-28: Digester No. 3 Mix Pump No. 2.  
80-P-29: Digester No. 3 Mix Pump No. 3.  
80-P-71: Digester No. 1 Recirculation Pump No. 1.  
80-P-72: Digester No. 1 Recirculation Pump No. 2.  
80-P-73: Digester No. 2 Recirculation Pump No. 1.  
80-P-74: Digester No. 2 Recirculation Pump No. 2.  
80-P-75: Digester No. 3 Recirculation Pump No. 1.  
80-P-76: Digester No. 3 Recirculation Pump No. 2.

**PART 1 GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Contractor shall furnish dry-pit chopper pump, appurtenances, and mixing nozzles as specified. Pump shall be specifically designed to pump digested sludge at high concentrations without plugging or dewatering of solids. Materials shall be chopped/macerated and conditioned by pump as an integral part of pumping action. Mixing nozzles shall be of a suitable material for handling abrasive material and shall be designed to operate without plugging.

**1.02 INTENT OF SECTION**

- A. This section covers supply, delivery, site storage, installation, testing and placement into operation of pumping equipment and includes motors, drives,

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control equipment, supports, and all appurtenances necessary for an operating system.

- B. Provide all pumps of similar design from one manufacturer.
- C. Pumps and mixing nozzles shall be from the same manufacturer.

1.03 SUBMITTALS

A. Action Submittals:

- 1. Shop Drawings:
  - a. General layout of each set of pumps complete with motor and drive showing anchor bolt locations, casing position, direction of rotation and electric motor terminal box location.
  - b. Cross-sectional details of each pump and pump seal with complete cross-referenced materials list.
  - c. Baseplate and structural steel base, complete with anchor bolt details.
  - d. Certified, characteristic curves including head, capacity, efficiency, net positive suction head and horsepower.
  - e. Details of impeller size, pump rpm, and solid sphere passing capacity.
  - f. Dimensional drawings of motors and drives, including full output power, rpm, and slip.
  - g. Seal lubricating and cooling water requirements.
  - h. Electrical wiring diagrams.
  - i. Details of storage and offloading requirements.
  - j. Sample warranty.
  - k. Motor information as specified in Section 26 22 00, Low Voltage Transformers.
  - l. Product data for mixing nozzles
  - m. General layout of nozzle assemblies inside the existing digesters
- 2. Anchorage and bracing Drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.
- 3. Reference installation list as described in this section. Provide contact name and telephone number for each installation provided.

B. Informational Submittals:

- 1. Operation and Maintenance Data: As specified in Section 01 78 23, Operation and Maintenance Data.
- 2. Quality Control Submittals:
  - a. Performance affidavit.
  - b. Certified, nonwitnessed, shop test results for all pumps.
  - c. Manufacturer's installation manuals.

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- d. List of recommended spare parts with current prices and anticipated delivery times.
- e. Certificate of proper installation.
3. Anchorage and bracing Drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.
4. Manufacturer's recommended spare parts list.

1.04 QUALIFICATIONS

- A. Manufacturer must have experience with installation of chopper pumps in similar service applications.

1.05 QUALITY ASSURANCE

- A. Provide manufacturer's standard warranty and a performance affidavit for equipment to be furnished in accordance with this Specification.

**PART 2 PRODUCTS**

2.01 MANUFACTURERS

A. General:

1. The following specifications do not purport to cover all details entering into the design of pumping units required, but rather to call attention to certain special features.
2. Provide workmanship, materials, and methods of construction that conform to best practice and highest standard of the industry.
3. Supply and install units complete in all particulars and ready for operation.
4. Design and proportion all parts to have liberal strength, stability, stiffness, and to be specially adapted to the conditions of service.
5. Tailor pump capacities and impeller diameters to actual pump speeds imparted by pump drives and belts.
6. Provide pumping units that satisfy the performance specified for the service indicated. Pumps may be certified on water; however, pumps will not be accepted until performance specified is demonstrated on the service indicated.

B. Manufacturers:

1. Vaughan Company, Inc.
2. Or approved equal.

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2.02 SERVICE CONDITIONS

A. Axial Mixing Pumps:

1. Quantity: Ten, nine installed, one shelf spare.
2. Type: Chopper pump.
3. Design Flow: 4,400 gpm.
4. Total Dynamic Head: 26 feet.
5. Discharge size: 12-inch
6. Motor: 60 hp, 1,800 rpm, 480V, three-phase, 60-Hz.
  - a. Constant Speed.
  - b. Side-mounted with belt drive system.
7. Solids Concentration: 3.0 percent to 3.5 percent TS.

B. Digester Mix Pumps:

1. Quantity: Nine.
2. Type: Chopper pump.
3. Design flow: 2,200 gpm.
4. Total Dynamic Head: 20 feet.
5. Discharge size: 10-inch.
6. Motor: 25 hp, 1,800 rpm, 480V, three-phase, 60-Hz.
  - a. Constant Speed.
  - b. Overhead-mounted with belt drive system.
7. Solids Concentration: 3.0 percent to 4.0 percent TS.

C. Digester Recirculation Pumps:

1. Quantity: Six.
2. Type: Chopper pump.
3. Design flow: 550 gpm.
4. Total Dynamic Head: 58 feet.
5. Discharge size: 6-inch.
6. Motor: 20 hp, 1,800 rpm, 480V, three-phase, 60-Hz.
  - a. Constant Speed.
  - b. Overhead-mounted with belt drive system.
7. Solids Concentration: 3.0 percent to 3.5 percent TS.

D. Mixing Nozzles:

1. Quantity: 36.
2. Design Flow: 1,100 gpm per nozzle.
3. Diameter: As shown on Drawings.
4. Solids Concentration: 3.0 percent to 3.5 percent.

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2.03 PUMP CONSTRUCTION

A. Casing and Back Pull-Out Adapter Plate:

1. Casing: Semi-concentric design, with first half of circumference being cylindrical beginning after the pump outlet, and the remaining circumference spiraling outward to the 125-pound flanged centerline discharge.
2. Back Pull-out Adapter Plate: Shall allow removal of pump components from above casing and allow external adjustment of impeller-to-cutter clearance.
3. Casing and adapter plate shall be ASTM A536 ductile cast iron with all water passages to be smooth, and free of blowholes and imperfections for good flow characteristics.

B. Impeller:

1. Semi-open chopper type.
2. Chopping/maceration of materials must be accomplished by action of the curved, cupped and sharpened leading edges at bottom of impeller blades as they move across cutter bar, creating a smooth efficient slicing effect.
3. Pump-out vanes must be provided across entire diameter of impeller on backing plate in order to reduce pressure in seal area, and to draw lubricant down from reservoir should seal leakage occur.
4. Either threaded in place or held in place with a key and shall have no axial adjustments or set screws, and shall not extend past the cutter bar.
5. ASTM A148 cast alloy steel and heat treated to a minimum 60 Rockwell C Hardness, and dynamically balanced.

C. Cutter Bar:

1. Shall be single cast component recessed into pump bowl with a funnel shaped inlet opening.
2. As a part of the casting, segment bars shall extend inwardly, to within 0.010 to 0.060 inch of the cutter nut.
3. Set clearance between cutter bar and impeller shall be adjustable to 0.010 inch to 0.015 inch.
4. ASTM A148 cast alloy steel and heat treated to a minimum 60 Rockwell C Hardness.

D. Upper Cutter Assembly:

1. Impeller pump-out vanes shall be specially modified to shear against upper cutter assembly mounted into back side of casing, in order to

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eliminate buildup of hair, or other stringy material in seal area or between impeller and pump casing.

2. No more than two cutting anvils to minimize potential for binding.
3. The upper cutter teeth are positioned as closely as possible to the center of shaft rotation to minimize cutting torque and nuisance motor tripping. The ratio of upper cutter cutting diameter to shaft diameter in the upper cutter area of the pump shall be 3.6 or less.
4. AISI 8620 alloy steel case hardened to a minimum 60 Rockwell C Hardness.

E. Cutter Nut:

1. Use to affix impeller to shaft and to eliminate binding or wrapping of stringy materials at pump inlet.
2. Shall consist of hex head sufficiently sized for ease of removal, and shall include integral cast anvil which shears against adjacent surface of segment bars on cutter bar.
3. AISI 8620 alloy steel case hardened to a minimum 60 Rockwell C Hardness.
4. Alternatively pumps 8 inch and larger to utilize an external cutter which shall consist of opposing cutter wings which shear against the outside surface of the shear bars and the anvil, an integral cast tooth which shears against the adjacent surface to the shear bars and a hex head sufficiently sized for ease of removal.

F. Pump Shafting:

1. Pump shaft and impeller shall be supported by ball bearings.
2. AISI 4140 heat treated steel.
3. Minimum diameter of 1-1/2 inches to minimize deflection during solids chopping.

G. Bearing Housing:

1. ASTM A536 ductile cast iron and machined with piloted bearing fits for concentricity of all components.
2. Piloted motor mount shall firmly align motor on top of bearing housing.

H. Thrust Bearings:

1. Shaft thrust in both directions shall be taken up by two back-to-back mounted single-row angular contact ball bearings.
2. Overhang from centerline of lower thrust bearing to seal faces shall be a maximum of 1.2 inches.
3. Shall be oil bath lubricated in bearing housing by ISO Grade 46 turbine oil, with a minimum B-10 life rated 100,000 hours.

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I. Pump Mechanical Seal:

1. Provide to isolate bearings from pumped media.
2. Shall be fitted with tungsten carbide seal faces to provide long life expectancy in the presence of grit and abrasive solids.
3. Seal shall ride on Type 316 stainless steel shaft sleeve with seal tension held by three set screws.
4. Seal shall be tested for flatness within two helium light bands under a helium light source and optical flat.
5. Single-spring rubber bellows-type mechanical seals are unacceptable.
6. Seal shall not require external seal water to pump lubrication system.

J. Automatic Oil Level Monitor:

1. Mount oil level switch at top of wet well, with hose feeding down to the side of bearing housing to detect oil level and shut off motor in event of low oil level.
2. Include sensitive relay for mounting in motor control panel.

K. Shaft Coupling:

1. Submersible motor shall be close coupled directly to pump shaft using solid sleeve coupling that is keyed to both pump and motor shaft.
2. Slip clutches and shear pins between shaft and motor are unacceptable.

L. Stainless Steel Nameplates: Attach to pump and drive motor giving manufacturer's model and serial number, rated capacity, head, speed and all pertinent data.

M. Base:

1. Support pump and motor on fabricated steel base with adequate grout holes.
2. Provide machined mounting surfaces for pump and motor.
3. For belt driven pump furnish adjustable brackets to support overhead or side-mounted motor.
4. Sheaves and belts shall be sized for 1-1/2 times the rated horsepower of the motor.
5. Provide OSHA-approved guard for pump drive system.

N. Venting: An automatic venting system shall be provided to vent the pump casing prior to startup. The automatic venting system shall have an upstream isolation ball valve to isolate the air relief system. For a top-discharge configuration, the vent shall be two-in NPT and tapped into the piping provided by the Contractor and the Shop Drawings shall clearly show this requirement including installation of a suitable valve. For a side-discharge

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configuration, the vent shall be through a 1/2-inch NPT threaded connection on the side of the pump casing and an increaser for a 2-inch pipe. The Shop Drawings shall clearly show that the Contractor connects to the increaser with a suitable valve. For either type of pump casing, the discharge may be to either drain piping or back to the tank being mixed as shown on Drawings.

2.04 ELECTRIC MOTOR

- A. Provide motor in accordance with Section 26 20 00, Low-Voltage Induction Motors.

2.05 SURFACE PREPARATION AND PAINTING

- A. All wetted parts shall be SSPC-SP5 white metal sandblast.
- B. Finish coat all surfaces with a total of 4-mil minimum dry film thickness of stainless steel pigment epoxy top coat, or approved equivalent.

2.06 CONTROL PANEL

- A. Pump shall be controlled from a local NEMA 4X control panel.

2.07 NOZZLES

- A. Nozzles shall be constructed of ASTM A536 Glass-lined cast ductile iron with a minimum 1.0-inch wall thickness to protect against abrasive conditions and a long straight taper length of at least 12 inches.

2.08 SOURCE QUALITY CONTROL

- A. Factory Tests and Adjustments: Test all equipment actually furnished.
- B. Factory Test Report: Include test data sheets, curve test results, performance test logs, certified correct by a registered professional engineer.
- C. Functional Test: Perform manufacturer's standard test on equipment. Functional test shall be run for at least 30 minutes with an operating head (TDH) within 10 percent of the design point.
  - 1. Adjust, realign, or modify units and retest in accordance with Hydraulic Institute Standards if necessary.
- D. Motor Test: See Section 26 20 00, Low-Voltage AC Induction Motors.



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**PART 3 EXECUTION**

3.01 FIELD QUALITY CONTROL

- A. Field test pump in presence of Engineer or Owner's representative to demonstrate that installation is correctly completed and each pump is operating satisfactorily without vibration or cavitation.
- B. Field test shall be supervised by pump manufacturer's representative.
- C. Engineer requires 72 working hours written notice prior to such tests.
- D. Field test pump with water prior to or during testing of process equipment. Perform second field test on specified service fluid during initial process startup.
- E. Supply required metering devices and gauges necessary to demonstrate pump performance. Supply and install gauge connections as required.
- F. Test results must be properly documented and presented to Engineer.
- G. Successful field tests done on water shall not constitute acceptance of pumping unit. Pump will be accepted only after successful performance tests on specified service.

3.02 MANUFACTURERS SERVICES

- A. See Section 01 43 33, Manufacturers' Field Services, and Section 01 91 14, Testing, Integration, and Startup, for more requirements.
- B. Manufacturer's Representative: Present at Site for minimum person-days listed below, travel time excluded:
  - 1. 3 person-days for installation assistance and inspection.
  - 2. 3 person-days for functional and performance testing and completion of Manufacturer's Certificate of Proper Installation.
  - 3. 1 person-day for prestartup classroom or site training.
  - 4. 1 person-day for facility startup.
  - 5. 1 person-day for post-startup training of Owner's personnel. Training shall not commence until accepted lesson plan for each training activity has been reviewed by Owner and Engineer.

**END OF SECTION**

**SECTION 44 42 56.09  
NON-CLOG DRY-PIT CENTRIFUGAL PUMPS**

**EQUIPMENT AND COMPONENT NUMBERS**

73-P-21: Raw Solids Feed Pump 1  
73-P-22: Raw Solids Feed Pump 2  
73-P-23: Raw Solids Feed Pump 3

**PART 1 GENERAL**

**1.01 REFERENCES**

A. The following is a list of standards which may be referenced in this section:

1. American Bearing Manufacturers' Association (ABMA):
  - a. 9, Load Ratings and Fatigue Life for Ball Bearings.
  - b. 11, Load Rating and Fatigue Life for Roller Bearings.
2. American Society of Mechanical Engineers (ASME):
  - a. B16.1, Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
  - b. B106.1, Design of Transmission Shafting.
3. ASTM International (ASTM): A48/A48M, Standard Specification for Gray Iron Castings.
4. Department of Defense (DoD) Test Method Standard: MIL STD 167, Mechanical Vibrations of Shipboard Equipment.
5. Hydraulic Institute Standards (HIS):
  - a. 9.6.4, Rotodynamic Pumps for Vibration Measurements and Allowable Values.
  - b. 11.6, Rotodynamic Submersible Pumps for Hydraulic Performance, Hydrostatic Pressure, Mechanical, and Electrical Acceptance Tests.
6. National Electrical Manufacturer's Association (NEMA): MG 1, Motors and Generators.
7. Occupational Safety and Health Administration (OSHA).
8. ISO 1940 Balance Quality Requirements of Rigid Rotors.

**1.02 DEFINITIONS**

A. Terminology pertaining to pumping unit performance and construction shall conform to the ratings and nomenclature of the Hydraulic Institute Standards.

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1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
  - a. Make, model, weight, and horsepower of each pump assembly.
  - b. Complete pump and motor catalog information, descriptive literature, specifications, and identification of materials of construction.
  - c. Plan and section dimensional outline drawings of the pumps and motors identifying all components, anchor bolts, external connections, and appurtenances.
    - 1) Include all components identified with quantity, part name and corresponding materials of construction complete with ASTM designation on sectional drawings.
  - d. Performance data curves showing head, capacity, horsepower demand, net positive suction head required (NPSHR), and pump efficiency over entire operating range of pump, from shutoff to maximum capacity.
    - 1) Include the pump's preferred operating range (POR) and the manufacturer's defined maximum allowable operating range (AOR) for continuous steady state service on performance curves.
    - 2) Indicate separately head, capacity, horsepower demand, NPSHR, and overall efficiency required at the AOR's minimum and maximum continuous stable flow conditions and at the Rated Conditions and at Secondary Conditions (if applicable).
  - e. For variable speed motors, provide performance data curves for 50, 60, 70, 80, and 90 percent of nominal speed.
  - f. Certified detail structural, mechanical, and electrical drawings showing equipment dimensions, arrangement, assembly, including locations and type of connections and weights of major equipment and components.
  - g. Lateral and torsional critical speed analysis.
  - h. Structural response frequency analysis.
  - i. Power and control wiring diagrams, including terminals and numbers.
  - j. Complete motor nameplate data, as defined by NEMA, motor manufacturer, and including any motor modifications.
  - k. Factory finish system.
  - l. Bearing life calculation confirming compliance with L10 bearing life requirement.

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- m. Seismic anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

1. Seismic anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
2. Manufacturer's design analyst qualifications.
3. Special shipping, storage and protection, and handling instructions.
4. Manufacturer's printed installation instructions.
5. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements, that factory finish system is identical to requirements specified herein.
6. Factory functional and performance test reports and log.
7. Field vibration and performance test reports and log.
8. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services.
9. Suggested spare parts list to maintain equipment in service for period of 1 year and 5 years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
10. List special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
11. Operation and Maintenance Data as specified in Section 01 78 23, Operation and Maintenance Data.

1.04 EXTRA MATERIALS

A. Furnish for each set of pumps:

1. One complete set bearings.
2. One complete set gaskets and O-ring seals.
3. One complete set of shaft sleeves.
4. One complete set keys, dowels, pins, etc.
5. One complete mechanical seal.
6. One impeller.
7. One impeller shaft.
8. One set of impeller and casing wear rings.
9. One complete set of any special tools required to dismantle pump.

## **PART 2 PRODUCTS**

### **2.01 GENERAL**

- A. Provide a complete, coordinated, and fully functional operating system.
- B. Coordinate pump requirements with motor manufacturer and be responsible for pump and motor requirements.
- C. Where variable speed drives are required, furnish a coordinated operating system complete with pump, motor, and variable speed controller. See Section 26 29 23, Low-Voltage Variable Frequency Drive System.
- D. Pumps supplied under this section to be a standard product of manufacturer and to have proven reliability.
- E. Provide a complete lateral and torsional critical speed analysis of each pump-motor rotating assembly and structural analysis of complete pump and motor assembly performed by pump manufacturer or qualified third party.
  - 1. Analyst Qualifications: Experienced in performing analyses for pump and motor units of comparable size and complexity.
  - 2. Prepare a written report for each completed analysis documenting analysis and calculation procedures.
  - 3. Submit results of each analysis for review and acceptance prior to pump and motor fabrication.
- F. Lateral Analysis:
  - 1. Identify lateral critical speeds for both pump and motor shafts.
  - 2. Include both dry and wet impeller cases.
  - 3. Provide a critical speed map demonstrating that a critical speed does not occur below 1.25 times the maximum rated speed of the pump and motor and does not occur between 0.75 times the blade pass frequency associated with the minimum speed of the pump and 1.25 times the blade pass frequency associated with the maximum specified speed of the pump.
  - 4. Calculate the damped vibration response to unbalance for the shafts and compare to applicable specified requirements to verify acceptable vibration amplitudes.
- G. Torsional Analysis:
  - 1. Calculate system torsional natural frequencies, corresponding mode shapes, and steady-state and transient torsional response.

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2. Provide an interference diagram demonstrating the following:
  - a. No critical speeds occur between 0.80 times the minimum specified operating speed and 1.20 times the maximum rated speed of the pump and motor.
  - b. No critical speed associated with the mechanical running speed (one times shaft speed) excitation frequency occurs below 1.20 times the maximum rated operating speed.
3. Forced Response Analysis:
  - a. Perform a forced response analysis for all critical speeds determined to occur below 1.20 times the maximum rated operating speed.
  - b. Expected excitation frequencies for steady-state operation include as a minimum, but not limited to, electrical line frequency, two times electrical line frequency, current modulating frequencies produced by the variable frequency drive, mechanical running speed (one times shaft speed), two times mechanical running speed (two times shaft speed), and blade pass frequency.
  - c. Confirm that calculated steady-state and transient dynamic torsional shaft stresses are below allowable levels, such that the motor shaft, pump shaft, and associated drive train components are capable of an unlimited number of startup and shutdown cycles associated with 0 rpm up to the maximum rated speed.
  - d. Determine allowable stresses (endurance limits) for the pump and motor shafts in accordance with ASME B106.1 (Design of Transmission Shafting) or MIL STD 167, whichever is lower.
  - e. Include a factor of safety of at least two in the allowable stress levels and demonstrate stresses on a modified Goodman diagram.

H. Structural Response Frequency Analysis:

1. Perform a structural response frequency analysis for the pump and motor assembly.
2. At a minimum, model the motor, pump, and fabricated support, including any other critical components based upon mounting details shown on Drawings.
3. Confirm that the minimum structural natural frequency of the complete pump and motor assembly is a minimum of 1.25 times the maximum rated pump and motor speed, and does not occur between 0.75 times the blade pass frequency associated with the minimum speed of the pump and 1.25 times the blade pass frequency associated with the maximum specified speed of the pump.
4. Verification of calculated natural frequencies of the pump and motor assembly shall be performed by pump manufacturer, or pump

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manufacturer's authorized representative, when unit is fully installed at the Project Site.

2.02 SUPPLEMENTS

- A. Specific service, performance, and design requirements are attached to this section as supplements.

2.03 EQUIPMENT

A. Pump:

1. Heavy-duty, solids handling, non-clog, dry pit design.
2. Configuration: See Supplements.
3. See Drawings for pump orientation and rotation.
4. Continuously rising head-capacity curve from runout to shutoff.
5. Designed to operate continuously at any point on specified operating range of performance curve without cavitation, overheating, or excessive vibration.
6. Motor nameplate horsepower rating not to be exceeded by pump brake horsepower required at any point on nominal pump performance curve.

B. Casing:

1. Back pullout design allowing for removal of rotating element without disturbing piping connections.
2. Heavy wall, one-piece volute construction with integral flanged discharge flange and smooth fluid passages. Provide drilled and tapped volute priming and drain connections.
3. Wear ring securely fastened to casing (or suction cover) with recessed stainless steel screws.
4. Provide handhole for cleanout purposes at volute centerline located to provide access to interior of pump.
5. Flanges:
  - a. Conform to ASME B16.1, Class 125-pound, flat face standard.
  - b. Provide 1/2-inch gauge connection drilled and tapped in discharge flange.
6. Diffusion vanes or stationary guides are not allowed.

C. Suction Cover (Fronthead):

1. Single-piece construction designed to provide even flow to impeller eye.
2. Flanged connection conforming to ASME B16.1, Class 125-pound, flat face standard.
3. Machine register fitted to casing.

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D. Stuffing Box Cover (Backhead):

1. Single-piece construction designed with integral stuffing box suitable for use of either conventional packing or mechanical seal. Drilled and tapped 3/4-inch drain connection and large openings to allow easy access to stuffing box.
2. Designed for installation of a minimum of five rings of packing and a split type lantern ring and a split type gland follower. Provide stuffing box with 1/4-inch minimum drilled and tapped connection for injection or venting of the stuffing box.
3. Machine register fitted to casing.

E. Bearing Frame and Bearings:

1. Removable, single-piece construction.
2. Machined for accurate bearing alignment and completely enclosing shaft between bearings.
3. Provide with retainer covers on inboard and outboard ends of frame equipped with lip-type grease seals to prevent entrance of contaminants.
4. Single or double row bearings at inboard and outboard ends designed to take radial, weight, and thrust loads of pump and associated shafting loads. Bearings to be designed for an L10 life in accordance with ABMA at best efficiency point.
5. Provide jacking screws for adjustment of impeller.
6. Grease packed at factory and provided with grease fittings for bearing lubrication.

F. Impeller:

1. Single suction, enclosed, non-clogging type design with extremely smooth passageways to prevent clogging.
2. Single-piece construction.
3. Secure to shaft with stainless steel bolt, washer, and key to prevent loosening from either forward or reverse rotation.
4. Dynamically balanced to assure vibration limits for pump are not exceeded.
5. Wear ring securely fastened to impeller with recessed stainless steel screws. Impeller wear ring to be a minimum of 50 Brinell softer than suction head wear ring.

G. Shaft:

1. Accurately machined over entire length and precision ground at bearing locations.



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2. Designed to transmit full motor horsepower with a liberal safety factor to carry maximum loads imposed and to meet pump vibration requirements.
3. Provide keyways at both ends.
4. Provide renewable, hooked shaft sleeve positively secured to shaft to prevent leakage.

H. Shaft Seals:

1. Sealing system shall be mechanical seal as indicated in pump data sheet.
  2. Mechanical Seal Requirements:
    - a. Nonfretting type.
    - b. If provided, sleeves shall be Type 316 stainless steel.
    - c. Shafts for pumps specified with mechanical seals shall be furnished with no reduction in size through the seal area.
    - d. Arrangement shall allow removal of seal without disturbing pump or driver.
    - e. Seal Materials:
      - 1) Faces: Homogeneous construction. Surface treatments and plated faces are unacceptable.
      - 2) Face/Primary Ring: Silicon carbide.
      - 3) Seat/Mating Ring: Silicon carbide.
      - 4) Metals:
        - a) Loaded Parts Over 0.060-inch Cross Section: Type 316 stainless steel minimum.
        - b) Thinner Parts (springs): Hastelloy-C, Alloy 20, AMS5876 Elgiloy, or other alloy that is not vulnerable to chloride stress corrosion.
      - 5) Elastomers: Fluorocarbon Viton, preferred unless seal manufacturer recommends ethylene propylene for service conditions.
    - f. Manufacturers and Products:
      - 1) John Crane; 5610 or 5611 cartridge seal.
      - 2) Or approved equal.
- I. Pump Base: Rugged, heavy duty, with ample strength for support of entire pump and imposed static and operational loads.

2.04 ACCESSORIES

- A. Lifting Lugs: Provide suitably attached for equipment assemblies and components weighing over 100 pounds.

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- B. Equipment Identification Plates: Provide 16-gauge, Type 316 stainless steel identification plate securely mounted on each separate equipment component and control panel in a readily visible location. Plate shall bear 3/8-inch high engraved block type black enamel filled equipment identification number and letters indicated in this Specification and as shown in the Contract Documents.
- C. Anchor Bolts: Type 316 stainless steel, sized by equipment manufacturer, 1/2-inch minimum diameter, and as specified in Section 05 50 00, Metal Fabrications. Coat in accordance with Section 09 90 00, Painting and Coating.

2.05 FACTORY FINISHING

- A. Manufacturer shall prepare, prime, and finish coat in accordance with Section 09 90 00, Painting and Coating.
- B. Manufacturer's standard enamel finish.

2.06 SOURCE QUALITY CONTROL

- A. Factory Tests and Adjustments:
  - 1. Factory testing to be in accordance with the standards of the Hydraulic Institute, latest edition.
    - a. Pump Test Acceptance Grade: 2B.
  - 2. Test one pumps actually furnished. Use manufacturer's standard test motor for factory tests.
  - 3. Factory tests to include the following:
    - a. Hydrostatic testing of pump pressure containing components, to include as a minimum, pump volute, suction cover, and stuffing box cover. Test pressure to be the greater of 150 percent of rated condition or 125 percent of pressure at rated speed with discharge valve closed. Test for 3 minutes.
    - b. Performance testing of fully assembled pump, in accordance with Hydraulic Institute Standard 14.6. Performance testing to be at rated speed.
    - c. Dynamically balance rotating assembly to ISO 1940 Grade G6.3 or better prior to final assembly.
    - d. Vibration testing of fully assembled pump with the Project motor at full rated speed.
      - 1) Limits of Vibration of Fully Assembled Pump: Less than 90 percent of those established in standards of the Hydraulic Institute.
    - e. Include complete test records and performance curves certified correct by an authorized representative of the pump manufacturer of each test performed.

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- f. Motor Test: See Section 26 20 00, Low-Voltage AC Induction Motors.
- g. Make necessary adjustments, realignments, and retest to bring pumps into compliance.
- h. Witnessing of factory testing shown on supplements at end of this section.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install in accordance with manufacturer's printed instructions.
- B. Level base by means of steel wedges (steel plates and steel shims). Wedge taper not greater than 1/4 inch per foot. Use double wedges to provide level bearing surface for pump and driver base. Accomplish wedging so there is no change of level or springing of baseplate when anchor bolts are tightened.
- C. Adjust pump assemblies such that driving units are properly aligned, plumb, and level with driven units and all interconnecting shafts and belts. Do not compensate for misalignment by use of flexible couplings.
- D. After pump and driver have been set in position, aligned, and shimmed to proper elevation, grout space between bottom of baseplate or pump pedestals and concrete foundation with a poured, nonshrinking grout of the proper category, as specified in Section 03 62 00, Grouting. Remove wedges after grout is set and pack void with grout.
- E. Connect suction and discharge piping without imposing strain to pump flanges.
- F. Anchor Bolts: Accurately place using equipment templates and as specified in Section 05 50 00, Metal Fabrications.

**3.02 FIELD FINISHING**

- A. Equipment as specified in Section 09 90 00, Painting and Coating.

**3.03 FIELD QUALITY CONTROL**

- A. Functional Tests:
  - 1. Conduct on each pump, system, and subsystem as specified in Section 01 91 14, Testing, Integration, and Startup.

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2. Alignment:
  - a. Test complete assemblies for correct rotation, proper alignment and connection, and quiet operation.
  - b. Shafting manufacturer's authorized representative shall verify installation alignment and prepare and submit a report confirming compliance.
3. Flow Output: Measure using plant instrumentation and storage volumes.
4. Operating Temperatures and Vibration: Monitor bearing areas on pump and motor abnormally high temperatures or vibrations.
5. Vibration Test:
  - a. Test with units installed and in normal operation, and discharging to connected piping systems at rates between low discharge head and high discharge head conditions specified, at 20 percent speed increments over the anticipated operating speed range of the pump and with actual building structures and foundations provided.
    - 1) Confirm vibration is below 90 percent of limits specified in HIS 9.6.4.
  - b. If units exhibit vibration in excess of the limits specified adjust or modify as necessary to bring units into compliance. Units that cannot be adjusted or modified to conform as specified shall be replaced.
  - c. Provide instrumentation in current calibration to measure pump vibration at locations outlined in the Hydraulic Standards.
  - d. Prepare test report, including test records for each pump.
6. Performance Test: Conduct on each pump as specified in Section 01 91 14, Testing, Integration, and Startup.
7. Test in accordance with Hydraulic Institute Standard 1.6, Centrifugal Pump Test.
8. Perform under simulated operating conditions at full rated speed.
9. Test for a continuous 3-hour period without malfunction.
10. Test Records and Report: Prepare and submit a complete test report along with the test records in accordance with Hydraulic Institute Standard 1.6.
11. Use of plant instrumentation is allowed for tests. Provide additional instrumentation required to obtain required test data per the Hydraulic Institute.

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3.04 MANUFACTURER’S SERVICES

- A. Manufacturer’s Representative: Present at Site or classroom designated by Owner for minimum person-days listed below, travel time excluded:
  - 1. 2 person-days for installation assistance and inspection.
  - 2. 2 person-days for functional and performance testing and completion of Manufacturer’s Certificate of Proper Installation.
  - 3. 2 person-days for prestartup classroom or Site training.
  - 4. 1 person-day for facility startup.
  - 5. 2 person-days for post-startup training of Owner’s personnel. Training shall not commence until an accepted detailed lesson plan for each training activity has been reviewed by Owner.
  
- B. See Section 01 43 33, Manufacturers’ Field Services, and Section 01 91 14, Testing, Integration, and Startup.

3.05 SUPPLEMENTS

- A. The supplements listed below, following “End of Section,” are a part of this Specification.
  - 1. Raw Solids Feed Pumps 1, 2, and 3 Data Sheet.

**END OF SECTION**

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**RAW SOLIDS FEED PUMP NOS. 1, 2, AND 3 DATA SHEET**

Tag Numbers: 73-P-21, 73-P-22, 73-P-23

Pump Name: Raw Solids Feed Pumps 1, 2, and 3

Manufacturer and Model Number: (1) Yeomans (Grundfos) 6315-4BHT/4A

(2) Flowserve 6MF13C FR5T

(3) Or approved equal

**SERVICE CONDITIONS**

Liquid Pumped (Material and Percent): Wastewater Sludge

Pumping Temperature (Fahrenheit): Normal: 75 Max: 100 Min: 50

Specific Gravity at 60 Degrees F: 1.01 Viscosity Range: Water

Vapor Pressure at 60 Degrees F: Water pH: Water

Abrasive (Y/N) Y caused by Wastewater Solids

Possible Scale Buildup (Y/N): Y caused by Wastewater

Corrosive caused by Wastewater

Total Suspended Solids (mg/L) Less than or equal to 1.5% TS

Min. NPSH Available (Ft. Absolute): 1.5

Area Classification: Unclassified

Ambient Temperature (degrees F): 70

Location Indoor/Outdoor: Indoor

Altitude: 390 ft amsl

**PERFORMANCE REQUIREMENTS**

Capacity (US gpm): Rated: 1,650 Secondary: 1,000

Total Dynamic Head (Ft): Rated: 92 Secondary: 82

BHP at Rated Point: Less than or equal to 51

Secondary: Less than or equal to 41

NPSH Required, Max. (Ft Absolute) at Rated Point: 19

Secondary: 11

Maximum Shutoff Pressure (Ft): 130

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**RAW SOLIDS FEED PUMPS 1, 2, AND 3 DATA SHEET**

Tag Numbers: 73-P-21, 73-P-22, 73-P-23

Pump Name: Raw Solids Feed Pumps 1, 2, and 3

Min. Rated Pump Hydraulic Efficiency at Rated Capacity (%): 76

Max. Pump Speed at Rated Capacity (rpm): 1,750

Constant Speed: No

Variable Speed: Yes Minimum Speed: 1,400 rpm

Maximum Head, Rated Impeller (ft): 160

Maximum Power, Rated Impeller (BHP): 60

Sphere Size Required (to pass through impeller), Min. (in): 3

**PUMP CONSTRUCTION DETAILS**

Configuration: Horizontal, Frame Mounted: X

Vertical, Close-Coupled: \_\_\_\_\_

Vertical, Extension Shafting: \_\_\_\_\_

Size: Suction (in.): 6 Discharge (in.): 6

Casing: Single Volute: \_\_\_\_\_

Tangential Discharge: X Centerline Discharge: \_\_\_\_\_

Impeller: Enclosed: X Two Vane: \_\_\_\_\_ Three Vane: \_\_\_\_\_  
Bladeless: \_\_\_\_\_

Wear Rings: Suction Cover: X Impeller: X

Axial Type: \_\_\_\_\_ Radial Type: \_\_\_\_\_ L Type: \_\_\_\_\_

Bearings L10 Life: 100,000 Hr: X 50,000 Hr: \_\_\_\_\_ 25,000 Hr: \_\_\_\_\_

Shaft Sleeve: Yes X No \_\_\_\_\_

Pump Base: Heavy Duty Fabricated Steel: X

Cast Iron Combination Base Elbow: \_\_\_\_\_

Cast Mounting Pads Integral With Casing: \_\_\_\_\_

Suction Elbow: Yes \_\_\_\_\_ No X Type: \_\_\_\_\_

Material: Cast Iron, ASTM A48 Class 30: \_\_\_\_\_  
With 3% Nickel: \_\_\_\_\_

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**RAW SOLIDS FEED PUMPS 1, 2, AND 3 DATA SHEET**

Tag Numbers: 73-P-21, 73-P-22, 73-P-23

Pump Name: Raw Solids Feed Pumps 1, 2, and 3

Connection: Standard Flexible Type: \_\_\_\_\_ Spacer Type: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_ Manufacturers Standard: \_\_\_\_\_  
Belt-and-Pulley: X

Seal: Packing: \_\_\_\_\_  
Mechanical Seal: X Single: X Double: \_\_\_\_\_  
Mechanical Seal Manufacturer/Model: \_\_\_\_\_  
Lubrication: \_\_\_\_\_

Extension: Solid Type: \_\_\_\_\_ Tubular Type: \_\_\_\_\_

Shafting: No of Segments: \_\_\_\_\_  
Max Drive Shaft Segment Length (in): \_\_\_\_\_

Materials: Pump Castings (includes casing, suction cover, stuffing box cover,  
bearing frame):  
Cast Iron, ASTM A48/A48M Class 30 X With 3% Nickel X  
Cast Iron, ASTM A48/A48M Class 35 \_\_\_\_\_ With 3% Nickel \_\_\_\_\_

Impeller: Cast Iron, ASTM A48/A48M Class 30 X With 3% Nickel X

Pump Shaft: High Strength Steel \_\_\_\_\_ AISI 1045 Steel, HR \_\_\_\_\_  
Type 4140 Alloy Steel X Type 304 Stainless Steel \_\_\_\_\_

Shaft Sleeve: Hardened Stainless Steel X Corrosion-Resistant Bronze \_\_\_\_\_

Wear Rings: Hardened Stainless Steel X

Packing: Graphite Impregnated Braided Synthetic \_\_\_\_\_

Lantern Ring: Bronze X Teflon \_\_\_\_\_

Follower Gland: Bronze X Cast Iron \_\_\_\_\_ Steel \_\_\_\_\_

Mechanical Seal: Buna N \_\_\_\_\_ Viton \_\_\_\_\_ EPT \_\_\_\_\_  
Carbon \_\_\_\_\_ Tungsten Carbide \_\_\_\_\_ Silicone Carbide X  
18-8 Stainless Steel \_\_\_\_\_ Type 316 Stainless Steel \_\_\_\_\_

Extension Steel \_\_\_\_\_ Fiber Reinforced Composite \_\_\_\_\_

Shafting: \_\_\_\_\_

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**RAW SOLIDS FEED PUMPS 1, 2, AND 3 DATA SHEET**

Tag Numbers: 73-P-21, 73-P-22, 73-P-23

Pump Name: Raw Solids Feed Pumps 1, 2, and 3

**DRIVE MOTOR** (See Section 26 20 00, Low-Voltage AC Induction Motors.)

Horsepower: 60 Voltage: 480 Phase: 3 Hertz: 60

Synchronous Speed (rpm): 1800

Service Factor (at max. ambient temp.): 1.0 \_\_\_\_\_ 1.15 \_\_\_\_\_

Insulation Class: \_\_\_\_\_ Temperature Rise: \_\_\_\_\_

Inverter Duty Rated (Y/N): Y Thermal Protection: \_\_\_\_\_

Motor nameplate horsepower shall not be exceeded at any head-capacity point on pump curve.

Enclosure: DIP \_\_\_\_\_ EXP \_\_\_\_\_ ODP \_\_\_\_\_ TEFC \_\_\_\_\_ CISD-TEFC \_\_\_\_\_

TENV \_\_\_\_\_ WPI \_\_\_\_\_ WPII \_\_\_\_\_ SUBM \_\_\_\_\_

Mounting Type: Horizontal X Vertical Solid Shaft: \_\_\_\_\_

Variable Speed Drive: \_\_\_\_\_ min to \_\_\_\_\_ max. See Section 26 29 23, Low-Voltage Variable Frequency Drive System.

**REMARKS** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**SECTION 44 42 56.10**  
**HORIZONTAL END SUCTION CENTRIFUGAL PUMPS**

**EQUIPMENT AND COMPONENT NUMBERS**

94-P-01: Centrate Pump 1  
94-P-02: Centrate Pump 2  
94-P-03: Centrate Pump 3

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Bearing Manufacturers' Association (ABMA).
  2. Hydraulic Institute Standards.
  3. National Electrical Manufacturer's Association (NEMA): MG 1, Motors and Generators.
  4. Occupational Safety and Health Administration (OSHA).

1.02 DEFINITIONS

- A. Terminology pertaining to pumping unit performance and construction shall conform to the ratings and nomenclature of the Hydraulic Institute Standards.

1.03 SUBMITTALS

- A. Action Submittals:
1. Shop Drawings:
    - a. Make, model, weight, and horsepower of each equipment assembly.
    - b. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
    - c. Performance data curves showing head, capacity, horsepower demand, and pump efficiency over entire operating range of pump from shutoff to maximum capacity. Indicate separately the head, capacity, horsepower demand, overall efficiency, and minimum submergence required at guarantee point.
    - d. Detailed mechanical, and electrical drawings showing equipment dimensions, size, and locations of connections and weights of associated equipment.

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- e. Flywheel size, shape, materials of construction, connection to motor shaft, and enclosure.
- f. Power and control wiring diagrams, including terminals and numbers.
- g. Complete motor nameplate data, as defined by NEMA, motor manufacturer.
- h. Factory finish system data sheets.
- i. Lateral and torsional analysis for rotating assembly. Analysis report shall include the specific items as specified herein and the applicable requirements of API 610, Part 2.8, Dynamics.
- j. Anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

- 1. Anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
- 2. Factory functional test reports.
- 3. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements, that factory finish system is identical to the requirements specified herein.
- 4. Special shipping, storage and protection, and handling instructions.
- 5. Manufacturer's printed installation instructions.
- 6. Suggested spare parts list to maintain the equipment in service for a period of 5 years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
- 7. List special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
- 8. Operation and Maintenance Data: As specified in Section 01 78 23, Operation and Maintenance Data.
- 9. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services.

1.04 EXTRA MATERIALS

A. Furnish for each pump:

- 1. Complete set bearings.
- 2. Complete set gaskets and O-ring seals.
- 3. Complete mechanical seal.
- 4. One complete set of special tools required to dismantle pump.

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**PART 2 PRODUCTS**

2.01 GENERAL

- A. Provide a complete, coordinated, and fully functional operating system. Provide each specified pumping unit. Each pumping unit shall consist of a pump, motor, moment of inertia flywheel, variable frequency drive, couplings, bases, and all appurtenances to provide a complete pumping system.
- B. The physical depiction of the pumps on Drawings represents the product of one manufacturer specified herein. The depiction of the product is not intended to confer any advantage to this product. Dimensional variations in equipment may exist between manufacturers. All costs for modifications to new piping, concrete equipment supports and pads, and electrical and instrumentation wire, cable, and conduit to accommodate pumps different than those shown on Drawings shall be the responsibility of the Contractor.
- C. Coordinate pump requirements with drive manufacturer and be responsible for pump and drive requirements.
- D. Coordinate pump and drive requirements with flywheel manufacturer and be responsible for pump, drive and flywheel requirements.
- E. Where variable speed drives are required, furnish a coordinated operating system complete with pump, flywheel, drive, and speed controller.
- F. The complete pumping unit rotational element, including pump, motor, intermediate shafting, flywheel rotors, and all other elements in the power train, shall be designed and manufactured to limit lateral and torsional vibration and stresses in accordance with the requirements in this Specification.
  1. A complete lateral and torsional critical speed analysis of each pump coupling and flywheel motor rotating assembly shall be performed by the pump manufacturer or a qualified third party. The analyst shall be experienced in performing these analyses for pump, flywheel, and motor units of comparable size and complexity as defined in the applicable specification sections and the requirements of this provision. A written report shall be submitted for each completed analysis, documenting the analysis and calculation procedures. The results of each completed analysis shall be submitted for review and acceptance prior to pump and motor fabrication. The report shall include calculations, tables, results, recommendations to achieve compliance, a plain-English Executive Summary, and sufficient graphical depictions to describe the results clearly to technical persons not conversant in rotodynamic technology.

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2. The lateral analysis shall identify the lateral critical speeds for both the pump and motor shafts. The pump shaft analysis shall include both the dry and wet impeller cases. A critical speed map shall be provided demonstrating that a critical speed does not occur below 1.5 times the maximum rated speed of the pump and motor. The damped vibration response to unbalance shall be calculated for the shafts and compared to amplitudes.
3. The torsional analysis shall include calculation of the system torsional natural frequencies and corresponding mode shapes, and the steady-state transient torsional response. An interference diagram shall be provided demonstrating no critical speeds occur between 0.25 times the maximum rated operating speed of the pump. In no case shall a critical speed associated with the mechanical running speed (1 times shaft speed) excitation frequency below 1.25 times the maximum rated operating speed. A forced response analysis shall be performed for all critical speeds that have been determined to occur below 1.25 times the maximum rated operating speed of the pump and motor. The expected excitation frequencies for steady-state operation shall include, but not be limited to, electrical line frequency, two times the electrical line frequency, current modulating frequencies produced by the variable frequency drives, mechanical running speed (1 times shaft speed), two times mechanical running speed (2 times shaft speed), and blade pass frequency. The calculated steady-state and transient dynamic torsional shaft stresses and coupling torques shall be shown to be below allowable levels such that the motor shaft, pump shaft, and associated drive train components are capable of an unlimited number of startup and shutdown cycles associated with 0 rpm up to the maximum rated pump speed. The allowable stresses (endurance limits) for the pump and motor shafts shall be determined in accordance with ASME B106.1 (Design of Transmission Shafting) or MIL STD 167. A factor of safety of at least 2 shall be included in the allowable stress levels. The allowable dynamic torque in the couplings shall be in accordance with the coupling manufacturer's requirements.

2.02 SUPPLEMENTS

- A. Some specific requirements are attached to this section as supplements.

2.03 SPECIAL FEATURES AND ACCESSORIES

- A. Moment of Inertia Flywheels:
  1. Pumps 94-P-01, 94-P-02, and 94-P-03 shall be equipped with flywheels. See the attached datasheet at the end of this section for flywheel sizing.

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2. The flywheel shall be designed by the motor and pump manufacturer to insure compatibility of rotating parts.
3. Motor shafts, bearings, pumps, and variable frequency drives shall be coordinated and designed to accommodate moment of inertia flywheels.
4. Each flywheel shall have a minimum moment of inertia of 400 pounds per square foot.
5. The flywheel shall be attached to the motor or pump as recommended by the pump manufacturer. Minimize laying length of the pump, motor, and flywheel assembly so that the flywheel and associated bearings adds no more than 24 inches to the assembly laying length.
6. Flywheels shall be made of the material specified on the attached datasheet. Welded parts shall be stress relieved after fabrication. The flywheel hub shall be shrink fitted to the shaft and secured with key and keyway set screws.

2.04 ACCESSORIES

- A. Equipment Identification Plate: 16-gauge stainless steel with 1/4-inch die-stamped equipment tag number securely mounted in a readily visible location.
- B. Lifting Lugs: Equipment weighing over 100 pounds.
- C. OSHA-approved coupling guard for direct coupled or belt driven pumps.
- D. Anchor Bolts: Type 316 stainless steel, sized by equipment manufacturer, and as specified in Section 05 50 00, Metal Fabrications.

2.05 FACTORY FINISHING

- A. Prepare, and prime, coat in accordance with Section 09 90 00, Painting and Coating.

2.06 SOURCE QUALITY CONTROL

- A. Factory Inspections: Inspect control panels for required construction, electrical connection, and intended function.
- B. Factory Tests and Adjustments: Test all equipment and control panels actually furnished.
- C. Factory Test Report: Include test data sheets, certified correct by a registered professional engineer.

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- D. Functional Test: Perform manufacturer's standard, motor test on equipment. Include vibration test, as follows:
1. Dynamically balance rotating parts of each pump and its driving unit before final assembly.
  2. Limits:
    - a. Driving Unit Alone: Less than 80 percent of NEMA MG 1 limits.
    - b. Complete Rotating Assembly Including Coupling, Drive Unit, and Motor: Less than 90 of limits established in the Hydraulic Institute Standards.
- E. Performance Test:
1. Conduct on each pump.
  2. In accordance with Hydraulic Institute Standards.
  3. Adjust, realign, or modify units and retest in accordance with Hydraulic Institute Standards if necessary.
- F. Motor Test: See Section 26 20 00, Low-Voltage AC Induction Motors.
- G. Hydrostatic Tests: Pump casing(s) tested at 150 percent of shutoff head. Test pressure maintained for not less than 5 minutes.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install in accordance with manufacturer's printed instructions.
- B. Level base by means of steel wedges (steel plates and steel shims). Wedge taper not greater than 1/4 inch per foot. Use double wedges to provide a level bearing surface for pump, flywheel and driver base. Accomplish wedging so there is no change of level or springing of baseplate when anchor bolts are tightened.
- C. Adjust pump assemblies such that the flywheel and driving units are properly aligned, plumb, and level with the driven units and all interconnecting shafts and couplings. Do not compensate for misalignment by use of flexible couplings.
- D. After pump, flywheel and driver have been set in position, aligned, and shimmed to proper elevation, grout the space between the bottom of the baseplate and the concrete foundation with a poured, nonshrinking grout of the proper category, as specified in Section 03 62 00, Grouting. Remove wedges after grout is set and pack void with grout.

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- E. Connect suction and discharge piping without imposing strain to pump flanges.
- F. Anchor Bolts: Accurately place using equipment templates and as specified in Section 05 50 00, Metal Fabrications.

3.02 FIELD FINISHING

- A. Finish equipment as specified in Section 09 90 00, Painting and Coating.

3.03 FIELD QUALITY CONTROL

- A. Functional Tests: Conduct on each pump.
  - 1. Alignment: Test complete assemblies for correct rotation, proper alignment and connection, and quiet operation.
  - 2. Vibration Test:
    - a. Test with unit installed and in normal operation, and discharging to the connected piping systems at rates between low discharge head and high discharge head conditions specified, and with actual building structures and foundations provided shall not develop vibration exceeding 80 percent of the limits specified in HIS 9.6.4.
    - b. If units exhibit vibration in excess of the limits specified, adjust or modify as necessary. Replace units which cannot be adjusted or modified to conform as specified.
  - 3. Flow Output: Measured by plant instrumentation and storage volumes.
- B. Operating Temperatures: Monitor bearing areas on pump, flywheel, and motor for abnormally high temperatures.
- C. Performance Test:
  - 1. Conduct on each pump.
  - 2. In accordance with Hydraulic Institute Standards.

3.04 MANUFACTURER'S SERVICES

- A. Manufacturer's Representative:
  - 1. Present at Site or classroom designated by Owner, for minimum person-days listed below, travel time excluded:
    - a. 2 person-days for installation assistance and inspection.
    - b. 1 person-day for functional and performance testing and completion of Manufacturer's Certificate of Proper Installation.



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- c. 1/2 person-day for pre-startup classroom or Site training.
  - d. 1 person-day for facility startup.
  - e. 1/2 person-day for post-startup training of Owner's personnel.
- B. See Section 01 43 33, Manufacturers' Field Services, and Section 01 91 14, Testing, Integration, and Startup.

3.05 SUPPLEMENTS

- A. The supplement listed below, following "End of Section," is a part of this Specification.
- 1. Centrate Pumps 1, 2, 3 Data Sheet.

**END OF SECTION**

**CENTRATE PUMPS 1, 2, 3 DATA SHEET**

Tag Numbers: 94-P-01; 94-P-02; 94-P-03

Pump Name: Centrate Pumps 1, 2, 3

Manufacturer and Model Number: (1) Sulzer APT 53-6  
(2) Hidrostal H5K-S  
(3) Yeomans 6315-4BHT/4A  
(4) Or approved equal

**SERVICE CONDITIONS**

Liquid Pumped (Material and Percent): Centrate

Pumping Temperature (Fahrenheit): Normal: 60 Max 85 Min 50

Specific Gravity at 60 Degrees F: 1 Viscosity Range: \_\_\_\_\_

pH: 6-8

Abrasive (Y/N) \_\_\_\_\_ Possible Scale Buildup (Y/N): Y

Min. NPSH Available (Ft. Absolute): \_\_\_\_\_

**PERFORMANCE REQUIREMENTS AT PRIMARY DESIGN POINT**

Capacity (US gpm): Rated: 1,900

Total Dynamic Head (Ft): Rated: 132

Min. Hydraulic Efficiency (%): \_\_\_\_\_

Maximum Shutoff Pressure (Ft): \_\_\_\_\_

Max. Pump Speed at Design Point (rpm): 1,750

Constant (Y/N): N Adjustable (Y/N): Y

**PERFORMANCE REQUIREMENTS AT SECONDARY DESIGN POINTS**

Capacity (US gpm): 800 Capacity (US gpm): 1,670

Total Dynamic Head (Ft): 64 Total Dynamic Head (Ft): 177

Min. Hydraulic Efficiency (%): \_\_\_\_\_ Min. Hydraulic Efficiency (%): \_\_\_\_\_

**CENTRATE PUMPS 1, 2, 3 DATA SHEET**

Tag Numbers: 94-P-01; 94-P-02; 94-P-03

Pump Name: Centrate Pumps 1, 2, 3

**DESIGN AND MATERIALS**

ANSI (Y/N) \_\_\_\_\_ Standard (Y/N) \_\_\_\_\_ Design: Frame-mounted (Y/N) \_\_\_\_\_  
Close-Coupled Casing (Y/N) \_\_\_\_\_ Back Pullout (Y/N) \_\_\_\_\_

Discharge Orientation: \_\_\_\_\_ Rotation (view from end coupling): \_\_\_\_\_

Casing Materials: Cast Iron or Ductile Iron

Case Wear Ring (Y/N) Y Material: Stainless steel

Impeller: Type: \_\_\_\_\_ Material: Type 316 stainless steel

Impeller Wear Ring (Y/N): Y Material: Stainless steel

Shaft Material: Stainless steel

Shaft Sleeve Material: Stainless steel

Shaft Seal: \_\_\_\_\_ Packing (Y/N) N Material: Tungsten carbide

Mechanical (Y/N) Y Type: Single Mechanical Seal

Lubrication: Pumped fluid

ABMA L-10 Bearing Life (Hrs): 100,000 Lubrication: \_\_\_\_\_

Coupling: \_\_\_\_\_ Falk (Y/N) \_\_\_\_\_ Fast (Y/N) \_\_\_\_\_

Spring-Grid (Y/N) \_\_\_\_\_

Gear Type (Y/N) \_\_\_\_\_ Spacer (Y/N) \_\_\_\_\_ Manufacturer \_\_\_\_\_  
Standard (Y/N) \_\_\_\_\_

Baseplate: Design: \_\_\_\_\_ Material: \_\_\_\_\_

Drive Type: Direct-Coupled: \_\_\_\_\_ Belt \_\_\_\_\_ Adjustable Speed \_\_\_\_\_

Other: \_\_\_\_\_

Variable Speed Drive Range: See Section 26 29 23, Low Voltage Variable Frequency Drive System.

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**CENTRATE PUMPS 1, 2, 3 DATA SHEET**

Tag Numbers: 94-P-01; 94-P-02; 94-P-03

Pump Name: Centrate Pumps 1, 2, 3

**DRIVE MOTOR** (See Section 26 20 00, Low-Voltage AC Induction Motors)

Horsepower: 100 Voltage: 460 Phase: 3 Synchronous Speed (rpm): \_\_\_\_\_

Service Factor: 1.15 Inverter Duty (Y/N) Y

Motor nameplate horsepower shall not be exceeded at any head-capacity point on the pump curve.

Enclosure: DIP \_\_\_\_\_ EXP \_\_\_\_\_ ODP \_\_\_\_\_ TEFC Y CISD-TEFC \_\_\_\_\_  
TENV \_\_\_\_\_ WPI \_\_\_\_\_ WPII \_\_\_\_\_ SUBM \_\_\_\_\_

Mounting Type: Horizontal Y Nonreverse Ratchet (Y/N) N

Thermal Protection: Temperature Switch, manufacturer's standard

**FLYWHEEL**

Minimum Flywheel Moment of Inertia (pounds-square feet): 400

Minimum Combined Moment of Inertia – pump, flywheel, motor (pounds-square feet): 450

Flywheel Material: Cast iron or fabricated steel

Bearing Ratings: \_\_\_\_\_

**REMARKS** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**SECTION 44 42 56.13  
PROGRESSING CAVITY PUMPS**

**EQUIPMENT AND COMPONENT NUMBERS**

76-P-51: Dewatering Centrifuge Sludge Feed Pump No. 1  
76-P-52: Dewatering Centrifuge Sludge Feed Pump No. 2  
76-P-53: Dewatering Centrifuge Sludge Feed Pump No. 3  
76-P-54: Dewatering Centrifuge Sludge Feed Pump No. 4  
76-P-55: Dewatering Centrifuge Sludge Feed Pump No. 5  
76-P-56: Dewatering Centrifuge Sludge Feed Pump No. 6  
76-P-57: Dewatering Centrifuge Sludge Feed Pump No. 7  
76-P-58: Dewatering Centrifuge Sludge Feed Pump No. 8  
76-P-61: Dewatering Polymer Feed Pump No. 1  
76-P-62: Dewatering Polymer Feed Pump No. 2  
76-P-63: Dewatering Polymer Feed Pump No. 3  
76-P-64: Dewatering Polymer Feed Pump No. 4  
76-P-65: Dewatering Polymer Feed Pump No. 5  
76-P-66: Dewatering Polymer Feed Pump No. 6  
76-P-67: Dewatering Polymer Feed Pump No. 7  
76-P-68: Dewatering Polymer Feed Pump No. 8  
76-P-11: Thickening Centrifuge Sludge Feed Pump No. 1  
76-P-12: Thickening Centrifuge Sludge Feed Pump No. 2  
76-P-13: Thickening Centrifuge Sludge Feed Pump No. 3  
76-P-14: Thickening Centrifuge Sludge Feed Pump No. 4  
76-P-15: Thickening Centrifuge Sludge Feed Pump No. 5  
76-P-21: Thickening Polymer Feed Pump No. 1  
76-P-22: Thickening Polymer Feed Pump No. 2  
76-P-23: Thickening Polymer Feed Pump No. 3  
76-P-24: Thickening Polymer Feed Pump No. 4  
76-P-25: Thickening Polymer Feed Pump No. 5  
76-P-31: Thickened Solids Transfer Pump No. 1  
76-P-32: Thickened Solids Transfer Pump No. 2  
76-P-33: Thickened Solids Transfer Pump No. 3

**PART 1 GENERAL**

**1.01 REFERENCES**

A. The following is a list of standards which may be referenced in this section:

1. American Bearing Manufacturers' Association (ABMA).
2. Hydraulic Institute Standards (HIS).
3. National Electrical Manufacturer's Association (NEMA): MG 1, Motors and Generators.

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1.02 DEFINITIONS

- A. Terminology pertaining to pumping unit performance and construction shall conform to the ratings and nomenclature of the Hydraulic Institute Standards.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
  - a. Make, model, weight, and horsepower of each equipment assembly.
  - b. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
  - c. Performance data curves showing head, capacity, horsepower demand, and pump efficiency over the entire operating range of the pump, from shutoff to maximum capacity. Indicate separately the head, capacity, horsepower demand, overall efficiency, and minimum submergence required at the guarantee point.
  - d. Detailed mechanical, and electrical drawings showing the equipment dimensions, size, and locations of connections and weights of associated equipment.
  - e. Power and control wiring diagrams, including terminals and numbers.
  - f. Complete motor nameplate data, as defined by NEMA, motor manufacturer, and including any motor modifications.
  - g. Factory finish system.
  - h. Seismic anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

1. Seismic anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
2. Manufacturer's Certificate of Compliance that factory finish system is identical to the requirements specified herein.
3. Factory Functional and Performance Test Reports and Log
4. Special shipping, storage and protection, and handling instructions.
5. Manufacturer's printed installation instructions.
6. Suggested spare parts list to maintain the equipment in service for a period of 1 year and 5 years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
7. List special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.

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8. Operation and Maintenance Data: As specified in Section 01 78 23, Operation and Maintenance Data.
9. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services.

1.04 EXTRA MATERIALS

A. Furnish for each set of pumps:

1. Complete mechanical seal.
2. Complete set of bearings.
3. Complete set gaskets and O-ring seals.
4. Complete set rod washers.
5. Complete set keys, dowels, pins, etc.
6. One stator.
7. One rotor.
8. One connecting rod with one pair of universal joint(s), as required by pump type.
9. One complete set of special tools required to dismantle pump.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. Coordinate pump requirements with drive manufacturer and be responsible for pump and drive requirements.
- B. Where adjustable speed drives are required, furnish a coordinated operating system complete with pump, drive, and speed controller.

2.02 SUPPLEMENTS

- A. Some specific requirements are attached to this section as supplements.

2.03 ACCESSORIES

A. Stator Thermal Protection:

1. Provide for pumps where indicated in supplements and as specified below:
  - a. Stator thermal protection (run dry protection) shall shut pump down before stator damage occurs.
  - b. Provide thermowell drilled and tapped into stator and thermocouple for measurement of temperature at pump stator to rotor interface.

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- c. Provide temperature controller in NEMA 4X enclosure, with dual display for stator temperature and alarm set-point with adjustable hysteresis to prevent on/off cycling of pump when coming off an alarm.
  - d. Provide thermocouple cable between thermocouple and temperature controller.
- B. Equipment Identification Plate: 16-gauge stainless steel with 1/4-inch die-stamped equipment tag number securely mounted in a readily visible location.
- C. Lifting Lugs: Equipment weighing over 100 pounds.
- D. Anchor Bolts: Type 316 stainless steel, sized by equipment manufacturer, and as specified in Section 05 50 00, Metal Fabrications.

2.04 FACTORY FINISHING

- A. Prepare, prime, and finish coat in accordance with Section 09 90 00, Painting and Coating.

2.05 SOURCE QUALITY CONTROL

- A. Factory Tests and Adjustments: Test all equipment actually furnished.
- B. Factory Test Report: Include test data sheets, curve test results, performance test logs, certified correct by a registered professional engineer.
- C. Functional Test: Perform manufacturer's standard test on equipment.
- D. Motor Test: See Section 26 20 00, Low-Voltage AC Induction Motors.
- E. Performance Test:
- 1. Conduct on each pump.
  - 2. Conduct in accordance with Hydraulic Institute Standards.
  - 3. Perform under simulated operating conditions.
  - 4. Test for a continuous 3-hour period without malfunction.
  - 5. Test Log:
    - a. Record the following:
      - 1) Total head.
      - 2) Capacity.
      - 3) Horsepower requirements.
      - 4) Flow measured by factory instrumentation and storage volumes.
      - 5) Field head.



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- 6) Driving motor voltage and amperage measured for each phase.
6. Adjust, realign, or modify units and retest in accordance with Hydraulic Institute Standards if necessary.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install in accordance with manufacturer's printed instructions.
- B. Level base by means of steel wedges (steel plates and steel shims). Wedge taper not greater than 1/4 inch per foot. Use double wedges to provide a level bearing surface for pump and driver base. Accomplish wedging so there is no change of level or springing of the baseplate when anchor bolts are tightened.
- C. Adjust pump assemblies such that driving units are properly aligned, plumb, and level with driven units and interconnecting shafts and couplings. Do not compensate for misalignment by use of flexible couplings.
- D. After pump and driver have been set in position, aligned, and shimmed to the proper elevation, grout space between bottom of baseplate and concrete foundation with a poured, nonshrinking grout of the proper category, as specified in Section 03 62 00, Grouting. Remove wedges after grout is set and pack void with grout.
- E. Connect suction and discharge piping without imposing strain to pump flanges.
- F. Anchor Bolts: Accurately place using equipment templates and as specified in Section 05 50 00, Metal Fabrications.
- G. Pipe pump drain(s) to hub drain.

**3.02 FIELD FINISHING**

- A. Equipment as specified in Section 09 90 00, Painting and Coating.

**3.03 FIELD QUALITY CONTROL**

- A. Functional Tests: Conduct on each pump.
  1. Alignment: Test complete assemblies for correct rotation, proper alignment and connection, and quiet operation.
  2. Flow Output: Measured by plant instrumentation and storage volumes.
  3. Operating Temperatures: Monitor bearing areas on pump and motor for abnormally high temperatures.

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B. Performance Test: In accordance with Hydraulic Institute Standards.

3.04 MANUFACTURER'S SERVICES

A. Manufacturer's Representative:

1. Present at Site or classroom designated by Owner, for minimum person-days listed below, travel time excluded:
  - a. 1 person-day for installation assistance and inspection.
  - b. 3 person-days for functional and performance testing and completion of Manufacturer's Certificate of Proper Installation.
  - c. 1 person-day for pre-startup classroom or Site training.
  - d. 1 person-day for facility startup.
  - e. 1 person-day for post-startup training of Owner's personnel. Training shall not commence until an accepted detailed lesson plan for each training activity has been reviewed by Owner.

B. See Section 01 43 33, Manufacturers' Field Services and Section 01 91 14, Testing, Integration, and Startup.

3.05 SUPPLEMENTS

A. The supplements listed below, following "End of Section," are a part of this Specification.

1. Dewatering Centrifuge Sludge Feed Pump 1, 2, 3, 4, 5, 6, 7, 8 Data Sheet.
2. Dewatering Polymer Feed Pumps 1, 2, 3, 4, 5, 6, 7, 8 Data Sheet.
3. Thickening Centrifuge Sludge Feed Pump 1, 2, 3, 4, 5 Data Sheet.
4. Thickening Polymer Feed Pumps 1, 2, 3, 4, 5 Data Sheet.
5. Thickened Solids Transfer Pump Data Sheet.

**END OF SECTION**

**DEWATERING CENTRIFUGE SLUDGE FEED PUMP DATA SHEET**

Tag Numbers: 76-P-51, 76-P-52, 76-P-53, 76-P-54, 76-P-55, 76-P-56, 76-P-57, 76-P-58

Pump Name: Dewatering Centrifuge Sludge Feed Pump 1, 2, 3, 4, 5, 6, 7, 8

Manufacturer and Model Number: (1) Seepex; 130-6LS

(2) Moyno; Z39K

(3) Netzsch; NM090

(4) Or approved equal

**SERVICE CONDITIONS**

Liquid Pumped (Material and Percent): Digested sludge, 2.0 – 3.0 percent

Pumping Temperature (Fahrenheit): Normal: 70 Max: 60 Min: 110

Specific Gravity at 60 Degrees F: Y Viscosity Range: \_\_\_\_\_

pH: \_\_\_\_\_ Abrasive (Y/N): Y Possible Scale Buildup (Y/N): Y

Inlet Pressure at Pump (psig): 1.0 (design) to 30.0 (max)

Min. Net Positive Inlet Pressure Available (psia): 14.7

**PERFORMANCE REQUIREMENTS**

Rated Capacity : 400 US gpm at 35 psi differential pressure.

Range (US gpm): 80 – 400

Max. Pump Speed (rpm): 300 Constant (Y/N): N Adjustable (Y/N): Y

Speed Range: 20% to 100% of Rated Speed

Constant Torque (Y/N): Y

**DESIGN AND MATERIALS**

Pump Body Material: Cast iron Drive Housing Material: Cast iron

Pump Stages: One

Connections:

Suction: Flanged: 8 in

Flange Type: 125 - 150 lb ANSI

Discharge: Flanged: 6 in

Flange Type: 125 - 150 lb ANSI

Suction Port: Top, mounted vertically

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Stator Material: Buna-N Stator Thermal Protection (Y/N): Y

Rotor Material: AISI 4150, hard chrome plate thickness 0.01 inch

Connecting Rod Material: AISI 8620 Drive Shaft Material: AISI 4150

Joints: Gear Type Universal (Y/N): Y Pin Type Universal (Y/N): Y Other:     

Shaft Sleeve (Y/N): Y Material: Type 316 stainless steel

Shaft Seal: Mechanical Packing (Y/N): N Material: Silicon carbide

Lantern Ring (Y/N): N Material: N/A

Mechanical (Y/N):     Y     Type:     Single    

Lubrication: None

ABMA B-10 Bearing Life (hrs): 100,000 Lubrication: Grease

Coupling: Falk (Y/N):      Fast (Y/N):       
Gear Type (Y/N):      Manufacturer Standard (Y/N):     

Baseplate: Design: Fabricated Material: Carbon Steel

Drive Type: Direct-Coupled:      Belt:      Hydrostatic Adjustable Speed:       
Close Coupled Gear Reducer: Y Other:     

**DRIVE MOTOR** (See Section 26 20 00, Low-Voltage AC Induction Motors.)

Horsepower: 25 Voltage: 480 Phase: 3 Base Speed (rpm): 1,800

Service Factor: 1 Inverter Duty (Y/N) Y

Motor nameplate horsepower shall not be exceeded at any head-capacity point on pump curve.

Enclosure: DIP      EXP      ODP      TEFC      CISD-  
TEFC X TENV      WPI      WPII      SUBM     

Drive Arrangement: In-Line: X Vertical "Z": X Piggy Back:       
Horizontal Offset:      C-Face Mounted:     

Nonreverse Ratchet (Y/N):

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**REMARKS:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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**DEWATERING POLYMER FEED PUMPS 1, 2, 3, 4, 5, 6, 7, 8 DATA SHEET**

Tag Numbers: 76-P-61, 76-P-62, 76-P-63, 76-P-64, 76-P-65, 76-P-66, 76-P-67, 76-P-68

Pump Name: Dewatering Polymer Feed Pumps 1, 2, 3, 4, 5, 6, 7, 8

Manufacturer and Model Number: (1) Seepex; 15-6LT  
(2) Moyno; Z38A  
(3) Netzsch; NM045  
(4) Or approved equal

**SERVICE CONDITIONS**

Liquid Pumped (Material and Percent): Diluted Mannich Polymer, 0.25 – 0.30%

Pumping Temperature (Fahrenheit): Normal: 70 Max: 60 Min: 110

Specific Gravity at 60 Degrees F: \_\_\_\_\_ Viscosity Range: 100 centipoise

pH: \_\_\_\_\_

Abrasive (Y/N): Y Possible Scale Buildup (Y/N): Y

Inlet Pressure at Pump (psig): 0 – 6

Min. Net Positive Inlet Pressure Available (psia): 14.7

**PERFORMANCE REQUIREMENTS**

Rated Capacity: 55 US gpm at 89 psi differential pressure.

Range (US gpm): 6 – 55

Max. Pump Speed (rpm): 350 Constant (Y/N): \_\_\_\_\_ Adjustable (Y/N): Y

Speed Range: 10 % to 100 % of Rated Speed  
Constant Torque (Y/N): Y

**DESIGN AND MATERIALS**

Pump Body Material: Type 316 SST Drive Housing Material: Type 316 SST

Pump Stages: 1

Connections:

Suction: Flanged: 2.5 in  
Discharge: Flanged: 2.5 in

Flange Type: 150-lb  
Flange Type: 150-lb

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Suction Port: (4) LH feed, (4) RH feed

Stator Material: Buna-N Stator Thermal Protection (Y/N): Y

Rotor Material: Type 316 SST

Connecting Rod Material: Type 316 SST Drive Shaft Material: Type 316 SST

Joints: Gear Type Universal (Y/N): N Pin Type Universal (Y/N): Y Other: \_\_\_\_\_

Shaft Sleeve (Y/N): N Material: \_\_\_\_\_

Shaft Seal: Mechanical Packing (Y/N): \_\_\_\_\_ Material: SiC

Lantern Ring (Y/N): N Material: N/A

Mechanical (Y/N): Y Type: Single

Lubrication: None

ABMA B-10 Bearing Life (hrs): 100,000 Lubrication: Grease

Coupling: Falk (Y/N): \_\_\_\_\_ Fast (Y/N): \_\_\_\_\_  
Gear Type (Y/N): \_\_\_\_\_ Manufacturer Standard (Y/N): Y

Baseplate: Design: Fabricated Material: Carbon Steel

Drive Type: Direct-Coupled: \_\_\_\_\_ Belt: \_\_\_\_\_ Hydrostatic Adjustable Speed: \_\_\_\_\_  
Close Coupled Gear Reducer: Y Other: \_\_\_\_\_

**DRIVE MOTOR** (See Section 26 20 00, Low-Voltage AC Induction Motors.)

Horsepower: 5 Voltage: 480 Phase: 3 Base Speed (rpm): 1800

Service Factor: 1 Inverter Duty (Y/N) Y

Motor nameplate horsepower shall not be exceeded at any head-capacity point on pump curve.

Enclosure: DIP \_\_\_ EXP \_\_\_ ODP \_\_\_ TEFC X CISD-  
TEFC \_\_\_ TENV \_\_\_ WPI \_\_\_ WPII \_\_\_ SUBM \_\_\_

Drive Arrangement: In-Line: X Vertical "Z": \_\_\_\_\_ Piggy Back: \_\_\_\_\_  
Horizontal Offset: \_\_\_\_\_ C-Face Mounted: \_\_\_\_\_

Nonreverse Ratchet (Y/N): \_\_\_\_\_

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**REMARKS:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



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**THICKENING CENTRIFUGE SLUDGE FEED PUMP DATA SHEET**

Tag Numbers: 76-P-11, 76-P-12, 76-P-13, 76-P-14, 76-P-15

Pump Name: Thickening Centrifuge Sludge Feed Pump 1, 2, 3, 4, 5

Manufacturer and Model Number: (1) Seepex 500-3LA

(2) Moyno 1K800G1

(3) Netzsch NM148

(4) Or approved equal

**SERVICE CONDITIONS**

Liquid Pumped (Material and Percent): Raw sludge, 0.5 percent

Pumping Temperature (Fahrenheit): Normal: 70 Max: 60 Min: 110

Specific Gravity at 60 Degrees F: Y Viscosity Range: \_\_\_\_\_

pH: \_\_\_\_\_

Abrasive (Y/N): Y Possible Scale Buildup (Y/N): Y

Inlet Pressure at Pump (psig): 1.0 (design) to 30.0 (max)

Min. Net Positive Inlet Pressure Available (psia): 14.7

**PERFORMANCE REQUIREMENTS**

Rated Capacity: 1,200 US gpm at 45 psi differential pressure.

Range (US gpm): 240 – 1,200

Max. Pump Speed (rpm): 250 Constant (Y/N): N Adjustable (Y/N): Y

Speed Range: 20% to 100% of Rated Speed

Constant Torque (Y/N): Y

**DESIGN AND MATERIALS**

Pump Body Material: Cast iron Drive Housing Material: Cast iron

Pump Stages: One

Connections:

Suction: Flanged: 10 in

Discharge: Flanged: 8 in

Flange Type: 125 – 150 lb ANSI

Flange Type: 125 – 150 lb ANSI

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Suction Port: Top, mounted vertically

Stator Material: Buna-N Stator Thermal Protection (Y/N): Y

Rotor Material: AISI 4150, hard chrome plate thickness 0.01 inch

Connecting Rod Material: AISI 8620 Drive Shaft Material: AISI 4150

Joints: Gear Type Universal (Y/N): Y Pin Type Universal (Y/N): Y Other: Pinion

Shaft Sleeve (Y/N): Y Material: Type 316 stainless steel

Shaft Seal: Mechanical Packing (Y/N): N Material: SiC

Lantern Ring (Y/N): N Material: N/A

Mechanical (Y/N): Y Type: Single

Lubrication: None

ABMA B-10 Bearing Life (hrs): 100,000 Lubrication: Grease

Coupling: Falk (Y/N): \_\_\_\_\_ Fast (Y/N): \_\_\_\_\_  
Gear Type (Y/N): \_\_\_\_\_ Manufacturer Standard (Y/N): \_\_\_\_\_

Baseplate: Design: Fabricated Material: Carbon Steel

Drive Type: Direct-Coupled: \_\_\_\_\_ Belt: \_\_\_\_\_ Hydrostatic Adjustable Speed: \_\_\_\_\_  
Close Coupled Gear Reducer: Y Other: \_\_\_\_\_

**DRIVE MOTOR** (See Section 26 20 00, Low-Voltage AC Induction Motors.)

Horsepower: 100 Voltage: 480 Phase: 3 Base Speed (rpm): 1,800

Service Factor: 1 Inverter Duty (Y/N) Y

Motor nameplate horsepower shall not be exceeded at any head-capacity point on pump curve.

Enclosure: DIP \_\_\_ EXP \_\_\_ ODP \_\_\_ TEFC \_\_\_ CISD-  
TEFC X TENV \_\_\_ WPI \_\_\_ WPII \_\_\_ SUBM \_\_\_

Drive Arrangement: In-Line: \_\_\_\_\_ Vertical "Z": X Piggy Back: \_\_\_\_\_  
Horizontal Offset: \_\_\_\_\_ C-Face Mounted: \_\_\_\_\_

Nonreverse Ratchet (Y/N): \_\_\_\_\_

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**REMARKS:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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**THICKENING POLYMER FEED PUMPS DATA SHEET**

Tag Numbers: 76-P-21, 76-P-22, 76-P-23, 76-P-24, 76-P-25

Pump Name: Thickening Polymer Feed Pumps 1, 2, 3, 4, 5

Manufacturer and Model Number: (1) Seepex 10-6L  
(2) Moyno Z34A  
(3) Netzsch NM038  
(4) Or approved equal

**SERVICE CONDITIONS**

Liquid Pumped (Material and Percent): Diluted Mannich Polymer, 0.25 – 0.30%

Pumping Temperature (Fahrenheit): Normal: 70 Max: 60 Min: 110

Specific Gravity at 60 Degrees F: \_\_\_\_\_ Viscosity Range: 100 centipoise

pH: \_\_\_\_\_

Abrasive (Y/N): Y Possible Scale Buildup (Y/N): Y

Inlet Pressure at Pump (psig): 0 – 6

Min. Net Positive Inlet Pressure Available (psia): 14.7

**PERFORMANCE REQUIREMENTS**

Rated Capacity: 22 US gpm at 72 psi differential pressure.

Range (US gpm): 2 - 22

Max. Pump Speed (rpm): 350 Constant (Y/N): \_\_\_\_\_ Adjustable (Y/N): Y

Speed Range: 10 % to 100 % of Rated Speed  
Constant Torque (Y/N): Y

**DESIGN AND MATERIALS**

Pump Body Material: Type 316 SST Drive Housing Material: Type 316 SST

Pump Stages: 1

Connections:

Suction: Flanged: 1.5 in Flange Type: 150-lb

Discharge: Flanged: -1.5 in Flange Type: 150-lb

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Suction Port: (4) LH feed, (4) RH feed

Stator Material: Buna-N Stator Thermal Protection (Y/N): Y

Rotor Material: Type 316 SST

Connecting Rod Material: Type 316 SST Drive Shaft Material: Type 316 SST

Joints: Gear Type Universal (Y/N): N Pin Type Universal (Y/N): Y Other: \_\_\_\_\_

Shaft Sleeve (Y/N): N Material: \_\_\_\_\_

Shaft Seal: Mechanical Packing (Y/N): N Material: SiC

Lantern Ring (Y/N): N Material: N/A

Mechanical (Y/N): Y Type: Single

Lubrication: None

ABMA B-10 Bearing Life (hrs): 100,000 Lubrication: Grease

Coupling: Falk (Y/N): \_\_\_\_\_ Fast (Y/N): \_\_\_\_\_  
Gear Type (Y/N): \_\_\_\_\_ Manufacturer Standard (Y/N): Y

Baseplate: Design: Fabricated Material: Carbon Steel

Drive Type: Direct-Coupled: \_\_\_\_\_ Belt: \_\_\_\_\_ Hydrostatic Adjustable Speed: \_\_\_\_\_  
Close Coupled Gear Reducer: Y Other: \_\_\_\_\_

**DRIVE MOTOR** (See Section 26 20 00, Low-Voltage AC Induction Motors.)

Horsepower: 5 Voltage: 480 Phase: 3 Base Speed (rpm): 1800

Service Factor: 1 Inverter Duty (Y/N) Y

Motor nameplate horsepower shall not be exceeded at any head-capacity point on pump curve.

Enclosure: DIP \_\_\_ EXP \_\_\_ ODP \_\_\_ TEFC X CISD-  
TEFC \_\_\_ TENV \_\_\_ WPI \_\_\_ WPII \_\_\_ SUBM \_\_\_

Drive Arrangement: In-Line: X Vertical "Z": \_\_\_\_\_ Piggy Back: \_\_\_\_\_  
Horizontal Offset: \_\_\_\_\_ C-Face Mounted: \_\_\_\_\_

Nonreverse Ratchet (Y/N): \_\_\_\_\_

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**REMARKS:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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**THICKENED SOLIDS TRANSFER PUMP DATA SHEET**

Tag Numbers: 76-P-31, 76-P-32, 76-P-33

Pump Name: Thickened Solids Transfer Pump

Manufacturer and Model Number: (1) Seepex 130-12  
(2) Moyno Z3AB  
(3) Netzsch NM105  
(4) Or approved equal

**SERVICE CONDITIONS**

Liquid Pumped (Material and Percent): Thickened sludge, 6.5 percent

Pumping Temperature (Fahrenheit): Normal: 70 Max: 60 Min: 110

Specific Gravity at 60 Degrees F: Y Viscosity Range: \_\_\_\_\_

pH: \_\_\_\_\_

Abrasive (Y/N): Y Possible Scale Buildup (Y/N): Y

Inlet Pressure at Pump (psig): 1.0 (design) to 30.0 (max)

Min. Net Positive Inlet Pressure Available (psia): 14.7

**PERFORMANCE REQUIREMENTS**

Rated Capacity: 200 US gpm at 95 psi differential pressure.

Range (US gpm): 200

Max. Pump Speed (rpm): 220 Constant (Y/N): Y Adjustable (Y/N): N

Speed Range: N/A

Constant Torque (Y/N): Y

**DESIGN AND MATERIALS**

Pump Body Material: Cast iron Drive Housing Material: Cast iron

Pump Stages: One

Connections:

Suction: Flanged: 8 in

Flange Type: 150 lb ANSI

Discharge: Flanged: 8 in

Flange Type: 150 lb ANSI

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Suction Port: Top, mounted vertically

Stator Material: Buna-N Stator Thermal Protection (Y/N): Y

Rotor Material: AISI 4150, hard chrome plate thickness 0.01 inch

Connecting Rod Material: AISI 8620 Drive Shaft Material: AISI 4150

Joints: Gear Type Universal (Y/N): Y Pin Type Universal (Y/N): Y Other:       

Shaft Sleeve (Y/N): Y Material: Type 316 stainless steel

Shaft Seal: Mechanical Packing (Y/N): N Material: SiC

Lantern Ring (Y/N): N Material: N/A

Mechanical (Y/N): Y Type: Single

Lubrication: None

ABMA B-10 Bearing Life (hrs): 100,000 Lubrication: Grease

Coupling: Falk (Y/N):        Fast (Y/N):         
Gear Type (Y/N):        Manufacturer Standard (Y/N):       

Baseplate: Design: Fabricated Material: Carbon Steel

Drive Type: Direct-Coupled:        Belt:        Hydrostatic Adjustable Speed:         
Close Coupled Gear Reducer: Y Other:       

**DRIVE MOTOR** (See Section 26 20 00, Low-Voltage AC Induction Motors.)

Horsepower: 40 Voltage: 480 Phase: 3 Base Speed (rpm): 1,800

Service Factor: 1 Inverter Duty (Y/N) N

Motor nameplate horsepower shall not be exceeded at any head-capacity point on pump curve.

Enclosure: DIP        EXP        ODP        TEFC        CISD-  
TEFC X TENV        WPI        WPII        SUBM       

Drive Arrangement: In-Line:        Vertical "Z": X Piggy Back:         
Horizontal Offset:        C-Face Mounted:       

Nonreverse Ratchet (Y/N):



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**REMARKS:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**SECTION 44 42 56.16  
PERISTALTIC HOSE PUMP**

**EQUIPMENT AND COMPONENT NUMBERS**

Spare: Peristaltic Feed Pump

**PART 1 GENERAL**

**1.01 REFERENCES**

A. The following is a list of standards which may be referenced in this section:

1. American Bearing Manufacturers Association (ABMA).
2. American Gear Manufacturers Association (AGMA).
3. American National Standards Institute (ANSI).
4. ASTM International (ASTM): A48/A48M, Standard Specification for Gray Iron Castings.
5. Hydraulic Institute Standards.
6. National Electrical Manufacturer's Association (NEMA): MG 1, Motors and Generators.

**1.02 DEFINITIONS**

A. Terminology pertaining to pumping unit performance and construction conforms to the ratings and nomenclature of the Hydraulic Institute Standards.

**1.03 SUBMITTALS**

A. Action Submittals:

1. Shop Drawings:
  - a. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
  - b. Detailed mechanical and electrical drawings showing equipment dimensions, size, and locations of connections and weights of associated equipment.
  - c. Make, model, weight, and horsepower of each equipment assembly.
  - d. Performance data curves showing head, capacity, and horsepower demand over entire operating range of pump, from shutoff to maximum capacity. Indicate head, capacity, and horsepower demand required at guarantee point.
  - e. Complete motor nameplate data, as defined by NEMA, motor manufacturer, and including any motor modifications.

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- f. Control panel elevation drawings showing construction and placement of operator interface devices and other elements.
- g. Power and control wiring diagrams, including terminals and numbers.
- h. Listing of extra materials supplied for this section.
- i. Factory finish system.
- j. Seismic anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

- 1. Manufacturer’s Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements, signed by an authorized representative of manufacturer that equipment and factory-applied coating system(s) meet requirements specified herein.
- 2. Seismic anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
- 3. Factory test reports.
- 4. Special shipping, storage and protection, and handling instructions.
- 5. Manufacturer’s printed installation instructions.
- 6. List special tools, materials, and supplies furnished with equipment for use prior to and during startup, and for future maintenance.
- 7. Suggested spare parts list to maintain equipment in service for a period of 1 year and 5 years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
- 8. Operation and Maintenance Data: As specified in Section 01 78 23, Operation and Maintenance Data.

1.04 EXTRA MATERIALS

- A. Furnish, tag, and box for shipment and storage the following spare parts, special tools, and materials:

Item	Quantity
Gasket Kit	One complete set per pump
Hoses	One per pump
Hose Lubricant Refill	One per pump
Special tools required to maintain or dismantle	One complete set for each different size unit

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**PART 2 PRODUCTS**

2.01 GENERAL

- A. Coordinate pump requirements with motor manufacturer and be responsible for pumps and motors.
- B. Where variable speed drives are required, furnish and be responsible for a coordinated operating system complete with pump, motor, and variable speed drive.
- C. Design Requirements: In accordance with Section 01 61 00, Common Product Requirements.

2.02 SUPPLEMENTS

- A. Specific product requirements are attached to this section as supplements.

2.03 ACCESSORIES

- A. Lifting Lugs: Provide suitably attached for equipment assemblies and components weighing over 100 pounds.
- B. Equipment Identification Plates: Provide 16-gauge stainless steel identification plate securely mounted on each separate equipment component and control panel in a readily visible location with 3/8-inch high engraved or die-stamped block type black enamel filled equipment identification number and letters indicated in this Specification.
- C. Anchor Bolts: Type 316 stainless steel, sized by equipment manufacturer, 1/2-inch minimum diameter, and as specified in Section 05 50 00, Metal Fabrications.
- D. Leak Detection Switch:
  - 1. Locate near top of pump to detect leakage of pumped product into pump housing.
  - 2. Mount sensor on rear of pump housing.
  - 3. Supply sensor Normally Closed with ability for field adjustment to Normally Open.
  - 4. Float Switch Rating: Vmax equals 240V ac, Imax equals 1 amp, Pmax equals 50VA.
- E. Revolution Sensor:
  - 1. Provide inductive type revolution sensor located to detect rotor revolutions.

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2. Pump manufacturer to supply and mount sensor and triggering device.
3. Inductive Sensor Rating: Vmax equals 30V dc, Imax equals 150 mA, Pmax equals 4.5 VA.

F. Inlet Pulsation Accumulators and Discharge Pulsation Dampeners:

1. Inlet size same as pump connecting pipe size. Provide ANSI Class 150 flanged inlet.
2. Housing: Epoxy coated steel.
3. Bladder: Compatible with chemical service.
4. Accessories: Pressure gauge, air fill valve, and cap.
5. Fasteners: Stainless steel.
6. Capacity: Sized by manufacturer.
7. Manufacturers and Products:
  - a. Blacoh Fluid Control; Sentry Series.
  - b. "Or approved equal."

2.04 FACTORY FINISHING

- A. Prepare, and prime and finish coat in accordance with Section 09 90 00, Painting and Coating.

2.05 SOURCE QUALITY CONTROL

A. Factory Tests:

1. Pumps: Assemble, check, and shim all pumps for the specific application prior to shipment.
2. Inspect pump construction, electrical connections, and intended functions.
3. Test all pump equipment, including start stop and speed controls in local and remote, interface signals (inputs and outputs), and leak detection that is actually furnished with the pump.

**PART 3 EXECUTION**

3.01 INSTALLATION

- A. This pump unit is to be stored as a shelf spare to existing peristaltic hose pumps.

3.02 FIELD FINISHING

- A. As specified in Section 09 90 00, Painting and Coating. Touch up manufacturer's finish using manufacturer's recommended coating repair system.

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3.03 FIELD QUALITY CONTROL

- A. Perform preoperational checks in accordance with manufacturer’s printed instructions.
- B. Functional Tests:
  - 1. Conduct on Each Pump: Test complete assemblies for correct rotation, proper connections, and normal operational characteristics.
- C. Performance Tests:
  - 1. Conduct on Each Pump:
    - a. Perform under simulated or actual operating conditions.
    - b. Test for a continuous 30-minute period for each pump.
    - c. Test and Test Log: Record the following:
      - 1) Pump suction head relative to suction flange centerline.
      - 2) Pump discharge head relative to pump discharge flange centerline.
      - 3) Pump flow using pump rpm and gallons per revolution.
      - 4) Pump flow using plant flowmeter instrumentation, if available.
      - 5) Motor voltage and amperage measured for each phase.

3.04 SUPPLEMENTS

- A. The supplement listed below, following “End of Section,” is a part of this Specification:
  - 1. Peristaltic Feed Pump Data Sheet.

**END OF SECTION**

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**PERISTALTIC FEED PUMP DATA SHEET**

Tag Numbers: Shelf Spare for 80-P-80, 80-P-81, 80-P-82

Pump Name: Peristaltic Feed Pump

Manufacturer and Model Number: (1) Watson Marlow/Bredel Pumps Bredel 620DUN/RE  
(2) Or approved equal

**SERVICE CONDITIONS**

Liquid Pumped (Material and Percent): Ferric Chloride

Pumping Temperature (Fahrenheit): Normal: \_\_\_\_\_ Max 105 Min 40

Specific Gravity @ 60 Degrees F: \_\_\_\_\_ Viscosity Range: \_\_\_\_\_

pH: \_\_\_\_\_

Abrasive (Y/N): \_\_\_\_\_ Possible Scale Buildup (Y/N): N

Inlet Pressure at Pump (psig): \_\_\_\_\_

Min. Net Positive Inlet Pressure Available (psia): \_\_\_\_\_

Area Classification: \_\_\_\_\_

**PERFORMANCE REQUIREMENTS**

Rated Capacity (gpm): 0.5 Rated Differential Pressure (psi): 100

Maximum Pump Speed at Rated Condition (rpm): 165

Constant Speed (Y/N): N Adjustable Speed (Y/N): Y

Speed Range: 40% to 80% of Rated Speed: 165 rpm

**PERISTALTIC FEED PUMP DATA SHEET**

Tag Numbers: Shelf Spare for 80-P-80, 80-P-81, 80-P-82

Pump Name: Peristaltic Feed Pump

**DESIGN AND MATERIALS**

Pump Type: Heavy-duty, horizontal, peristaltic hose pump

Pump Configuration: Direct or close-coupled

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Pump Housing Material: Cast, ASTM A48/A48M, Class 25

Cover Material: Carbon steel or cast iron, with inspection window

Cover Seal Material: EPDM or Buna N (NBR)

Rotor Material: Cast iron

Rotor Shoes: Stainless Steel

No. of Rotor Shoes (Minimum): 2

Rotor Shoe Shim Material: Type 316 stainless steel

Hose Size, Millimeters: 17

Hose Material: Marprene

Hose Pressure Rating (psig): 230

Hose Inserts Material: Type 316 stainless steel

Hose Lubricant: Manufacturer's standard

Flange Rating and Material: ANSI Class 125/150, Type 316 stainless steel

Bearing Housing Material: Cast iron

Bearing Type: Ball bearings, permanently lubricated

Bearing Life (ABMA L-10) (hrs): 100,000

**PERISTALTIC FEED PUMP DATA SHEET**

Tag Numbers: Shelf Spare for 80-P-80, 80-P-81, 80-P-82

Pump Name: Peristaltic Feed Pump

Gear Drive: Planetary type, AGMA Class II

Baseplate: Die-cast Aluminum

High Level Leak Detector (Y/N): Y

Pump Speed Sensor (Y/N): Y

Revolution Sensor (Y/N): Y



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Suction Pulsation Dampener (Y/N): Y

Discharge Pulsation Dampener (Y/N): Y

**DRIVE MOTOR** (see Section 26 20 00, Low-Voltage AC Induction Motors)

Horsepower: \_\_\_\_\_ Voltage: 120 Phase: 1 Synchronous Speed (rpm): \_\_\_\_\_

Service Factor: 1.0 Inverter Duty (Y/N): \_\_\_\_\_

Enclosure: DIP \_\_\_\_\_ EXP \_\_\_\_\_ ODP \_\_\_\_\_ TEFC \_\_\_\_\_ CISD-TEFC \_\_\_\_\_  
TENV \_\_\_\_\_ WPI \_\_\_\_\_ WPII \_\_\_\_\_ SUBM \_\_\_\_\_

Variable Speed Drive Range: See Section 26 29 23, Low-Voltage Variable Frequency Drive Systems

**REMARKS** 120V single-phase pump with integral operator interface, variable frequency  
drive (speed) control, and leak detection. Pump unit is to be a shelf spare for existing  
Pumps 80-P-80, 80-P-81, 80-P-82.

**SECTION 44 46 20**  
**DIGESTER GAS SAFETY EQUIPMENT AND SPECIALTIES**

**EQUIPMENT AND COMPONENT NUMBERS**

80-GFL-03: Gas Flare No. 3

80-GFL-03.LCP: Gas Flare No. 3 Panel

**PART 1 GENERAL**

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Society of Mechanical Engineers (ASME):
  - a. B16.1, Gray Iron Pipe Flanges and Flanged Fittings (Classes 25, 125, and 250).
  - b. B16.5, Pipe Flanges and Flanged Fittings NPS 1/2 through NPS 24 Metric/Inch Standard.
  - c. Boiler and Pressure Vessel Code (BPVC), Section VIII, Rules for Construction of Pressure Vessels.
2. National Electrical Manufacturers Association (NEMA): 250, Enclosures for Electrical Equipment (1,000 volts, maximum).

1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
  - a. Make, model, and weight of each equipment assembly.
  - b. Manufacturer's catalog information, descriptive literature, specifications, and identification of materials of construction.
  - c. Detailed mechanical and electrical drawings showing equipment fabrications and interface with other items. Include dimensions, size, and locations of connections to other work, and weights of associated equipment.
  - d. Functional description of internal and external instrumentation and controls to be supplied including list of parameters monitored, controlled, or alarmed.
  - e. Control panel elevation drawings showing construction and placement of operator interface devices and other elements.
  - f. Power and control wiring diagrams, including terminals and numbers.

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- g. Shop and Field Painting Systems Proposed: Include manufacturer’s descriptive technical catalog literature and specifications.
- h. Anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

- 1. Anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
- 2. Special shipping, storage and protection, and handling instructions.
- 3. Manufacturer’s written/printed installation instructions.
- 4. Routine maintenance requirements prior to plant startup.
- 5. Factory and field performance test procedures.
- 6. Component and attachment testing seismic certificate of compliance as required by Section 01 45 33, Special Inspection, Observation, and Testing.
- 7. Operation and Maintenance Data: As specified in Section 01 78 23, Operation and Maintenance Data.
- 8. Manufacturer’s Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers’ Field Services.
- 9. Service records for maintenance performed during construction.

1.03 EXTRA MATERIALS

- A. Furnish, tag, and box for shipment and storage the following materials:

<u>Item</u>	<u>Quantity</u>
Automatic Drip Trap: Gaskets	Three complete sets
Manual Drip Traps: Gaskets and O-rings	Three complete sets

- B. Delivery: In accordance with Section 01 61 00, Common Product Requirements.

**PART 2 PRODUCTS**

2.01 SERVICE CONDITIONS

- A. Material Handled: Digester gas consisting of approximately 61 percent methane, 33 percent carbon dioxide, 5 percent water vapor, and 1 percent hydrogen sulfide. Specific gravity approximately 0.86.

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2.02 WASTE GAS BURNER/IGNITION SYSTEM

A. Equipment Identification:

1. Name: Gas Flare No. 3.
2. Tag Number: 80-GFL-03.

B. General:

1. Design Capacity: 33,000 scfh digester gas at maximum pressure drop of 1/2-inch WC. Digester gas will have a minimum heat content of 550 Btu per cubic foot and will be saturated with water at 90 degrees F.
2. Size: 12 inches, with 1/2-inch pilot line.
3. Pilot Fuel: Natural gas.

C. Emission Requirements:

1. Emission range (design capacity) at 1,500 degrees F to 1,800 degrees F operating temperature range:
  - a. Overall destruction efficiency: 99 percent.
  - b. NO<sub>x</sub>, pounds per MMBtu: 0.060 maximum.
  - c. CO, pounds per MMBtu: 0.300 maximum.
  - d. VOC, pounds per MMBtu: 0.028 maximum.
2. Flare manufacturer must provide guarantee of compliance with emission requirements.

D. Pilot Gas Burner:

1. Pressure regulating valve to be installed in the 1/2-inch pilot line.
  - a. Reduce a maximum upstream pressure of 40 psig to a constant downstream pressure as required by burner pilots. Downstream pressure and pilot orifice size shall be as required for proper pilot operation and main burner ignition.
  - b. Pressure gauges of appropriate range for upstream and downstream of the pressure regulating valve.
2. Pilot Solenoid Valve: Dual coil, energized open and energized closed, two-way with NEMA 4, Class 1 Division 1 enclosure and high temperature coils.
3. Equip burner with the following:
  - a. Steel pedestal, internally insulated.
  - b. Pedestal baseplate suitable for mounting as shown on Drawings.
  - c. Iron-alloy ignition ring to ensure positive ignition under flow conditions.
  - d. Air/gas mixture adjustment.

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- e. Stainless steel pilot orifices.
- f. All Other Parts: Stainless steel.

E. Ignition System:

1. Automatic, using flame-sensing electrode that shall energize a pilot ignition electrode if the pilot flame has been extinguished.
2. Safety shutdown alarm to provide flame failure contact to the plant's Instrumentation and Control System. Contact shall be rated at 5 amps, 120 volts ac.
3. Power: 120-volt, 60-Hz power source installed in a NEMA 7 enclosure field adjacent to burner pedestal.
4. Controls: Integral ON/OFF and HAND/OFF/COMPUTER switches on face of panel.
  - a. 3-second flame response time and 30-second safety switch timing.
  - b. In the COMPUTER position, operate in response to a dry contact closure provided by control panel.
5. Furnish with ignition and flame lead cable. Field mount control unit adjacent to burner pedestal. Control unit and cable shall be suited for operation at ambient temperatures to 115 degrees F. Provide access to pilot burner so that it can be manually ignited.
6. Suitable relay, mounted in control box to open solenoid valve when system is in the ON position or close the solenoid valve when system is in the OFF position from either HAND or COMPUTER control stations. Valve shall remain in last position on power failure.

F. Waste Gas Burner:

1. Materials:
  - a. Type 316 stainless steel for pilot nozzles, piping, and fittings.
  - b. Integral Type 304 stainless steel shroud of 10-gauge minimum thickness.
2. 12-inch flanged digester gas connection.
3. Self-supporting, mounted vertically on a matching ASME B16.1 150-pound raised face flange.
4. Integral 2-inch continuous burning pilot and 1/2-inch flame retention pilot.
5. 8 to 1 turn down ratio, minimum.
6. Furnish with 1/2-inch thick, Type 316 stainless steel thermowell housing, 1/4-inch magnesium filled Incoloy 600 sheath Type K thermocouple mounted in the continuous pilot nozzle.
7. Provide 12-inch electric actuated butterfly valve on inlet piping that will shut upon failure alarm.

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G. Ignition System:

1. Venturi: 2-inch NPT, aspirating, to supply a combustible air/gas mixture to the continuous flame nozzle.
  - a. Include a combustion chamber, spark plug, and flashback preventer.
  - b. Furnish 1/2-inch NPT inlet connection.
2. Regulator Assembly: Valve and regulator package to provide pressure reduction and isolation of pilot gas as required.
  - a. Consist of isolation valves, pressure regulators, pressure gauges, explosion-proof solenoid valve, and interconnecting fittings.
  - b. Components shall be copper free and affixed to a backplate.
3. To ignite waste gas burner pilot flame, the following shall occur in sequence:
  - a. Pilot gas solenoid valve and flame retention solenoid valve shall be commanded to OPEN.
  - b. A spark shall be generated to ignite air/gas mixture at exit of venturi assembly.
  - c. Flame generated by spark ignites gas exiting from flame retention nozzle.
  - d. When thermocouple located inside the continuous flame nozzle heats up to a preset temperature setting, flame retention solenoid valve shall be commanded to CLOSE.
  - e. Pilot flame remains lit using air/gas mixture supplied by the continuous flame nozzle.
  - f. If pilot flame goes out, a re-ignition cycle will automatically be initiated.
4. If pilot flame is lit and LOW temperature is detected by pilot thermocouple, a BURNER SYSTEM FAIL output shall be provided. A discrete output shall also be provided for remote indication of pilot FLAME ON.
5. Power Requirements: Power supply to control panel shall be 120V ac, single-phase, 60-Hz.

H. Stack:

1. A stack constructed of Type 304 stainless steel chambers, pipes, and all other parts shall be provided. Chamber walls are to be 11-gauge, minimum 2B thickness.
2. Stack shall be constructed and installed to withstand a service level wind load of 100 mph. Complete structural calculations sealed by a professional engineer licensed by the State of California shall be provided.

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3. Install two sets of thermocouples to monitor stack discharge temperature. Maintain stack temperature at 1,450 degrees F by adjusting air intake dampers. Flare system must shut down if temperature rises above 1,800 degrees F or below 1,400 degrees F.
4. Provide test ports for emission source testing, and provide OSHA-approved personnel access to the test ports.
5. If required, provide two air dampers, one manually adjusted, the other with an actuator that will adjust intake air based on the flare stack temperature.
6. Provide blower to purge stack upon failure alarm.

I. Manufacturers:

1. Aereon; Model FEF.
2. Varec Biogas, Model 244E.
3. John Zink, Model ZTOF.
4. Or approved equal.

J. Controls:

1. In accordance with general control requirements and component qualities specified in Section 40 99 90, Package Control Systems. Provide panels and controls as follows:

Panel No.	NEMA 250 Rating	Material
80-GFL-03.LCP	7	316 stainless steel

2. Operator Controls and Indicators:
  - a. HAND/OFF/COMPUTER control of waste gas burner.
  - b. IGNITION pushbutton to generate spark for burner in HAND mode.
  - c. Spark ON, flame retention solenoid valve OPEN, pilot ON, and pilot OFF indicating lights mounted inside of panel.
  - d. Control power ON/OFF switch mounted inside panel.
  - e. AUTO START simulator switch mounted inside panel.
3. Programmable Controller (PLC) Hardware:
  - a. PLC system shall be Allen-Bradley Logix family including ControlLogix, or CompactLogix, as specified below. No substitutes allowed.
  - b. All products shall be the latest version of each module.
  - c. CPU: Latest version of AB Logix family with appropriate memory size.

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- d. Power Supply Module: Shall use the latest version, 120V ac, 60 Hz or 24V dc.
- e. Input/Output:
  - 1) Discrete Input Modules:
    - a) Voltage: 120V ac, 60-Hz or 24V dc.
    - b) Operating Power: 2 watts.
    - c) Points per Module: 16 maximum.
    - d) LED status indicator for each point.
    - e) Isolation: Between input point and PLC, 1,500 volts rms.
  - 2) Discrete Output Modules:
    - a) Voltage: 120V ac, 60-Hz or 24V dc.
    - b) Operating Power: 2 watts.
    - c) Load Rating: 2 amps continuous.
    - d) Isolation: Between PLC and output point, 1,500 volts rms.
    - e) Points per Module: 16 maximum.
    - f) LED status indicator for each point.
  - 3) Isolated Discrete Output Modules:
    - a) Type: Isolated Form C relay.
    - b) Voltage: 120V ac, 60-Hz or 24V dc.
    - c) Isolated Outputs per Module: 8.
    - d) Load Rating: 5 amps continuous.
    - e) Operating Power: 2.5 watts.
    - f) Points Per Module: 8 maximum.
    - g) LED status indicator and fuse for each point.
    - h) Isolation: Between PLC and output point, 1,500 volts rms.
  - 4) Analog Input/Output Modules:
    - a) Voltage: 4 mA to 20 mA and 1 volt to 5 volts.
    - b) Power: 3 watts.
    - c) Differential Analog Points Per Module: 8 maximum.
    - d) Isolated Analog Output Points Per Module: 8 maximum.
    - e) Isolation: Between PLC and I/O point and between I/O points, 1,500 volts rms.
    - f) Inputs modules shall be HART Compatible.
  - 5) Pulse Input Modules:
    - a) Input Voltage: 5V or 12V to 24V (user selectable).
    - b) Input Current: 7 mA at 5V; 7 mA to 1.5 mA at 12V to 24V.
    - c) Points per Module: 4 maximum.



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- d) Maximum Input Frequency: 100 KHz in counter mode.
- e) Maximum Count Value: 0 to 999,999 (programmable).
- 6) Communication Network Module: Latest version of Ethernet Network module from AB Logix family product line for Ethernet/IP protocol.
- 7) Interface Products: Provide any hardware, such as interfacing cables required for accessing/programming/modifying logic or I/O configuration.
- f. PLC Programming:
  - 1) PLC Programming Software Tool:
    - a) Provide one copy of the latest Version AB Studio 5000 PLC programming software.
    - b) Provide all licenses to facilitate the communications, such as, Modbus, EIP, etc.
    - c) Provide all development software used to create the application software, such as Studio 5000, containing the exact software revision level used to develop the logic.
  - 2) Application Program: Provide final PLC application program at the end of the Project to the City. If it is password protected, the password shall be provided. Provide complete annotated soft copies of the developed application software complete with I/O assignments and network configurations.
  - 3) Application program shall be programmed based on City's standard using IEC 1131-3 standard languages including FB, ladder logic, structured text, and sequential flow chart.
- 4. External Interfaces:
  - a. Provide PLC control of flare. Use Ethernet/IP to communicate the following signals to the DCS.

Hand/Off/Computer	(80QI9118)	(DCS Read)
Start/Stop	(80HS9118A)	(PLC Read)
Reset	(80HS9118B)	(PLC Read)
Flame Proved	(80BI9115)	(DCS Read)
Plugged	(80PDAH9114)	(DCS Read)
Flame Failed	(80UA9113)	(DCS Read)

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Control Power status	(80JA9118)	(DCS Read)
Temperature	(80TT9112)	(DCS Read)
Gas Pressure	(80PI9113)	(DCS Read)
Gas Pressure Start Setpoint	(80PC9118A)	(PLC Read)
Gas Pressure Stop Setpoint	(80PC9118B)	(PLC Read)

5. Functional Requirements:
  - a. Provide HAND/OFF/COMPUTER control of pilot flame for waste gas burner. In OFF mode, pilot gas supply shall be shut off and pilot ignition system shall be disabled. In HAND mode, pilot gas supply shall be turned on and pilot flame shall be manually ignited by IGNITION pushbutton.
  - b. In COMPUTER mode, pilot flame shall be automatically ignited and extinguished depending upon the availability of waste gas, as sensed by a pressure switch on waste gas inlet. When sufficient pressure exists at waste gas inlet, pilot shall be automatically ignited, after an adjustable time delay. When pressure at waste gas inlet falls below pressure setpoint, pilot shall be extinguished after an adjustable time delay. Allow gas pressure setpoints to be adjusted from the DCS, restrict the setpoints to be within the minimum and maximum gas pressures for safe operation of the waste gas flare. When in COMPUTER mode allow DCS to issue START/STOP command to the flare. To assist in startup and troubleshooting, AUTO ignition system and AUTO-START simulator switch shall be provided.
  - c. If a failure is detected, the air actuated butterfly valve and pilot gas solenoid must close and the blower must purge the stack.

2.03 CONDENSATE TRAPS

A. Features:

1. Materials: Type 316 stainless steel.
2. 13-gallon size, 35 psig design pressure, 20-inch water column maximum operating pressure.
3. Connections:
  - a. Provide following connections as minimum:
    - 1) Inlet: 4-inch groove connection.
    - 2) Outlet: 1-inch NPT.
    - 3) Drain: 2-inch NPT.

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- 4) Sight Glass: Two 1/2-inch with Type 316 stainless steel isolation valves.
- 5) Level Switches: Two appropriate size connections for high and low level switches.
4. Storage Capacity: 13 gallons of condensate, minimum per unit. Provide 24-inch minimum water seal depth for outlet.
5. Level switches shall be suitable for biogas application with Type 316 stainless steel wetted parts.
6. Alarm horn with attached amber colored strobe shall be metal encased and suitable for outdoor hazardous locations. The horn will 120-volt powered with a 5 Joule strobe.
7. Sight glass assembly shall include Type 316 stainless steel isolation and drain valves, glass and stainless steel guard rods.
8. Orientation of sight glasses and other connections may be nonstandard and shall be submitted for approval prior to starting any fabrications.

B. Manufacturers and Products:

1. Varec; Model 248 condensate accumulator.
2. Or approved equal.

## 2.04 AUTOMATIC DRIP TRAPS

A. Features:

1. Design to prevent gas from escaping while draining.
2. Materials:
  - a. Cast-iron or 356 HT cast aluminum body, cover plate, disc, and handle.
  - b. Internal working parts and fasteners shall be stainless steel.
  - c. Compressed asbestos-free gasket.
3. Size: 1-inch threaded inlet and outlet, minimum.
4. Provide with electric motor actuator and timer to automatically open and close drip trap.
  - a. Electric components shall be single-phase, 120V ac, 60-Hz, and rated for Class 1, Division 1, Group D environment.
  - b. Provide stainless steel shaft coupling with stainless steel hardware to secure actuator to drip trap.

B. Manufacturers and Products:

1. Varec; Figure 246 AT.
2. Groth; Model 8460 EADT.
3. Or approved equal.

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2.05 FLAME TRAP ASSEMBLY

- A. One 12-inch size, mounted on waste gas burner supply.
- B. Includes thermal shutoff valve.
- C. Manufacturers and Products:
  - 1. Varec; 450 Series.
  - 2. Groth; Model 8500A.
  - 3. Or approved equal.

2.06 ACCESSORIES

- A. Lifting Lugs: Provide suitably attached for equipment assemblies and components weighing over 100 pounds.
- B. Equipment Anchor Bolts: Type 316 stainless steel sized by equipment manufacturer at least 1/2 inch in diameter, or as shown, and as specified in Section 05 50 00, Metal Fabrications.
- C. Equipment Identification Plates: Provide 16-gauge Type 316 stainless steel identification plate securely mounted on each separate equipment component and control panel(s) in a readily visible location. Plate shall bear 3/8-inch high engraved block type identification number and letters indicated in this specification.

2.07 FACTORY FINISHING

- A. For carbon steel and cast-iron equipment and accessories, factory prepare, prime, and finish paint with manufacturer's standard coating as specified in Section 09 90 00, Painting and Coating, for exposed or high temperature surfaces.

**PART 3 EXECUTION**

3.01 INSTALLATION

- A. In accordance with manufacturer's instructions.
- B. Accurately place anchor bolts using templates furnished by manufacturer and in accordance with Section 05 50 00, Metal Fabrications.

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DIGESTER GAS SAFETY  
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3.02 FIELD QUALITY CONTROL

- A. Functional Test: Conduct on each unit.
- B. Performance Test: Conduct performance testing of exhaust from waste gas burner. Emissions must not exceed requirements listed above.
  - 1. If waste gas burner does not meet requirements of the specifications during performance test:
    - a. Make changes in equipment and methods of operation as required by manufacturer and as approved by Engineer as soon as practical, but within a period not to exceed 30 days.
    - b. Following adjustments, repeat the performance test.
  - 2. If waste gas burner still does not achieve specified performance during the retest, equipment will be subject to rejection.

3.03 MANUFACTURER'S SERVICES

- A. Manufacturer's Representative:
  - 1. Present at Site or classroom designated by Owner, for minimum person-days listed below, travel time excluded:
    - a. 1 person-day for installation assistance and inspection.
    - b. 1 person-day for functional testing and completion of Manufacturer's Certificate of Proper Installation.
    - c. 1 person-day for prestartup classroom or Site training.
    - d. 1 person-day for facility startup.
    - e. 1/2 person-day for post-startup training of Owner's personnel. Training shall not commence until an accepted detailed lesson plan for each training activity has been reviewed by Engineer.

**END OF SECTION**

**SECTION 44 46 22**  
**DIGESTER GAS BOOST COMPRESSORS**

**EQUIPMENT AND COMPONENT NUMBERS**

80-C-01: Biogas Compressor No. 1  
80-C-02: Biogas Compressor No. 2  
80-C-03: Biogas Compressor No. 3

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Bearing Manufacturers' Association (ABMA): 9, Load Ratings and Fatigue Life for Ball Bearings.
  2. American Society of Mechanical Engineers (ASME): B16.1, Cast Iron Pipe Flanges and Flanged Fittings.
  3. National Electrical Manufacturers' Association (NEMA): MG 1, Motors and Generators.
  4. UL: 674, Electric Motors and Generators for Use in Division 1 Hazardous (Classified) Locations.

1.02 SUBMITTALS

- A. Action Submittals:
1. Shop Drawings:
    - a. Make, model, weight, and horsepower of each equipment assembly.
    - b. Manufacturer's catalog information, descriptive literature, specifications, and identification of materials of construction.
    - c. Performance data curves showing pressure, capacity, horsepower demand, and compressor efficiency over the entire operating range of the unit, from shutoff to maximum capacity. Equipment manufacturer shall indicate pressure, capacity, horsepower demand, with 20 degrees F, 68 degrees F, and 100 degrees F ambient air, and overall efficiency, which is defined as wire-to-air efficiency at guarantee point, and capacity above which units should be operated to preclude surging.
    - d. Manufacturer's suggestion of minimum and maximum operating flows the unit can safely operate continuously.

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- e. Detailed mechanical, and electrical drawings showing the equipment fabrications and interface with other items. Include dimensions, size, and locations of connections to other work, and weights of associated equipment.
- f. Functional description of internal and external instrumentation and controls to be supplied including list of parameters monitored, controlled, or alarmed.
- g. Control panel elevation drawings showing construction and placement of operator interface devices and other elements.
- h. Power and control wiring diagrams, including terminals and numbers.
- i. Shop and Field Painting Systems Proposed: Include manufacturer's descriptive technical catalog literature and specifications.
- j. Seismic anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

- 1. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements.
- 2. Seismic anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
- 3. Special shipping, storage and protection, and handling instructions.
- 4. Manufacturer's written/printed installation instructions.
- 5. Factory test results, reports, and certifications. Include:
  - a. Functional test certificates.
  - b. Vibration test certificates.
  - c. Test results of control panels for proper operation, construction, electrical connection, and function.
- 6. Routine maintenance requirements prior to plant startup.
- 7. Field performance test procedures.
- 8. Operation and Maintenance Data: As specified in Section 01 78 23, Operation and Maintenance Data.
- 9. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services, including field vibration test.

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1.03 EXTRA MATERIALS

- A. Furnish, tag, and box for shipment and storage, the following spare parts and special tools:

<u>Item</u>	<u>Quantity</u>
Seals and gaskets	One complete set
Bearings	One complete set
Special tools required to maintain or dismantle unit	One complete set

- B. Delivery: In accordance with Section 01 61 00, Common Product Requirements.

**PART 2 PRODUCTS**

2.01 MANUFACTURERS

- A. Materials, equipment, and accessories specified in this section shall be products of:
1. Hoffman and Lamson, Series 510.
  2. Or approved equal.

2.02 SUPPLEMENTS

- A. See supplements at the end of this section for additional product information.

2.03 SERVICE CONDITIONS

- A. Material Handled: Digester gas consisting of approximately 61 percent methane, 33 percent carbon dioxide, 5 percent water vapor, and 1 percent or less hydrogen sulfide.
- B. Minimum inlet gas pressure at each compressor will be 8-inch water column gauge. Inlet gas temperature will be 90 degrees F plus or minus 10 degrees F. Specific gravity of digester gas will be 0.94 plus or minus 0.05.



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2.04 COMPRESSOR

- A. Type: Multistage centrifugal with outboard mounted bearing construction and diaphragm cast integrally with casing.
  - 1. Under specified inlet conditions, capable of continuously compressing 600 scfm of digester gas to a discharge pressure of 5 psig without entering a surge condition.
  - 2. Tip speed of rotating assembly not to exceed 530 feet per second, with first critical speed 20 percent above its operating speed.
  
- B. Shaft: Type 416 stainless steel.
  - 1. Through Inlet Head:
    - a. One carbon ring seal, including Type 304 stainless steel ring retainers and adapters.
    - b. Stuffing box consisting of adjustable packing gland, nonasbestos packing material, and closed bearing housing.
  - 2. Through Outlet Head: Two carbon ring seals, including Type 304 stainless steel ring retainers and adapters.
  
- C. Seals and Bearings:
  - 1. Replaceable without having to disconnect inlet or discharge piping.
  - 2. Bearings:
    - a. Antifriction, designed for ABMA 9, L-10 rating life of 50,000 hours.
    - b. Able to be lubricated, inspected, or replaced without disassembling the blower's rotating element.
  
- D. Inlet and Outlet Connections: ASME B16.1 125-pound drilled and tapped flange pattern; integral part of the heads. Furnish 1/4-inch NPT pressure indicator taps.
  
- E. Casing: Carbon steel with baked phenolic heresite coating.
  
- F. Impellers: Aluminum with baked phenolic heresite coating.
  
- G. Mounting for Each Assembly: Common fabricated steel baseplate with flexible coupling and coupling guard.
  - 1. Mounting Pads: Manufacturer's standard resilient foundation pads.
  - 2. Flexible connections for each compressor suction and discharge.
    - a. 125-pound ASME B16.1 flange single arch type, multiple, rubber or synthetic elastomer.

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- b. Include steel backing rings.
  3. Coupling: Falk or Fast sprung grid or gear type with OSHA coupling guard.
- H. Controls: In accordance with general control requirements and component qualities specified in Section 40 99 90, Package Control Systems.
  1. Control Panels:
    - a. Furnish a NEMA 7, skid mounted control panel with each compressor. Each control panel shall provide the following operator controls and indicators:
      - 1) ON/OFF/REMOTE hand switch for each motor.
      - 2) Dual scale (amps and acfm) motor current indicator and LOW CURRENT (low flow or surge) indicating lights.
      - 3) A blower ON indicating light.
      - 4) RESET pushbutton.
  2. External Interfaces:
    - a. Provide the following discrete contact outputs:
      - 1) Blower RUN.
    - b. Receive the following signal inputs:
      - 1) A 0-amp to 5-amp analog signal from a current transformer in motor starter. Signal shall be proportional to motor current.
      - 2) A discrete ON signal from the motor starter to indicate status (energized or de-energized) of motor.
      - 3) A discrete RUN signal from the DCS.
  3. Functional Requirements:
    - a. Provide devices and interlocks to shut down blower upon low airflow (surge) after a suitable startup delay.
    - b. Provide logic to maintain indication of condition that causes blower shutdown and inhibit restarting of blower until RESET button is pressed.
  4. Power Requirements: 120 volts, single-phase, 60-Hz.

2.05 ACCESSORIES

- A. Lifting Lugs: Provide suitably attached for equipment assemblies and components weighing over 100 pounds.
- B. Anchor Bolts: Type 316 stainless steel sized by equipment manufacturer and as specified in Section 05 50 00, Metal Fabrications. Coat in accordance with Section 09 90 00, Painting and Coating.

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- C. Equipment Identification Plates: Provide 16-gauge Type 316 stainless steel identification plate securely mounted on each separate equipment component and control panel in a readily visible location. Plate shall bear 3/8-inch high die-stamped block type black enamel filled equipment identification number indicated in this Specification.

2.06 FABRICATION

- A. Install current transformer in blower motor starter to sense motor current in one phase and transmit a signal to dual scale motor current indicator in blower panel. Coordinate installation of current transformer with motor control center supplier.
- B. Shop Painting:
  - 1. Interior Surfaces: Factory prepare, prime, and finish coat in accordance with Section 09 90 00, Painting and Coating.
  - 2. Exterior Surfaces: Factory prepare, prime, and finish coat in accordance with Section 09 90 00, Painting and Coating.

2.07 SOURCE QUALITY CONTROL

- A. Factory Inspections: Inspect control panels for required construction, electrical connection, and intended function.
- B. Factory Tests and Adjustments: Test all equipment and control panels actually furnished.
- C. Functional Test: Perform manufacturer's standard test on equipment. Include vibration test, as follows:
  - 1. Dynamically balance rotating parts of each blower and its driving unit before final assembly.
  - 2. Dynamically balance blower, coupling, and its driving unit. Ensure that mechanical vibration does not exceed 1.25 mils double (total) amplitude, when measured on the bearing housing at design speed.

**PART 3 EXECUTION**

3.01 INSTALLATION

- A. In accordance with manufacturer's instructions.
- B. Accurately place anchor bolts using templates furnished by the manufacturer and in accordance with Section 05 50 00, Metal Fabrications.

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3.02 FIELD QUALITY CONTROL

- A. Functional Tests: Conduct on each unit.
  - 1. Vibration Test: Test with units installed and in normal operation.
- B. Performance Test:
  - 1. Conduct on each unit.
  - 2. Perform under actual or approved simulated operating conditions.
  - 3. Test for a continuous 3-hour period without malfunction.
  - 4. Perform with the Engineer present.
  - 5. Test Log:
    - a. Upon completion of test, record the following:
      - 1) Flow measured by plant instrumentation.
      - 2) Blower inlet and discharge pressure.
      - 3) Driving motor voltage and amperage measured for each phase.
  - 6. Adjust, realign, or modify units and retest, if necessary.

3.03 MANUFACTURER'S SERVICES

- A. Manufacturer's Representative:
  - 1. Present at Site or classroom designated by Owner, for minimum person-days listed below, travel time excluded:
    - a. 1/2 person-day for inspection.
    - b. 1/2 person-day for functional and performance testing and completion of Manufacturer's Certificate of Proper Installation.
    - c. 1 person-day for post-startup training of Owner's personnel. Training shall not commence until an accepted detailed lesson plan for each training activity has been reviewed by Engineer.
- B. See Section 01 43 33, Manufacturers' Field Services, and Section 01 91 14, Testing, Integration, and Startup.

3.04 SUPPLEMENTS

- A. The supplement listed below, following "End of Section," is a part of this Specification.
  - 1. Biogas Compressor No. 1, No. 2, & No. 3 Induction Motor Data Sheet.

**END OF SECTION**

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<b>BIOGAS COMPRESSOR NO. 1, NO. 2, &amp; NO. 3            INDUCTION MOTOR DATA SHEET</b>	
Project: <u>Metropolitan Biosolids Center Improvements</u>	
Owner: <u>City of San Diego</u>	
Equipment Name: <u>Biogas Compressor No. 1, No. 2, &amp; No. 3</u>	
Equipment Tag Number(s): <u>80-C-01, 80-C-02, &amp; 80-C-03</u>	
Type: Squirrel-cage induction meeting requirements of NEMA MG 1	
Manufacturer: For multiple units of the same type of equipment, furnish motors and accessories of a single manufacturer; or approved equal.	
Hazardous Location: <input type="checkbox"/> Furnish motors for hazardous (classified) locations that conform to UL 674 and have an applied UL listing mark.	
Motor Horsepower: <u>30</u>	Guaranteed Minimum Efficiency at Full Load: ___ percent
Voltage: <u>460</u>	Guaranteed Minimum Power Factor at Full Load: ___ percent
Phase: <u>3</u>	Service Factor (@ rated max. amb. temp.): <input type="checkbox"/> 1.0 <input checked="" type="checkbox"/> 1.15
Frequency: <u>60 Hz</u>	Enclosure Type: <u>Explosion proof</u>
Synchronous Speed: <u>3600</u> rpm	<input type="checkbox"/> Multispeed, Two-Speed: ___ / ___ rpm
<input checked="" type="checkbox"/> Thermal Protection: _____	Winding: <input type="checkbox"/> One <input type="checkbox"/> Two
<input checked="" type="checkbox"/> Space Heater: <u>120</u> volts, single-phase	Mounting Type: <input checked="" type="checkbox"/> Horizontal <input type="checkbox"/> Vertical
	<input type="checkbox"/> Vertical Shaft: <input type="checkbox"/> Solid <input type="checkbox"/> Hollow
	<input type="checkbox"/> Vertical Thrust Capacity (lb): Up ___ Down ___
	<input type="checkbox"/> Variable Speed Drive: See Section 26 29 23, Low-Voltage Variable Frequency Drive System.
	Operating Speed Range: ___ to ___% of Rated Speed
	<input type="checkbox"/> Variable Torque
	<input type="checkbox"/> Constant Torque
Additional Motor Requirements: <input checked="" type="checkbox"/> See Section 26 20 00, Low-Voltage AC Induction Motors.	
Special Features:	
_____	
_____	
_____	

**SECTION 44 46 23  
DIGESTER CLEANING**

**EQUIPMENT AND COMPONENT NUMBERS**

80-T-11: Digester 1  
80-T-12: Digester 2  
80-T-13: Digester 3

**PART 1 GENERAL**

**1.01 SCOPE OF WORK**

- A. Provide all labor and materials to remove, treat, and dispose of residuals in Metro Biosolids Center (MBC's) three digesters. Pressure wash with clean water the entire inside of the tank. Treated residuals shall be greater than or equal to 40 percent solids, as determined by the City.
- B. Work shall be confined to the locations shown on the Drawings.
- C. MBC is under federal regulations for Site Specific Control and Countermeasures (SPCCP) and by permit must report any significant quantity of petroleum product that spills. In the event of a spill, the Contractor shall be responsible for fines levied by regulators and the cost of City staff time dedicated to a Contractor-caused spill including, but not limited to, the following tasks:
  - 1. The Contractor shall not take grit to a landfill for disposal without written approval by the City in advance. The City must approve use of any landfill for disposal of MBC grit.
- D. The Contractor shall provide all equipment, labor, material, monitoring, fuel, and all other appurtenances and services required to remove and dispose of digester cleanings including, but not limited to, the following tasks:
  - 1. The Contractor shall submit to the City all permits and licenses not provided by the City, but required for the removal, cleaning, and disposal of digester cleanings.
  - 2. Obtain and maintain licenses and regulatory permits which are not specifically provided by the City.
  - 3. Provide administrative services and a Superintendent continuously on-site to oversee all Contractor and subcontractor operations.
  - 4. Provide a Supervisor as the key contact person to coordinate with the City staff representative, particularly concerning emergencies, scheduling, and progress.

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5. Provide odor control (if required), decanting, loading, hauling, removal and disposal services.
6. Vehicles used for hauling solids for disposal shall be weighed at a certified scale off-site. Weigh tickets shall be kept with the Contractor's records and made available to the City immediately on request.
7. Pay all permit fees.
8. Pay all disposal fees.
9. Provide any sampling, laboratory testing, monitoring and reporting functions above those provided by the City.
10. All work is subject to prevailing wages law.

1.02 SUBMITTALS REQUIRED

A. Schedule of Digester Cleanout:

1. A proposed schedule due at or prior to the kickoff meeting.
2. When the current schedule does not represent the actual progress of work, the Contractor is required to update and submit a revised schedule in 24 hours.

B. Permits.

C. Licenses.

D. Safety Plan.

E. Informational Submittals:

1. Work Plan:
  - a. Prepare and submit within 14 days of execution of Contract.
  - b. Work shall not begin until work plan has been reviewed by Engineer.
  - c. Include the following information:
    - 1) Site layout plan that includes the following:
      - a) Work areas.
      - b) Support zone.
      - c) Material/equipment staging area.
      - d) Roof dome temporary equipment weights and sizes.
  - d. Digester Dome Access Plan.
  - e. Description of proposed equipment, procedures, and materials for performing the Work.
  - f. Proposed sequence and schedule for performing the Work.
  - g. Written Safety Plan, including a confined space program, for approval by City.
  - h. Written procedures for controlling, handling, and disposing of digester contents and spill prevention requirements.

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- i. Proposed Staging Area, including:
  - 1) Layout.
  - 2) Drainage controls.
  - 3) Containers.
  - 4) Spill containment measures.
- j. Proposed Transportation and Disposal Subcontractors:
  - 1) Name and letter of acceptance from disposal facilities proposed for disposal of screened digester contents.
  - 2) Name, qualifications, and licensing information for transportation subcontractor proposed for removing digester contents.
  - 3) All water from cleaning operations shall be trucked to the septage discharge location for disposal.

F. Personnel Qualifications:

- 1. Contractor shall have experience performing work of similar scope and size to this Project.
- 2. Where Work requires health and safety trained and medically screened personnel, provide documentation of training and medical qualifications for personnel working inside exclusion zone.

G. Digester Loading Criteria:

- 1. Loading from any source (dead load, live load, snow, etc.) is limited to a maximum, uniform load of 25 pounds per square foot.
- 2. Local or point loads shall be distributed to achieve the above uniform load.
- 3. Unbalanced load conditions shall be avoided. Loads shall be distributed to achieve a balanced condition on the dome structure.
- 4. The Engineer will evaluate whether additional restrictions are necessary based on the submitted access plan.

H. Digester Dome Access Plan:

- 1. The plan shall consist of:
  - a. Drawing(s) locating equipment and range and number of staff to be located on the dome, sequentially or simultaneously.
  - b. Cut sheets of equipment to be located on the dome, indicating:
    - 1) Weight of equipment.
    - 2) Foot print area of equipment.
    - 3) Other parameters that might affect weight distribution.
  - c. Calculations stamped by an engineer licensed in the State of California indicating overall uniform load distribution to the dome, both sequential and simultaneous.



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1.03 BACKGROUND AND GENERAL INFORMATION

A. Background:

1. The Work of this Section includes providing all labor and materials to clean the MBC digester(s).
2. The digester tank cleanings are from a municipal biosolids treatment plant. The mixture contains organic and inorganic solids, grit, grease, scum, hair, plastics, rags, silt, industrial solvents and other material normally found in digesters in a biosolids treatment plant. Optimum operating pH is near neutral but may vary from 4 to 11. Ferric chloride has been added to the influent stream and in the sludge and cleanings. Thick hair mats and heavy concentration of grit on the digester floors may be present.
3. Previous tank cleanings have generated Title 22 reports. For information purposes a sample of this data is included in Supplement 1. Prior to assigning work to the Contractor, a Title 22 report will be generated for cleaning the digester. In the unlikely event that tank residuals are found to be hazardous under Title 22, the City will proceed as follows:
  - a. Solicit a bid from the Contractor for dewatering, hauling the waste to a Class III landfill, and cleaning the tank and piping. Revised Contract Drawings and Specifications will be provided.
  - b. If the bid for item above is unacceptable, the City shall solicit bids through the City's open bidding process or purchase order process.

B. General Information:

1. The City is contracting for cleaning services of Digester(s) 1, 2 and 3.
2. The Contractor shall be responsible for removing, decanting, staging, processing, and final disposal of all large tank cleanings. The material may be temporarily stored on-site at designated staging areas, but must be hauled to and disposed at a landfill the same day as grit is loaded in the truck. Prior to disposal at any landfill, the Contractor is required to have approval by the City.
3. Prior to starting work, the Contractor shall submit a plan for City approval with a plan view of the equipment layout including proposed truck loading station and truck ingress and egress, and a list of all equipment used in the dewatering process.
4. The City retains the right to cancel this contract, whole or in part, should new digester cleanings disposal regulations be adopted that cause a disposal option to become illegal or unworkable or should the nature or quality of the digester cleanings change to make disposal under the terms of the contract illegal or undesirable.

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5. All work shall be coordinated in advance with MBC Senior Operations, Senior Plant Maintenance Staff, and MBC Engineering. Contractor shall provide a complete list of all employees working on-site to the City.
6. The Contractor shall furnish and install two 1/4-inch by 8-foot by 8-foot steel plates over the concrete slab expansion joint located between Digesters 1 and 3, prior to work in Area 80. An asphalt transition shall be provided between the steel plate and the existing concrete slab. Contractor shall maintain the asphalt daily or as needed. The steel plate is for heavy traffic loads. Contractor shall remove the asphalt and steel plate and transition material before demobilizing is completed and the Contractor moves off the site. A submittal for the method and material is required prior to any work or ordering materials.
7. Exceptional Contractor housekeeping is required at MBC, which has a policy of zero spills at the street level. Therefore, the Contractor is required to have containment above ground (i.e., the street level) at all locations a spill is possible. No underground containment in the gallery is required. Spill locations include, but are not limited to, the belt press, portable centrifuge, settling tanks, pumps, hoses, semi-tractor trailers, truck lanes, vactor trucks, etc. It is the Contractor's responsibility to identify a potential spill in advance and take action to contain the potential spill. Drips from hoses, truck trailers, conveyors, holding tanks, dewatering equipment, etc., are not acceptable and will also require immediate repair. The Contractor shall place containment (typically sandbags) around all storm drain inlets that can receive runoff water from the work area or locations loaded semi-trucks are idling or parked.
8. Contractor is required to attend the following mandatory meetings with City:
  - a. An initial kickoff meeting with MBC senior staff prior to the start of any work. The Contractor shall schedule this meeting to be held at MBC at a day and time of mutual convenience. It is anticipated that this meeting will last 1-1/2 hours. Meeting minutes will be taken.
  - b. A daily coordination meeting to be held at MBC at 7:00 a.m. or another convenient time mutually agreed to in advance. It is expected that the meeting will last 20 minutes or less. Serious issues will require longer meetings. Meetings will be held in MBC's small conference room. Meeting minutes will be taken if required.

1.04 DEFINITIONS

- A. Cal-OSHA: California Occupational Safety and Health Administration.

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- B. Competent Person: One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
- C. Contractor: The firm or business under contract with the Owner to demolish, construct, repair, expand, rehabilitate or upgrade a facility, equipment, or process systems. A Contractor may also be considered to be a consultant or out-source management group.
- D. Emergency Action Plan: A written plan prepared by the Contractor to describe the various response activities that take place in the event of an emergency.
- E. First Aid Case: Any personal injury that does not require more than first aid, i.e., scratch, minor bruise, et al.
- F. Incident: Any personal injury, property damage, near miss, security breach, environmental or other business interruption, associated with Owner's projects.
- G. Job Safety Analysis: A method of analyzing the steps of a task to identify potential hazards, and inserting control measures to prevent an Incident.
- H. Lost Work Day Cases: The number of cases where an employee would have worked but could not because of a work-related illness/injury; or the number of recordable cases on which, because of an injury or illness: (1) the employee was assigned to other duties on a temporary basis; or (2) the employee worked less than full time; or (3) the employee worked at his/her assigned function but could not perform all duties connected with it.
- I. Process Safety Management: An OSHA regulation that specifies safety requirements for operating and maintaining systems that contain highly hazardous chemicals.
- J. Qualified Person(s): One who, by possession of a recognized degree, certificate or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work or Project.
- K. Recordable Injury: Any work-related illness or injury that requires medical treatment beyond first aid such as, prescribed medication, sutures, therapy, surgery, fracture setting, lost days from work, etc.
- L. Site Specific Safety Plan: A written plan prepared by the Contractor that details specific Project site safety issues and assigns responsibility for control of those issues.

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- M. Subcontractor: A party that provides services to another Contractor who in turn is contracted to Owner or other City of San Diego department or agency.
- N. Man-hours: The sum of hours worked on a Project for a specified period of time that includes the labor of all Contractor and subcontractor employees, including Consultants and other on-site labor for which the Contractor has responsibility.

1.05 REGULATORY PERMITTING AND MONITORING

- A. The Contractor shall provide approved Federal, State, and Local regulatory permits for all activities identified in these contract documents. All necessary permits must be obtained and submitted to the City as part of the bid documents. Permits shall accommodate handling the estimated quantity of digester cleanings specified herein and throughout the entire term of the contract. All costs associated with obtaining the required permits and related testing, monitoring, and record keeping, shall be the responsibility of the Contractor and shall be included in the price bid.
- B. Contractor shall comply with existing, revised, proposed, and new Federal, State, and Local rules and regulations covering its activities in connection with this work. Changes in regulations or practices necessitated by any revision in rules and regulations shall be brought to the attention of the City sufficiently in advance of their implementation. Changes in regulations will not constitute justification for contract amendments or relaxation of the responsibility of the Contractor to provide the required services.
- C. Contractor shall meet all monitoring and reporting requirements imposed by all regulatory agencies having jurisdiction over Contractor's operations. Monitoring records shall always be kept on site and made available to the City immediately on request.
- D. All necessary permits and/or regulatory-monitoring requirement information shall be obtained and submitted to the City prior to the start of the Work. Permits shall be kept on site at all times and made available to the City immediately on request.
- E. City personnel shall be permitted to inspect the Contractor's disposal site(s) and weigh scales at any time and without prior notification to the Contractor.

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1.06 SUBCONTRACTOR NAMES

- A. The Contractor shall provide to the City a list of all subcontractor and sub-haulers including their company name, address, telephone number, PUT/ICC numbers, State and local contractor license numbers, and a contact person, type of transport truck, a list of all truck numbers and trailer numbers, and a list of all driver's names. The Contractor shall advise the City immediately, in advance, of any changes to subcontractor agreements.

1.07 DIGESTER CLEANING QUANTITIES

- A. Digester Data: The anaerobic digesters at MBC are 105 feet in inside diameter. Digester tanks have a fixed dome cover. The bottom floor is a cone that drops an additional 10 feet at the tank centerline. Refer to the Contract Drawings in Supplement 2 for additional information. The approximate volumes of the existing digester tank components are as follows:
1. Digester's Total (Approximate) Calculated Operating Volume: 3,131,000 gallons.
  2. Digester's (Approximate) Calculated Cone Volume: 216,000 gallons.
  3. Residuals are expected up to 3 feet above the top of the cone. These residuals are estimated at 194,300 gallons.
  4. The total amount of residuals to be removed is estimated to be 410,300 gallons.
  5. The City will have transferred as much of the digester contents as possible prior to turning over the digester to the Contractor for cleaning. The volume of sludge remaining in the digester for removal by the Contractor will be calculated by the Contractor and the City based upon measurement of the digester sludge surface elevation, with the resultant geometric volume determined from the most accurate Digester drawings available at the time of cleaning.

1.08 ODOR CONTROL REQUIREMENTS FOR THE CONTRACTOR

- A. Odor control shall be an immediate concern of the Contractor. If an odor problem occurs, the Contractor shall take all necessary actions to abate the odor. Prior to work, the Contractor shall submit to the City the proposed odor control system to be used, if required.
- B. The City reserves the right to require that the Contractor enclose odorous areas to contain potential odor emission sources. Areas include but are not limited to staged cleanings, e.g., bins, centrifuges, cleaning processes, truck load out in and around a large tank or transport between the digester and the staging areas, and the decant staging. The Contractor shall treat foul air discharges to remove odors using granular activated carbon units designed for this application. Ventilation and treatment flow rates shall be as required to

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prevent detectable odor emissions at the property limits of the treatment plant. The carbon unit bed depth shall be not less than 3 feet-0 inch. The carbon loading rate shall result in a superficial force velocity of not greater than 55 feet per minute. Carbon shall be new virgin material with design criteria as follows:

1. Mesh Size, U.S. Sieve: Minimum 4 by 10.
  2. Maximum Moisture Content as Packed, Percent by Weight: 5.0.
  3. CC14 Number, % by Weight, Minimum (per ASTM D3467): 60.
  4. Hardness Number, Minimum (per ASTM D3802): 92.
  5. Retentivity, Percent: 35.
- C. If required, startup of odor treatment of malodorous emissions shall occur after commencing the Work.
- D. Odor treatment of emissions from the digester tanks is not required.
- E. Contractor shall comply with San Diego Air Pollution Control District Rule 51, below:
1. Rule 51 – Nuisance:
    - a. “A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public or which endanger the comfort, repose, health or safety of any such persons or the public or which cause or have a natural tendency to cause injury or damage to business or property. The provisions of this rule do not apply to odors emanating from agricultural operations in the growing of crops or raising of fowls or animals.”

1.09 HAULING AND HAULING ROUTES

- A. All hauling routes used throughout this Contract shall be approved by the City prior to the start of any work. The City retains the right to withdraw its approval of any hauling route and require the use of alternative routes. In no case will approval be given for any route which passes through the community of Borrego Springs, California. Deviation from approved routes may be grounds for immediate cancellation of the Work.
- B. The Contractor’s hauler shall not stop for a prolonged period after leaving MBC until the truck reaches the landfill or disposal site. The Contractor shall report mechanical breakdowns of trucks hauling grit to landfill to the City within 24 hours of the breakdown.

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- C. The Contractor shall be responsible for all costs associated with traffic violations or other claims incurred from hauling operations for the duration of the Work. This includes ensuring that all loads are within legal limits.
- D. The Contractor or subcontractor shall provide to the City upon request any or all driver's license(s) of truck drivers or any employee of the Contractor or the subcontractor working on-site. Having a current, unrevoked license is required for operating a motor vehicle or heavy equipment at MBC. Refusal to provide a driver's license, or failure to produce a valid driver's license will result in that individual not being allowed to drive any vehicle at MBC, or drive a truck carrying grit from MBC to a landfill.

1.10 TRUCKING SPILL RESPONSE PLAN

- A. The Contractor shall prepare a spill response plan defining a course of action in the event a hauling vehicle is involved in an accident and/or digester cleaning residuals are spilled. The spill response plan shall define a course of action in the event a hauling vehicle is involved in an accident and/or cleaning residuals are spilled.
- B. Prior to any work, the Contractor shall submit a copy of the spill response plan to the City. At all times copies of the plan shall be on-site and in each vehicle hauling grit.
- C. The draft contingency plan shall be submitted to the City for review and comment 10 days after of award of the contract and a final plan 10 days after receipt of the City's draft comments. The final contingency plan shall incorporate all of the City's comments.
- D. The Contractor shall provide formal training (e.g., tailgate training) for drivers and dispatchers on the spill response contingency plan. The Contractor shall submit to the City written confirmation that all drivers and dispatchers have received training. The Contractor shall include a list of names of those drivers and dispatchers having received spill contingency response plan training. Only those drivers and dispatchers with spill contingency response plan training shall work with MBC's tank cleanings.

1.11 DISPOSAL SITE DOCUMENTATION AND LOCATION

- A. The City will provide documentation showing the City as the point of origin, and the Contractor's involvement as it relates to any disposal activities.
- B. The City's intent is to ensure that its own actions and that of the Contractor and subcontractor actions achieve full regulatory compliance and continuous, strict oversight of all aspects of this contract. For this reason, disposal locations are limited to sites within the United States.

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1.12 TRIBAL LANDS – NATIVE AMERICAN LANDS

- A. If the Contractor proposes to process, store, or apply digester cleanings on tribal lands, the following documentation shall be included with the Bid:
1. Copies of certified resolutions documenting that the Tribal Council has adopted standards provided in 40 CFR 503 and has designated an individual or authorized Tribal organization to enforce and administer the 40 CFR 503 standards.
  2. Copies of a lease defining the rights of the Contractor to process, store, or apply digester cleanings on Tribal land. The lease shall include:
    - a. Express approval in writing by the Tribal Council and Bureau of Indian Affairs (BIA).
    - b. Express written documentation proving that authority has been granted by both the Tribal Council and Bureau of Indian Affairs to receive and process cleanings upon Tribal Lands.
    - c. Express written proof regarding the nature and extent of this authorization, including any conditions, restrictions or limitations relating to this authorization.
    - d. Express documentation establishing that pertinent federal regulations (40 CFR 503) have been adopted by the Tribal Council and will be strictly adhered to by the bidder.
  3. Copies of a Finding of No Significant Impacts or a certified Environmental Impact Statement, all in accordance with the National Environmental Policy Act (NEPA).
- B. Further to the agreement of general indemnification provided in Section 51 of the City of San Diego General Provisions (Appendix B of the Request for Bids), the Contractor specifically agrees to defend, indemnify, and hold harmless the City from any and all claims or regulatory liability to the Tribal Council, tribe members, the Bureau of Indian Affairs, the Environmental Protection Agency, the Regional Water Quality Control Board, or any other party that may be caused or alleged to be caused as a result of disposal of digester cleanings on Tribal Lands.
- C. The City expressly reserves the right to determine whether a bidder has sufficiently satisfied the above conditions relating to tank cleanings beneficial use on Tribal Lands. Documentation may be in the form of a lease, Tribal Council resolutions, agreements with the Bureau of Indian Affairs, or other written instruments demonstrating binding authority acceptable to the City. The City reserves the right to determine the sufficiency of submitted documentation, to seek further assurances if necessary, and to reject any Bid that it reasonably finds to be deficient.



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1.13 SAFETY

- A. An approved ‘Site Specific Safety and Health Plan’ including a ‘Job Safety Analysis Report’ is required from the Contractor and subcontractors for all work at MBC. Also, all workers for the Contractor or subcontractor are required to attend an MBC ‘Site Specific Safety Training’ class. Training is approximately 1 hour. These safety requirements shall be satisfied prior to commencing work.
1. The Contractor will be working in a Class 1, Division 1 area and shall meet all Cal-OSHA standards. All State of California rules and regulations will be strictly enforced. The work shall comply with the State of California General Safety Orders and the Construction Safety Orders regarding work in confined spaces (please refer to Drawings). The Contractor is advised to contact the local office of Cal-OSHA for information about the local safety regulations.
  2. A comprehensive site-specific safety plan that covers all aspects of on-site construction operations and activities associated with the contract.
  3. The plan must comply with applicable safety and health regulations and Owner safety requirements, and must include an Emergency Action Plan.
  4. The Contractor will allow 10 working days before the scheduled pre-construction meeting for safety plan review.
  5. Acceptance of the Contractor’s safety plan only signifies that the plan generally conforms to the requirements of the contract. It does not relieve the Contractor of the responsibility for providing employees with a safe and healthful work environment nor will it replace the requirement for Job Safety Analysis (JSA).
    - a. A list of hazardous substances brought to the workplace with accompanying SDS.
    - b. Documentation of site safety orientation for employees, subcontractors and visitors.
    - c. Job Safety Analysis (JSA).
    - d. Certifications and Proof of training when required by Owner.
  6. Two continuous oxygen deficiency and lower explosive limit monitors shall be furnished by the Contractor for each digester undergoing cleaning. The monitors shall be in operation at all times. If one unit fails, work may continue on the digester while the unit is being repaired. If both units fail, all work shall stop inside the digester.
  7. Contractor shall provide blower induced ventilation to meet the requirements of Cal-OSHA. The blowers shall be in operation at all times work is in progress inside the digester. The Contractor shall provide emergency air packs for employees and inspectors.

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1.14 POLICY

- A. All contractors, their employees, visitors, subcontractors, vendors, and delivery personnel are required to comply with all safety regulations contained in this document including its appendices, the Owner Contractor Environment Safety and Health Manual, applicable portions of the Department Health and Safety Manual, and applicable portions of the California Code of Regulations and Federal OSHA regulations.
- B. Construction and maintenance activities at this site may present situations or conditions that may adversely impact the safety and health of a Contractor and subcontractor employees, City employees, or the general public. Therefore, the highest level of safety performance is required of the Contractor as demonstrated by a Contractor's willingness to adopt a "Safety First" culture, quickly address safety concerns brought up by its employees, subcontractors or City staff, providing quality training, open lines of communication on safety issues and concerns, and enforcement of regulations and policies.
- C. Contractor and subcontractor employees shall be responsible for their actions and the impact their actions have on others. Substandard safety performance of individuals shall be sufficient grounds to dismiss and deny access to Owner project sites. Employees shall obey safety rules and follow safe work procedures in general, and specifically as outlined in required 'Site Specific Safety Plans and Job Safety Analysis'.

1.15 ENVIRONMENTAL HEALTH AND SAFETY REQUIREMENTS

- A. Each Contractor shall:
  - 1. Provide a safe and healthy workplace for their employees.
  - 2. Notify the Construction Manager of work schedules, locations, and special precautions or concerns prior to the start of a project.
  - 3. Provide for frequent and regular safety inspections of work site(s), materials, equipment, and behavior.
  - 4. Promptly notify the Construction Manager of OSHA complaint notifications and/or OSHA inspections of the job site.
  - 5. Bear sole and exclusive responsibility for protecting the safety and health of their employees, visitors, subcontractors, and delivery persons.
  - 6. Ensure their employees, visitors, and subcontractors are given an appropriate safety orientation prior to site activity. The orientation will include general safety procedures and all required Metro Wastewater Department general and project-specific rules, regulations, and known hazards.

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7. Advise employees that failure to comply with MBC rules, or federal, state, and City regulations, will result in corrective action that may include removal from the project site.
8. Act immediately on reported unsafe conditions or activities and implement controls to eliminate the hazard or exposure as soon as possible.
9. Investigate accidents and incidents that result in personal injury or illness to their employees, subcontractors, visitors, or delivery persons and for any damage caused to public or private buildings and/or equipment.
  - a. In the event of an accident or incident that results in a personal injury or illness to Contractor's employees, subcontractors, visitors, or delivery persons, the Contractor shall notify the Contract Representative and Safety Officer or designee immediately. The Contractor shall contact all federal, state, and local agencies when required by law and complete all required reports. The Contractor shall cooperate with all investigations by Metro Wastewater Department, City, State, or Federal officials.
10. Ensure that a "Competent Person" is provided at all their job sites including their subcontractors and vendors as required by CCR, Title 8.
11. Provide and maintain an appropriate number and type of sanitary facilities for their employees, and subcontractors.
12. Inform and disseminate to their employees, subcontractors, visitors, and delivery persons, all safety information provided by Owner.
13. Have a written safety and health plan that includes the following elements:
  - a. Management Commitment and Employee Involvement.
  - b. Written policy.
  - c. Establish and communicate goals and objectives.
  - d. Provide for top management visibility.
  - e. Assign and communicate responsibilities:
    - 1) Provide authority and resources.
    - 2) Hold all personnel accountable.
    - 3) Program review annually for synergy with goals.
    - 4) Complies with Cal-OSHA Title 8, Section 3203.
14. Prioritize Hazard Prevention and Control efforts using the following guide:
  - a. Engineering techniques.
  - b. Procedures for safe work.
  - c. Provisions for personal protective equipment.
  - d. Administrative controls.
  - e. Preventative maintenance.
  - f. Emergency planning.
  - g. Medical program.

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15. Reinforce safety performance expectations by:
  - a. Ensuring that employees understand hazards and how to protect themselves.
  - b. Supervisors analyzing the work-site and employee performance for optimum effectiveness.
  - c. Maintaining physical protection.
  - d. Scheduling ongoing, effective quality training.
  - e. Ensuring line management understands responsibility and methodology to provide a safe work environment for their employees.
  - f. Maintaining records of employees training and safety meetings.
16. Unless otherwise specified, provide the services of a full-time safety representative and provide verification of the selected individual's qualifications. Such representative shall:
  - a. Have experience with Occupational Safety or closely related discipline with construction experience in the field.
  - b. Interface directly with the MWWDC Construction Manager, and/or MWWDC Construction Safety Officer or their designees.
  - c. Report directly to the Contractor's Corporate Safety Manager or Company President or Vice President.
  - d. Have authority to correct any hazard or unsafe practice by any means necessary including stoppage of work if necessary.
  - e. Demonstrate knowledge in construction-related safe practices, Cal-OSHA regulations, and any other regulations or practices pertinent to the work being performed.
17. Perform employee training including:
  - a. New employee orientations of company safety policies and practices as well as specific safety procedures for the employee's work function.
  - b. An educational program to familiarize employees with their company management system.
  - c. "Toolbox" or "Tailgate" safety meeting at least weekly to address specific safety issues and awareness of project related topics.
  - d. Additional training for new job functions or whenever a new or previously unrecognized hazard is discovered.
  - e. Safe operating procedures and related hazards of specific tools and equipment used by employees.

B. Enforcement:

1. Each Contractor and their subcontractor(s) shall establish in writing and enforce effective disciplinary measures in accordance with California Code of Regulations (CCR) Title 8 Section 3203.

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2. Owner reserves authority to require the Contractor to remove from the job site, any person who demonstrates an unwillingness to comply with safety rules.
3. Failure to comply with all applicable federal, state, and local safety rules and regulations will be considered as non-compliance with the contract. The Construction Safety Officer or their designee will advise the Construction Manager of any substandard safety performance issues. Such issues will be documented and placed in the Contractor's file. A copy of the document will be presented to the Contractor to correct violations or hazards. Grounds will have been established to withhold progress payments, terminate the contract, and/or seek disbarment should the Contractor fail to promptly make corrections or continue to violate safety rules.
4. Owner has authority to stop work immediately and without prior notification when either real or perceived conditions or practices present an imminent danger. Work will remain stopped until such conditions or practices are corrected or otherwise dealt with in a manner acceptable to Owner. Note: Imminent danger may be described as actions and situations that may result in serious injury or death, or considerable property damage.
5. The Construction Manager or designee may issue to the responsible Contractor a Notice of Non-Compliance for issues other than imminent danger. Verbal communication with the Contractor to correct simple issues is acceptable.
6. Prior to resuming work, the responsible Contractor shall agree to abate the hazard(s), document how the hazard will be abated, and agree upon a date with Owner to complete the corrective action(s).
7. If the Contractor fails to take corrective action by the agreed upon date, Owner has authority to stop work or retain the necessary craftsman to make the corrections with all labor and materials costs to be charged back to the responsible Contractor. The Contractor shall have no recourse against Owner for damages that may arise as a result of such actions the Department takes.

C. Preconstruction Meetings:

1. Representatives of the Contractor shall meet with the Construction Manager and Construction Safety Officer or their designees prior to the start of construction to review ESH requirements and discussing how those requirements will be implemented. A site visit may also occur to ensure appropriate safety equipment, tools, and personnel are ready for work to begin.
2. The Contractor shall submit their site-specific safety plan and JSA to be reviewed by the Construction Safety Officer or designee. Work may not proceed until the aforementioned have been reviewed and approved.

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3. The Contractor Environmental Safety and Health Matrix Requirements will be reviewed with the Contractor.

D. Reports:

1. The Contractor shall provide the following to the Construction Manager:
  - a. Bi-weekly total of person-hours worked at the project(s) site including those of the Contractor, subcontractor, and consultants.
  - b. Number of First Aid Cases, Recordable Injuries, and Lost Work Day Cases incurred on the Project for the same period.
  - c. Certification of New Employee Orientation.
  - d. Safety Meeting Minutes.
  - e. Tailgate Meeting Topic and signed attendance roster.
  - f. List of competent persons assigned to the project and competency type.
  - g. Safety Inspection reports.
  - h. Copies of Incident/Accident Reports.
  - i. Other safety related data as required.

1.16 MBC AFFILIATION WITH ISO 14001

- A. MBC is voluntarily affiliated with ISO 14001 an International Standards Organization promoting environmental awareness in all aspects of manufacturing or labor activities. MBC is audited annually by ISO for maintaining and improving our environmental way of doing business. Digester cleaning is an opportunity to observe the principals of ISO 14001. By carefully planning the work in advance and continuing with a conscientious effort during work activities, the environment will be protected.
- B. Contact Wastewater Operations Supervisor Richard Pithford at (858) 614-5822, MBC's Environmental Coordinator, for further information about ISO 14001.

**PART 2 PRODUCTS**

2.01 CLEANING EQUIPMENT

- A. Cleaning equipment shall be capable of removing digester contents that may contain organic and inorganic solids, plastics, rubber, bones, rags, fibrous material, etc., from digesters.

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- B. Mechanically and/or electrically powered cleaning equipment shall be capable of the minimum:
  - 1. Reducing (grinding) the digester contents down to a maximum particle size of 1-1/4 inches by 3/8 inch by 5/16 inch.
  - 2. Digester contents that cannot be reduced shall be loaded and transported, without leakage, over roadways and disposed at an offsite location.

2.02 DIGESTER CLEANINGS HAULING VEHICLES

- A. The Contractor shall provide and maintain all vehicles and containers required for hauling described under this contract. After approval of this equipment by the City, the Contractor can remove, haul, and dispose of digester cleanings.
- B. The Contractor shall provide water-tight sealed containers for hauling the dewatered digester cleanings. Leaking truck trailers shall be repaired and the leaking stopped immediately. The Contractor shall capture all leaking fluid and waste in MBC's centrate/sewer system.
- C. All open-top trucks or bins shall be covered with heavy tarps before leaving the MBC.
- D. All trucks shall be identified on the driver and passenger doors, in bold letters and numbers, clearly stating the Company name (greater than or equal to 8-inch tall letters), truck number (greater than or equal to 6-inch tall letters/numbers) and Company phone number (greater than or equal to 6-inch tall numbers) for easy identification by the public and City staff. The same identification is required of semi's trailers and storage bins that are used for hauling.
- E. All vehicles, trailers, bins and containers shall be delivered to the site in a clean, well-maintained, and water-tight condition. The City has the right to reject a container for any reason and to ask that it be substituted with a clean, well-maintained container.
- F. Contractor shall be responsible for erecting temporary barriers around vital MBC pipes, equipment or other assets that could be damaged by the Contractors dewatering, truck loading, or truck hauling operations.

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**PART 3 EXECUTION**

3.01 DIGESTER 1, 2 AND 3 TANK AND PIPE CLEANING

- A. The Contractor shall clean all interior tank surfaces and pipes embedded in the concrete floor. All solids and debris from the cleaning shall be removed, dewatered, and disposed.
- B. The Contractor shall clean and flush all piping associated with the digester mixing pumps, recirculation pumps, and axial pumps. All solids and debris from the cleaning shall be removed and disposed.
- C. The Contractor shall clean with high pressure water and remove all solids and scale in all pipes embedded in the sump of the tank. The Contractor shall use non-abrasive tools and acceptable water pressure to prevent damage to the pipes. These ductile iron pipes are encased in concrete and have glass liners. A submittal of the Contractor's plan and approval by the City is required prior to this work.
- D. Plant process water and/or reclaimed water may be used by the Contractor without charge. MBC's water is City of San Diego water. The MBC water is separated from the City water supply by an air gap tank. Use of process water or reclaimed water by the Contractor will be determined solely by the City.
- E. The Contractor's use of plant water is limited to a total instantaneous flow of 150 gallons per minute, and a total daily usage of 75,000 gallons.
- F. The Contractor shall provide construction water meters and a reduced pressure back flow preventer for each connection to the plant water system. The back-flow preventer shall be Febco Model 825, Beeco Model G-C, "or-equal."
- G. The Contractor shall record water hourly usage and daily usage. Record water usage in a log book and make the log book available to the City staff on request.
- H. The City will provide all electrical power at no cost. The Contractor shall provide compressed air, pumps, vacuum trucks, piping and appurtenances, hoses, generators, forklifts and all other tools and equipment required for the work.
- I. Contractor shall visit the MBC before bidding to determine if the existing power connections are sufficient. If not, the Contractor shall provide temporary portable generators for power requirements. The City will not modify any electrical connection points for the Contractor. The Contractor shall be responsible for all air quality permits associated with portable engines.



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- J. MBC staff is available to discuss any power issues. Contractor's plan for this phase shall be submitted prior to this work.
- K. Following removal of all digester cleanings, the entire interior surface of the tank shall be water-cleaned, including columns and appurtenances. The blast pressure used shall be sufficient to remove all remaining materials on the digester walls and not so powerful that water damages the digester's concrete or PVC lined concrete surfaces. Clumps of hair, rags and other material shall be removed or work will not be accepted.
- L. The Contractor shall remove all residual water inside the digester from the Contractor's cleaning activities and dispose of this water appropriately.
- M. Any damage from the Contractor's cleaning activity to City property shall be repaired by the Contractor immediately, to the satisfaction of the City, and at no additional cost to the City.

3.02 ON SITE DEWATERING (IF SELECTED)

- A. Decant piping from the dewatering area shall be routed to the designated discharge point into the plant's centrate system located at the Emergency Biosolids Tank. All sludge and decant piping shall be installed and maintained to not interfere with Plant street traffic. All sludge and decant piping shall be routed, installed, and maintained to prevent any leakage or spillage from entering the Plant storm drain system.
- B. Contractor shall return their dewatering operation to the plant drain.
- C. Decant samples will be analyzed by the MBC's Process Control Laboratory. City will be the sole judge of whether decant complies with the quality constraints specified herein. The Contractor will be notified and additional sampling will be performed. The Contractor shall modify operations to comply at all times.
- D. Contractor shall provide instantaneous and total flow metering of decant flow. Plant personnel shall be allowed access to the flow meter for observation/determination of accuracy of meter and precision of calibration unit.
- E. Contractor will provide a 24-hour, refrigerated, discrete, programmable sampler with 24-1,000 mL bottles, and provide one 1-liter sample for each hour of decant operation. Each 1-liter sample will be a composite of individual 100-mL aliquots taken every 0.1 hour. Samples will be taken within 10 feet of the decant discharge in a settling tank or from the connection point to the plant drain. Plant personnel shall be allowed access to the sampler to verify accurate sampling.

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- F. Decant flow shall be de-gritted by the use of tea cup, snail type de-gritter or other equipment approved by the City.
- G. Contractor shall haul grit from the plant site to landfill approved by the City.

3.03 RESIDUALS TREATMENT AND TESTING

- A. The Contractor is responsible for discharging the liquid content of the digester cleanings into the plant centrate system.
- B. Digester cleaning liquid decant shall be discharged into the 6-inch tee connection to Plant Drainage at the Emergency Biosolids Tank, J-Tube.
- C. The Contractor shall be responsible for removing sufficient liquid from residuals removed from the digester cleanings so that all grit and solids sent to a landfill has the minimum solids content specified herein.
- D. The concentration of solids in the decant discharged into MBC's centrate system shall be below the following limits (for items 1 through 4):
  - 1. Total Suspended Solids (max): 750 mg/L on any instantaneous grab.
  - 2. Total Suspended Solids (avg): 400 mg/L.
  - 3. Settleable Solids (max): 10.0 mL/L on any instantaneous grab.
  - 4. Settleable Solids (avg): 5.0 mL/L.
  - 5. Volatile Solids: 35 percent.
- E. The City shall be responsible for testing the grit and decanted material and reporting the test results to the Contractor. The Contractor shall be responsible for immediately correcting any deficiencies in the decanting operation to meet the specified limits. Failure to meet the percentage solids limits will require shut down of the Contractor's operation and submittal of plans for obtaining these limits by the Contractor.
- F. The Contractor shall allow up to 48 hours for test results from a Certified Laboratory. A Certified Laboratory report is required to allow cleaning materials to leave the MBC.

3.04 WEIGHING PROCEDURE

- A. The Contractor shall be responsible, at its own expense, to obtain a Certified Weigh Ticket from a scale approved by the City, at or near the processing/disposal site. The ticket shall be used for determining billable tonnages hauled (if required), as well as verifying disposal destination. This certified ticket must meet the criteria as stated in the following paragraphs.

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- B. The Certified Weigh Ticket shall show gross weight, tare weight, net weight, date and time of weighing, tractor and trailer, license/equipment numbers, name of Contractor, subcontractor, driver and City manifest number. The type of material hauled and the operators name must appear on the ticket. No predetermined tare weight will be accepted. Once the information is completed and correctly filled out, the driver shall sign the ticket. Tickets in non-compliance shall be rejected and no payment shall be made for that portion of the work.
- C. Should the Contractor use scales which are not Public Certified Scales, the Contractor shall provide the Certified Weighmaster's name, and a copy of their certification, along with a telephone number and a list of the Deputy Weighmaster which are authorized to sign weigh tickets under Certified Weighmaster.
- D. Prior to receiving payment for any load, the Contractor shall provide a hauler's manifest, and Certified Weigh Ticket showing receipt and disposal/unloading at the processing/disposal site. All discrepancies between the City Weigh Ticket and the Certified Weight Ticket will be investigated by the City prior to payment.

3.05 LOADING PROCEDURE

- A. The landfill gate hours are 5:30 a.m. to 5:00 p.m., Monday through Friday. The locked landfill gate can be opened by MBC staff on request. Landfill hours may be different than those above. The Contractor is responsible for determining landfill hours of operation.
- B. Administrative requirements before and during construction:
  - 1. Attend various meetings.
  - 2. Submit and keep current a written schedule.
  - 3. Make timely technical, data and updated schedule submittals as required.
- C. Hauling activities on weekends shall require notification by the Contractor no later than noon on the Wednesday preceding the weekend hauling. Making special arrangements with the landfill is advised.
- D. The Contractor shall provide to the City landfill weight slips for all quantities sent to the landfill. Copies of weight slips shall be submitted on a weekly basis, although daily submittals are preferred. The weight slips are required for MBC permit requirements. Failure to provide all required landfill weight slips is cause for the City to refuse to pay Contractor invoices.

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3.06 DIGESTER CLEANINGS DISPOSAL

- A. It is requested that the Contractor's first choice for disposal of digester cleanings is the Miramar Landfill. If another landfill is selected, the Contractor shall provide documentation to the City substantiating the selection.
- B. All sampling, testing, chemical analysis processing, or other requirements to meet a specific landfill's permit requirements for digester cleanings disposal or other requirements shall be performed by the City. Grit testing and analysis shall be in accordance with this specification.
- C. The Contractor shall not dispose of any digester cleanings in the City of San Diego sewer system, sewage pumping facility, or sewage treatment facility. However, decant and wash water disposal is allowed into MBC's centrate system. Decant testing and analysis shall be in accordance with this specification.

3.07 VERIFICATION OF CLEANING

- A. The digester will be considered clean if less than 1/8 inch thin layer of material and no single piece of debris larger than 1/2 inch in any dimension remain after a washdown by the Contractor.

3.08 SITE RESTORATION

- A. The Contractor shall restore the Site to its original condition at the completion of the digester cleaning activities.

3.09 SUPPLEMENTS

- A. The supplements listed below, following "End of Section," are a part of this Specification:
  - 1. Title 22 Reports.
  - 2. Contract Drawings.

**END OF SECTION**

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POINT LOMA WASTEWATER TREATMENT PLANT  
CALIFORNIA HAZARDOUS WASTE IDENTIFICATION TESTS (Title 22)  
Metro Biosolids Center Digester #2 Cleanings

From: 01-JAN-2001 To: 31-JAN-2001

**EXAMPLE**

Sampled by: M&C Personnel  
Analyzed by: BOA, G&C, JRF, JZI, IEN, LXP, DXS, JRV, TSB, HHB, KOD, EVL  
Source: M&C\_DIG2  
Sample ID: P94148  
Sample Date: 02-JAN-2001

INORGANICS		Total Conc Dry Wt. mg/Kg	Total Conc Wet Wt. mg/Kg	TTLc Limit Wet Wt. mg/Kg	W.E.T. Conc Wet Wt. mg/L	STLC Limit Wet Wt. mg/L	40 CFR 503 Limits ** mg/Kg	CA Health & Safety Code Limits *** mg/Kg
Constituent	MDL Units							
Antimony	50 mg/kg	ND	ND	500	*	15	-	-
Arsenic	.64 mg/kg	3.2	0.4	500	*	5.0	41	-
Barium	.5 mg/kg	491	60	10000	*	100	-	-
Beryllium	.2 mg/kg	ND	ND	75	*	0.75	-	-
Cadmium	5 mg/kg	ND	ND	100	*	1.0	39	-
Chromium (VI)	NA mg/kg	NA	NA	500	NA	5.0	-	-
Chromium	7 mg/kg	61	7	2500	*	560	1200	-
Cobalt	2.8 mg/kg	ND	ND	8000	*	80	-	-
Copper	4 mg/kg	518	64	2500	*	25	1500	2500
Lead	29 mg/kg	33	4	1000	*	5.0	300	350
Mercury	.38 mg/kg	2.1	0.3	20	*	0.2	17	-
Molybdenum	2.8 mg/kg	14	1.7	3500	*	350.0	-	-
Nickel	4 mg/kg	42	5	2000	*	20	420	2000
Selenium	1.5 mg/kg	2.8	0.3	100	*	1.0	36	-
Silver	3 mg/kg	30.4	3.7	500	*	5.0	-	-
Thallium	23 mg/kg	ND	ND	700	*	7.0	-	-
Vanadium	1.5 mg/kg	27.5	3.4	2400	*	.24	-	-
Zinc	50 mg/kg	772	95	5000	*	250	2800	-
Fluoride	NA mg/kg	NA	NA	18000	NA	180	-	-
Sulfides-Reactive	217 mg/kg	591	73	-				
Sulfides-Total	50 mg/kg	16300	2005	-				
Total Solids	NA Wt%	12.3	-	-				
Total Volatile Solids	NA Wt%	52.0	-	-				
pH	NA pH Units	7.35	>2 - < 12	-				

ORGANICS		Total Conc Dry Wt. mg/Kg	Total Conc Wet Wt. mg/Kg	TTLc Limit Wet Wt. mg/Kg	W.E.T. Conc Wet Wt. mg/L	STLC Limit Wet Wt. mg/L
Constituent	MDL Units					
Aldrin	0.00002 mg/Kg	ND	ND	1.4	*	0.14
Chlordanes	0.000014 mg/Kg	ND	ND	2.5	*	0.25
DDT, DDE, DDD	0.00004 mg/Kg	ND	ND	1.0	*	0.10
2,4-D	3.4 mg/Kg	ND	ND	100	*	10
Dieldrin	0.00002 mg/Kg	ND	ND	8.0	*	0.8
Endrin	0.00003 mg/Kg	ND	ND	0.2	*	0.02
Heptachlor	0.000003 mg/Kg	ND	ND	4.7	*	0.47
Kepone	NA mg/Kg	NA	NA	21	NA	2
Lindane	0.00001 mg/Kg	ND	ND	4.0	*	0.4
Methoxychlor	NA mg/Kg	ND	ND	100	*	10
Mirex	0.00002 mg/Kg	ND	ND	21	*	2
Pentachlorophenol	0.8 mg/Kg	NA	NA	17	NA	1.7
PCBs (Arochlors)	NA mg/Kg	ND	ND	50	*	5.0
Toxaphene	0.00024 mg/Kg	ND	ND	5	*	0.5
Trichloroethene	0.0253 mg/Kg	NA	NA	2040	NA	204
2,4,5-TP	4.4 mg/Kg	ND	ND	10	*	1

TTLc = Total Threshold Limit Concentration.  
STLC = Soluble Threshold Limit Concentration.  
W.E.T. = Waste Extraction Technique.  
\* = The total concentration is less than 10 times the STLC. Therefore by definition, this substance is present in concentrations that are less than the limits for hazardous wastes.  
\*\* = Limits are in mg/Kg (dry weight) based on 40 CFR part 503.13 Table 3 "Limits for Land Application".  
\*\*\* = The California State Health and Safety Code 25157.8 establishes a lower limit for Lead.  
ND = Not Detected  
NA = Not Analyzed  
NS = Not Sampled  
MDL = Method Detection Limit (are in mg/Kg per dry weight; except for pH and Total and Volatile Solids)  
M&C\_DIG2 = Metro Biosolids Center Digester Cleanings from Digester #2.

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METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

File Name: I:\REPORTS\Mbc\Special\MBC\_dig2.xls  
 City of San Diego  
 Wastewater Chemistry Laboratory, Calif. ELAP Cert. No. 1609  
 5530 Kiowa Drive, La Mesa, CA 91942 phone 61.668.3212  
 Report By: SWM Report Date: February 2, 2001 12:40 PM

*Walter F. Konopka, Jr.*  
 Walter F. Konopka, Jr.  
 Senior Chemist

Source: MBC\_DIG2  
 Sample Date: 2-Jan-01  
 Sample ID: P94148

Analysis	Analyte Name	Qualifier	Value	MDL	Units
8260B_SLDS	1,1,1-trichloroethane	ND		27.4	UG/KG
Volatile Organics	1,1,2,2-tetrachloroethane	ND		64	UG/KG
	1,1,2-trichloroethane	ND		35.1	UG/KG
	1,1-dichloroethane	ND		25.7	UG/KG
	1,1-dichloroethene	ND		25.1	UG/KG
	1,2,4-trichlorobenzene	ND			UG/KG
	1,2-dibromoethane	ND			UG/KG
	1,2-dichlorobenzene	ND		28.7	UG/KG
	1,2-dichloroethane	ND		20.5	UG/KG
	1,2-dichloropropane	ND		25.5	UG/KG
	1,3-dichlorobenzene	ND		16.1	UG/KG
	1,4-dichlorobenzene		492		UG/KG
	2-butanone	ND			UG/KG
	2-chloroethylvinyl ether	ND		53.6	UG/KG
	2-nitropropane	ND			UG/KG
	4-methyl-2-pentanone	ND			UG/KG
	Acetone		3460	185	UG/KG
	Acrolein	ND		70.9	UG/KG
	Acrylonitrile	ND		275	UG/KG
	Allyl chloride	ND			UG/KG
	Benzene	ND		26.5	UG/KG
	Benzyl chloride	ND			UG/KG
	Bromodichloromethane	ND		21.9	UG/KG
	Bromoform	ND		26.1	UG/KG
	Bromomethane	ND		29.2	UG/KG
	Carbon disulfide		62	56.8	UG/KG
	Carbon tetrachloride	ND		15.6	UG/KG
	Chlorobenzene	ND		31.1	UG/KG
	Chloroethane	ND		61	UG/KG
	Chloroform	ND		25.6	UG/KG
	Chloromethane	ND		25.8	UG/KG
	Chloroprene	ND			UG/KG
	Dibromochloromethane	ND		24.2	UG/KG
	Ethylbenzene	ND		90.5	UG/KG
Isopropylbenzene	ND			UG/KG	
Methyl Iodide	ND			UG/KG	
Methyl methacrylate	ND			UG/KG	
Methyl tert-butyl ether	ND		34	UG/KG	
Methylene chloride	ND		62.5	UG/KG	
Styrene	ND			UG/KG	
Toluene	ND		48	UG/KG	
Trichlorofluoromethane	ND		28	UG/KG	
Vinyl chloride	ND		26.2	UG/KG	
cis-1,3-dichloropropene	ND		21.5	UG/KG	
meta,para xylenes		60.3		UG/KG	
ortho-xylene	ND			UG/KG	
trans-1,2-dichloroethene	ND		24.9	UG/KG	
trans-1,3-dichloropropene	ND		16.6	UG/KG	



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 City of San Diego  
 Wastewater Chemistry Laboratory, Calif. ELAP Cert. No. 1609  
 5530 Kiowa Drive, La Mesa, CA 91942 phone 61.668.3212  
 Report By: SWM Report Date: February 2, 2001 12:40 PM

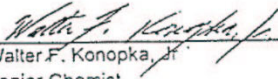
*Walter F. Konopka, Jr.*  
 Walter F. Konopka, Jr.  
 Senior Chemist

Source: MBC\_DIG2  
 Sample Date: 2-Jan-01  
 Sample ID: P94148

Analysis	Analyte Name	Qualifier	Value	MDL	Units
Chlorinated Pesticides & PCBs	Aldrin	ND		20	NG/KG
	Alpha (cis) Chlordane	ND		14	NG/KG
	Alpha Chlordene	NA			NG/KG
	Alpha Endosulfan	ND		20	NG/KG
	BHC, Alpha isomer	ND		20	NG/KG
	BHC, Beta isomer	ND		30	NG/KG
	BHC, Delta isomer	ND		30	NG/KG
	BHC, Gamma isomer	ND		10	NG/KG
	Beta Endosulfan	ND			NG/KG
	Cis Nonachlor	ND			NG/KG
	Dieldrin	ND		40	NG/KG
	Endosulfan Sulfate	ND			NG/KG
	Endrin aldehyde	ND		23	NG/KG
	Endrin	ND		30	NG/KG
	Gamma (trans) Chlordane	ND		14	NG/KG
	Gamma Chlordene	NA			NG/KG
	Heptachlor epoxide	ND		30	NG/KG
	Heptachlor	ND		3	NG/KG
	Methoxychlor	ND			NG/KG
	Mirex	ND		20	NG/KG
	Oxychlordane	ND		10	NG/KG
	PCB 1016	ND		600	NG/KG
	PCB 1221	ND			NG/KG
	PCB 1232	ND			NG/KG
	PCB 1242	ND		70	NG/KG
	PCB 1248	ND			NG/KG
	PCB 1254	ND			NG/KG
PCB 1260	ND		300	NG/KG	
PCB 1262	ND			NG/KG	
Toxaphene	ND		240	NG/KG	
Trans Nonachlor	ND		10	NG/KG	
o,p-DDD	ND		20	NG/KG	
o,p-DDE	ND		40	NG/KG	
o,p-DDT	ND		20	NG/KG	
p,p-DDD	ND		30	NG/KG	
p,p-DDE	ND		20	NG/KG	
p,p-DDT	ND		20	NG/KG	
Herbicides	2,4 Dichlorophenoxy acetic acid	ND		3.4	MG/KG
	2,4,5-TP (Silvex)	ND		4.4	MG/KG

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File Name: I:\REPORTS\Mbc\Special\MBC\_dig2.xls  
 City of San Diego  
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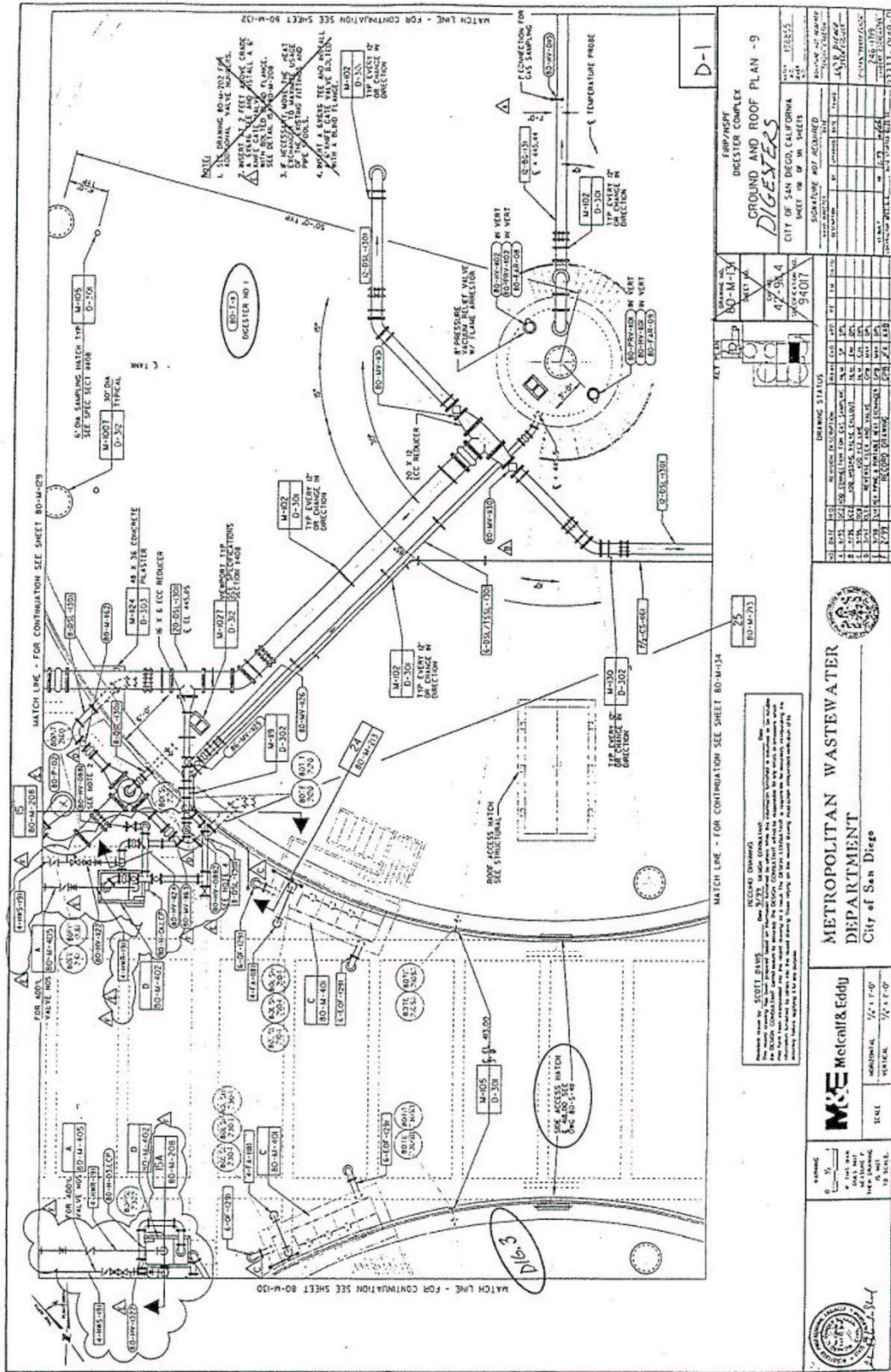
  
 Walter F. Konopka, Jr.  
 Senior Chemist

Source: MBC\_DIG2  
 Sample Date: 2-Jan-01  
 Sample ID: P94148

Analysis	Analyte Name	Qualifier	Value	MDL	Units
Metals	Mercury		2.12	0.38	MG/KG
	Arsenic		3.17	0.16	MG/KG
	Selenium		2.75	0.38	MG/KG
	Aluminum		12700	11	MG/KG
	Antimony	ND		50	MG/KG
	Barium		491	0.5	MG/KG
	Beryllium	ND		0.2	MG/KG
	Cadmium	ND		5	MG/KG
	Chromium		60.6	7	MG/KG
	Cobalt	ND		2.8	MG/KG
	Copper		518	4	MG/KG
	Iron		79400	6	MG/KG
	Lead		32.5	29	MG/KG
	Manganese		308	0.8	MG/KG
	Molybdenum		14	2.8	MG/KG
	Nickel		41.6	4	MG/KG
	Silver		30.4	3	MG/KG
	Thallium	ND		23	MG/KG
	Vanadium		27.5	1.5	MG/KG
Other Inorganic	Zinc		772	50	MG/KG
	pH		7.35		PH
	Sulfides-Reactive		591	487	MG/KG
	Sulfides-Total		16300	50	MG/KG
	Total Solids		12.3		WT%
	Total Volatile Solids		52		WT%



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RECORD DRAWING  
 RECORD NUMBER: 2023  
 RECORD DATE: 07/20/19

PROJECT: METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS  
 SHEET NO. OF 38 SHEETS: 9

DATE: 07/20/19  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 DESIGNED BY: [Name]

REVISION STATUS

NO.	DATE	DESCRIPTION
1	07/20/19	ISSUE FOR PERMIT
2	07/20/19	ISSUE FOR CONSTRUCTION
3	07/20/19	ISSUE FOR CONSTRUCTION
4	07/20/19	ISSUE FOR CONSTRUCTION
5	07/20/19	ISSUE FOR CONSTRUCTION
6	07/20/19	ISSUE FOR CONSTRUCTION
7	07/20/19	ISSUE FOR CONSTRUCTION
8	07/20/19	ISSUE FOR CONSTRUCTION
9	07/20/19	ISSUE FOR CONSTRUCTION

METROPOLITAN WASTEWATER DEPARTMENT  
 City of San Diego

SCALE: AS SHOWN

DATE: 07/20/19

PROJECT: METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

SHEET NO. OF 38 SHEETS: 9

M&E Metcalf & Eddy

PROJECT: METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

SHEET NO. OF 38 SHEETS: 9

DATE: 07/20/19

PROJECT: METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

SHEET NO. OF 38 SHEETS: 9

PW\DEN001\050020-695037  
 JULY 2019

Pure Water Program: Metro Biosolids Center Improvements  
 Attachment E – Technicals

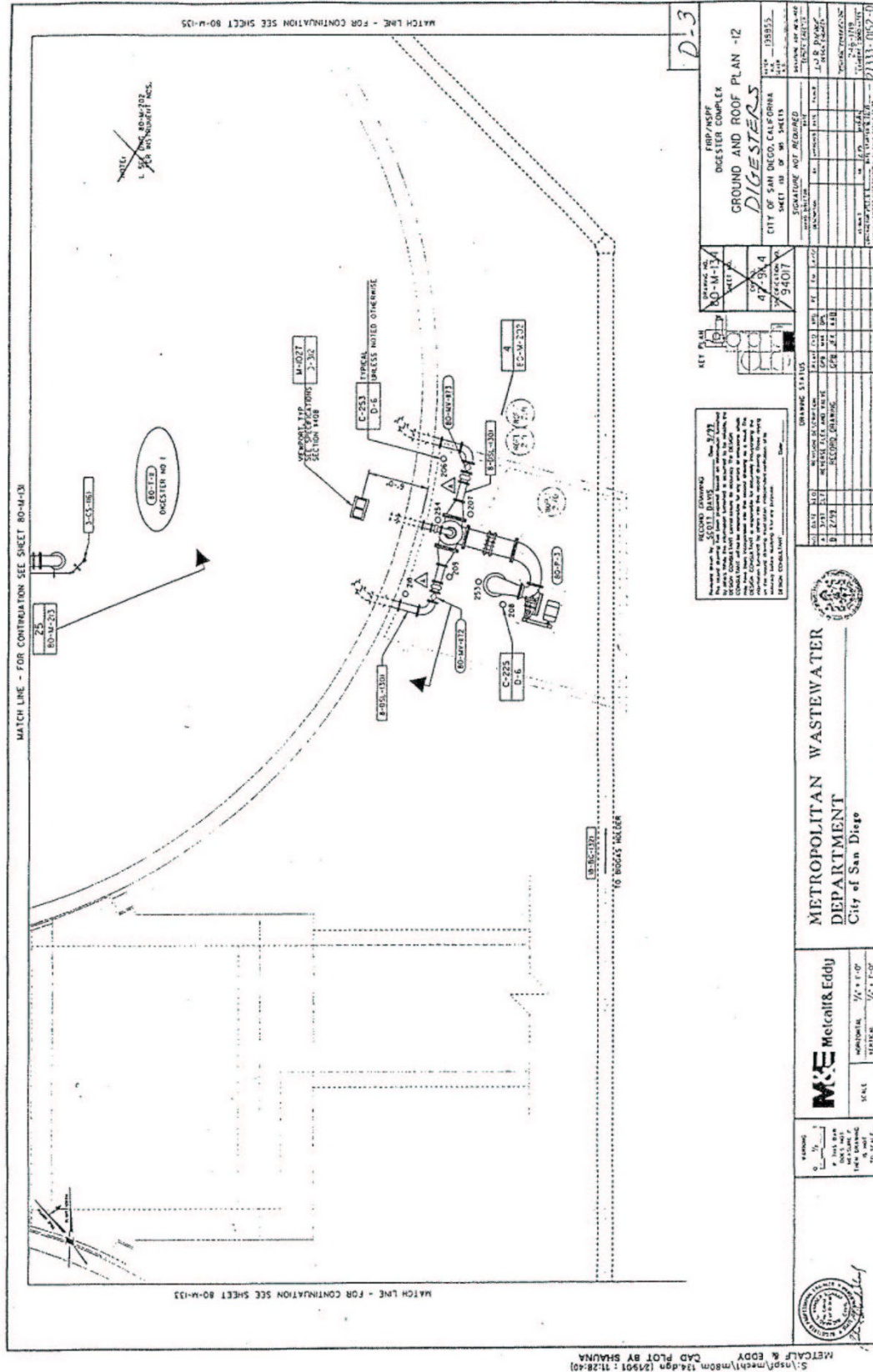
DIGESTER CLEANING  
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CITY OF SAN DIEGO  
 METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS



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 METCALF & EDDY

D-3

FRP/MSFP DIGESTER COMPLEX GROUND AND ROOF PLAN -12 <b>DIGESTERS</b>	
CITY OF SAN DIEGO, CALIFORNIA	DATE: 10/25/18
SHEET NO. OF 96 SHEETS	PROJECT NO.: 138953
DATE: 10/25/18	SCALE: AS SHOWN
DESIGNED BY: J. P. ...	CHECKED BY: ...
DRAWN BY: ...	APPROVED BY: ...
DATE: 10/25/18	PROJECT: ...

REV.	DATE	DESCRIPTION
1	10/25/18	ISSUE FOR PERMIT
2	11/14/18	REVISIONS
3	11/14/18	REVISIONS
4	11/14/18	REVISIONS

**REVISIONS**  
 REVISION 2: 11/14/18  
 REVISION 3: 11/14/18  
 REVISION 4: 11/14/18

NO.	DATE	DESCRIPTION
1	10/25/18	ISSUE FOR PERMIT
2	11/14/18	REVISIONS
3	11/14/18	REVISIONS
4	11/14/18	REVISIONS

**METROPOLITAN WASTEWATER  
 DEPARTMENT**  
 City of San Diego

**M&E Metcalf & Eddy**  
 SCALE: HORIZONTAL: 1/4" = 1'-0"  
 VERTICAL: 1/4" = 1'-0"

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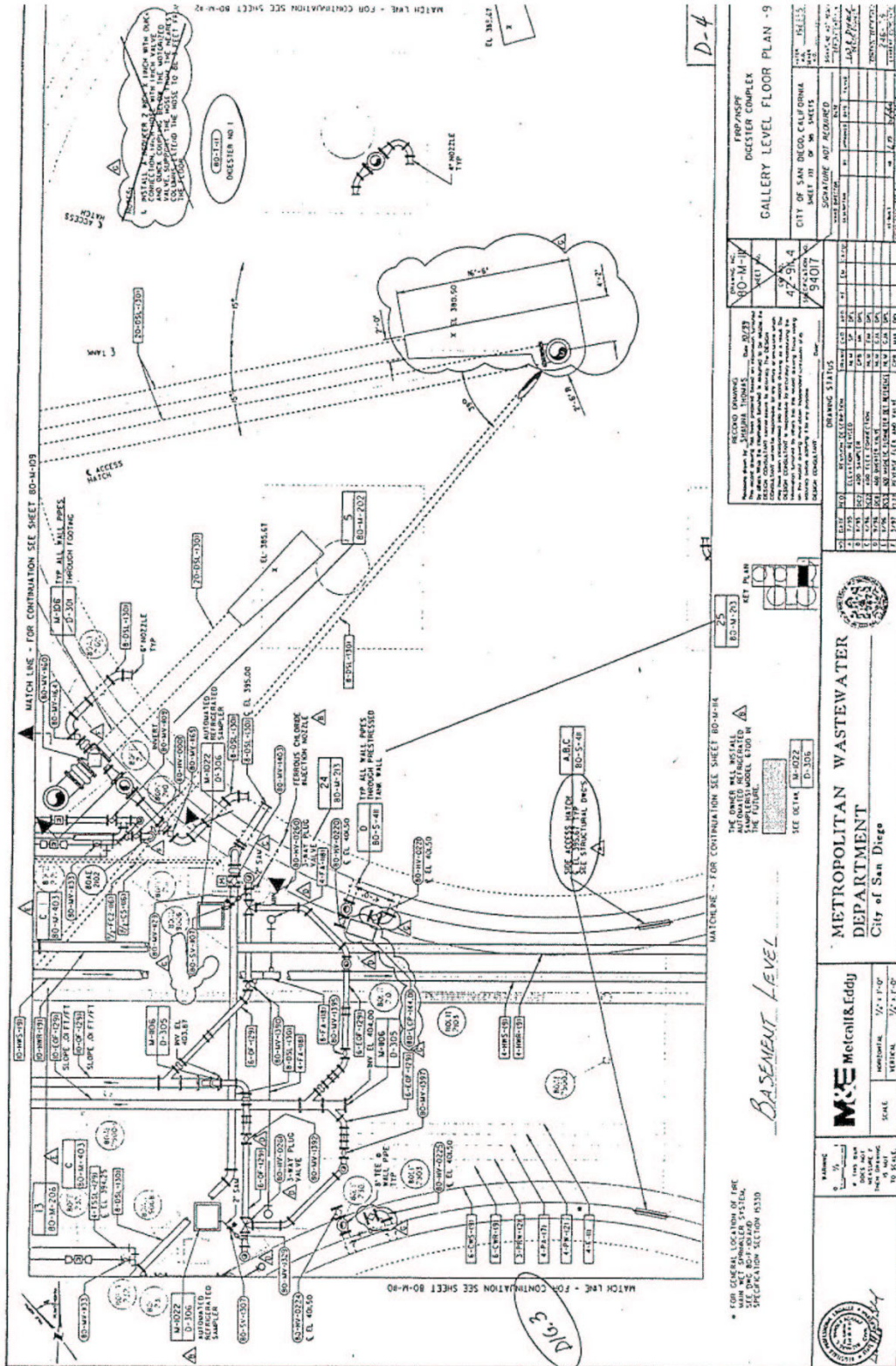
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JULY 2019

Pure Water Program: Metro Biosolids Center Improvements  
 Attachment E – Technicals

DIGESTER CLEANING  
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CITY OF SAN DIEGO  
METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS



**D-4**

PROJECT: METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS  
DRAWING: GALLERY LEVEL FLOOR PLAN - 9  
SHEET NO. OF 36 SHEETS

**REVISIONS**

NO.	DATE	DESCRIPTION
1	08/14/19	ISSUED FOR PERMIT
2	08/14/19	REVISED PER COMMENTS
3	08/14/19	REVISED PER COMMENTS
4	08/14/19	REVISED PER COMMENTS
5	08/14/19	REVISED PER COMMENTS
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**DESIGNED BY:** JOSHUA THOMAS  
**CHECKED BY:** JOSHUA THOMAS  
**DATE:** 08/14/19

**PROJECT:** METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS  
**DRAWING:** GALLERY LEVEL FLOOR PLAN - 9  
**SHEET NO. OF 36 SHEETS**

**APPROVED:** [Signature]  
**DATE:** 08/14/19

**KEY PLAN**

SEE O.C.T.M. 8-022  
D-301

**THE OWNER WILL INSTALL  
AUTOMATED INTEGRATED  
SYSTEMS IN THE FUTURE.**

**BASEMENT LEVEL**

**METROPOLITAN WASTEWATER  
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City of San Diego

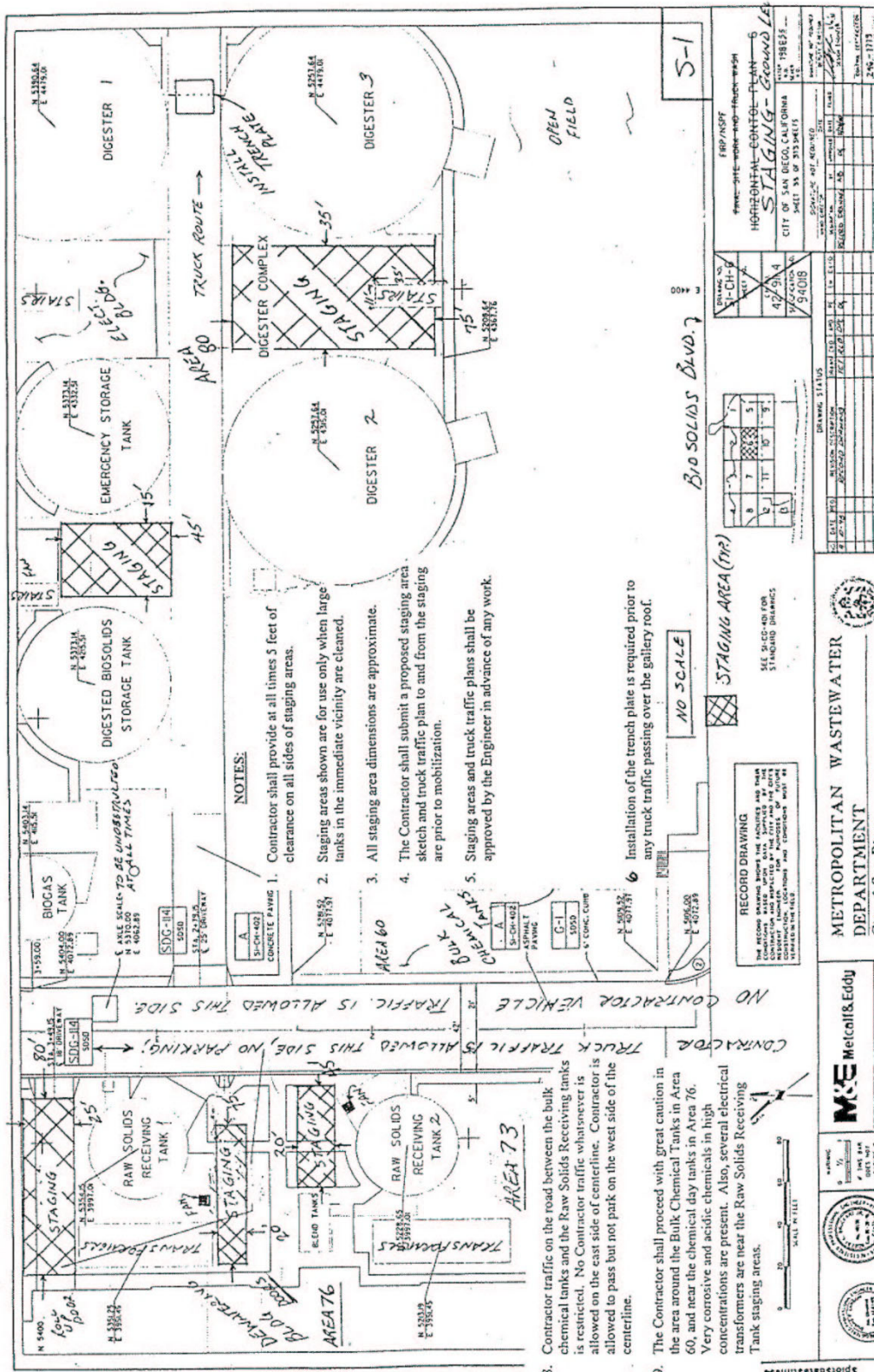
**M&E Metcalf & Eddy**  
SCALE: HORIZONTAL 1/4" = 1'-0"  
VERTICAL 1/8" = 1'-0"

**WARNING:**  
1. THIS PLAN IS A PRELIMINARY DESIGN.  
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD.  
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS.  
4. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL EXISTING UTILITIES AND STRUCTURES.  
5. THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES AND STRUCTURES FROM DAMAGE.  
6. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES AND STRUCTURES IN GOOD WORKING ORDER.  
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CITY OF SAN DIEGO  
METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS



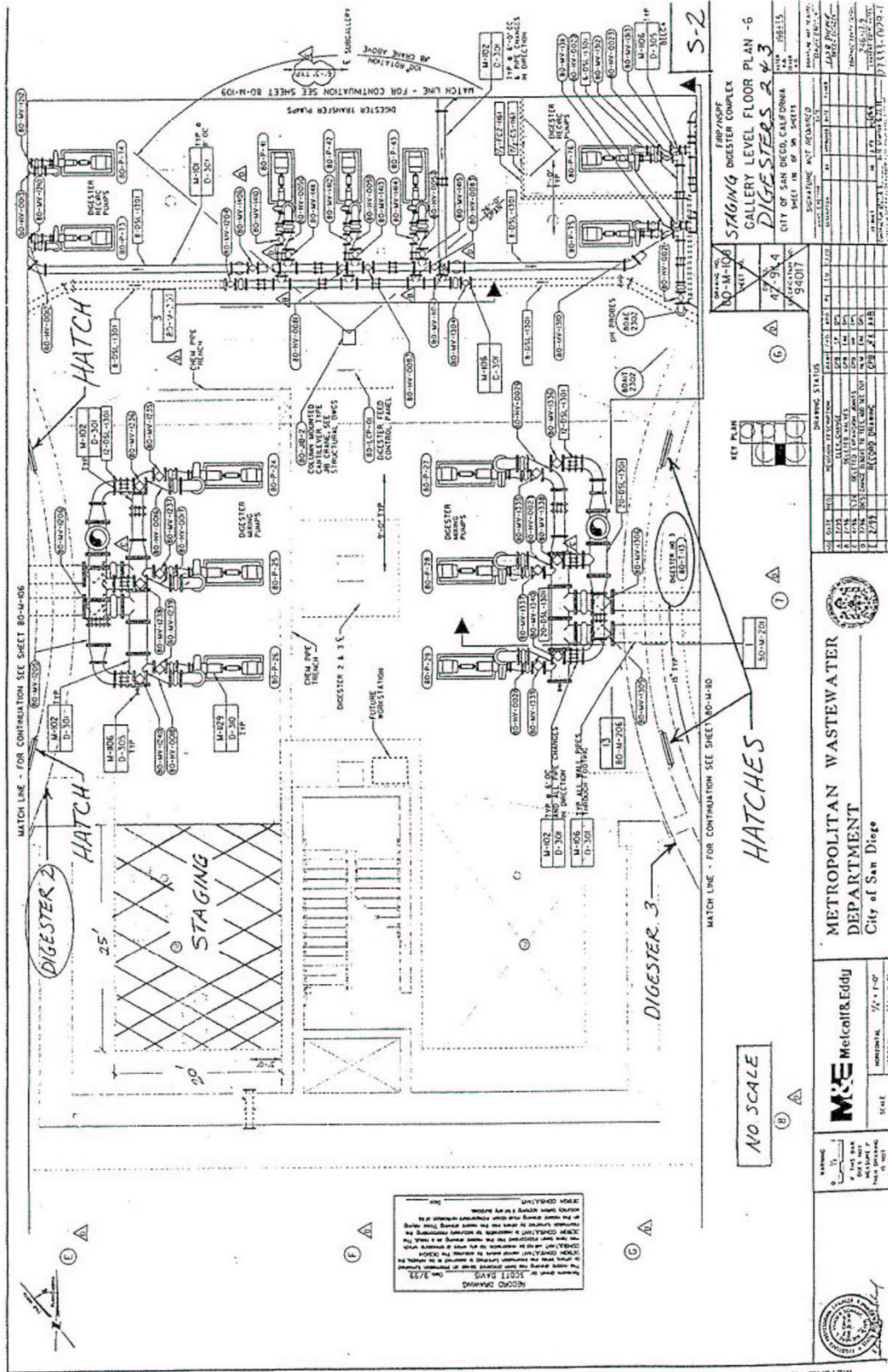
DIGESTER CLEANING  
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80-M-106  
STAGING LEVEL FLOOR PLAN - 6  
DIGESTERS 2 & 3  
CITY OF SAN DIEGO, CALIFORNIA  
SHEET 16 OF 26 SHEETS

NO.	DATE	DESCRIPTION
1	10/15/15	ISSUED FOR PERMITS
2	10/15/15	ISSUED FOR CONSTRUCTION
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NO SCALE

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DEPARTMENT  
City of San Diego

SCALE: VERTICAL 1/4" = 1'-0"

**M&E** Metcalf & Eddy

DATE: 10/15/15

PROJECT: METRO BIOSOLIDS CENTER IMPROVEMENTS

DRWING NO.: 80-M-106

DATE: 10/15/15

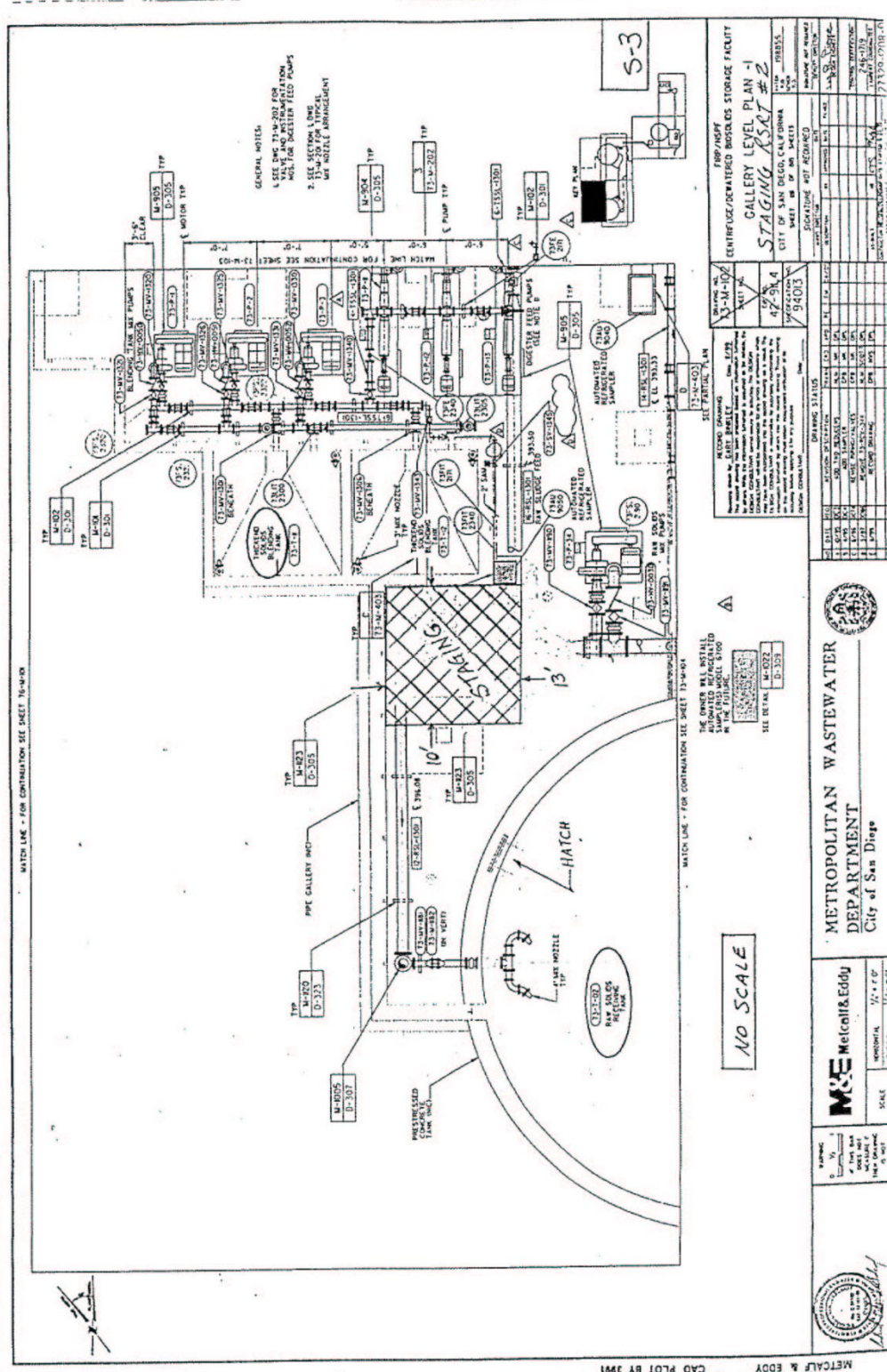
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Pure Water Program: Metro Biosolids Center Improvements  
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GENERAL NOTES:  
1. SEE SECTION 15.00 FOR VALVE AND INSTRUMENTATION FOR DIGESTER FEED PUMPS.  
2. SEE SECTION 15.00 FOR NOZZLE ARRANGEMENT.

FOR PUMP CENTRIFUGAL/DEBITATED BIOSOLIDS STORAGE FACILITY  
GALLERY LEVEL PLAN - I  
STAGING AREA # 2  
CITY OF SAN DIEGO, CALIFORNIA

DATE	DESCRIPTION	BY	CHK
11/15/18	ISSUE FOR PERMIT	W. J. EDDY	W. J. EDDY
11/15/18	REVISION 1: ADD VALVE	W. J. EDDY	W. J. EDDY
11/15/18	REVISION 2: ADD VALVE	W. J. EDDY	W. J. EDDY
11/15/18	REVISION 3: ADD VALVE	W. J. EDDY	W. J. EDDY
11/15/18	REVISION 4: ADD VALVE	W. J. EDDY	W. J. EDDY

PROJECT NO. 15-0000-0000  
SHEET NO. 15-0000-0000-0000

METROPOLITAN WASTEWATER DEPARTMENT  
City of San Diego

NO SCALE

THE OWNER HAS REVIEWED AND APPROVED THIS DRAWING FOR THE PROJECT DESCRIBED HEREIN. THE ENGINEER HAS REVIEWED AND APPROVED THIS DRAWING FOR THE PROJECT DESCRIBED HEREIN. THE ENGINEER HAS REVIEWED AND APPROVED THIS DRAWING FOR THE PROJECT DESCRIBED HEREIN.

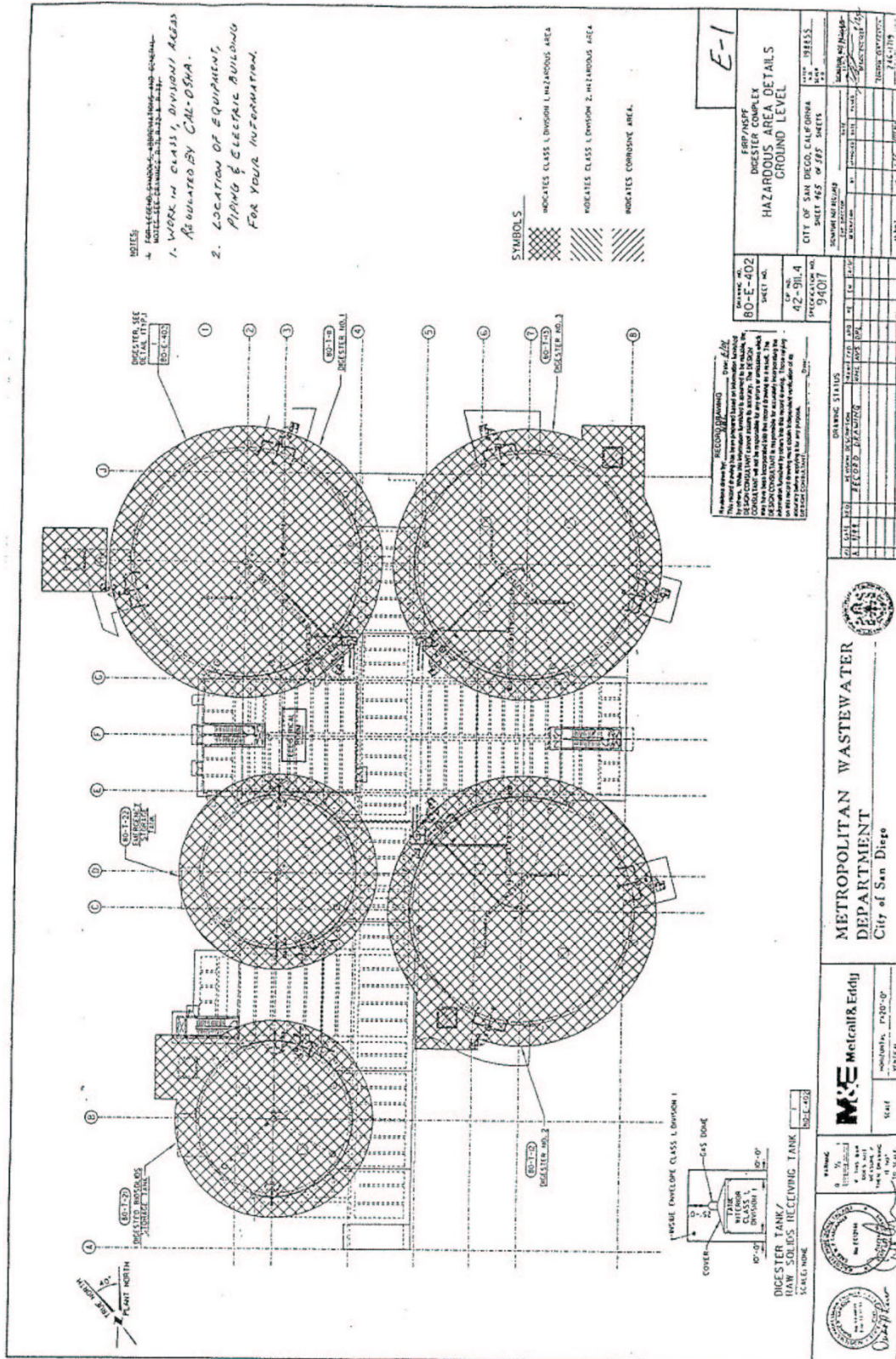
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**SECTION 46 23 00  
GRIT SEPARATORS**

**EQUIPMENT AND COMPONENT NUMBERS**

76-GSR-01: Grit Separator 1 (existing, replacement parts only)  
76-GSR-02: Grit Separator 2 (existing, replacement parts only)  
76-GSR-03: Grit Separator 3 (existing, replacement parts only)  
76-GSR-04: Grit Separator 4 (new unit)  
76-GSR-02.LCP: Grit Separator Control Panel

**PART 1 GENERAL**

1.01 DESCRIPTION

A. Scope: This section specifies equipment for separating grit slurries from raw primary and secondary solids. Grit separator unit supplier shall design and supply supports for equipment specified in this section. Grit separator unit performance and compatibility shall be identical to existing sludge grit separators in all respects, except as specified herein.

B. Operating Requirements:

<b>Equipment Number</b>	<b>Inlet Flow Rate, gpm</b>	<b>Inlet Sludge Pressure, psig</b>	<b>Process Stream</b>
76-GSR-04	1,040	20.0 (maximum)	Raw solids (RSL)

C. All mechanical, electrical, and structural components (including those not specifically listed herein) for both new and existing grit separators shall be inspected for corrosion and to ensure proper working status. Defective, corroded, or inoperable equipment shall be repaired or replaced to restore working status, as approved by the Engineer or Owner. Coatings shall be reapplied to new and existing equipment according to the Contract Documents, as necessary.

1.02 QUALITY ASSURANCE

A. Performance:

1. The grit separator unit shall be designed to separate solids from a grit slurry generated from domestic wastewater solids containing up to 1.0 percent solids by volume. The grit slurry will include sand, sticks, gravel, petroleum products, industrial solvents, organic solids, detergents, and paper products. Grit separator unit shall remove no less

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than 95 percent of all grit particles in the inlet slurry having a diameter equal to or greater than that retained on a 200-mesh U.S. standard sieve and specific gravity of 2.7 or greater.

2. Grit separator unit shall be the top overflow, bottom discharge type. Unit shall be all hydraulic, high efficiency vortex separator designed to remove grit, sediment, and sand from wastewater solids using vortex motion and boundary layer effects to aid in organics removal.
3. Grit separator unit shall be designed for continuous operation. Ambient air temperatures are expected to vary from 50 degrees F to 100 degrees F with maximum humidity of 100 percent.

B. Related Sections: Section 40 99 90, Package Control Systems.

### 1.03 SUBMITTALS TO BE PROVIDED

A. The following submittals shall be provided in accordance with the Contract Documents:

1. Fabrication drawings with full dimensions.
2. Plan, cross section views, and details showing fabrication details of proposed mounting supports for each separator.
3. Anchorage and structural calculations signed and sealed by a Professional Engineer registered in the State of California. Anchorage design shall be in accordance with Section 01 88 15, Anchorage and Bracing.
4. Manufacturer's written certification that the grit separator unit will achieve the grit removal performance specified in this section.
5. Operations and maintenance manual in accordance with the Contract Documents.
6. Manufacturer's standard warranty, in accordance with the requirements specified herein.

## **PART 2 PRODUCTS**

A. Acceptable Products:

1. Grit separator unit shall be Hydro International TeaCup modified as necessary to provide the specified features.
2. Or approved equal.

### 2.02 GRIT SEPARATOR UNIT DESIGN

A. Design Data:

1. Number of Units: One.
2. Size: 76-inch diameter.

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3. Performance: 95 percent removal of all grit (specific gravity 2.65).
4. Greater than or equal to 75 microns in the flow range.
5. Influent Solids Concentration: Less than or equal to 1.0 percent.
6. Design Flow/Unit: 1,040 gpm with 276 inches water column headloss.
7. Influent Connection: 8-inch flanged pipe.
8. Effluent Connection: 8-inch flanged pipe.
9. Underflow Connection: 3-inch NPT pipe.
10. NPW Connection: 1.5-inch NPT.
11. Material of Construction: Type 304 stainless steel.

B. Operation:

1. The unit shall be designed to handle grit slurry.
2. The unit shall be characterized by a dominant, strong free vortex which uses centrifugal and gravitational forces and secondary boundary layer velocities to affect the separation, collection, and classification of grit from the unit's inflow.
3. Defining characteristics of the dominant free vortex / secondary boundary layer velocity type units are as follows:
  - a. Dominating increasing tangential velocity profile toward the center of the unit.
  - b. The ability to handle increasing flows with no loss of the specified grit removal efficiency and with increasing headloss requirements.
  - c. The ability to classify (wash) the grit from lighter organic material to meet the specified organic solids content.
  - d. No requirements for electrical or mechanical components, flow deflecting / guiding weirs or baffles, or compressed air lines within the unit to meet the specified performance.
  - e. Continuous removal of washed, clean grit.
4. The unit shall be all-hydraulic with no moving parts within the unit.
5. Grit underflow shall be transported to the Grit Dewatering units.
6. Fluidizing water shall be continuously supplied to the unit.

C. Construction:

1. The unit shall be fabricated from stainless steel. The dished and flanged heads shall be 1/4-inch thick. The vessel walls shall be 3/16-inch thick.
2. A coating of Belzona shall be applied to the inside bottom part of the unit body to add a secondary layer of abrasion resistance.
3. The unit shall be designed to withstand a maximum working pressure of 20 psig. The actual maximum pressure at the inlet shall be no more than 20 psig.
4. A minimum 24-inch diameter access hatch shall be provided in the top of the unit. All internal elements shall be removable from inside the unit.

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5. The unit shall be free standing on three supports. The main support frame shall be flanged so the legs can be removed for shipping and installation and reinstalled by the General Contractor in the field.
6. The unit shall include a hydraulic valve (HV) to deliver a continuous flow of “washed” grit slurry to the dewatering unit. The HV shall have no mechanical or moving parts.
7. The unit shall have one 1-inch NPT pipe stub for connection of the system water.
8. The unit shall have one 2-inch NPT connection on the lid for a sewage air release valve, one 1.5-inch NPT grit underflow connection, one 3-inch NPT threaded drain connection, and one 1.5-inch NPT fluidizing water connection for the HV supply and HV backwash.

D. Valves and Accessories:

1. Work to be provided on 76-GSR-01, 76-GSR-02, and 76-GSR-03:
  - a. Unit supplier shall furnish and Contractor shall install new PITs (76PIT-1104A, 76PIT-1109A, and 76PIT-1114A).
  - b. Unit supplier shall furnish and Contractor shall install new PDITs (76PDIT-1104B, 76PDIT-1109B, and 75PDIT-1114B).
  - c. Contractor shall salvage existing 4-inch plug valves (76MV1101, 76MV1102, 76MV1106, 76MV1107, 76MV1111, and 76MV1112) and re-install and re-name if necessary as shown on Drawings. Others shall be kept as shelf-spares.
  - d. Unit supplier shall furnish and Contractor shall install new 3-inch motorized valves (76MV1101, 76MV1106, and 76MV1111).
  - e. Unit supplier shall furnish and Contractor shall install new 1.5-inch solenoid valves (76SV1138A, 76SV1139A, and 76SV1140A).
  - f. Unit Supplier shall furnish and Contractor shall install new 1.25-inch motorized valves (76MV1104B, 76MV1109B, and 76MV1114B).
  - g. Contractor shall furnish and install new manual valves as shown on Drawings.
  - h. Contractor shall furnish and install new flushing connections as shown on Drawings.
2. Unit supplier shall supply 76-GSR-04 with valving and piping required for their standard hydraulic valve unit, including the following equipment (or approved equal):
  - a. One 4-inch motorized modulating valve (76MV1123).
  - b. One 3-inch motorized valve (76MV1124).
  - c. One 1.25-inch bronze ball valve.
  - d. One 1.25-inch modulating ball valve to regulate water flow to the HV (76MV1125B).
  - e. One 1.5-inch bronze ball valve for utility water supply shut off.

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- f. One 1.5-inch NEMA 4X brass solenoid valve to automate system water to the HV (76SV1125A).
- g. One 1.5-inch stainless steel ball valve.
- h. One 1.5-inch stainless steel solenoid valve to regulate flow to drain pipe (76SV1125C).
- i. One gauge pressure indicating transmitter (76PIT-2123).
- j. One differential pressure indicating transmitter (76PDIT-2126).

2.03 CONTROL PANEL: 76-GSR-02.LCP

- A. One control panel shall be furnished, completely pre-wired, and tested.
- B. In accordance with general control requirements and component qualities specified in Section 40 99 90, Package Control Systems. Provide panels and controls as follows:
  - 1. Enclosure Rating: NEMA 4X.
  - 2. Material: Type 304 stainless steel.
  - 3. Voltage: 120 volt.
  - 4. Phase: One-phase.
  - 5. Frequency: 60 Hz.
  - 6. Logic:
    - a. Programmable relay.
    - b. Single loop controller.
- C. The control panel shall contain all timers, switches, indicator lights, and other components necessary to operate the unit.
- D. The control panel shall be supplied with applicable control relays and time delay relays with a minimum one extra normally closed and one extra normally opened contact provided for each relay.
- E. Where remote monitoring is required, the panel shall be provided with all dry contacts necessary.
- F. The panel door layout shall include the following items:
  - 1. Front panel mounted combination main disconnect switch and circuit breaker.
  - 2. Back lit, push-to-test Power On indicating light.
  - 3. System three position HOA switch.
  - 4. System Emergency Stop push button.
  - 5. System Alarm Reset push button.
  - 6. Three position HOA switch.
  - 7. Supply water three position HOA switch.
  - 8. Backwash water valve three position HOA switch.

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9. Auxiliary backwash pushbutton.
10. RUNNING indicating light.
11. Supply valve OPEN light.
12. Backwash valve OPEN light.
13. BLOWDOWN light.
14. WET/DRY/REMOTE three position switch.
15. SYSTEM BLOWDOWN three position HOA switch.
16. Inlet/outlet high pressure alarm.

2.04 SEQUENCE OF OPERATION

- A. The system shall be controlled to provide automatic or manual operation and unit shut down when a fault is detected.
- B. Grit Separator Unit:
  1. Unit shall be designed to run continuously.
  2. During operation, a washed/classified grit slurry shall continuously underflow from the unit. Control of the grit slurry underflow rate shall be via the HV mounted on the bottom of the unit. A portion of the system water shall be continuously introduced to the HV.
  3. Twice per hour during heavy grit loads and once per hour during light grit loads, a backwash sequence shall be initiated by cycling solenoid valves, which shall flush the grit underflow gap inside the unit. Frequency and duration of backwash cycles shall be adjustable.
  4. Once every four backwashes, a blowdown sequence shall be initiated to flush accumulations of debris inside the unit. Blowdown shall be accomplished by stopping the influent to the unit, cycling solenoid valves, and resuming operation. Frequency and duration of blowdown cycles shall be adjustable.

2.05 CONTROL REVISIONS

- A. General Contractor or grit separator supplier shall revise the grit separator system controls for all units:
  1. To delay overpressure shutdowns for 30 minutes to allow backwash and blowdown at higher pressures, as indicated in this section.
  2. Furnish, replace and tune existing under flow controls, including: Single loop controllers, modulating control valves, differential pressure (flow) and pressure transmitters.
    - a. Differential Pressure and Pressure Transmitters models to match data sheets.
      - 1) Section 40 90 00, Instrumentation and Control, Supplement 02C P03, Pressure Differential Transmitter.

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- 2) Section 40 90 00, Instrumentation and Control, Supplement 02F P09, Pressure Transmitter.
- b. Coordinate the procurement of instrumentation to be the same manufacture and model as other instrumentation provided under the Metropolitan Biosolids Center Improvements Project.
3. Modify existing control panel relay logic to remove the following control logic:
  - a. Individual grit separator will select the dewatering unit based on the operator selection of one of two grit discharge valves.
  - b. Start Stop commands to Grit Dewatering Units No. 1 and 2 from 76MV1101, 76MV1106, 76MV1111, and 76MV1112.
4. Modify existing control panel relay logic to add the following control logic:
  - a. Valve 76MV1102 will control all grit flow and Start Stop commands to Grit Dewatering Unit No. 1.
  - b. Valve 76MV1107 will control all grit flow and Start Stop commands to Grit Dewatering Unit No. 2.
  - c. Individual grit separator will have one grit discharge valve.
  - d. Furnish and install new two position switch, Local / Computer, and three position switch, Open / Stop / Close, for 76MV1101, 76MV1106, and 76MV1111.

2.06 UTILITY REQUIREMENTS

A. Water:

1. The unit shall use non-potable water supplied at a regulated 50 psig plus or minus 5 psi. The water requirements shall be as follows:
  - a. A continuous supply of 50 gpm for normal operation of the unit.
  - b. An intermittent supply of 47 gpm for a periodic short duration during backwash.

B. Electrical: The system shall require one 120V ac, single-phase electrical service connection to operate.

2.07 STANDBY COMPONENTS

- A. The following spare parts shall be provided for the grit separator unit: One baffle.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Supports, fabricated or structural steel, shall be provided for the grit separator unit. Connections shall be located to match existing units.



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- B. The General Contractor shall be responsible for the compatibility of the grit separator and grit dewatering units.

3.02 DELIVERY AND INSTALLATION

- A. The equipment and material shall be shipped complete except where partial disassembly is required by transportation regulations, for protection of components, or to transport, mount, and install the unit inside the existing building.
- B. Spare parts shall be packed in containers bearing packing lists clearly designating contents and pieces of equipment for which they are intended.
- C. The General Contractor shall inspect equipment prior to unloading and notify the manufacturer of any damage to equipment within 5 days. Failure to notify the manufacturer of damage to equipment prior to unloading shall void all warranties pertaining to subject equipment.
- D. The General Contractor shall unload, store, and safeguard equipment, materials, and spare parts in accordance with manufacturer's recommendations.

3.03 STARTUP, TRAINING, AND MANUFACTURER'S SERVICES

- A. A factory-trained representative for the equipment specified herein shall be present at the jobsite and/or classroom designated by the Owner for a maximum of one 8-hour person-day (1 visit) for installation inspection, plant startup, functional testing, and operator instructions; travel time excluded. A minimum of 30 days' notice to the manufacturer shall be provided to schedule manufacturer's services. Any services with less than 30 days' notice shall be billed to the General Contractor for service time and actual travel costs.

3.04 FIELD TESTING

- A. Prior to plant startup, all equipment shall be inspected for proper alignment, operation, connection, and satisfactory operation by means of a functional test. It is the General Contractor's responsibility to notify the manufacturer of any inability to perform functional testing prior to operator training.

3.05 MANUFACTURER'S CERTIFICATE(S)

- A. Provide manufacturer's certificate of installation and commissioning following functional testing and startup.
- B. Provide manufacturer's OEM software licensing agreement following acceptance and final payment.

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3.06 WARRANTY

- A. Manufacturer shall warranty to the City that any installed equipment will be free from workmanship defects for a period of 1 year after completion of field testing, as determined by the manufacturer.
- B. The workmanship warranty shall cover all defects related to installed work only. Manufacturer shall provide service without charge throughout warranty period if a problem occurs due to workmanship or material defects. Services shall be rendered by the Manufacturer within 2 weeks of notification of defect and shall occur between 8:00 a.m. and 5:00 p.m. Pacific time on weekdays.

**END OF SECTION**

**SECTION 46 23 10**  
**GRIT DEWATERING UNIT REHABILITATION**

**EQUIPMENT AND COMPONENT NUMBERS**

76-GS-01: Grit Dewatering Unit 1

76-GS-02: Grit Dewatering Unit 2

**PART 1 GENERAL**

**1.01 EXISTING EQUIPMENT**

A. Existing grit dewatering units (grit snails) were manufactured by Hydro International (previously Eutek). The units use a slow moving cleated belt to dewater grit by gently escalating grit from the clarifier pool without resuspending fine grit particles in the clarifier overflow. Existing equipment information is below.

1. Model Number: GS1296.
2. Capacity: Up to 2.0 cubic yards of dewatered grit per hour.
3. Belt Width: 12 inches.
4. Clarifier: 96 inches square.
5. Motor: 1 hp, totally enclosed non-ventilated (TENV), 480V, three-phase, 60-Hz.
6. Overflow Connection: 6-inch flanged pipe.
7. Drain Connection: 3-foot flanged pipe.
8. Nonpotable Water (NPW) Connection: 1.5-inch NPT.
9. NPW Requirement/Unit: Continuous 10 gpm at 50 psig.
10. Material of Construction: Type 304 stainless steel housing/rubber cleated belt.

**1.02 WORK INCLUDES**

- A. Repair and replacement of mechanical, electrical, and other systems for existing grit dewatering units. Work shall be performed in the field.
- B. Contractor shall coordinate with Hydro International, Hydro International's manufacturer's representative, or Engineer-approved equal to refurbish both existing grit dewatering units. All parts used in the refurbishment shall be compatible with existing equipment. At least one grit dewatering unit shall be available for operation at all times during the rehabilitation period.

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- C. At a minimum, the following components of each grit dewatering unit shall be replaced:
1. One 12-inch belt.
  2. One scraper; internal 1/4-inch HDPE; 12-inch belt.
  3. One scraper; head roll 12 inches; 1/4-inch HDPE.
  4. One liner, tail-roll retainer 12-inch.
  5. One retainer liner, head roll.
  6. Two filler skirts.
  7. Two drip skirts.
  8. Two side skirts, head roll drive side.
  9. Two side skirts, head roll non-drive side.
  10. One liner, drain side 12-inch.
  11. One liner, non-drain side.
  12. One liner, bottom.
  13. One sprocket; 70-tooth bored and faced for TTA-50.
  14. One sprocket; Martin 15-tooth 1-1/4-inch bore; 1/4-inch KW stainless steel.
  15. One Dodge Torque Tamer; No. 50 x 1-1/4 inch.
  16. One bushing; Dodge Torque Tamer; No. 50 x 1/4 inch.
  17. One chain; 40-pound with connection link.
  18. Two bearings; Dodge flange 1-1/4-inch; F4BSC104 HI-VOL ball.
  19. Four gaskets; tail-roll flange bearing.
  20. Two bearings; Dodge 1/2-inch SC pillow block.
  21. Two bearings; Dodge 1-1/4-inch SC pillow block.
  22. Two bushings; B-Loc 1-1/4-inch with socket head cap screws.
  23. One tail roll (lagged).
  24. One head roll (lagged).
  25. One sponge rubber strip 3/16-inch by 2-inch by 50 feet long Neoprene/EPDM/SBR.
- D. All mechanical, electrical, and structural components (including those not specifically listed herein) shall be inspected for corrosion and to ensure proper working status. Defective, corroded, or inoperable equipment shall be repaired or replaced to restore working status, as approved by the Engineer or Owner. Coatings shall be reapplied to new and existing equipment according to Section 09 90 00, Painting and Coating, as necessary.

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1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
  - a. Product Data:
    - 1) Complete scope of supply, including narrative and bill of materials, for rehabilitation work.
    - 2) Make, model, weight, and horsepower.
    - 3) Descriptive literature, specifications, dimensional layout, and identification of materials of construction.
    - 4) Painting/Coating System(s): Manufacturer's descriptive technical catalog of literature and specifications.
  - b. Detailed Drawings:
    - 1) Mechanical and Electrical: Show equipment fabrication drawings, interface with other items (including dimensions, size, and locations of connections to other work), and weights of associated equipment.
    - 2) Include piping, control valves, and seal between fixed and rotating parts.

B. Informational Submittals:

1. Refurbishing Contractor's qualifications.
2. Installation schedule.
3. Certificates:
  - a. Manufacturer's Certification of Compliance, in accordance with the Contract Documents.
  - b. Manufacturer's certificate that coating system(s) meet or exceed specified requirements, if applicable.
4. Special shipping, storage, protection, and handling instructions.
5. Test procedures and schedule, in accordance with the requirements specified herein.
6. Test results, reports, and certifications.
7. Manufacturer's Certificate of Proper Installation, in accordance with the Contract Documents.
8. Service records for maintenance performed during construction.
9. Manufacturer's standard warranty, in accordance with the requirements specified herein.

1.04 QUALIFICATIONS

- A. Refurbishing Contractor shall have experience performing the type of Work specified herein.

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1.05 DELIVERY

- A. Delivery shall be in accordance with Contract Documents.

**PART 2 PRODUCTS**

2.01 SERVICE CONDITIONS

- A. General: Products shall be suitable for installation indoors and exposed to site conditions as described below.
- B. Material Handled: Liquid slurry containing grit fraction of municipal wastewater solids.
- C. Influent Liquid Temperature Range: 50 degrees F minimum to 85 degrees F maximum.
- D. Influent pH Range: 6.5 minimum to 7.5 maximum.
- E. Site Conditions:
  - 1. Ambient Temperature Range: Minimum 0 degrees F to maximum 100 degrees F.
  - 2. Ambient Relative Humidity Range: Minimum 10 percent to maximum 98 percent.

**PART 3 EXECUTION**

3.01 INSTALLATION

- A. In accordance with manufacturer's written instructions.
- B. No field welding, except seal welding, shall be allowed. Seal weld continuously for tightness against leakage. Seal welding shall comply with applicable requirements of AWS D1.1/D1.1M.

3.02 FIELD QUALITY CONTROL

- A. Functional Tests:
  - 1. Conduct on each grit dewatering unit.
  - 2. Test for continuous 24-hour period without malfunction.

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B. Performance Test:

1. Conduct on each grit dewatering unit in accordance with the original equipment manufacturer-accepted test procedure.
2. Perform under actual or approved simulated operating conditions.
3. Grit in the dumpster shall contain greater than or equal to 60 percent by weight total solids and less than or equal to 20 percent by weight volatile solids. Analyze samples according to EPA Method 1684 or Engineer-approved equal. At least three samples shall be collected over a 24-hour period from the grit dewatering unit discharge or screw conveyor discharge. Samples shall be collected no less than 8 hours apart.

3.03 MANUFACTURER'S SERVICES

- A. A factory-trained representative for the equipment specified herein shall be present at the jobsite and/or classroom designated by the Owner for a maximum of four 8-hour person-days (2 visits) for installation inspection, plant startup, functional testing, and operator instructions; travel time excluded.

3.04 MANUFACTURER'S CERTIFICATE(S)

- A. Provide manufacturer's certificate of installation and commissioning following functional testing and startup.
- B. Provide manufacturer's standard warranty, including the following,
1. Manufacturer shall warranty to the City that any installed equipment will be free from workmanship defects for a period of 1 year after completion of functional testing, as determined by the manufacturer.
  2. The workmanship warranty shall cover all defects related to installed work only. Manufacturer shall provide service without charge throughout warranty period if a problem occurs due to workmanship or material defects. Services shall be rendered by the manufacturer within 2 weeks of notification of defect. Repair work by the manufacturer shall occur between 8:00 a.m. and 5:00 p.m. Pacific time on weekdays, excluding holidays.

**END OF SECTION**

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## **VOLUME 5 through VOLUME 7 DRAWINGS**

can be found on the link below:

[https://drive.google.com/drive/folders/1DHTQFc\\_t9F\\_cVIj95Tvn7Y3g0jFQGnv](https://drive.google.com/drive/folders/1DHTQFc_t9F_cVIj95Tvn7Y3g0jFQGnv)

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**SUPPLEMENTARY SPECIAL PROVISIONS**  
**APPENDICES**

**APPENDIX A**  
**MITIGATION MEASURES**

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## **MITIGATION MONITORING AND REPORTING PROGRAM**

Section 21081.6 of the California Environmental Quality Act (CEQA) requires that a mitigation, monitoring, and reporting program (MMRP) be adopted upon certification of an Environmental Impact Report (EIR) to ensure that the mitigation measures are enforceable and implemented. It stipulates that "the public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during project implementation."

This MMRP has been developed in compliance with Section 21081.6 of CEQA and identifies (1) mitigation measures to be implemented prior to, during, and after construction of the North City Project; (2) the individual/agency responsible for that implementation; and (3) criteria for completion or monitoring of the specific measures.

The Environmental Impact Report/Environmental Impact Statement (EIR/EIS), incorporated herein as referenced, focused on issues determined to be potentially significant by the City. Public Resources Code Section 21081.6 requires mitigation of only those impacts identified as significant or potentially significant. The environmental analysis resulted in the identification of mitigation measures that would reduce potentially significant impacts for the following issue areas: air quality; biological resources; health and safety/hazards; historical resources; noise; paleontological resources; public utilities; and transportation, circulation, and parking.

### **GENERAL**

1. Prior to issuance of a Notice to Proceed (NTP) or any construction permits, including but not limited to, the first Demolition Plans/Permits, and Building Plans/Permits, the Assistant Deputy Director (ADD) Environmental Designee of the Land Development Review Division shall verify that all mitigation measures listed in this EIR/EIS have been included in entirety on the submitted construction documents and contract specifications, and included under the heading, "Environmental Mitigation Requirements." In addition, the requirements for a Preconstruction Meeting shall be noted on all construction documents.
2. Prior to the commencement of work, a Preconstruction Meeting (Pre-con) shall be conducted and include the City of San Diego's Mitigation Monitoring Coordination (MMC) Section, Construction Manager (CM), Resident Engineer, Building Inspector, Project Consultant, Applicant and other parties of interest.

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3. Evidence of compliance with other permitting authorities is required, if applicable. Evidence shall include either copies of permits issued, letters of resolution issued by the Responsible Agency documenting compliance, or other evidence documenting compliance and deemed acceptable by the ADD Environmental Designee.
  4. Pursuant to Section 1600 et seq. of the State of California Fish & Game Code, evidence of compliance with Section 1602 is required, if applicable. Evidence shall include either copies of permits issued, letters of resolution issued by the Responsible Agency documenting compliance, or other evidence documenting compliance and deemed acceptable by the ADD Environmental Designee.

### **SPECIFIC MMRP ISSUE AREA CONDITIONS/REQUIREMENTS**

#### **AIR QUALITY Miramar**

##### **Reservoir Alternative**

The following mitigation measures outline the steps necessary to reduce the construction emissions from all components of the Miramar Reservoir Alternative.

**MM-AQ-1** The following best management practices shall be implemented during construction to comply with applicable San Diego Air Pollution Control District (SDAPCD) rules and regulations and to further reduce daily construction emissions:

- Best management practices that could be implemented during construction to reduce particulate emissions and reduce soil erosion and trackout include the following:
  - Cover or water, as needed, any on-site stockpiles of debris, dirt, or other dusty material.
  - Use adequate water and/or other dust palliatives on all disturbed areas in order to avoid particle blow-off. Due to current drought conditions, the contractor shall consider use of a SDAPCD-approved dust suppressant where feasible to reduce the amount of water to be used for dust control. Use of recycled water in place of potable water shall also be considered provided that the use is approved by the City of San Diego and other applicable regulatory agencies prior

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to initiation of construction activity.<sup>1</sup> Use of recycled water shall be in compliance with all applicable City of San Diego Rules and Regulation for Recycled Water (City of San Diego 2016a), particularly for the protection of public health per the California Code of Regulations, Title 22, Division 4.

- Wash down or sweep paved streets as necessary to control trackout or fugitive dust.
- Cover or tarp all vehicles hauling dirt or spoils on public roads if sufficient freeboard is not available to prevent material blow-off during transport.
- Use gravel bags and catch basins during ground-disturbing operations.
- Maintain appropriate soil moisture, apply soil binders, and plant stabilizing vegetation.

**MM-AQ-2** The following measures shall be adhered to during construction activities associated with the North City Project to reduce oxides of nitrogen (NO<sub>x</sub>):

- a. All diesel-fueled construction equipment shall be equipped with Tier 3 or better (i.e., Tier 4 Interim or Tier 4 Final) diesel engines.
- b. The engine size of construction equipment shall be the minimum size suitable for the required job.
- c. Construction equipment shall be maintained in accordance with the manufacturer's specifications.

Mitigation measure MM-AQ-3 is provided to reduce odor impacts for the Miramar Reservoir Alternative.

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<sup>1</sup> The use of recycled water for construction purposes requires approval of the City and other regulatory agencies on a case-by-case basis. The permit shall be obtained prior to beginning construction. Recycled water used for construction purposes may only be used for soil compaction during grading operations, dust control, and consolidation and compaction of backfill in trenches for non-potable water, sanitary sewer, storm drain, gas and electric pipelines. Equipment operators shall be instructed about the requirements contained herein and the potential health hazards involved with the use of recycled water. Water trucks, hoses, drop tanks, etc. shall be identified as containing non-potable water and not suitable for drinking. Determinations as to specific uses to be allowed shall be in accordance with the standards set forth in Title 22, Division 4 of the California Code of Regulations and with the intent of this ordinance to preserve the public health. The City may, at its discretion, set forth specific requirements as conditions to providing such services and/or require specific approval from the appropriate regulatory agencies (City of San Diego 2016a).

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**MM-AQ-3** The City shall implement odor control systems at the NCWRP Expansion, Morena Pump Station, and Morena Wastewater Forcemain specifically designed to abate the potential odors of the facility. Odor control systems would be similar to those currently employed at City of San Diego wastewater treatment facilities to reduce odor impacts. The following odor control systems or equivalent measures shall be implemented to mitigate nuisance odors:

- a. North City Water Reclamation Plant Expansion and the Morena Pump Station: NaOCl/NaOH Wet Scrubber plus carbon or Biofilter plus carbon.
- b. Air/vacuum relief valves at high points along the wastewater forcemain: ferric chloride and/or High Purity Oxygen injection.

Alternatively, odors could be abated through the addition of chemicals such as iron chloride, nitrate, hydrogen peroxide, sodium hypochlorite, high purity oxygen, magnesium hydroxide, and/or caustic solutions to reduce the liquid phase concentration and thus, reduce the amount volatilized into the gas phase.

## **BIOLOGICAL RESOURCES Miramar**

### **Reservoir Alternative**

Refer to Section 6.4, Biological Resources, for specific impact summary tables for the Miramar Reservoir Alternative.

**MM-BIO-3 Nesting Birds.** To avoid any direct impacts any species identified as a candidate, sensitive, or special status species in the MSCP or other local or regional plans, policies or regulations, or by CDFW or USFWS, removal of habitat that supports active nests in the proposed area of disturbance should occur outside of the breeding season for these species (February 1 to September 15). If removal of habitat in the proposed area of disturbance must occur during the breeding season, the Qualified Biologist shall conduct a pre-construction survey to determine the presence or absence of nesting birds on the proposed area of disturbance. The pre-construction survey shall be conducted within 10 calendar days prior to the start of construction activities (including removal of vegetation). The applicant shall submit the results

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of the pre-construction survey to the City's Development Services Department for review and approval prior to initiating any construction activities. If nesting birds are detected, a letter report or mitigation plan in conformance with the City's Biology Guidelines and applicable State and Federal Law (i.e. appropriate follow up surveys, monitoring schedules, and construction barriers/buffers, etc.) shall be prepared and include proposed measures to be implemented to ensure that take of birds or eggs is avoided. The report or mitigation plan shall be submitted to the City for review and approval and implemented to the satisfaction of the City. The City's MMC Section and Biologist shall verify and approve that all measures identified in the report or mitigation plan are in place prior to and/or during construction.

**MM-BIO-4a Coastal California Gnatcatcher.** Prior to the preconstruction meeting, the Assistant Deputy Director (ADD) or MMC shall verify that the MHPA boundaries and the Project requirements regarding the coastal California gnatcatcher, as specified below, are shown on the construction plans.

No clearing, grubbing, grading, or other construction activities shall occur during the coastal California gnatcatcher breeding season (March 1 to August 15), until the following requirements have been met to the satisfaction of the ADD/MMC:

1. A Qualified Biologist (possessing a valid Endangered Species Act Section 10(a)(1)(a) Recovery Permit) shall survey those habitat areas within the MHPA that would be subject to construction noise levels exceeding 60 decibels [dB(A)] hourly average for the presence of the coastal California gnatcatcher. Surveys for coastal California gnatcatcher shall be conducted pursuant to the protocol survey guidelines established by the USFWS within the breeding season prior to the commencement of any construction. If coastal California gnatcatchers are present, then the following conditions must be met:
  - a. Between March 1 and August 15, no clearing, grubbing, or grading of occupied coastal California gnatcatcher habitat shall be permitted. Areas restricted from such activities shall be staked or fenced under the supervision of a Qualified Biologist; and
  - b. Between March 1 and August 15, no construction activities shall occur within any portion of the site where construction activities would result in noise levels exceeding 60 dB(A) hourly average at

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the edge of occupied coastal California gnatcatcher habitat. An analysis showing that noise generated by construction activities would not exceed 60 dB(A) hourly average at the edge of occupied habitat must be completed by a Qualified Acoustician (possessing current noise engineer license or registration with monitoring noise level experience with listed animal species) and approved by the ADD/MMC at least 2 weeks prior to the commencement of construction activities. Prior to the commencement of construction activities during the breeding season, areas restricted from such activities shall be staked or fenced under the supervision of a Qualified Biologist; or

- c. At least 2 weeks prior to the commencement of construction activities, under the direction of a Qualified Acoustician, noise attenuation measures (e.g., berms, walls) shall be implemented to ensure that noise levels resulting from construction activities would not exceed 60 dB(A) hourly average at the edge of habitat occupied by the coastal California gnatcatcher. Concurrent with the commencement of construction activities and the construction of necessary noise attenuation facilities, noise monitoring shall be conducted at the edge of the occupied habitat area to ensure that noise levels do not exceed 60 dB(A) hourly average. If the noise attenuation techniques implemented are determined to be inadequate by the Qualified Acoustician or Biologist, then the associated construction activities shall cease until such time that adequate noise attenuation is achieved or until the end of the breeding season (August 16). Construction noise monitoring shall continue to be monitored at least twice weekly on varying days, or more frequently depending on the construction activity, to verify that noise levels at the edge of occupied habitat are maintained below 60 dB(A) hourly average or to the ambient noise level if it already exceeds 60 dB(A) hourly average. If not, other measures shall be implemented in consultation with the biologist and the ADD/MMC, as necessary, to reduce noise levels to below 60 dB(A) hourly average or to the ambient noise level if it already exceeds 60 dB(A) hourly average. Such measures may include, but are not limited to, limitations on the placement of construction equipment and the simultaneous use of equipment.

2. If coastal California gnatcatchers are not detected during the protocol survey, the Qualified Biologist shall submit substantial evidence to the



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ADD/MMC and applicable resource agencies which demonstrates whether or not mitigation measures such as noise walls are necessary between March 1 and August 15 as follows:

- a. If this evidence indicates that the potential is high for coastal California gnatcatcher to be present based on historical records or site conditions, then Condition 1(a) shall be adhered to as specified above.
- b. If this evidence concludes that no impacts to this species are anticipated, no mitigation measures would be necessary.

**MM-BIO-4b Coastal California Gnatcatcher.** Ambient noise levels on MCAS Miramar, in particular in the vicinity of the airfield, exceed typical construction noise level. On MCAS Miramar, construction noise levels are not anticipated to exceed ambient noise levels. Potential impacts associated with construction activities on MCAS Miramar would be mitigated through the following:

1. Qualified Biologist (possessing a valid federal Endangered Species Act (FESA) Section 10(a)(1)(a) Recovery Permit) shall conduct a pre-construction survey within suitable habitat. Between February 15 and August 31, no clearing, grubbing, or grading of occupied coastal California gnatcatcher habitat shall be permitted. Areas restricted from such activities shall be staked or fenced under the supervision of a Qualified Biologist; and
2. For potential impacts associated with construction noise, presence or absence of coastal California gnatcatcher would be determined by pre-construction surveys conducted by a Qualified Biologist adjacent to the Project area. Coastal sage scrub outside of the impact area would be flagged to protect it from construction equipment as directed by the Project Biologist. Between February 15 and August 31, no noise-generating construction activities that exceed ambient noise levels would occur in close proximity to occupied habitat. If necessary, other measures shall be implemented in consultation with the Project Biologist as necessary, to reduce noise levels. Measures may include, but are not limited to, limitations on the placement of construction equipment and the simultaneous use of equipment.

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## ***Introduction to MM-BIO-9***

Mitigation measure MM-BIO-9 will be included in the design and construction documents for each Project component and will reduce the potential for short-term and long-term indirect impacts to sensitive vegetation communities. A biological monitor will be present during construction within or adjacent to sensitive resources and would ensure that the Project adheres to and implements the appropriate measures to protect sensitive resources.

**MM-BIO-9** The following measures will be included in the design and construction documents for each Project component to reduce potential impacts to sensitive resources:

- a. **Qualified Biologist.** The owner/permittee shall provide a letter to the City's Mitigation Monitoring Coordination (MMC) section stating that a Project Biologist (Qualified Biologist) as defined in the City of San Diego Municipal Code, Land Development Code—Biology Guidelines (City of San Diego 2012), has been retained to implement the Project's biological monitoring program. The letter shall include the names and contact information of all persons involved in the biological monitoring of the Project.
- b. **Preconstruction Meeting.** The Qualified Biologist shall attend the preconstruction meeting, discuss the Project's biological monitoring program, and arrange to perform any follow up mitigation measures and reporting including site-specific monitoring, restoration or revegetation, and additional fauna/flora surveys/salvage.
- c. **Documentation.** The Qualified Biologist shall submit all required documentation to MMC verifying that any special mitigation reports including but not limited to, maps, plans, surveys, survey timelines, or buffers are completed or scheduled per City Biology Guidelines, Multiple Species Conservation Program (MSCP), Environmentally Sensitive Lands Ordinance, project permit conditions; California Environmental Quality Act (CEQA); National Environmental Policy Act (NEPA); endangered species acts (federal Endangered Species Act and California Endangered Species Act); and/or other local, state or federal requirements.
- d. **Biological Construction Mitigation/Monitoring Exhibit.** The Qualified Biologist shall present a Biological Construction

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Mitigation/Monitoring Exhibit (BCME), which includes the biological documents above. In addition, the BCME would include restoration/revegetation plans, plant salvage/relocation requirements (e.g., burrowing owl exclusions, etc.), avian or other wildlife surveys/survey schedules (including general avian nesting and U.S. Fish and Wildlife (USFWS) protocol), timing of surveys, wetland buffers, avian construction avoidance areas/noise buffers/barriers, other impact avoidance areas, and any subsequent requirements determined by the Qualified Biologist and the City Assistant Deputy Director (ADD)/MMC. The BCME shall include a site plan, written and graphic depiction of the Project's biological mitigation/monitoring program, and a schedule. The BCME shall be approved by MMC and referenced in the construction documents.

- e. **Construction Fencing.** Prior to construction activities, the Qualified Biologist shall supervise the placement of orange construction fencing or equivalent along the limits of disturbance adjacent to sensitive biological habitats and verify compliance with any other project conditions as shown on the BCME. This phase shall include flagging plant specimens and delineating buffers to protect sensitive biological resources (e.g., habitats/flora and fauna species, including nesting birds) during construction. Appropriate steps/care should be taken to minimize attraction of nest predators to the site.
- f. **On-site Education.** Prior to commencement of construction activities, the Qualified Biologist shall meet with the owner/permittee or designee and the construction crew and conduct an on-site educational session regarding the need to avoid impacts outside of the approved construction area and to protect sensitive flora and fauna (e.g., explain the avian and wetland buffers, flag system for removal of invasive species or retention of sensitive plants, and clarify acceptable access routes/methods and staging areas).
- g. **Biological Monitoring.** During construction, a Qualified Biologist would be present to assist in the avoidance of impacts to native vegetation, jurisdictional aquatic resources, sensitive plants and wildlife, and nesting birds. Specific biological monitoring and or mitigation measures for sensitive wildlife, sensitive vegetation communities, and jurisdictional aquatic resources are described further in the mitigation measures.

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j. **Best Management Practices/Erosion/Runoff.** The City will incorporate methods to control runoff, including a Stormwater Pollution Prevention Plan (SWPPP) to meet National Pollutant Discharge Elimination System (NPDES) regulations or batch discharge permit from the City. Implementation of stormwater regulations are expected to substantially control adverse edge effects (e.g., erosion, sedimentation, habitat conversion) during and following construction both adjacent and downstream from the study area. Typical construction Best Management Practices (BMPs) specifically related to reducing impacts from dust, erosion, and runoff generated by construction activities would be implemented. During construction, material stockpiles shall be placed such that they cause minimal interference with on-site drainage patterns. This will protect sensitive vegetation from being inundated with sediment-laden runoff. Dewatering shall be conducted in accordance with standard regulations of the Regional Water Quality Control Board (RWQCB). An NPDES permit, issued by RWQCB to discharge water from dewatering activities, shall be required prior to start of dewatering. This will minimize erosion, siltation, and pollution within sensitive communities. Design of drainage facilities shall incorporate long-term control of pollutants and stormwater flow to minimize pollution and hydrologic changes.

k. **Toxics/Project Staging Areas/Equipment Storage.** Projects that use chemicals or generate by-products such as pesticides, herbicides, and animal waste, and other substances that are potentially toxic or impactive to native habitats/flora/fauna (including water) shall incorporate measures to reduce impacts caused by the application and/or drainage of such materials into the MHPA. No trash, oil, parking, or other construction/development-related material/activities shall be allowed outside any approved construction limits. Where applicable, this requirement shall be incorporated into leases on publicly owned property when applications for renewal occur. Provide a note in/on the CDs that states: "All construction-related activity that may have potential for leakage or intrusion shall be monitored by the Qualified Biologist/Owners Representative or Resident Engineer to ensure there is no impact to the MHPA."

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## HEALTH AND SAFETY/HAZARDS Miramar

### Reservoir Alternative

Potential impacts due to hazardous materials release would be reduced by implementation of the following mitigation measures:

**MM-HAZ-1** A Construction Fire Prevention/Protection Plan shall be prepared by the City of San Diego or its contractors prior to construction of the North City Project, as determined necessary by the City of San Diego. Construction within or immediately adjacent to areas of dense foliage during periods of low humidity and/or high winds (Red Flag Warning periods) shall be prohibited. During all other non-Red Flag Warning periods, necessary brush fire prevention and management practices shall be incorporated and shall address common construction-related ignition prevention and hot-works (any spark-, heat-, or flame-producing activity) policies, as well as necessary fire prevention equipment to be on site during all construction activities. Details of the Construction Fire Prevention/Protection Plan shall be determined as site plans for each component are finalized to the satisfaction of the City of San Diego Fire Marshal. Plans shall also contain fire safety information to be disseminated to construction crews during regular safety meetings. Fire prevention techniques shall be applied during construction as deemed necessary by the City of San Diego Fire Marshal based on the vegetation (fuels) within the site and surrounding areas.

**MM-HAZ-2** A Hazardous Materials Reporting Form shall be prepared, as determined necessary by the City of San Diego, and a Hazardous Materials Review conducted by the Development Services Department for each North City Project component in compliance with the City of San Diego's Information Bulletin 116.

**MM-HAZ-3** A Spill Prevention and Emergency Response Plan shall be completed, as determined necessary by the City of San Diego, for each North City Project component which includes on-site storage of hazardous materials (i.e., Morena Pump Station, NCWRP Expansion, North City Renewable Energy Facility, NCPWF, and Dechlorination Facility) prior to the commencement of operation. Other safety programs, including a worker safety program, fire response program, a plant safety program, and the facility's standard operating procedures, shall be developed addressing hazardous materials storage locations, emergency response procedures, employee training

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requirements, hazard recognition, fire safety, first aid/emergency medical procedures, hazard communication training, and release reporting requirements.

## **HISTORICAL RESOURCES Miramar**

### **Reservoir Alternative**

The mitigation measures (MMs) provided in this section have been designed to fulfill the requirements of Section 106 of the National Historic Preservation Act, the CEQA Guidelines, and the City of San Diego Historic Resource Guidelines. The City of San Diego will be the lead agency implementing cultural resource mitigation measures and will provide information to the Bureau of Reclamation for their ongoing Section 106 oversight and consultation obligations.

**MM-HIS-3** To reduce potential impacts to unknown archaeological resources and/or grave sites during construction of all Project components (i.e., Components Common to the Project Alternatives, Miramar Reservoir Alternative, and San Vicente Reservoir Alternative) the following measures shall be implemented:

#### **I. Prior to Permit Issuance or Bid Opening/Bid Award**

##### **A. Entitlements Plan Check**

1. Prior to permit issuance or bid opening/bid award, whichever is applicable, the Assistant Deputy Director (ADD) environmental designee shall verify that the requirements for archaeological monitoring and Native American monitoring have been noted on the applicable construction documents through the plan check process.

##### **B. Letters of Qualification have been submitted to ADD**

1. Prior to bid award, the applicant shall submit a letter of verification to Mitigation Monitoring Coordinator (MMC) identifying the Principal Investigator (PI) for the Project and the names of all persons involved in the archaeological monitoring program, as defined in the City Historical Resources Guidelines (HRG). If applicable, individuals involved in the archaeological monitoring program must have completed the 40-hour HAZWOPER training with certification documentation.
2. MMC will provide a letter to the applicant confirming the qualifications of the PI and all persons involved in the archaeological

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monitoring of the Project meet the qualifications established in the City Historical Resources Guidelines.

3. Prior to the start of work, the applicant must obtain written approval from MMC for any personnel changes associated with the monitoring program.

## **II. Prior to Start of Construction**

### **A. Verification of Records Search**

1. The PI shall provide verification to MMC that a site-specific records search (0.25-mile radius) has been completed. Verification includes, but is not limited to a copy of a confirmation letter from South Coastal Information Center, or, if the search was in-house, a letter of verification from the PI stating that the search was completed.
2. The letter shall introduce any pertinent information concerning expectations and probabilities of discovery during trenching and/or grading activities.
3. The PI may submit a detailed letter to MMC requesting a reduction to the 0.25-mile radius.

### **B. PI Shall Attend Preconstruction Meetings**

1. Prior to beginning any work that requires monitoring, the applicant shall arrange a Preconstruction Meeting that shall include the PI, Native American consultant/monitor (where Native American resources may be impacted), Construction Manager (CM), Grading Contractor, Resident Engineer (RE), Building Inspector (BI), if appropriate, and MMC. The qualified archaeologist and Native American monitor shall attend any grading/excavation related Preconstruction Meetings to make comments and/or suggestions concerning the archaeological monitoring program with the CM and/or Grading Contractor.
  - a. If the PI is unable to attend the Preconstruction Meeting, the applicant shall schedule a focused Preconstruction Meeting with MMC, the PI, RE, CM, if appropriate, prior to the start of any work that requires monitoring.
2. Acknowledgment of Responsibility for Curation (Capital Improvement Program or Other Public Projects)

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The applicant shall submit a letter to MMC acknowledging their responsibility for the cost of curation associated with all phases of the archaeological monitoring program.

3. Identify Areas to be Monitored

- a. Prior to the start of any work that requires monitoring, the PI shall submit an Archaeological Monitoring Exhibit (AME) (with verification that the AME has been reviewed and approved by the Native American consultant/monitor when Native American resources may be impacted) based on the appropriate construction documents (reduced to 11×17) to MMC identifying the areas to be monitored, including the delineation of grading/excavation limits.
- b. The AME shall be based on the results of a site-specific records search as well as information regarding the age of existing pipelines, laterals and associated appurtenances, and/or any known soil conditions (native or formation).
- c. MMC shall notify the PI that the AME has been approved.

4. When Monitoring Will Occur

- a. Prior to the start of any work, the PI shall also submit a construction schedule to MMC through the RE indicating when and where monitoring will occur.
- b. The PI may submit a detailed letter to MMC prior to the start of work or during construction requesting a modification to the monitoring program. This request shall be based on relevant information such as review of final construction documents which indicate conditions such as age of existing pipe to be replaced, depth of excavation and/or site graded to bedrock, etc., which may reduce or increase the potential for resources to be present.

5. Approval of AME and Construction Schedule

After approval of the AME by MMC, the PI shall submit to MMC written authorization of the AME and Construction Schedule from the CM.



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### III. During Construction

#### A. Monitor Shall be Present During Grading/Excavation/Trenching

1. The Archaeological Monitor shall be present full-time during all soil-disturbing and grading/excavation/trenching activities that could result in impacts to archaeological resources as identified on the AME. **The CM is responsible for notifying the RE, PI, and MMC of changes to any construction activities such as in the case of a potential safety concern within the area being monitored. In certain circumstances Occupational Safety and Health Administration safety requirements may necessitate modification of the AME.**
2. The Native American consultant/monitor shall determine the extent of their presence during soil-disturbing and grading/excavation/trenching activities based on the AME and provide that information to the PI and MMC. If prehistoric resources are encountered during the Native American consultant/monitor's absence, work shall stop, and the Discovery Notification Process detailed in Section III.B–III.C and IV.A–IV.D shall commence.
3. The PI may submit a detailed letter to MMC during construction requesting a modification to the monitoring program when a field condition such as modern disturbance post-dating the previous grading/trenching activities, presence of fossil formations, or when native soils are encountered that may reduce or increase the potential for resources to be present.
4. The archaeological and Native American consultant/monitor shall document field activity via the Consultant Site Visit Records. The Consultant Site Visit Records shall be emailed by the CM to the RE the first day of monitoring, the last day of monitoring, monthly (Notification of Monitoring Completion), and in the case of ANY discoveries. The RE shall forward copies to MMC.

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## B. Discovery Notification Process

1. In the event of a discovery, the Archaeological Monitor shall direct the contractor to temporarily divert all soil-disturbing activities, including but not limited to digging, trenching, excavating, or grading activities in the area of discovery and in the area reasonably suspected to overlay adjacent resources and immediately notify the RE or CM, as appropriate.
2. The Archaeological Monitor shall immediately notify the PI (unless monitor is the PI) of the discovery.
3. The PI shall immediately notify MMC by phone of the discovery, and shall also submit written documentation to MMC within 24 hours by email with photos of the resource in context, if possible.
4. No soil shall be exported off site until a determination can be made regarding the significance of the resource specifically if Native American resources are encountered.

## C. Determination of Significance

1. The PI and Native American consultant/monitor, where Native American resources are discovered shall evaluate the significance of the resource. If Human Remains are involved, follow protocol in Section IV below.
  - a. The PI shall immediately notify MMC by phone to discuss significance determination and shall also submit a letter to MMC indicating whether additional mitigation is required.
  - b. If the resource is significant, the PI shall submit an Archaeological Data Recovery Program (ADRP) and obtain written approval of the program from MMC, CM, and RE. The ADRP and any mitigation must be approved by MMC, RE, and/or CM before ground-disturbing activities in the area of discovery will be allowed to resume. **Note: If a unique archaeological site is also an historical resource as defined in CEQA Guidelines Section 15064.5, then the limits on the amount(s) that a Project applicant may be required to pay to cover mitigation costs as indicated in CEQA Section 21083.2 shall not apply.****
- (1) Note: For pipeline trenching and other linear projects in the public Right-of-Way, the PI shall implement the

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Discovery Process for Pipeline Trenching projects identified below under "D."

- c. If the resource is not significant, the PI shall submit a letter to MMC indicating that artifacts will be collected, curated, and documented in the Final Monitoring Report. The letter shall also indicate that that no further work is required.
  - (1) Note: For pipeline trenching and other linear projects in the public right-of-way, if the deposit is limited in size, both in length and depth; the information value is limited and is not associated with any other resource; and there are no unique features/artifacts associated with the deposit, the discovery should be considered not significant.
  - (2) Note: For pipeline trenching and other linear projects in the public right-of-way, if significance cannot be determined, the Final Monitoring Report and Site Record (DPR Form 523A/B) shall identify the discovery as potentially significant.

D. Discovery Process for Significant Resources – Pipeline Trenching and Other Linear Projects in the Public Right-of-Way

The following procedure constitutes adequate mitigation of a significant discovery encountered during pipeline trenching activities or for other linear project types within the public right-of-way, including but not limited to excavation for jacking pits, receiving pits, laterals, and manholes to reduce impacts to below a level of significance:

- 1. Procedures for documentation, curation, and reporting
  - a. One hundred percent (100%) of the artifacts within the trench alignment and width shall be documented in situ, to include photographic records, plan view of the trench and profiles of side walls, recovered, photographed after cleaning and analyzed and curated. The remainder of the deposit within the limits of excavation (trench walls) shall be left intact.
  - b. The PI shall prepare a Draft Monitoring Report and submit to MMC via the RE as indicated in Section VI-A.
  - c. The PI shall be responsible for recording (on the appropriate State of California Department of Parks and Recreation forms

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DPR 523 A/B) the resource(s) encountered during the Archaeological Monitoring Program in accordance with the City's HRG. The DPR forms shall be submitted to the South Coastal Information Center for either a Primary Record or SDI Number and included in the Final Monitoring Report.

- d. The Final Monitoring Report shall include a recommendation for monitoring of any future work in the vicinity of the resource.

#### **IV. Discovery of Human Remains**

If human remains are discovered, work shall halt in that area, and no soil shall be exported off site until a determination can be made regarding the provenance of the human remains; and the following procedures as set forth in CEQA Guidelines Section 15064.5(e), the California Public Resources Code Section 5097.98, and the California Health and Safety Code Section 7050.5, shall be undertaken:

##### **A. Notification**

1. Archaeological Monitor shall notify the RE or CM as appropriate, MMC, and the PI, if the monitor is not qualified as a PI. MMC will notify the appropriate Senior Planner in the Environmental Analysis Section of the Development Services Department to assist with the discovery notification process.
2. The PI shall notify the Medical Examiner after consultation with the RE, either in person or via telephone.

##### **B. Isolate discovery site**

1. Work shall be directed away from the location of the discovery and any nearby area reasonably suspected to overlay adjacent human remains until a determination can be made by the Medical Examiner in consultation with the PI concerning the provenience of the remains.
2. The Medical Examiner, in consultation with the PI, will determine the need for a field examination to determine the provenience.
3. If a field examination is not warranted, the Medical Examiner will determine with input from the PI, if the remains are or are most likely to be of Native American origin.

##### **C. If human remains are determined to be Native American**

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1. The Medical Examiner will notify the Native American Heritage Commission (NAHC) within 24 hours. By law, only the Medical Examiner can make this call.
  2. NAHC will immediately identify the person or persons determined to be the Most Likely Descendant (MLD) and provide contact information.
  3. The MLD will contact the PI within 24 hours or sooner after the Medical Examiner has completed coordination, to begin the consultation process in accordance with CEQA Guidelines Section 15064.5(e) and the California Public Resources and Health and Safety Codes.
  4. The MLD will have 48 hours to make recommendations to the property owner or representative, for the treatment or disposition with proper dignity, of the human remains and associated grave goods.
  5. Disposition of Native American human remains will be determined between the MLD and the PI, and, if:
    - a. The NAHC is unable to identify the MLD, OR the MLD failed to make a recommendation within 48 hours after being notified by the Commission, OR
    - b. The landowner or authorized representative rejects the recommendation of the MLD and mediation in accordance with California Public Resources Code Section 5097.94(k), by the NAHC fails to provide measures acceptable to the landowner, THEN
    - c. To protect these sites, the landowner shall do one or more of the following:
      - (1) Record the site with the NAHC,
      - (2) Record an open space or conservation easement, or
      - (3) Record a document with the County.
    - d. Upon the discovery of multiple Native American human remains during a ground-disturbing land development activity, the landowner may agree that additional conferral with descendants is necessary to consider culturally appropriate treatment of multiple Native American human remains. Culturally appropriate treatment of such a discovery may be ascertained from review of the site

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utilizing cultural and archaeological standards. Where the parties are unable to agree on the appropriate treatment measures, the human remains and items associated and buried with Native American human remains shall be reinterred with appropriate dignity, pursuant to Section 5.c.

D. If human remains are not Native American

1. The PI shall contact the Medical Examiner and notify them of the historic era context of the burial.
2. The Medical Examiner will determine the appropriate course of action with the PI and City staff (California Public Resources Code, Section 5097.98).
3. If the remains are of historic origin, they shall be appropriately removed and conveyed to the San Diego Museum of Man for analysis. The decision for internment of the human remains shall be made in consultation with MMC, Environmental Analysis Section, the applicant/landowner, any known descendant group, and the San Diego Museum of Man.

**V. Night and/or Weekend Work**

A. If night and/or weekend work is included in the contract

1. When night and/or weekend work is included in the contract package, the extent and timing shall be presented and discussed at the Preconstruction Meeting.
2. The following procedures shall be followed.

a. No Discoveries

In the event that no discoveries were encountered during night and/or weekend work, the PI shall record the information on the Consultant Site Visit Record and submit to MMC by email by 8 a.m. of the next businessday.

b. Discoveries

All discoveries shall be processed and documented using the existing procedures detailed in Sections III – During Construction, and IV – Discovery of Human Remains. Discovery of human remains shall always be treated as a significant discovery.

c. Potentially Significant Discoveries

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If the PI determines that a potentially significant discovery has been made, the procedures detailed under Section III – During Construction and IV – Discovery of Human Remains shall be followed.

- d. The PI shall immediately contact the RE and MMC, or by 8 a.m. of the next business day to report and discuss the findings as indicated in Section III-B, unless other specific arrangements have been made.
- B. If night and/or weekend work becomes necessary during the course of construction
1. The CM shall notify the RE, as appropriate, a minimum of 24 hours before the work is to begin.
  2. The RE, or CM, as appropriate, shall notify MMC immediately.
- C. All other procedures described above shall apply, as appropriate.

## **VI. Post Construction**

- A. Submittal of Draft Monitoring Report
1. The PI shall submit two copies of the Draft Monitoring Report (even if negative), prepared in accordance with the HRG (Appendix C/D) that describes the results, analysis, and conclusions of all phases of the Archaeological Monitoring Program (with appropriate graphics) to MMC via the RE for review and approval within 90 days following the completion of monitoring. **It should be noted that if the PI is unable to submit the Draft Monitoring Report within the allotted 90-day time frame as a result of delays with analysis, special study results or other complex issues, a schedule shall be submitted to MMC establishing agreed due dates and the provision for submittal of monthly status reports until this measure can be met.**
    - a. For significant archaeological resources encountered during monitoring, the ADRP or Pipeline Trenching Discovery Process shall be included in the Draft Monitoring Report.
    - b. Recording Sites with State of California Department of Parks and Recreation

The PI shall be responsible for recording (on the appropriate State of California Department of Parks and Recreation forms DPR 523 A/B) any significant or potentially significant

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resources encountered during the Archaeological Monitoring Program in accordance with the City's HRG, and submittal of such forms to the South Coastal Information Center with the Final Monitoring Report.

2. MMC shall return the Draft Monitoring Report to the PI via the RE for revision or for preparation of the Final Report.
3. The PI shall submit revised Draft Monitoring Report to MMC via the RE for approval.
4. MMC shall provide written verification to the PI of the approved report.
5. MMC shall notify the RE or CM, as appropriate, of receipt of all Draft Monitoring Report submittals and approvals.

B. Handling of Artifacts

1. The PI shall be responsible for ensuring that all cultural remains collected are cleaned and catalogued
2. The PI shall be responsible for ensuring that all artifacts are analyzed to identify function and chronology as they relate to the history of the area; that faunal material is identified as to species; and that specialty studies are completed, as appropriate.

C. Curation of Artifacts: Accession Agreement and Acceptance Verification

1. The PI shall be responsible for ensuring that all artifacts associated with the survey, testing and/or data recovery for this project are permanently curated with an appropriate institution. This shall be completed in consultation with MMC and the Native American representative, as applicable.
2. When applicable to the situation, the PI shall include written verification from the Native American consultant/monitor indicating that Native American resources were treated in accordance with state law and/or applicable agreements. If the resources were reinterred, verification shall be provided to show what protective measures were taken to ensure no further disturbance occurs in accordance with Section IV – Discovery of Human Remains, Subsection C.



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3. The PI shall submit the Accession Agreement and catalogue record(s) to the RE or CM, as appropriate for donor signature with a copy submitted to MMC.
  4. The RE or CM, as appropriate shall obtain signature on the Accession Agreement and shall return to PI with copy submitted to MMC.
  5. The PI shall include the Acceptance Verification from the curation institution in the Final Monitoring Report submitted to the RE or CM and MMC.
- D. Final Monitoring Report(s)
1. The PI shall submit one copy of the approved Final Monitoring Report to the RE or CM as appropriate, and one copy to MMC (even if negative), within 90 days after notification from MMC of the approved report.
  2. The RE shall in no case issue the Notice of Completion until receiving a copy of the approved Final Monitoring Report from MMC which includes the Acceptance Verification from the curation institution.

## **NOISE**

### **Miramar Reservoir Alternative**

Potential impacts due to construction noise would be reduced by implementation of the following mitigation measures:

**MM-NOI-4** A noise and vibration study shall be conducted during the final design phase for the NCPWF Influent Pump Station, Morena Pump Station, North City Pump Station, North City Renewable Energy Facility (both Project Alternatives), and the Mission Trails Booster Station (San Vicente Reservoir Alternative only). Pump station machinery and/or generators shall be housed within concrete structures with acoustically absorptive treatments where necessary, and additional measures such as sound enclosures, separate rooms for high noise equipment, etc. shall be incorporated into the final project design as necessary to assure that noise and vibration produced by operation of the facility shall not exceed the applicable limits in the municipal code.

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## **PALEONTOLOGICAL RESOURCES Miramar**

### **Reservoir Alternative**

Potential impacts paleontological resources would be reduced by implementation of the following mitigation measure:

**MM-PALEO-1** If construction of a project would occur within a formation with a moderate to high resource potential, monitoring during construction would be required, and a paleontological resources mitigation program consisting of the following components shall be implemented:

#### **I. Prior to Permit Issuance or Bid Opening/Bid Award**

##### **A. Entitlements Plan Check**

1. Prior to permit issuance or Bid Opening/Bid Award, whichever is applicable, the Assistant Deputy Director (ADD) Environmental designee shall verify that the requirements for Paleontological Monitoring have been noted on the appropriate construction documents.

##### **B. Letters of Qualification have been submitted to ADD**

1. Prior to Bid Award, the applicant shall submit a letter of verification to Mitigation Monitoring Coordinator (MMC) identifying the Principal Investigator (PI) for the Project and the names of all persons involved in the paleontological monitoring program, as defined in the City of San Diego Paleontology Guidelines.
2. MMC will provide a letter to the applicant confirming the qualifications of the PI and all persons involved in the paleontological monitoring of the Project.
3. Prior to the start of work, the applicant shall obtain approval from MMC for any personnel changes associated with the monitoring program.

#### **II. Prior to Start of Construction**

##### **A. Verification of Records Search**

1. The PI shall provide verification to MMC that a site-specific records search has been completed. Verification includes, but is not limited

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to, a copy of a confirmation letter from San Diego Natural History Museum, other institution or, if the search was in-house, a letter of verification from the PI stating that the search was completed.

2. The letter shall introduce any pertinent information concerning expectations and probabilities of discovery during trenching and/or grading activities.

**B. PI Shall Attend Precon Meetings**

1. Prior to beginning any work that requires monitoring, the applicant shall arrange a Precon Meeting that shall include the PI, Construction Manager (CM), Grading Contractor, Resident Engineer (RE), Building Inspector (BI), if appropriate, and MMC. The qualified paleontologist shall attend any grading/excavation related Precon Meetings to make comments and/or suggestions concerning the Paleontological Monitoring program with the Construction Manager and/or Grading Contractor.
  - a. If the PI is unable to attend the Precon Meeting, the applicant shall schedule a focused Precon Meeting with MMC, the PI, RE, CM or BI, if appropriate, prior to the start of any work that requires monitoring.
2. Acknowledgement of Responsibility for Curation (CIP or Other Public Projects)

The applicant shall submit a letter to MMC acknowledging their responsibility for the cost of curation associated with all phases of the paleontological monitoring program.

3. Identify Areas to be Monitored
  - a. Prior to the start of any work that requires monitoring, the PI shall submit a Paleontological Monitoring Exhibit (PME) based on the appropriate construction documents (reduced to 11x17) to MMC for approval identifying the areas to be monitored including the delineation of grading/excavation limits. Monitoring shall begin at depths below 10 feet from existing grade or as determined by the PI in consultation with MMC. The determination shall be based on site-specific records search data which supports monitoring at depths less than 10 feet.

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- b. The PME shall be based on the results of a site-specific records search as well as information regarding existing known soil conditions (native or formation).
  - c. MMC shall notify the PI that the PME has been approved.
4. When Monitoring Will Occur
- a. Prior to the start of any work, the PI shall also submit a construction schedule to MMC through the RE indicating when and where monitoring will occur.
  - b. The PI may submit a detailed letter to MMC prior to the start of work or during construction requesting a modification to the monitoring program. This request shall be based on relevant information such as review of final construction documents which indicate conditions such as depth of excavation and/or site graded to bedrock, presence or absence of fossil resources, etc., which may reduce or increase the potential for resources to be present.

5. Approval of PME and Construction Schedule

After approval of the PME by MMC, the PI shall submit to MMC written authorization of the PME and Construction Schedule from the CM.

### **III. During Construction**

A. Monitor Shall be Present During Grading/Excavation/Trenching

- 1. The monitor shall be present full-time during grading/excavation/trenching activities including, but not limited to mainline, laterals, jacking and receiving pits, services and all other appurtenances associated with underground utilities as identified on the PME that could result in impacts to formations with high and/or moderate resource sensitivity. The Construction Manager is responsible for notifying the RE, PI, and MMC of changes to any construction activities such as in the case of a potential safety concern within the area being monitored. In certain circumstances Occupational Safety and Health Administration safety requirements may necessitate modification of the PME.

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2. The PI may submit a detailed letter to MMC during construction requesting a modification to the monitoring program when a field condition such as trenching activities that do not encounter formational soils as previously assumed, and/or when unique/unusual fossils are encountered, which may reduce or increase the potential for resources to be present.
  3. The monitor shall document field activity via the Consultant Site Visit Record (CSVR). The CSVR shall be emailed by the CM to the RE the first day of monitoring, the last day of monitoring, monthly (Notification of Monitoring Completion), and in the case of ANY discoveries. The RE shall forward copies to MMC.

B. Discovery Notification Process

1. In the event of a discovery, the Paleontological Monitor shall direct the contractor to temporarily divert trenching activities in the area of discovery and immediately notify the RE or CM, as appropriate.
2. The Monitor shall immediately notify the PI (unless Monitor is the PI) of the discovery.
3. The PI shall immediately notify MMC by phone of the discovery, and shall also submit written documentation to MMC within 24 hours by email with photos of the resource in context, if possible.

C. Determination of Significance

1. The PI shall evaluate the significance of the resource.
  - a. The PI shall immediately notify MMC by phone to discuss significance determination and shall also submit a letter to MMC indicating whether additional mitigation is required. The determination of significance for fossil discoveries shall be at the discretion of the PI.
  - b. If the resource is significant, the PI shall submit a Paleontological Recovery Program (PRP) and obtain written approval of the program from MMC, MC and/or RE. PRP and any mitigation must be approved by MMC, RE, and/or CM before ground-disturbing activities in the area of discovery will be allowed to resume.

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- (1) Note: For pipeline trenching projects only, the PI shall implement the Discovery Process for Pipeline Trenching projects identified below under "D."
- c. If resource is not significant (e.g., small pieces of broken common shell fragments or other scattered common fossils) the PI shall notify the RE, or CM as appropriate, that a non-significant discovery has been made. The Paleontologist shall continue to monitor the area without notification to MMC unless a significant resource is encountered.
- d. The PI shall submit a letter to MMC indicating that fossil resources will be collected, curated, and documented in the Final Monitoring Report. The letter shall also indicate that no further work is required.
- (1) Note: For Pipeline Trenching Projects Only. If the fossil discovery is limited in size, both in length and depth; the information value is limited and there are no unique fossil features associated with the discovery area, then the discovery should be considered not significant.
- (2) Note, for Pipeline Trenching Projects Only: If significance can not be determined, the Final Monitoring Report and Site Record shall identify the discovery as Potentially Significant.
- D. Discovery Process for Significant Resources - Pipeline Trenching Projects

The following procedure constitutes adequate mitigation of a significant discovery encountered during pipeline trenching activities including but not limited to excavation for jacking pits, receiving pits, laterals, and manholes to reduce impacts to below a level of significance.

1. Procedures for documentation, curation, and reporting
  - a. One hundred percent (100%) of the fossil resources within the trench alignment and width shall be documented in-situ photographically, drawn in plan view (trench and profiles of side walls), recovered from the trench and photographed after cleaning, then analyzed and curated consistent with Society of Invertebrate Paleontology Standards. The

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remainder of the deposit within the limits of excavation (trench walls) shall be left intact and so documented.

- b. The PI shall prepare a Draft Monitoring Report and submit to MMC via the RE as indicated in Section VI-A.
- c. The PI shall be responsible for recording (on the appropriate forms for the San Diego Natural History Museum) the resource(s) encountered during the Paleontological Monitoring Program in accordance with the City's Paleontological Guidelines (PG). The forms shall be submitted to the San Diego Natural History Museum and included in the Final Monitoring Report.
- d. The Final Monitoring Report shall include a recommendation for monitoring of any future work in the vicinity of the resource.

#### **IV. Night and/or Weekend Work**

- A. If night and/or weekend work is included in the contract
  1. When night and/or weekend work is included in the contract package, the extent and timing shall be presented and discussed at the precon meeting.
  2. The following procedures shall be followed.
    - a. No Discoveries

In the event that no discoveries were encountered during night and/or weekend work, the PI shall record the information on the CSV and submit to MMC via the RE by email by 8 am on the next business day.
    - b. Discoveries

All discoveries shall be processed and documented using the existing procedures detailed in Sections III - During Construction.
    - c. Potentially Significant Discoveries

If the PI determines that a potentially significant discovery has been made, the procedures detailed under Section III - During Construction shall be followed.

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- d. The PI shall immediately contact the RE and MMC, or by 8:00 a.m. on the next business day to report and discuss the findings as indicated in Section III-B, unless other specific arrangements have been made.
- B. If night and/or weekend work becomes necessary during the course of construction
    1. The Construction Manager shall notify the RE, as appropriate, a minimum of 24 hours before the work is to begin.
    2. The RE, or CM, as appropriate, shall notify MMC immediately.
  - C. All other procedures described above shall apply, as appropriate.

## **V. Post Construction**

- A. Preparation and Submittal of Draft Monitoring Report
  1. The PI shall submit two copies of the Draft Monitoring Report (even if negative), prepared in accordance with the PG, which describes the results, analysis, and conclusions of all phases of the Paleontological Monitoring Program (with appropriate graphics) to MMC via the RE for review and approval within 90 days following the completion of monitoring.
    - a. For significant paleontological resources encountered during monitoring, the Paleontological Recovery Program or Pipeline Trenching Discovery Process shall be included in the Draft Monitoring Report.
    - b. Recording Sites with the San Diego Natural History Museum

The PI shall be responsible for recording (on the appropriate forms) any significant or potentially significant fossil resources encountered during the Paleontological Monitoring Program in accordance with the City's PG, and submittal of such forms to the San Diego Natural History Museum with the Final Monitoring Report.
  2. MMC shall return the Draft Monitoring Report to the PI via the RE for revision or for preparation of the Final Report.
  3. The PI shall submit revised Draft Monitoring Report to MMC via the RE for approval.



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4. MMC shall provide written verification to the PI of the approved report.
  5. MMC shall notify the RE or CM, as appropriate, of receipt of all Draft Monitoring Report submittals and approvals.
- B. Handling of Fossil Remains
1. The PI shall be responsible for ensuring that all fossil remains collected are cleaned and catalogued.
- C. Curation of Fossil Remains: Deed of Gift and Acceptance Verification
1. The PI shall be responsible for ensuring that all fossil remains associated with the monitoring for this project are permanently curated with an appropriate institution.
  2. The PI shall submit the Deed of Gift and catalogue record(s) to the RE or CM, as appropriate for donor signature with a copy submitted to MMC.
  3. The RE or CM, as appropriate shall obtain signature on the Deed of Gift and shall return to PI with copy submitted to MMC.
  4. The PI shall include the Acceptance Verification from the curation institution in the Final Monitoring Report submitted to the RE or CM and MMC.
- D. Final Monitoring Report(s)
1. The PI shall submit two copies of the Final Monitoring Report to MMC (even if negative), within 90 days after notification from MMC of the approved report.
  2. The RE shall, in no case, issue the Notice of Completion until receiving a copy of the approved Final Monitoring Report from MMC which includes the Acceptance Verification from the curation institution.

**MITIGATION SUMMARY**

The applicability of mitigation measures to each Project component is outlined below in Table 10-1.

**Table 10-1  
Summary of Mitigation Measures**

Mitigation Measure	Components Common to Project Alternatives								Miramar Reservoir Alternative				San Vicente Reservoir Alternative		
	Morena Pump Station	Morena Pipelines	NCWRP Expansion	NCPWF Influent Pump Station	North City Pump Station	North City Renewable Energy Facility	Landfill Gas Pipeline	MBC Improvements	NCPWF-MR	North City Pipeline	Dechlorination Facility	Miramar Water Treatment Plant Improvements	NCPWF-SVR	San Vicente Pipeline	Mission Trails Booster Station
<i>Air Quality</i>															
MM-AQ-1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MM-AQ-2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MM-AQ-3	X	X	X												
<i>Biological Resources</i>															
MM-BIO-1a					X				X				X	X	X
MM-BIO-1b					X				X				X		
MM-BIO-1c														X	
MM-BIO-2		X					X			X				X	
MM-BIO-3		X	X		X		X	X	X	X	X	X	X	X	X
MM-BIO-4		X	X	X		X	X	X		X				X	
MM-BIO-5														X	
MM-BIO-6	X	X												X	
MM-BIO-7														X	
MM-BIO-8		X			X				X	X			X	X	
MM-BIO-9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>Health and Safety/Hazards</i>															
MM-HAZ-1		X	X		X		X	X	X	X			X	X	X
MM-HAZ-2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MM-HAZ-3	X		X			X			X		X		X		
MM-HAZ-4	X	X								X				X	
MM-HAZ-5		X													
<i>Historical Resources</i>															
MM-HIS-1										X					
MM-HIS-2		X					X			X		X		X	
MM-HIS-3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MM-HIS-4										X					
<i>Noise</i>															
MM-NOI-1		X								X				X	X
MM-NOI-2		X								X				X	X
MM-NOI-3		X								X				X	X
MM-NOI-4	X			X	X	X									X

**Table 10-1  
Summary of Mitigation Measures**

Mitigation Measure	Components Common to Project Alternatives								Miramar Reservoir Alternative				San Vicente Reservoir Alternative		
	Morena Pump Station	Morena Pipelines	NCWRP Expansion	NCPWF Influent Pump Station	North City Pump Station	North City Renewable Energy Facility	Landfill Gas Pipeline	MBC Improvements	NCPWF-MR	North City Pipeline	Dechlorination Facility	Miramar Water Treatment Plant Improvements	NCPWF-SVR	San Vicente Pipeline	Mission Trails Booster Station
<i>Paleontological Resources</i>															
<b>MM-PALEO-1</b>	X		X	X	X	X		X	X		X	X	X	X	X
<i>Public Utilities</i>															
<b>MM-PU-1</b>		X					X			X				X	
<i>Transportation and Traffic</i>															
<b>MM-TRAF-1</b>		X								X				X	

The timing of mitigation, responsible person, and applicable location along the pipeline alignments or within the facility sites are outlined below in Tables 10-2 through 10-15 for each Project component.

**Table 10-9  
Mitigation Measures – Metro Biosolids Center Improvements**

Mitigation Measure	Timing of Mitigation			Responsible Person	Location/Notes
	Pre Const.	During Const.	Post Const.		
MM-AQ-1 (construction BMPs)		X		Construction Manager	Entire site
MM-AQ-2 (construction NO <sub>x</sub> )		X		Construction Manager	Entire site
MM-BIO-3 (Nesting Birds)	X	X		Project Applicant/City of San Diego	Sensitive vegetation within the site
MM-BIO-4 (Coastal California Gnatcatcher)	X	X		City of San Diego	Sensitive vegetation within the site within MCAS Miramar
MM-BIO-9a (Qualified biologist)	X			Owner/Permittee	Sensitive vegetation within the site
MM-BIO-9b (preconstruction meeting)	X			City of San Diego	Sensitive vegetation within the site
MM-BIO-9c (documentation)	X	X	X	Owner/Permittee	Sensitive vegetation within the site
MM-BIO-9d (biological construction mitigation/monitoring exhibit)	X			City of San Diego	Sensitive vegetation within the site
MM-BIO-9e (construction fencing)	X			City of San Diego	Sensitive vegetation within the site
MM-BIO-9f (on-site education)	X			City of San Diego	Sensitive vegetation within the site
MM-BIO-9g (biological monitoring)		X		City of San Diego	Sensitive vegetation within the site
MM-BIO-9j (BMPs/Erosion/Runoff)	X	X	X	City of San Diego	Sensitive vegetation within the site
MM-BIO-9k (Toxics/Project Staging Areas/Equipment Storage)		X	X	Construction manager/owner	Sensitive vegetation within the site
MM-BIO-9l (silt fencing)	X	X		City of San Diego	Vernal pool PW8
MM-BIO-9m (dust)		X		City of San Diego	Vernal pool PW8
MM-BIO-9n (vernal pool biologist)		X		City of San Diego	Vernal pool PW8
MM-BIO-9o (limits of work)		X		City of San Diego	Vernal pool PW8
MM-BIO-9p (equipment staging)		X		City of San Diego	Vernal pool PW8
MM-BIO-9q (grading activities)		X		City of San Diego	Vernal pool PW8
MM-HAZ-1 (construction fire protection plan)	X	X		Construction Contractor/ City of San Diego Fire Marshal	Entire site
MM-HAZ-2 (hazardous material reporting form)			X	City of San Diego	Entire site
MM-HIS-3 (archaeological monitoring)	X	X	X	Principal Investigator (Archaeologist)	Entire site
MM-PALEO-1 (paleontological monitoring)	X	X		City of San Diego	Entire site

**APPENDIX B**  
**FIRE HYDRANT METER PROGRAM**

<b>CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS</b>	<b>NUMBER DI 55.27</b>	<b>DEPARTMENT Water Department</b>
<b>SUBJECT  FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)</b>	<b>PAGE 1 OF 10</b>	<b>EFFECTIVE DATE  October 15, 2002</b>
	<b>SUPERSEDES DI 55.27</b>	<b>DATED April 21, 2000</b>

1. **PURPOSE**

- 1.1 To establish a Departmental policy and procedure for issuance, proper usage and charges for fire hydrant meters.

2. **AUTHORITY**

- 2.1 All authorities and references shall be current versions and revisions.
- 2.2 San Diego Municipal Code (NC) Chapter VI, Article 7, Sections 67.14 and 67.15
- 2.3 Code of Federal Regulations, Safe Drinking Water Act of 1986
- 2.4 California Code of Regulations, Titles 17 and 22
- 2.5 California State Penal Code, Section 498B.0
- 2.6 State of California Water Code, Section 110, 500-6, and 520-23
- 2.7 Water Department Director

**Reference**

- 2.8 State of California Guidance Manual for Cross Connection Programs
- 2.9 American Water Works Association Manual M-14, Recommended Practice for Backflow Prevention
- 2.10 American Water Works Association Standards for Water Meters
- 2.11 U.S.C. Foundation for Cross Connection Control and Hydraulic Research Manual

3. **DEFINITIONS**

- 3.1 **Fire Hydrant Meter:** A portable water meter which is connected to a fire hydrant for the purpose of temporary use. (These meters are sometimes referred to as Construction Meters.)

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- 3.2 **Temporary Water Use:** Water provided to the customer for no longer than twelve (12) months.
- 3.3 **Backflow Preventor:** A Reduced Pressure Principal Assembly connected to the outlet side of a Fire Hydrant Meter.

4. **POLICY**

- 4.1 The Water Department shall collect a deposit from every customer requiring a fire hydrant meter and appurtenances prior to providing the meter and appurtenances (see Section 7.1 regarding the Fees and Deposit Schedule). The deposit is refundable upon the termination of use and return of equipment and appurtenances in good working condition.
- 4.2 Fire hydrant meters will have a 2 ½" swivel connection between the meter and fire hydrant. The meter shall not be connected to the 4" port on the hydrant. All Fire Hydrant Meters issued shall have a Reduced Pressure Principle Assembly (RP) as part of the installation. Spanner wrenches are the only tool allowed to turn on water at the fire hydrant.
- 4.3 The use of private hydrant meters on City hydrants is prohibited, with exceptions as noted below. All private fire hydrant meters are to be phased out of the City of San Diego. All customers who wish to continue to use their own fire hydrant meters must adhere to the following conditions:
  - a. Meters shall meet all City specifications and American Water Works Association (AWWA) standards.
  - b. Customers currently using private fire hydrant meters in the City of San Diego water system will be allowed to continue using the meter under the following conditions:
    - 1. The customer must submit a current certificate of accuracy and calibration results for private meters and private backflows annually to the City of San Diego, Water Department, Meter Shop.

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2. The meter must be properly identifiable with a clearly labeled serial number on the body of the fire hydrant meter. The serial number shall be plainly stamped on the register lid and the main casing. Serial numbers shall be visible from the top of the meter casing and the numbers shall be stamped on the top of the inlet casing flange.
3. All meters shall be locked to the fire hydrant by the Water Department, Meter Section (see Section 4.7).
4. All meters shall be read by the Water Department, Meter Section (see Section 4.7).
5. All meters shall be relocated by the Water Department, Meter Section (see Section 4.7).
6. These meters shall be tested on the anniversary of the original test date and proof of testing will be submitted to the Water Department, Meter Shop, on a yearly basis. If not tested, the meter will not be allowed for use in the City of San Diego.
7. All private fire hydrant meters shall have backflow devices attached when installed.
8. The customer must maintain and repair their own private meters and private backflows.
9. The customer must provide current test and calibration results to the Water Department, Meter Shop after any repairs.
10. When private meters are damaged beyond repair, these private meters will be replaced by City owned fire hydrant meters.



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11. When a private meter malfunctions, the customer will be notified and the meter will be removed by the City and returned to the customer for repairs. Testing and calibration results shall be given to the City prior to any re-installation.
  12. The register shall be hermetically sealed straight reading and shall be readable from the inlet side. Registration shall be in hundred cubic feet.
  13. The outlet shall have a 2 ½ “National Standards Tested (NST) fire hydrant male coupling.
  14. Private fire hydrant meters shall not be transferable from one contracting company to another (i.e. if a company goes out of business or is bought out by another company).
- 4.4 All fire hydrant meters and appurtenances shall be installed, relocated and removed by the City of San Diego, Water Department. All City owned fire hydrant meters and appurtenances shall be maintained by the City of San Diego, Water Department, Meter Services.
- 4.5 If any fire hydrant meter is used in violation of this Department Instruction, the violation will be reported to the Code Compliance Section for investigation and appropriate action. Any customer using a fire hydrant meter in violation of the requirements set forth above is subject to fines or penalties pursuant to the Municipal Code, Section 67.15 and Section 67.37.
- 4.6 **Conditions and Processes for Issuance of a Fire Hydrant Meter**
- Process for Issuance
- a. Fire hydrant meters shall only be used for the following purposes:
    1. Temporary irrigation purposes not to exceed one year.

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2. Construction and maintenance related activities (see Tab 2).
  - b. No customer inside or outside the boundaries of the City of San Diego Water Department shall resell any portion of the water delivered through a fire hydrant by the City of San Diego Water Department.
  - c. The City of San Diego allows for the issuance of a temporary fire hydrant meter for a period not to exceed 12 months (365 days). An extension can only be granted in writing from the Water Department Director for up to 90 additional days. A written request for an extension by the consumer must be submitted at least 30 days prior to the 12 month period ending. No extension shall be granted to any customer with a delinquent account with the Water Department. No further extensions shall be granted.
  - d. Any customer requesting the issuance of a fire hydrant meter shall file an application with the Meter Section. The customer must complete a "Fire Hydrant Meter Application" (Tab 1) which includes the name of the company, the party responsible for payment, Social Security number and/or California ID, requested location of the meter (a detailed map signifying an exact location), local contact person, local phone number, a contractor's license (or a business license), description of specific water use, duration of use at the site and full name and address of the person responsible for payment.
  - e. At the time of the application the customer will pay their fees according to the schedule set forth in the Rate Book of Fees and Charges, located in the City Clerk's Office. All fees must be paid by check, money order or cashiers check, made payable to the City Treasurer. Cash will not be accepted.
  - f. No fire hydrant meters shall be furnished or relocated for any customer with a delinquent account with the Water Department.
  - g. After the fees have been paid and an account has been created, the

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meter shall be installed within 48 hours (by the second business day). For an additional fee, at overtime rates, meters can be installed within 24 hours (within one business day).

#### 4.7 Relocation of Existing Fire Hydrant Meters

- a. The customer shall call the Fire Hydrant Meter Hotline (herein referred to as “Hotline”), a minimum of 24 hours in advance, to request the relocation of a meter. A fee will be charged to the existing account, which must be current before a work order is generated for the meter’s relocation.
- b. The customer will supply in writing the address where the meter is to be relocated (map page, cross street, etc). The customer must update the original Fire Hydrant Meter Application with any changes as it applies to the new location.
- c. Fire hydrant meters shall be read on a monthly basis. While fire hydrant meters and backflow devices are in service, commodity, base fee and damage charges, if applicable, will be billed to the customer on a monthly basis. If the account becomes delinquent, the meter will be removed.

#### 4.8 Disconnection of Fire Hydrant Meter

- a. After ten (10) months a “Notice of Discontinuation of Service” (Tab 3) will be issued to the site and the address of record to notify the customer of the date of discontinuance of service. An extension can only be granted in writing from the Water Department Director for up to 90 additional days (as stated in Section 4.6C) and a copy of the extension shall be forwarded to the Meter Shop Supervisor. If an extension has not been approved, the meter will be removed after twelve (12) months of use.
- b. Upon completion of the project the customer will notify the Meter Services office via the Hotline to request the removal of the fire hydrant meter and appurtenances. A work order will be generated

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for removal of the meter.

- c. Meter Section staff will remove the meter and backflow prevention assembly and return it to the Meter Shop. Once returned to the Meter Shop the meter and backflow will be tested for accuracy and functionality.
- d. Meter Section Staff will contact and notify Customer Services of the final read and any charges resulting from damages to the meter and backflow or its appurtenance. These charges will be added on the customer's final bill and will be sent to the address of record. Any customer who has an outstanding balance will not receive additional meters.
- e. Outstanding balances due may be deducted from deposits and any balances refunded to the customer. Any outstanding balances will be turned over to the City Treasurer for collection. Outstanding balances may also be transferred to any other existing accounts.

5. **EXCEPTIONS**

- 5.1 Any request for exceptions to this policy shall be presented, in writing, to the Customer Support Deputy Director, or his/her designee for consideration.

6. **MOBILE METER**

- 6.1 Mobile meters will be allowed on a case by case basis. All mobile meters will be protected by an approved backflow assembly and the minimum requirement will be a Reduced Pressure Principal Assembly. The two types of Mobile Meters are vehicle mounted and floating meters. Each style of meters has separate guidelines that shall be followed for the customer to retain service and are described below:

- a) **Vehicle Mounted Meters:** Customer applies for and receives a City owned Fire Hydrant Meter from the Meter Shop. The customer mounts the meter on the vehicle and brings it to the Meter Shop for

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inspection. After installation is approved by the Meter Shop the vehicle and meter shall be brought to the Meter Shop on a monthly basis for meter reading and on a quarterly basis for testing of the backflow assembly. Meters mounted at the owner's expense shall have the one year contract expiration waived and shall have meter or backflow changed if either fails.

b) **Floating Meters:** Floating Meters are meters that are not mounted to a vehicle. **(Note: All floating meters shall have an approved backflow assembly attached.)** The customer shall submit an application and a letter explaining the need for a floating meter to the Meter Shop. The Fire Hydrant Meter Administrator, after a thorough review of the needs of the customer, (i.e. number of jobsites per day, City contract work, lack of mounting area on work vehicle, etc.), may issue a floating meter. At the time of issue, it will be necessary for the customer to complete and sign the "Floating Fire Hydrant Meter Agreement" which states the following:

- 1) The meter will be brought to the Meter Shop at 2797 Caminito Chollas, San Diego on the third week of each month for the monthly read by Meter Shop personnel.
- 2) Every other month the meter will be read and the backflow will be tested. This date will be determined by the start date of the agreement.

If any of the conditions stated above are not met the Meter Shop has the right to cancel the contract for floating meter use and close the account associated with the meter. The Meter Shop will also exercise the right to refuse the issuance of another floating meter to the company in question.

Any Fire Hydrant Meter using reclaimed water shall not be allowed use again with any potable water supply. The customer shall incur the cost of replacing the meter and backflow device in this instance.

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7. **FEE AND DEPOSIT SCHEDULES**

- 7.1 **Fees and Deposit Schedules:** The fees and deposits, as listed in the Rate Book of Fees and Charges, on file with the Office of the City Clerk, are based on actual reimbursement of costs of services performed, equipment and materials. These deposits and fees will be amended, as needed, based on actual costs. Deposits, will be refunded at the end of the use of the fire hydrant meter, upon return of equipment in good working condition and all outstanding balances on account are paid. Deposits can also be used to cover outstanding balances.

All fees for equipment, installation, testing, relocation and other costs related to this program are subject to change without prior notification. The Mayor and Council will be notified of any future changes.

8. **UNAUTHORIZED USE OF WATER FROM A HYDRANT**

- 8.1 Use of water from any fire hydrant without a properly issued and installed fire hydrant meter is theft of City property. Customers who use water for unauthorized purposes or without a City of San Diego issued meter will be prosecuted.
- 8.2 If any unauthorized connection, disconnection or relocation of a fire hydrant meter, or other connection device is made by anyone other than authorized Water Department personnel, the person making the connection will be prosecuted for a violation of San Diego Municipal Code, Section 67.15. In the case of a second offense, the customer's fire hydrant meter shall be confiscated and/or the deposit will be forfeited.
- 8.3 Unauthorized water use shall be billed to the responsible party. Water use charges shall be based on meter readings, or estimates when meter readings are not available.
- 8.4 In case of unauthorized water use, the customer shall be billed for all applicable charges as if proper authorization for the water use had been obtained, including but not limited to bi-monthly service charges, installation charges and removal charges.

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- 8.5 If damage occurs to Water Department property (i.e. fire hydrant meter, backflow, various appurtenances), the cost of repairs or replacements will be charged to the customer of record (applicant).

**Water Department Director**

- Tabs: 1. Fire Hydrant Meter Application  
2. Construction & Maintenance Related Activities With No Return To Sewer  
3. Notice of Discontinuation of Service

#### APPENDIX

**Administering Division:** Customer Support Division

**Subject Index:** Construction Meters  
Fire Hydrant  
Fire Hydrant Meter Program  
Meters, Floating or Vehicle Mounted  
Mobile Meter  
Program, Fire Hydrant Meter

**Distribution:** DI Manual Holders



# Application for Fire Hydrant Meter (EXHIBIT A)

(For Office Use Only)

NS REQ	FAC#
DATE	BY

METER SHOP (619) 527-7449

## Meter Information

Application Date	Requested Install Date:
------------------	-------------------------

Fire Hydrant Location: (Attach Detailed Map//Thomas Bros. Map Location or Construction drawing.) <u>Zip:</u>	T.B.	G.B. (CITY USE)
Specific Use of Water:		
Any Return to Sewer or Storm Drain, if so, explain:		
Estimated Duration of Meter Use: <input type="text"/>	<input type="checkbox"/>	Check Box if Reclaimed Water

## Company Information

Company Name:			
Mailing Address:			
City:	State:	Zip:	Phone: ( )
*Business license#		*Contractor license#	
A Copy of the Contractor's license OR Business License is required at the time of meter issuance.			
Name and Title of Billing Agent: <small>(PERSON IN ACCOUNTS PAYABLE)</small>			Phone: ( )
Site Contact Name and Title:			Phone: ( )
Responsible Party Name:			Title:
Cal ID#			Phone: ( )
Signature:		Date:	
<small>Guarantees Payment of all Charges Resulting from the use of this Meter. Insures that employees of this Organization understand the proper use of Fire Hydrant Meter</small>			

<b>Fire Hydrant Meter Removal Request</b>	Requested Removal Date:
Provide Current Meter Location if Different from Above:	
Signature:	Title: Date:
Phone: ( )	Pager: ( )

<input type="checkbox"/> City Meter	<input type="checkbox"/> Private Meter	
Contract Acct #:	Deposit Amount: <b>\$ 936.00</b>	Fees Amount: <b>\$ 62.00</b>
Meter Serial #	Meter Size: <b>05</b>	Meter Make and Style: <b>6-7</b>
Backflow #	Backflow Size:	Backflow Make and Style:
Name:	Signature:	Date:



**WATER USES WITHOUT ANTICIPATED CHARGES FOR RETURN TO SEWER**

Auto Detailing  
Backfilling  
Combination Cleaners (Vactors)  
Compaction  
Concrete Cutters  
Construction Trailers  
Cross Connection Testing  
Dust Control  
Flushing Water Mains  
Hydro Blasting  
Hydro Seeing  
Irrigation (for establishing irrigation only; not continuing irrigation)  
Mixing Concrete  
Mobile Car Washing  
Special Events  
Street Sweeping  
Water Tanks  
Water Trucks  
Window Washing

**Note:**

1. If there is any return to sewer or storm drain, then sewer and/or storm drain fees will be charges.

Date

Name of Responsible Party  
Company Name and Address  
Account Number: \_\_\_\_\_

Subject:           Discontinuation of Fire Hydrant Meter Service

Dear Water Department Customer:

The authorization for use of Fire Hydrant Meter # \_\_\_\_\_, located at (*Meter Location Address*) ends in 60 days and will be removed on or after (*Date Authorization Expires*). Extension requests for an additional 90 days must be submitted in writing for consideration 30 days prior to the discontinuation date. If you require an extension, please contact the Water Department, or mail your request for an extension to:

City of San Diego  
Water Department  
Attention: Meter Services  
2797 Caminito Chollas  
San Diego, CA 92105-5097

Should you have any questions regarding this matter, please call the Fire Hydrant Hotline at (619) \_\_\_\_\_ - \_\_\_\_\_.

Sincerely,

Water Department

## **APPENDIX C**

### **MATERIALS TYPICALLY ACCEPTED BY CERTIFICATE OF COMPLIANCE**

## **MATERIALS TYPICALLY ACCEPTED BY CERTIFICATE OF COMPLIANCE**

1. Soil amendment
2. Fiber mulch
3. PVC or PE pipe up to 16 inch diameter
4. Stabilizing emulsion
5. Lime
6. Preformed elastomeric joint seal
7. Plain and fabric reinforced elastomeric bearing pads
8. Steel reinforced elastomeric bearing pads
9. Waterstops (Special Condition)
10. Epoxy coated bar reinforcement
11. Plain and reinforcing steel
12. Structural steel
13. Structural timber and lumber
14. Treated timber and lumber
15. Lumber and timber
16. Aluminum pipe and aluminum pipe arch
17. Corrugated steel pipe and corrugated steel pipe arch
18. Structural metal plate pipe arches and pipe arches
19. Perforated steel pipe
20. Aluminum underdrain pipe
21. Aluminum or steel entrance tapers, pipe downdrains, reducers, coupling bands and slip joints
22. Metal target plates
23. Paint (traffic striping)
24. Conductors
25. Painting of electrical equipment
26. Electrical components
27. Engineering fabric
28. Portland Cement
29. PCC admixtures
30. Minor concrete, asphalt
31. Asphalt (oil)
32. Liquid asphalt emulsion
33. Epoxy

**APPENDIX D**

**SAMPLE CITY INVOICE WITH CASH FLOW FORECAST**

City of San Diego, CM&FS Div., 9753 Chesapeake Drive, SD CA 92123

**Project Name:**  
Work Order No or Job Order No.  
City Purchase Order No.  
Resident Engineer (RE):  
RE Phone#:             Fax#:

**Contractor's Name:**  
Contractor's Address:  
  
Contractor's Phone #:  
Contractor's fax #:  
Contact Name:

**Invoice No.**  
**Invoice Date:**  
Billing Period: ( To )

Item #	Item Description	Contract Authorization				Previous Totals To Date		This Estimate		Totals to Date	
		Unit	Price	Qty	Extension	%/QTY	Amount	% / QTY	Amount	% / QTY	Amount
1					\$ -		\$ -		\$ -	0.00%	\$ -
2					\$ -		\$ -		\$ -	0.00%	\$ -
3					\$ -		\$ -		\$ -	0.00%	\$ -
4					\$ -		\$ -		\$ -	0.00%	\$ -
5					\$ -		\$ -		\$ -	0.00%	\$ -
6					\$ -		\$ -		\$ -	0.00%	\$ -
7					\$ -		\$ -		\$ -	0.00%	\$ -
8					\$ -		\$ -		\$ -	0.00%	\$ -
5					\$ -		\$ -		\$ -	0.00%	\$ -
6					\$ -		\$ -		\$ -	0.00%	\$ -
7					\$ -		\$ -		\$ -	0.00%	\$ -
8					\$ -		\$ -		\$ -	0.00%	\$ -
9					\$ -		\$ -		\$ -	0.00%	\$ -
10					\$ -		\$ -		\$ -	0.00%	\$ -
11					\$ -		\$ -		\$ -	0.00%	\$ -
12					\$ -		\$ -		\$ -	0.00%	\$ -
13					\$ -		\$ -		\$ -	0.00%	\$ -
14					\$ -		\$ -		\$ -	0.00%	\$ -
15					\$ -		\$ -		\$ -	0.00%	\$ -
16					\$ -		\$ -		\$ -	0.00%	\$ -
17	Field Orders				\$ -		\$ -		\$ -	0.00%	\$ -
	CHARGE ORDER No.				\$ -		\$ -		\$ -	0.00%	\$ -
					\$ -		\$ -		\$ -	0.00%	\$ -
	Total Authorized Amount (including approved Change Order)				\$ -		\$ -		\$ -	<b>Total Billed</b>	\$ -

SAMPLE REFERENCE

SUMMARY	
A. Original Contract Amount	\$ -
B. Approved Change Order #00 Thru #00	\$ -
C. Total Authorized Amount (A+B)	\$ -
D. Total Billed to Date	\$ -
E. Less Total Retention (5% of D)	\$ -
F. Less Total Previous Payments	\$ -
<b>G. Payment Due Less Retention</b>	<b>\$0.00</b>
H. Remaining Authorized Amount	\$0.00

**I certify that the materials  
have been received by me in  
the quality and quantity specified**

\_\_\_\_\_

**Resident Engineer**

\_\_\_\_\_

**Construction Engineer**

Retention and/or Escrow Payment Schedule	
Total Retention Required as of this billing (Item E)	\$0.00
Previous Retention Withheld in PO or in Escrow	\$0.00
<b>Add'l Amt to Withhold in PO/Transfer in Escrow:</b>	<b>\$0.00</b>
<b>Amt to Release to Contractor from PO/Escrow:</b>	

Contractor Signature and Date: \_\_\_\_\_

NOTE: CONTRACTOR TO CALCULATE TO THE 2ND DECIMAL PLACE.

WBS #:	B18108
Date Submitted:	10/10/2018
NTP Date:	3/23/2018
Final Statement of WD Date:	5/23/2020
Contract #:	K-XX-XXXX-XXX-X
Contract Amount:	\$5,617,000

## Construction Cash Flow Forecast

"Sewer and Water Group Job 965 (W)"

Year	January	February	March	April	May	June	July	August	September	October	November	December
2018				15,000	25,000	52,000	52,000	100,000	10,000	100,000	100,000	100,000
2019	10,000	10,000	85,000	58,000	100,000	100,000	100,000	100,000	100,000	100,000	1,000,000	1,000,000
2020	100,000	100,000	100,000	1,000,000	1,000,000							
2021												
2022												
2023												
2024												
2025												

SAMPLE REFERENCE

**APPENDIX E**  
**LOCATION MAP**





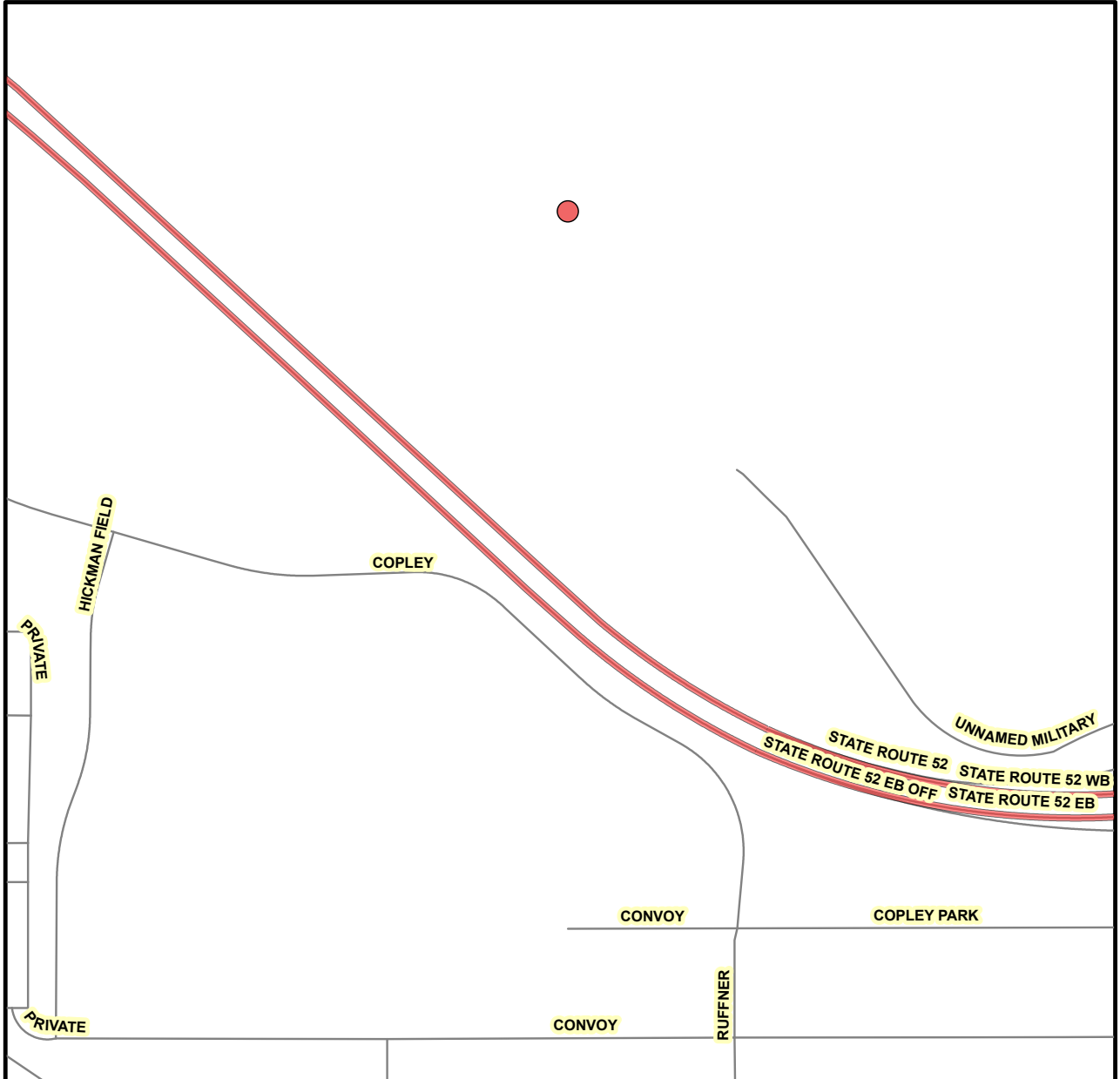
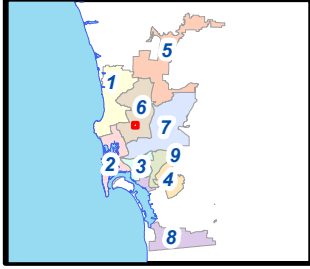
### Metro Biosolids Center

SENIOR ENGINEER  
Reyhaneh Martin  
858-614-5750

PROJECT MANAGER  
Lubna Arikat  
858-292-6419

PROJECT ENGINEER  
N/A

FOR QUESTIONS ABOUT THIS PROJECT  
Call: (619) 533-4207  
Email: [engineering@sandiego.gov](mailto:engineering@sandiego.gov)



### Legend

● S17013



COMMUNITY NAME: Kearny Mesa

COUNCIL DISTRICT: 6

WBS NO: B-17006

Date: 01/20/2021

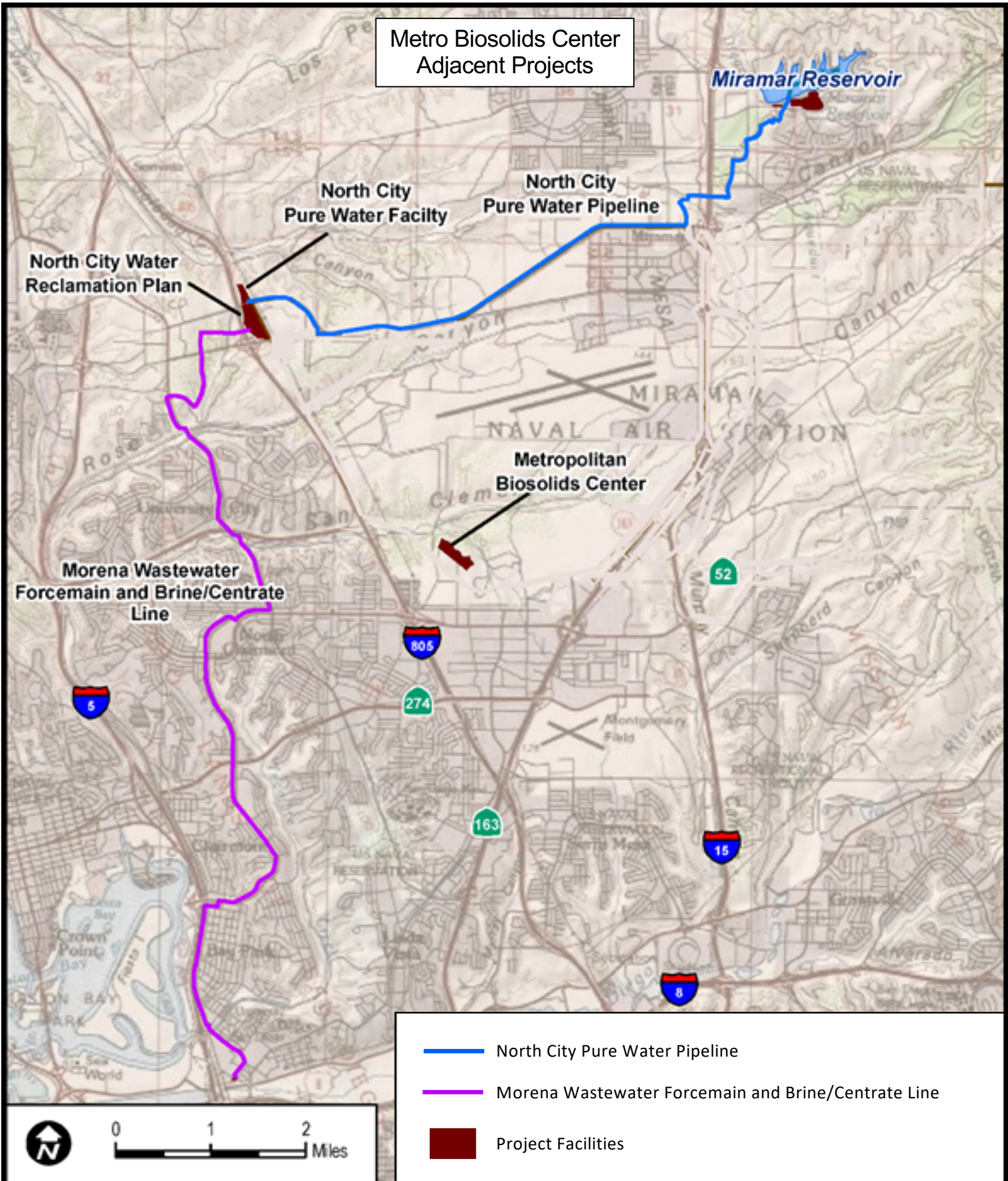


S-17013

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**APPENDIX F**  
**ADJACENT PROJECT MAP**

Metro Biosolids Center  
Adjacent Projects



- North City Pure Water Pipeline
- Morena Wastewater Forcemain and Brine/Centrates Line
- Project Facilities

**APPENDIX G**

**SAMPLE CERTIFICATION LETTER FOR AMERICAN IRON AND STEEL (AIS)  
COMPLIANCE**

## SAMPLE CERTIFICATION LETTER

The following information is provided as a sample letter of **step** certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Step Certification for Project (XXXXXXXXXX)

I, (company representative), certify that the (melting, bending, coating, galvanizing, cutting, etc.) process for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. XXXX
2. XXXX
3. XXXX

Such process took place at the following location:

\_\_\_\_\_

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

The following information is provided as a sample letter of certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Certification for Project (XXXXXXXXXXXX)

I, (company representative), certify that the following products and/or materials shipped/provided to the subject project are in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. XXXX
2. XXXX
3. XXXX

Such process took place at the following location:

\_\_\_\_\_

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

**APPENDIX H**  
**MONTHLY DRINKING WATER DISCHARGE MONITORING FORM**



# DRINKING WATER DISCHARGE MONITORING FORM

(Use for All Discharges to the Storm Drain)

All discharge activities related to this project comply with the State Water Resources Control Board ORDER WQ 2014-0194-DWQ, STATEWIDE GENERAL NPDES PERMIT FOR DRINKING WATER SYSTEMS DISCHARGES as referenced by ([http://www.waterboards.ca.gov/water\\_issues/programs/npdes/docs/drinkingwater/final\\_statewide\\_wqo2014\\_0194\\_dwq.pdf](http://www.waterboards.ca.gov/water_issues/programs/npdes/docs/drinkingwater/final_statewide_wqo2014_0194_dwq.pdf)), and as follows:

<b>Project Name:</b>		<b>WBS No.:</b>		<b>Watershed No.</b>	
<b>Qualified Person Conducting Tests:</b>		<b>signature</b>			

BMPs MUST BE IN PLACE PRIOR TO ANY SCHEDULED DISCHARGE

By signing, I certify that all of the statements and conditions for drinking water discharge events are correct.

Event #1												
Discharge Location <sup>1</sup>	Category <sup>2</sup> (Select one)	Notification <sup>3</sup> (Select all that apply)	BMPs in Place <sup>4</sup> (Select all that apply)	Volume <sup>5</sup> (gal)	Sampling <sup>6</sup> (take samples at 10 mins, 50-60 mins & last 10 mins)				Exceedence <sup>7</sup>			Notes <small>Report exceedence to RE &amp; complete page 2 of 2</small>
					Measure	Unit	Time	Result	Limit	No	Yes	
<b>Inlet Location</b>  <b>Start</b>  <b>Date:</b> <b>Time:</b>  <b>End</b>  <b>Date:</b> <b>Time:</b>	<input type="checkbox"/> <b>Superchlorinated</b> <small>(Chlorine added for disinfection)</small>	<input type="checkbox"/> <b>TSW</b> <small>(All Categories)</small>	<input type="checkbox"/> <b>Sweep flow path</b> <small>(gutter, street, etc.)</small>	<b>Total</b>	<b>Chlorine</b>	mg/L			0.1 mg/L= Exceedence			
	<input type="checkbox"/> <b>Large Volume</b> <small>(≥ 325,850 gal)</small>	<input type="checkbox"/> <b>PUD</b> <small>(All Categories)</small>	<input type="checkbox"/> <b>Dechlorination</b> <small>(diffusers, chemicals, etc.)</small>									
	<input type="checkbox"/> <b>Well Dev/Rehab</b> <small>(Not Typical)</small>	<input type="checkbox"/> <b>Water Board</b> <small>(Large Volume Only)</small>	<input type="checkbox"/> <b>Inlet Protection</b>		<b>Turbidity</b>	NTU			20 NTU= Exceedence 225 NTU= Exceedence for Ocean			
	<input type="checkbox"/> <b>Small Volume/Other</b> <small>(No Sampling Required)</small>	<input type="checkbox"/> <b>County</b> <small>(≥100,000 gal &amp; within ¼ mile of ocean/bay; or if enters the County's MS4)</small>	<input type="checkbox"/> <b>Erosion Controls</b>									
		<input type="checkbox"/> <b>Sediment Controls</b>										

Event #2												
Discharge Location <sup>1</sup>	Category <sup>2</sup> (Select one)	Notification <sup>3</sup> (Select all that apply)	BMPs in Place <sup>4</sup> (Select all that apply)	Volume <sup>5</sup> (gal)	Sampling <sup>6</sup> (take samples at 10 mins, 50-60 mins & last 10 mins)				Exceedence <sup>7</sup>			Notes <small>Report exceedence to RE &amp; complete page 2 of 2</small>
					Measure	Unit	Time	Result	Limit	No	Yes	
<b>Inlet Location</b>  <b>Start</b>  <b>Date:</b> <b>Time:</b>  <b>End</b>  <b>Date:</b> <b>Time:</b>	<input type="checkbox"/> <b>Superchlorinated</b> <small>(Chlorine added for disinfection)</small>	<input type="checkbox"/> <b>TSW</b> <small>(All Categories)</small>	<input type="checkbox"/> <b>Sweep flow path</b> <small>(gutter, street, etc.)</small>	<b>Total</b>	<b>Chlorine</b>	mg/L			0.1 mg/L= Exceedence			
	<input type="checkbox"/> <b>Large Volume</b> <small>(≥ 325,850 gal)</small>	<input type="checkbox"/> <b>PUD</b> <small>(All Categories)</small>	<input type="checkbox"/> <b>Dechlorination</b> <small>(diffusers, chemicals, etc.)</small>									
	<input type="checkbox"/> <b>Well Dev/Rehab</b> <small>(Not Typical)</small>	<input type="checkbox"/> <b>Water Board</b> <small>(Large Volume Only)</small>	<input type="checkbox"/> <b>Inlet Protection</b>		<b>Turbidity</b>	NTU			20 NTU= Exceedence 225 NTU= Exceedence for Ocean			
	<input type="checkbox"/> <b>Small Volume/Other</b> <small>(No Sampling Required)</small>	<input type="checkbox"/> <b>County</b> <small>(≥100,000 gal &amp; within ¼ mile of ocean/bay; or if enters the County's MS4)</small>	<input type="checkbox"/> <b>Erosion Controls</b>									
		<input type="checkbox"/> <b>Sediment Controls</b>										

Submit completed Form to RE

Instructional Notes found on the Page 2 of 2



## Receiving Water Monitoring

(Complete only if limits exceed on Page 1 of 2)

<b>Event #1</b>	
1) Go to the location where the discharge enters the receiving water.	
<input type="checkbox"/> Accessible <input type="checkbox"/> Unable to Determine <input type="checkbox"/> No Safe Access	
2) If accessible, take photos and complete the visual monitoring below. If unable to determine, stop here. If no safe access, stop here.	
3) Visual Monitoring: Is the discharge into the receiving water...	
...causing erosion	<input type="checkbox"/> Yes <input type="checkbox"/> No
...carrying floating or suspended matter	<input type="checkbox"/> Yes <input type="checkbox"/> No
...causing discoloration	<input type="checkbox"/> Yes <input type="checkbox"/> No
...causing and impact to the aquatic life present	<input type="checkbox"/> Yes <input type="checkbox"/> No
...observed with visible film	<input type="checkbox"/> Yes <input type="checkbox"/> No
...observed with an sheen or coating	<input type="checkbox"/> Yes <input type="checkbox"/> No
...causing potential nuisance conditions	<input type="checkbox"/> Yes <input type="checkbox"/> No
3) If all answers are NO, stop here.	
<b>4) If any answers are YES, Notify the RE immediately for further action</b>	

<b>Event #2</b>	
1) Go to the location where the discharge enters the receiving water.	
<input type="checkbox"/> Accessible <input type="checkbox"/> Unable to Determine <input type="checkbox"/> No Safe Access	
2) If accessible, take photos and complete the visual monitoring below. If unable to determine, stop here. If no safe access, stop here.	
3) Visual Monitoring: Is the discharge into the receiving water...	
...causing erosion	<input type="checkbox"/> Yes <input type="checkbox"/> No
...carrying floating or suspended matter	<input type="checkbox"/> Yes <input type="checkbox"/> No
...causing discoloration	<input type="checkbox"/> Yes <input type="checkbox"/> No
...causing and impact to the aquatic life present	<input type="checkbox"/> Yes <input type="checkbox"/> No
...observed with visible film	<input type="checkbox"/> Yes <input type="checkbox"/> No
...observed with an sheen or coating	<input type="checkbox"/> Yes <input type="checkbox"/> No
...causing potential nuisance conditions	<input type="checkbox"/> Yes <input type="checkbox"/> No
3) If all answers are NO, stop here.	
<b>4) If any answers are YES, Notify the RE immediately for further action</b>	

## Instructional Notes

- 1) Log the location of the inlet or discharge point. For example: Albatross St & 5th Av. Log the start date and time and the end date and time of the discharge.
- 2) Log the discharge category. "Superchlorinated" are discharges where additional chlorine is added in order to adequately disinfect and sanitize drinking water system facilities. This does NOT include potable water containing residual chlorine from the water treatment process. "Large Volume" discharges are greater than 325,850 gallons of total volume for one event. "Well Dev/Rehab" are discharges of potable ground water from a well. This is not typical. If none of these categories apply, then select "Small Volume/Other."
- 3) Notifications of the location, date, time, category, and estimated volume of discharge must be made to the contacts and per the requirements below:

Contact	When to Notify	Email
TSW	3 days prior to all discharges	<a href="mailto:SWPPP@SanDiego.gov">SWPPP@SanDiego.gov</a>
PUD	3 days prior to all discharges	<a href="mailto:CompReports@SanDiego.gov">CompReports@SanDiego.gov</a> <a href="mailto:Rdavenport@SanDiego.gov">Rdavenport@SanDiego.gov</a>
San Diego Water Board	3 days prior to Large Volume discharges	<a href="mailto:SanDiego@WaterBoards.ca.gov">SanDiego@WaterBoards.ca.gov</a> <a href="mailto:Ben.Neill@WaterBoards.ca.gov">Ben.Neill@WaterBoards.ca.gov</a>
County of San Diego	3 days prior if 100,000 gal and within 1/4 mile of ocean/bay	DEH: <a href="mailto:Joseph.Palmer@SDCounty.ca.gov">Joseph.Palmer@SDCounty.ca.gov</a> <a href="mailto:Dominique.Edwards@SDCounty.ca.gov">Dominique.Edwards@SDCounty.ca.gov</a>
	3 days prior if enter county MS4 or unincorporated County	WPP: <a href="mailto:Nicholas.DeValle@SDCounty.ca.gov">Nicholas.DeValle@SDCounty.ca.gov</a> <a href="mailto:LUEG.Watersheds@sdcounty.ca.gov">LUEG.Watersheds@sdcounty.ca.gov</a>

- 4) At a minimum, sweep gutters prior to starting discharge and use dechlorination BMPs. The contractor and RE must monitor and determine if BMPs need to be removed or modified. For example if inlet protection is causing flooding at a storm drain inlet, contractor may elect to remove BMPs. Document any modification to BMPs in the notes
- 5) Total volume must be logged for all discharges. If discharge water is reused for other purposes such as watering a golf course, log that volume under "Reused"
- 6) Sampling is required for categories per the following table:

Category	Measure	Sample Frequency
Superchlorinated	Chlorine, Turbidity, pH	first 10 min, 50-60 min, last 10 min
Large Volume	Chlorine Turbidity	first 10 min, 50-60 min, last 10 min
Well Dev/Rehab	Chlorine Turbidity	first 10 min, 50-60 min, last 10 min
Small Volume/Other	None required	N/A

- 7) Effluent limitations must be monitored not to exceed per the following table:

Measure	Method	Limit
Chlorine	Field Measure	0.10 mg/L-Cl
Turbidity	Visual Estimate	20 NTU for inland waters
		225 NTU for ocean 100 NTU for wells
pH	Field Measure	6.5 - 8.5

**APPENDIX I**  
**HAZARDOUS WASTE LABEL/FORMS**

# HAZARDOUS WASTE

STATE AND FEDERAL LAW PROHIBITS IMPROPER DISPOSAL  
IF FOUND, CONTACT THE NEAREST POLICE, OR PUBLIC SAFETY  
AUTHORITY, OR THE U.S. ENVIRONMENTAL PROTECTION AGENCY  
OR THE CALIFORNIA DEPARTMENT OF HEALTH SERVICES

GENERATOR NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_ 24 HR. PHONE ( ) \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

EPA ID NO. \_\_\_\_\_ MANIFEST DOCUMENT NO. \_\_\_\_\_

EPA WASTE NO. \_\_\_\_\_ CA WASTE NO. \_\_\_\_\_ ACCUMULATION START DATE \_\_\_\_\_ / \_\_\_\_ / \_\_\_\_

CONTENTS, COMPOSITION \_\_\_\_\_

PROPER DOT SHIPPING NAME \_\_\_\_\_

TECHNICAL NAME (S) \_\_\_\_\_

UN/NA NO. WITH PREFIX \_\_\_\_\_

PHYSICAL STATE | HAZARDOUS PROPERTIES     FLAMMABLE     TOXIC  
 SOLID    LIQUID    CORROSIVE     REACTIVE     OTHER \_\_\_\_\_

**HANDLE WITH CARE!**  
CONTAINS HAZARDOUS OR TOXIC WASTES

# INCIDENT/RELEASE ASSESSMENT FORM <sup>1</sup>

## If you have an emergency, Call 911

Handlers of hazardous materials are required to report releases. The following is a tool to be used for assessing if a release is reportable. Additionally, a non-reportable release incident form is provided to document why a release is not reported (see back).

### Questions for Incident Assessment:

	YES	NO
1. Was anyone killed or injured, or did they require medical care or admitted to a hospital for observation?	<input type="checkbox"/>	<input type="checkbox"/>
2. Did anyone, other than employees in the immediate area of the release, evacuate?	<input type="checkbox"/>	<input type="checkbox"/>
3. Did the release cause off-site damage to public or private property?	<input type="checkbox"/>	<input type="checkbox"/>
4. Is the release greater than or equal to a reportable quantity (RQ)?	<input type="checkbox"/>	<input type="checkbox"/>
5. Was there an uncontrolled or unpermitted release to the air?	<input type="checkbox"/>	<input type="checkbox"/>
6. Did an uncontrolled or unpermitted release escape secondary containment, or extend into any sewers, storm water conveyance systems, utility vaults and conduits, wetlands, waterways, public roads, or off site?	<input type="checkbox"/>	<input type="checkbox"/>
7. Will control, containment, decontamination, and/or clean up require the assistance of federal, state, county, or municipal response elements?	<input type="checkbox"/>	<input type="checkbox"/>
8. Was the release or threatened release involving an unknown material or contains an unknown hazardous constituent?	<input type="checkbox"/>	<input type="checkbox"/>
9. Is the incident a threatened release (a condition creating a substantial probability of harm that requires immediate action to prevent, reduce, or mitigate damages to persons, property, or the environment)?	<input type="checkbox"/>	<input type="checkbox"/>
10. Is there an increased potential for secondary effects including fire, explosion, line rupture, equipment failure, or other outcomes that may endanger or cause exposure to employees, the general public, or the environment?	<input type="checkbox"/>	<input type="checkbox"/>

If the answer is YES to any of the above questions – report the release to the California Office of Emergency Services at 800-852-7550 and the local CUPA daytime: (619) 338-2284, after hours: (858) 565-5255. Note: other state and federal agencies may require notification depending on the circumstances.

\*Call 911 in an emergency\*

If all answers are NO, complete a Non Reportable Release Incident Form (page 2 of 2) and keep readily available. Documenting why a “no” response was made to each question will serve useful in the event questions are asked in the future, and to justify not reporting to an outside regulatory agency.

If in doubt, report the release.

---

<sup>1</sup> This document is a guide for accessing when hazardous materials release reporting is required by Chapter 6.95 of the California Health and Safety Code. It does not replace good judgment, Chapter 6.95, or other state or federal release reporting requirements.

# NON REPORTABLE RELEASE INCIDENT FORM

## 1. RELEASE AND RESPONSE DESCRIPTION

Incident # \_\_\_\_\_

Date/Time Discovered	Date/Time Discharge	Discharge Stopped <input type="checkbox"/> Yes <input type="checkbox"/> No
Incident Date / Time:		
Incident Business / Site Name:		
Incident Address:		
Other Locators (Bldg, Room, Oil Field, Lease, Well #, GIS)		
Please describe the incident and indicate specific causes and area affected. Photos Attached?: <input type="checkbox"/> Yes <input type="checkbox"/> No		
Indicate actions to be taken to prevent similar releases from occurring in the future.		

## 2. ADMINISTRATIVE INFORMATION

Supervisor in charge at time of incident:	Phone:
Contact Person:	Phone:

## 3. CHEMICAL INFORMATION

Chemical	Quantity <input type="checkbox"/> GAL <input type="checkbox"/> LBS <input type="checkbox"/> FT <sup>3</sup>
Chemical	Quantity <input type="checkbox"/> GAL <input type="checkbox"/> LBS <input type="checkbox"/> FT <sup>3</sup>
Chemical	Quantity <input type="checkbox"/> GAL <input type="checkbox"/> LBS <input type="checkbox"/> FT <sup>3</sup>
Clean-Up Procedures & Timeline:	
Completed By:	Phone:
Print Name:	Title:

**EMERGENCY RELEASE FOLLOW - UP NOTICE REPORTING FORM**

<b>A</b>	BUSINESS NAME	FACILITY EMERGENCY CONTACT & PHONE NUMBER ( ) -	
<b>B</b>	INCIDENT DATE MO DAY YR	TIME OES NOTIFIED (use 24 hr time)	OES CONTROL NO.
<b>C</b>	INCIDENT ADDRESS LOCATION	CITY / COMMUNITY	COUNTY ZIP
<b>D</b>	CHEMICAL OR TRADE NAME (print or type)		CAS Number
<b>E</b>	CHECK IF CHEMICAL IS LISTED IN 40 CFR 355, APPENDIX A <input type="checkbox"/>	CHECK IF RELEASE REQUIRES NOTIFICATION UNDER 42 U.S.C. Section 9603 (a) <input type="checkbox"/>	
<b>F</b>	PHYSICAL STATE CONTAINED <input type="checkbox"/> SOLID <input type="checkbox"/> LIQUID <input type="checkbox"/> GAS	PHYSICAL STATE RELEASED <input type="checkbox"/> SOLID <input type="checkbox"/> LIQUID <input type="checkbox"/> GAS	QUANTITY RELEASED
<b>G</b>	ENVIRONMENTAL CONTAMINATION <input type="checkbox"/> AIR <input type="checkbox"/> WATER <input type="checkbox"/> GROUND <input type="checkbox"/> OTHER	TIME OF RELEASE	DURATION OF RELEASE — DAYS — HOURS — MINUTES
<b>H</b>	ACTIONS TAKEN		
<b>I</b>	KNOWN OR ANTICIPATED HEALTH EFFECTS (Use the comments section for addition information) <input type="checkbox"/> ACUTE OR IMMEDIATE (explain) _____ <input type="checkbox"/> CHRONIC OR DELAYED (explain) _____ <input type="checkbox"/> NOTKNOWN (explain) _____		
<b>J</b>	ADVICE REGARDING MEDICAL ATTENTION NECESSARY FOR EXPOSED INDIVIDUALS		
<b>K</b>	COMMENTS (INDICATE SECTION (A - G) AND ITEM WITH COMMENTS OR ADDITIONAL INFORMATION)		
<b>L</b>	CERTIFICATION: I certify under penalty of law that I have personally examined and I am familiar with the information submitted and believe the submitted information is true, accurate, and complete. REPORTING FACILITY REPRESENTATIVE (print or type) _____ SIGNATURE OF REPORTING FACILITY REPRESENTATIVE _____ DATE: _____		

## **EMERGENCY RELEASE FOLLOW-UP NOTICE REPORTING FORM INSTRUCTIONS**

### **GENERAL INFORMATION:**

Chapter 6.95 of Division 20 of the California Health and Safety Code requires that written emergency release follow-up notices prepared pursuant to 42 U.S.C. § 11004, be submitted using this reporting form. Non-permitted releases of reportable quantities of Extremely Hazardous Substances (listed in 40 CFR 355, appendix A) or of chemicals that require release reporting under section 103(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 [42 U.S.C. § 9603(a)] must be reported on the form, as soon as practicable, but no later than 30 days, following a release. The written follow-up report is required in addition to the verbal notification.

### **BASIC INSTRUCTIONS:**

- The form, when filled out, reports follow-up information required by 42 U.S.C § 11004. Ensure that all information requested by the form is provided as completely as possible.
- If the incident involves reportable releases of more than one chemical, prepare one report form for each chemical released.
- If the incident involves a series of separate releases of chemical(s) at different times, the releases should be reported on separate reporting forms.

### **SPECIFIC INSTRUCTIONS:**

**Block A:** Enter the name of the business and the name and phone number of a contact person who can provide detailed facility information concerning the release.

**Block B:** Enter the date of the incident and the time that verbal notification was made to OES. The OES control number is provided to the caller by OES at the time verbal notification is made. Enter this control number in the space provided.

**Block C:** Provide information pertaining to the location where the release occurred. Include the street address, the city or community, the county and the zip code.

**Block D:** Provide information concerning the specific chemical that was released. Include the chemical or trade name and the Chemical Abstract Service (CAS) number. Check all categories that apply. Provide best available information on quantity, time and duration of the release.

**Block E:** Indicate all actions taken to respond to and contain the release as specified in 42 U.S.C. § 11004(c).

**Block F:** Check the categories that apply to the health effects that occurred or could result from the release. Provide an explanation or description of the effects in the space provided. Use Block H for additional comments/information if necessary to meet requirements specified in 42 U.S.C. § 11004(c).

**Block G:** Include information on the type of medical attention required for exposure to the chemical released. Indicate when and how this information was made available to individuals exposed and to medical personnel, if appropriate for the incident, as specified in 42 U.S.C. § 11004(c).

**Block H:** List any additional pertinent information.

**Block I:** Print or type the name of the facility representative submitting the report. Include the official signature and the date that the form was prepared.

### **MAIL THE COMPLETED REPORT TO:**

**State Emergency Response Commission (SERC)  
Attn: Section 304 Reports  
Hazardous Materials Unit  
3650 Schriever Avenue  
Mather, CA 95655**

NOTE: Authority cited: Sections 25503, 25503.1 and 25507.1, Health and Safety Code. Reference: Sections 25503(b)(4), 25503.1, 25507.1, 25518 and 25520, Health and Safety Code.

## **APPENDIX J**

### **ADVANCED METERING INFRASTRUCTURE (AMI) DEVICE PROTECTION**



## Protecting AMI Devices in Meter Boxes and on Street Lights

The Public Utilities Department (PUD) has begun the installation of the Advanced Metering Infrastructure (AMI) technology as a new tool to enhance water meter reading accuracy and efficiency, customer service and billing, and to be used by individual accounts to better manage the efficient use of water. **All AMI devices shall be protected per Section 402-2, "Protection", of the 2018 Whitebook.**

AMI technology allows water meters to be read electronically rather than through direct visual inspection by PUD field staff. This will assist PUD staff and customers in managing unusual consumption patterns which could indicate leaks or meter tampering on a customer's property.

Three of the main components of an AMI system are the:

- A. Endpoints, see Photo 1:

**Photo 1**



B. AMI Antenna attached to Endpoint (antenna not always required), see Photo 2:



---

Network Devices, see Photo 3:

**Photo 3**



AMI endpoints transmit meter information to the AMI system and will soon be on the vast majority of meters in San Diego. These AMI devices provide interval consumption data to the PUD's Customer Support Division. If these devices are damaged or communication is interrupted, this Division will be alerted of the situation. The endpoints are installed in water meter boxes, coffins, and vaults adjacent to the meter. A separate flat round antenna may also be installed through the meter box lid. This antenna is connected to the endpoint via cable. The following proper installation shall be implemented when removing the lid to avoid damaging the antenna, cable, and/or endpoint. Photo 4 below demonstrates a diagram of the connection:

**Photo 4**



The AMI device ERT/Endpoint/Transmitter shall be positioned and installed as discussed in this Appendix. If the ERT/Endpoint/Transmitter is disturbed, it shall be re-installed and returned to its original installation with the end points pointed upwards as shown below in Photo 5.

**The PUD's code compliance staff will issue citations and invoices to you for any damaged AMI devices that are not re-installed as discussed in the Contract Document**

Photo 5 below shows a typical installation of an AMI endpoint on a water meter.

**Photo 5**

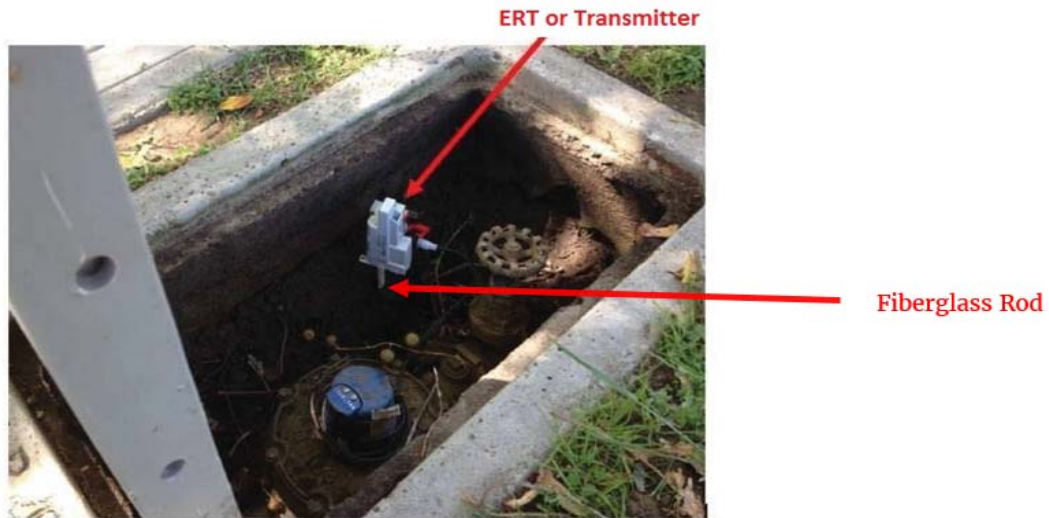


Photo 6 below is an example of disturbance that shall be avoided:

**Photo 6**





**You are responsible when working in and around meter boxes.** If you encounter these endpoints, use proper care and do not disconnect them from the registers on top of the water meter. If the lid has an antenna drilled through, do not change or tamper with the lid and inform the Resident Engineer immediately about the location of that lid. Refer to Photo 7 below:

**Photo 7**



Another component of the AMI system are the Network Devices. The Network Devices are strategically placed units (mainly on street light poles) that collect interval meter reading data from multiple meters for transmission to the Department Control Computer. **If you come across any of these devices on street lights that will be removed or replaced (refer to Photos 8 and 9 below), notify AMI Project Manager Arwa Sayed at (619) 362-0121 immediately.**

Photo 8 shows an installed network device on a street light. On the back of each Network Device is a sticker with contact information. See Photo 9. **Call PUD Water Emergency Repairs at 619-515-3525 if your work will impact these street lights.** These are assets that belong to the City of San Diego and you shall be responsible for any costs of disruption of this network.

**Photo 8**



**Network Device**

**Photo 9**



**If you encounter any bad installations, disconnected/broken/buried endpoints, or inadvertently damage any AMI devices or cables, notify the Resident Engineer immediately. The Resident Engineer will then immediately contact the AMI Project Manager, Arwa Sayed, at (619) 362-0121.**

**ATTACHMENT F**  
**RESERVED**

**ATTACHMENT G**  
**CONTRACT AGREEMENT**



## CONTRACT AGREEMENT

### CONSTRUCTION CONTRACT

This Phase-Funded contract is made and entered into between THE CITY OF SAN DIEGO, a municipal corporation, herein called "City", and PCL Construction, Inc., herein called "Contractor" for construction of **Pure Water Program: Metro Biosolids Center Improvements**; Bid No. **K-21-1867-DBB-3**; in the total amount Forty Million Eighty Six Thousand Six Hundred Ninety Dollars and Zero Cents (**\$40,086,690.00**), which is comprised of the Base Bid, consisting of an amount not to exceed **\$3,483,072.00** for **Phase 1**; **\$10,613,623.00** for **Phase 2**; **\$20,467,495.00** for **Phase 3** and **\$5,522,500.00** for **Phase 4**.

IN CONSIDERATION of the payments to be made hereunder and the mutual undertakings of the parties hereto, City and Contractor agree as follows:

1. The following are incorporated into this contract as though fully set forth herein:
  - (a) The attached Faithful Performance and Payment Bonds.
  - (b) The attached Proposal Included in the Bid documents by the Contractor.
  - (c) Reference Standards listed in the Instruction to Bidders and the Supplementary Special Provisions (SSP).
  - (d) Phased Funding Schedule Agreement.
  - (e) That certain documents entitled **Pure Water Program: Metro Biosolids Center Improvements**, on file in the office of the City Clerk as Document No. **K-21-1867-DBB-3**, as well as all matters referenced therein.
2. The Contractor shall perform and be bound by all the terms and conditions of this contract and in strict conformity therewith shall perform and complete in a good and workmanlike manner  
**Pure Water Program: Metro Biosolids Center Improvements**, Bid Number **K-21-1867-DBB-3**, San Diego, California.
3. For such performances, the City shall pay to Contractor the amounts set forth at the times and in the manner and with such additions or deductions as are provided for in this contract, and the Contractor shall accept such payment in full satisfaction of all claims incident to such performances (See WHITEBOOK, Section 7-3.10, Phased Funding Compensation).
4. No claim or suit whatsoever shall be made or brought by Contractor against any officer, agent, or employee of the City for or on account of anything done or omitted to be done in connection with this contract, nor shall any such officer, agent, or employee be liable hereunder.
5. This contract is effective as of the date that the Mayor or designee signs the agreement and is approved by the City Attorney in accordance with San Diego Charter Section 40.

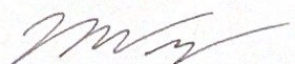
CONTRACT AGREEMENT (continued)

IN WITNESS WHEREOF, this Agreement is signed by the City of San Diego, acting by and through its Mayor or designee, pursuant to Resolution No. R-312062 authorizing such execution.

THE CITY OF SAN DIEGO

APPROVED AS TO FORM

Mara W. Elliott, City Attorney

By 

By 

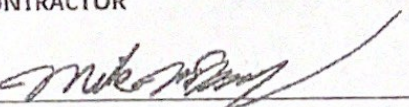
Print Name: Matthew Vespi, CFO

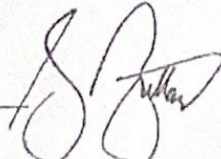
Print Name: Bonny Hsu  
Deputy City Attorney

Date: 8/12/2021

Date: 8/13/21

CONTRACTOR

By 



Print Name: Mike McKinney  
President

Print Name: Shawn W. Britton  
Secretary/Treasurer

Title: \_\_\_\_\_

Date: 10/24/21

City of San Diego License No.: 82009002140

State Contractor's License No.: 913592

DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) REGISTRATION NUMBER: 100000753

**ATTACHMENT H**

**ESCROW BID DOCUMENTS**

## **1. ESCROW BID DOCUMENTS**

### **1.1. Definition and Purpose**

The Escrow Bid Documents (EBD) are a compilation of all the documentary information generated in preparation of bid prices for this project. EBDs will be used to assist in the negotiation of price adjustments and variations and in the settlement of disputes, claims and other controversies. They will not be used for pre-award evaluation of the Contractor's anticipated methods of construction or to assess the Contractor's qualifications for performing the Work.

### **1.2. General**

**1.2.1.** All bidders shall submit a copy of the EBD within 4 working days of the bid opening.

**1.2.2.** The successful bidder agrees, as a condition of award of the Contract, that the Escrow Bid Documents constitute the only complete documentary information used in preparation of his bid. No other bid preparation information shall be considered in resolving disputes.

**1.2.3.** Nothing in the Escrow Bid Documents shall change or modify the terms or conditions of the Contract.

### **1.3. Ownership**

**1.3.1.** The EBDs are and shall always remain the property of the Contractor subject only to joint review by the City and the Contractor, except as provided for herein.

**1.3.2.** The City stipulates and expressly acknowledges that the EBDs, as defined herein, constitute trade secrets. This acknowledgment is based on the City's express understanding that the information contained in the EBDs is not known outside the Contractor's business, is known only to a limited extent and only by a limited number of employees of the Contractor, is safeguarded while in the Contractor's possession, and is extremely valuable to competitors by virtue of its reflecting the Contractor's contemplated techniques of construction.

**1.3.3.** The City acknowledges that EBDs and the information contained therein are made available to the City only because such action is an express prerequisite to award of the Contract. The City acknowledges that the EBDs include a compilation of information used in the Contractor's business, intended to give the Contractor an opportunity to obtain an advantage over competitors who do not know of or use the contents of the documentation. The City agrees to safeguard the EBDs and all information contained therein to the fullest extent permitted by law.

**1.3.4.** The City agrees to safeguard the EBDs and all information contained therein from any California Public Act Request to the fullest extent permitted by law.

### **1.4. Format and Contents**

**1.4.1.** Bidders may submit EBDs in their usual cost estimating format. It is not intended that extra work is required in preparing the bid but to ensure that the EBDs will be adequate to enable complete and proper understanding and proper interpretation for their intended use. The EBDs shall be in the English language only.

- 1.4.2.** The EBDs shall clearly itemize the estimated costs of performing the work of each item contained in the Bid Schedule. Items should be separated into sub-items as required to present a complete and detailed cost estimate and allow a detailed cost review. The EBDs shall include all quantity take-offs, crews, equipment, calculations of rates of production and progress, copies of quotations from sub-contractors and suppliers, and memoranda, narratives, consultants reports, add/deduct sheets and all other information used by the Contractor to arrive at the prices contained in the bid. Estimated costs shall be broken down into the Contractor's usual estimate categories such as direct labor, repair labor, equipment operation, equipment ownership, expendable materials, permanent material and subcontract costs as appropriate. Plant and equipment and indirect costs should be detailed in the Contractor's usual format. The Contractor's allocation of plant and equipment, indirect costs, contingencies, mark-up and other items to each bid item shall be clearly indicated.
- 1.4.3.** The EBDs shall clearly show in calculations, text, or both, the relationship between baseline indications presented in the Contract Documents and assumptions that form the basis for the Contractor's means, methods, equipment selection, rates of production, and costs.
- 1.4.4.** All costs shall be identified. For bid items where the extended amount is less than \$10,000, estimated unit costs are acceptable without a detailed cost estimate, provided that labor, equipment, materials and subcontracts, as applicable, are included and provided that indirect costs, contingencies, and mark-up, as applicable, are allocated.
- 1.4.5.** Bid Documents provided by the City should not be included in the EBDs unless needed to comply with the above requirements.

## **1.5. Submittal**

- 1.5.1.** All bidders shall submit their EBDs within 4 working days of the bid opening. The EBDs shall be submitted in a sealed container (e.g., sealed envelope, box or carton sealed with tape, locked strongbox, etc.), and the container shall be clearly marked on the outside with the Bidder's name, date of submittal, project name, Contract Number and the words "Escrow Bid Documents". The EBDs shall be submitted to:

Engineering & Capital Projects Department, Contracts Division  
525 B Street, Suite 750 (7<sup>th</sup> Floor)  
San Diego, California, 92101  
Attention: Rosa Riego

- 1.5.2.** The EBDs shall be signed by an individual authorized by the bidder to execute the bid, stating that the material in the Escrow Bid Documentation constitutes all the documentary information used in the preparation of the bid and that he or she has personally examined the contents of the EBDs submission and has found that the documents are complete:

**"ESCROW BID DOCUMENT CERTIFICATION"**

THE UNDERSIGNED HEREBY CERTIFIES THAT THE BID DOCUMENTATION CONTAINED HEREIN CONSTITUTES ALL THE INFORMATION USED IN PREPARATION OF THE BID AND THAT I HAVE PERSONALLY EXAMINED THESE CONTENTS AND HAVE FOUND THAT THIS BID DOCUMENTATION IS COMPLETE.

SIGNATURE: \_\_\_\_\_

NAME: \_\_\_\_\_  
(Print)

TITLE: \_\_\_\_\_

FIRM: \_\_\_\_\_

DATE: \_\_\_\_\_

- 1.5.3.** Prior to award of the contract, the EBDs of the apparent low bidder will be examined, organized and inventoried by representatives of the City, and members of the Contractor’s staff who are knowledgeable in how the bid was prepared. This examination is to ensure that the EBDs are authentic, legible, and complete (as defined in 1.4). It will not include review of and will not constitute approval of proposed construction methods, estimating assumptions, or interpretations of the contract documents. Examination will not alter any condition(s) or term(s) of the Contract.
- 1.5.4.** If the Contract is not awarded to the apparent low bidder, the EBDs of the next apparent low bidder to be considered for award shall be processed, as described above.
- 1.5.5.** The City may reject the bid as non-responsive and ineligible for further consideration if the necessary EBDs are not submitted.
- 1.5.6.** If the bidder's proposal is based on subcontracting any part of the Work, each subcontractor whose total subcontract price exceeds five percent of the total contract price proposed by the bidder, shall provide separate EBDs to be included with those of the bidder. These documents will be opened and examined in the same manner and at the same time as the examination described above for the apparent successful bidder. The failure to submit subcontractor EBDs may render contractor’s bid non-responsive.
- 1.5.7.** If the Contractor wishes to substitute a subcontractor for a portion of the Work which exceeds five percent of the total contract price proposed by the bidder after award, the City retains the right to require the Contractor to submit EBDs from the subcontractor before the subcontract is approved. This section is not intended to and shall not be interpreted as a waiver by the City of any of the requirements or provisions of public contract code section 4100 et seq. known as the Subletting and Subcontracting Fair Practices Act.

## **1.6. Storage**

**1.6.1.** Absent a request from the Contractor to place the EBDs in possession of a third-party escrow agent the EBDs will be stored by the City of San Diego, Engineering & Capital Projects Department, Contracts Division. Upon written request from the Contractor, the EBDs shall be placed in escrow with a mutually agreeable institution for the life of the Contract, unless examination is required, which shall be conducted in accordance with this section. The cost of storage by third-party escrow agent will be borne by the Contractor.

## **1.7. Examination**

**1.7.1.** The EBDs shall be examined by both the City and the Contractor, at any time deemed necessary by either the City or the Contractor, to assist in the negotiation of price adjustments and change orders, or the settlement of disputes.

**1.7.2.** Examination of the EBDs is subject to the following conditions:

**1.7.2.1.** As trade secrets, the EBDs are proprietary and confidential as described above

**1.7.2.2.** The City and the Contractor shall each designate, in writing to the other party a minimum of ten days prior to examination, representatives who are authorized to examine the EBDs. No other person shall have access to examine the EBDs.

**1.7.2.3.** Examination of the EBDs will take place only in the presence of duly designated representatives of both the City and the Contractor.

**1.7.2.4.** As escrow bid documents shall be examined by both the City and the Contractor to assist in the negotiation of price adjustments and change orders or the settlement of disputes as either party sees fit.

## **1.8. Final Disposition**

**1.8.1.** The EBDs will be returned to the awarded Contractor upon completion and final settlement of the contract.

**1.8.2.** The EBDs submitted by unsuccessful bidders will be returned unopened, unless opened as provided for above, following execution of the Contract.

# **ATTACHMENT I**

## **PROJECT LABOR AGREEMENT (PLA)**



**CITY OF SAN DIEGO**  
**PROJECT LABOR AGREEMENT**  
**FOR CONSTRUCTION OF PURE WATER PROGRAM**  
**PHASE I PROJECTS**

**Effective Date: June 16, 2020**

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**CITY OF SAN DIEGO**  
**PROJECT LABOR AGREEMENT**  
**FOR CONSTRUCTION OF PURE WATER PROGRAM**  
**PHASE I COVERED PROJECTS**

This Project Labor Agreement (hereinafter, “PLA” or “Agreement”) is entered into this 16<sup>th</sup> day of June, 2020 by and between the San Diego Building and Construction Trades Council (hereinafter “Council”), and the signatory Craft Unions (hereinafter, together with the Council, collectively, the “Union” or “Unions”), and the Contractors performing work on Covered Projects that are subject to this Agreement. The City of San Diego is not a signatory Party to this Agreement, but shall be considered a “negotiating party” and will be responsible for implementing and administering the Agreement as described herein together with the Council, Unions and Contractors.

**ARTICLE 1**

**RECITALS**

WHEREAS, the City desires the completion of the Pure Water Program Phase I Projects in a professional, safe, efficient, and economical manner, without undue delay or work stoppage; and

WHEREAS, the successful completion of the City’s Pure Water Program Phase I Projects are of the utmost importance to the rate payers and the City; and

WHEREAS, the Parties have pledged their full commitment to work towards a mutually satisfactory completion of the Pure Water Program Phase I Projects; and

WHEREAS, large numbers of workers of various skills will be required in the performance of the construction work on the Pure Water Program Phase I Projects, including workers affiliated with and/or represented by the Unions; and

WHEREAS, it is recognized that on construction projects with multiple contractors and bargaining units on the job site at the same time over an extended period of time, the potential for work disruption is substantial without an overriding commitment to maintain continuity of work; and

WHEREAS, the Parties agree that by establishing and stabilizing wages, hours, and working conditions for the workers employed on the Pure Water Program Phase I Projects, a

satisfactory, continuous, and harmonious relationship will exist among labor and management that will lead to the efficient and economical completion of Covered Projects; and

WHEREAS, in recognition of the special needs of the Project Work and to maintain a spirit of harmony, labor-management relations, peace, and stability during the term of this PLA, the Parties agree to establish effective and binding methods for the settlement of all misunderstandings, disputes and grievances without any strikes, slowdowns, work interruptions, or disruption of Project Work, and the Contractors agree not to engage in any lockout.

WHEREAS, the City places high priority upon the development of comprehensive programs for the recruitment, training, and employment of City Residents and Targeted Workers, and also recognizes the ability of local Apprenticeship Programs to provide meaningful and sustainable careers in the building and construction industry. The Parties will encourage City Residents and Targeted Workers to participate in Project Work through programs and procedures jointly developed to prepare and encourage such individuals for entrance into Apprenticeship Programs and formal employment on the Project Work through the referral programs sponsored and/or supported by the Parties to this PLA.; and

WHEREAS, the Project Work will provide opportunities for Disadvantaged Business Enterprises to participate as Contractors, subcontractors, or suppliers, and the Parties therefore agree that they will cooperate with all efforts of the City, the Project Labor Coordinator, and other organizations retained by the City for this purpose, to encourage and assist the participation of Disadvantaged Business Enterprises in the Project Work. Specifically, all Parties understand that the City has established and quantified goals which place a strong emphasis on the utilization of Disadvantaged Business Enterprises on the Project. Each Party agrees that it shall participate in outreach programs and provide education, and assistance to businesses not familiar with working on projects of this scope. Further, the Parties shall ensure that the provisions of this PLA do not inadvertently establish impediments to participation of such Disadvantaged Business Enterprises, City Residents and Targeted Workers.

WHEREAS, it is further understood that the City is a real party in interest to this Agreement and shall actively administer and enforce the obligations of this PLA to ensure that the benefits of this Agreement flow to all signatory Parties, craft persons working under it, and the rate payers and residents of the City. The City will send a letter to the Council to signify that the City will be performing its obligation under this Agreement and will designate a "Project Labor Coordinator," either from its own staff and/or an independent contractor acting on behalf of the City, to monitor and enforce compliance with this PLA. In addition, this letter will state that the City will include and incorporate this Agreement into each Covered Project's construction documents. The Project Labor Coordinator, as the authorized representative of the City, will assist with the development and implementation of the programs referenced in this PLA, all of which are critical to fulfilling the intent and purposes of the Parties and this PLA.

NOW, THEREFORE, IT IS AGREED BETWEEN AND AMONG THE PARTIES AS FOLLOWS:

## ARTICLE 2

### DEFINITIONS

Capitalized terms utilized in this PLA which are not otherwise defined herein shall have the meanings ascribed to said terms below.

“Agreement” means this Project Labor Agreement (PLA).

“Applicable Prevailing Determination” means the prevailing wage determinations applicable to Project Work pursuant to the State of California Labor Code.

“Apprentice” means an apprentice properly registered in an Apprenticeship Program for the entire time they are employed on a Covered Project.

“Apprenticeship Program” as used in this PLA shall be defined as an apprenticeship program certified by the State of California.

“City” means the City of San Diego and its departments delivering the Covered Projects.

“City Resident” means a City of San Diego permanent resident at the time of initial employment on a Covered Project or a Veteran residing anywhere.

“Contractor” means any contractor to whom the City awards a Construction Contract for Project Work and all subcontractors utilized by such Contractors for Project Work. The term “Contractor” includes any individual, firm, partnership, corporation, owner operator, or combination thereof, including joint ventures, that has entered into a contract with the City for Project Work, or any subcontractor who has signed a contract with a Contractor or another subcontractor for Project Work.

“Core Employees” are defined in Article 4, Section 4.6 (e).

“Council” means the San Diego County Building & Construction Trades Council.

“Covered Contract” means a contract awarded to a Contractor by the City for a Pure Water Program Phase I Project identified in Appendix A.

“Covered Project” or “Project Work” means a Pure Water Program Phase I Project that is identified in Appendix A and is limited to the construction site of work.

“Disadvantaged Business Enterprise” means a firm that has been certified via the Department of Transportation, but also includes: Minority Business Enterprises or Woman Business Enterprises certified by the Department of Transportation or the California Public Utilities Commission; and Small Local Business Enterprises or Emerging Local Business Enterprises certified by the City.

“Prime Contractor” means the prime Contractor awarded a Covered Contract in privity directly with the City.

“Project Labor Coordinator” means the designee of the City, either from its own staff and/or an independent entity acting on behalf of the City, to monitor compliance with this Agreement and assist with developing, implementing and administering the requirements, policies and programs referenced herein.

“Schedule A’s” means the local master labor agreements of the Unions.

“Targeted Worker” means any individual qualifying for one (1) or more of the following Targeted Worker categories:

- (a) Is a Veteran, or is the eligible spouse of a “Veteran of the United States armed forces, under Section 2(a) of the Jobs for Veterans Act (38 United States Code [U.S.C.] 4215[a]);
- (b) At initial time of employment on a Covered Project, is an Apprentice with less than ten (10) percent of the work hours required for graduation to become a Journeyman;
- (c) Has no high school diploma or general education diploma (GED);
- (d) Is homeless or has been homeless within the last year;
- (e) Is a former foster youth;
- (f) Is a custodial single parent;
- (g) Is experiencing protracted unemployment (receiving unemployment benefits for at least three [3] months);
- (h) Is a current recipient of government cash or food assistance benefits;
- (i) Has a documented income at or below 100 percent of the Federal Poverty Level;

(j) Is formerly incarcerated with a history of involvement with the criminal justice system.

“Union” or “Unions” means any labor organization signatory to this Agreement acting in their own behalf and on behalf of their respective affiliates and member organizations whose names are subscribed hereto and who have, through their officers, executed this Agreement.

“Veteran” means a veteran or the eligible spouse of a veteran of the United States armed forces, under Section 2(a) of the Jobs for Veterans Act (38 U.S.C. 4215[a]);

### ARTICLE 3

#### **SCOPE OF THE AGREEMENT**

**Section 3.1** This PLA is limited to covering all onsite construction work within the scope of each Covered Contract.

**Section 3.2** Exclusions. Items specifically excluded from the scope of this PLA include the following:

(a) Work of non-manual employees including but not limited to, superintendents, supervisors, staff engineers, quality control and quality assurance personnel, timekeepers, mail carriers, clerks, office workers, messengers, guards, safety personnel, emergency medical and first aid technicians, and other professional, engineering, administrative, supervisory, and management employees; and

(b) All offsite manufacturing, fabrication, deliveries, maintenance, and handling of materials, equipment, or machinery, and the offsite hauling of materials of any kind to or from the Covered Project site. However, any lay down or storage areas for equipment or material and manufacturing (i.e. prefabrication) sites dedicated solely for the project, and the movement of materials or goods between locations on a Covered Project site are within the scope of the PLA. On-site fabrication work includes work done for the Project in temporary yards or areas near the Project. On-site construction shall also include the site of any batch plant constructed solely to supply materials to the Project; and

(c) All employees of the City, Project Labor Coordinator, design teams (including, but not limited to, architects, engineers, and master planners), or any other consultants for the City (including, but not limited to, project managers and



construction managers and their employees where not engaged in Project Work) and their subconsultants, and other employees of professional service organizations, not performing manual labor within the scope of this PLA. Notwithstanding the foregoing, however, this exclusion shall not apply to the classifications for Surveyors and/or Building/Construction Inspectors and/or Field Soils and Material Testers (Inspectors) unless they are City employees. This inclusion applies to the scope of work defined in the State of California Wage Determination for Surveyors and/or Building/Construction Inspectors and/or Field Soils and Material Testers (Inspectors). This shall also specifically include such work where it is referred to by utilization of such terms as “quality control” or “quality assurance.” Every Inspector performing under these classifications on Covered Projects pursuant to a professional services agreement, a contract entered into directly with the City, or a contract with a Contractor shall be bound to all applicable requirements of this Agreement; and

(d) Any work performed on or near or leading to or into a site of work covered by this PLA and undertaken by state, county, city, or other governmental bodies, or their contractors (other than work within the scope of this PLA undertaken by contractors to the City); or by private utilities, or their contractors; and

(e) Work performed by employees of a manufacturer or vendor on the manufacturer’s or vendor’s equipment, if required by the warranty agreement in order to maintain the warranty or guarantee, and provided that the warranty agreement is the manufacturer’s or vendor’s usual and customary warranty agreement for such equipment and is consistent with industry practice; and

(f) Specialized or technical work requiring specialized training, unique skills, or a level of specific technical experience which employees represented by the Union do not possess. At least ten (10) working days notice shall be given to the Council before any work is performed pursuant to this exemption.; and

(g) Laboratory work for testing; and

(h) Non-construction support services contracted by the City, Project Labor Coordinator, or Contractor in connection with this Project.

**Section 3.3** Awarding of Contracts.

(a) The City has the absolute right to bid or award Covered Contracts regardless of delivery method to any Contractor notwithstanding the existence or non-existence of any agreements between such Contractor and any Union Parties,

provided only that such Contractor is willing, ready, and able to execute and comply with this PLA should such Contractor be awarded work covered by this PLA.

(b) It is agreed that all Contractors who have been awarded a contract for Project Work shall be required to accept and be bound by the terms and conditions of this PLA. Contractors shall evidence their acceptance of this Agreement by executing a Letter of Assent as set forth in Attachment A hereto. The Prime Contractor must sign and submit the Letter of Assent as a condition of award prior to the execution of a Covered Contract. No Contractor shall commence Project Work without first providing a copy of the signed Letter of Assent to the Project Labor Coordinator.

(c) The City and Prime Contractors agree that to the extent permitted by law and consistent with the economy and efficiency of construction and operation, it will use its best efforts to purchase materials, equipment, and supplies that will not create labor strife. Under all circumstances, however, the City and Prime Contractors shall retain the absolute right to select the lowest responsive and responsible bidder for the award of contracts on all Covered Projects.

**Section 3.4** Coverage Exception. The Parties agree and understand that this PLA shall not apply to any work that would otherwise be covered Project Work if a governmental agency or granting authority partially or fully funding such work determines that it will not fund the Project Work if it is covered by this PLA. The City agrees that it will make every effort to establish the inclusion of this PLA with any governmental agency or granting authority funding a Covered Project.

**Section 3.5** Schedule A's.

(a) The provisions of this PLA, including the Schedule A's (which are the local Master Labor Agreements of the signatory Unions having jurisdiction over the work on the Project, as such may be changed from time to time consistent with Section 21.3, and which are incorporated herein by reference), shall apply to the work covered by this PLA, notwithstanding the provisions of any other local, area and/or national agreement that may conflict with or differ from the terms of this PLA. Where a subject covered by the provisions of this PLA is also covered by a Schedule A, the provisions of this PLA shall prevail. Where a subject is covered by a provision of a Schedule A and not covered by this PLA, the provisions of the Schedule A shall prevail. Any dispute as to the applicable source between this PLA and any Schedule A shall be resolved under the procedures established in Article 10.

(b) It is understood that this PLA, together with the referenced Schedule A's, constitutes a self-contained, stand-alone agreement and, by virtue of having become bound to this PLA, the Contractor will not be obligated to sign any other local, area, or national collective bargaining agreement as a condition of performing work within the scope of this PLA (provided, however, that the Contractor may be required to sign a uniformly applied non-discriminatory Participation or Subscription Agreement at the request of the trustees or administrator of a trust fund established pursuant to Section 302 of the Labor Management Relations Act, and to which such Contractor may be bound to make contributions under this PLA, provided that such Participation or Subscription Agreement does not purport to bind the Contractor beyond the terms and conditions of this PLA and/or expand its obligation to make contributions pursuant thereto). It shall be the responsibility of the Prime Contractor to have each of its Contractors of any tier sign the documents with the appropriate Union prior to the Contractor beginning Project Work.

**Section 3.6** The Parties agree that this PLA will be made available to, and will fully apply to, any successful bidder for Project Work, without regard to whether that successful bidder performs work at other sites on either a Union or non-Union basis. This PLA shall not apply to any work of any Contractor other than that on Project Work specifically covered by this PLA.

**Section 3.7** Binding Signatories Only. This PLA and Letter of Assent shall only be binding on the signatory Parties hereto, and shall not apply to the parents, affiliates, subsidiaries, or other ventures of any such Party.

**Section 3.8** Other City Work. Nothing contained herein shall be interpreted to prohibit, restrict, or interfere with the performance of any other operation, work, or function not covered by this PLA, which may be performed by City employees or contracted for by the City for its own account, on its property, or in and around a project site.

**Section 3.9** Separate Liability. It is understood that the liability of the Contractor(s) and the liability of the separate Unions under this PLA shall be several and not joint. The Unions agree that this PLA does not have the effect of creating any joint employment status between or among the City or Project Labor Coordinator and/or any Contractor.

**Section 3.10** Completed Project Work. As areas of Project Work are accepted by the City, this PLA shall have no further force or effect on such items or areas except where the Contractor is directed by the City or its representatives to engage in repairs, modification and/or check-out functions required by its contract(s) with the City.

**Section 3.11** Except for all work performed under the NTL Articles of Agreement, the National Stack/Chimney Agreement, and the National Cooling Tower Agreement, all instrument calibrations work and loop checking shall be performed under the terms of the UA/IBEW Joint National Agreement for Instrument and Control Systems Technicians, and the National Agreement of the International Union of Elevator Constructors, with the exception of Article 7 (Work Stoppages and Lockouts), Article 8 (Work Assignments and Jurisdictional Disputes) and Article 10 (Settlement of Grievances and Disputes) of this PLA, which shall apply to such work.

## ARTICLE 4

### **UNION RECOGNITION AND EMPLOYMENT**

**Section 4.1** **Recognition.** The Contractor recognizes the Unions as the exclusive bargaining representative for the employees engaged in Project Work. Such recognition does not extend beyond the period when the employee is engaged in Project Work.

**Section 4.2** **Contractor Selection of Employees.** The Contractor shall have the right to determine the competency of all employees, the number of employees required, the duties of such employees within their craft jurisdiction, and shall have the sole responsibility for selecting employees to be laid off, consistent with this Article. The Contractor shall also have the right to reject any applicant referred by a Union for any reason, subject to any reporting time requirements of the applicable Schedule A; provided, however, that such right is exercised in good faith and not for the purpose of avoiding the Contractor's commitment to employ qualified workers through the procedures endorsed in this PLA.

**Section 4.3** **Referral Procedures.**

(a) For signatory Unions to this Agreement having a job referral system contained in a Schedule A, the Contractor agrees to comply with such system and it shall be used exclusively by such Contractor, except as modified by this PLA. Such job referral system will be operated in a nondiscriminatory manner and in full compliance with federal, state, and local laws and regulations that require equal employment opportunities and non-discrimination. All of the foregoing hiring procedures, including related practices affecting apprenticeship, shall be operated so as to consider the goals of the City to encourage employment of City Residents, Targeted Workers, and utilization of Disadvantaged Business Enterprises on the Project Work, and to facilitate the ability of all Contractors to meet their employment needs.

(b) The local Unions will exert their best efforts to recruit and refer sufficient numbers of skilled craft workers to fulfill the labor requirements of the Contractor, including specific employment obligations to which the Contractor may be legally and/or contractually obligated; and to refer Apprentices as requested to develop a larger, skilled workforce. The Unions will work with the Project Labor Coordinator and others designated by the City, to identify and refer competent craft persons as needed for Project Work, and to identify individuals, particularly City Residents and Targeted Workers, for entrance into Apprenticeship Programs, or participation in other identified programs and procedures to assist individuals in qualifying and becoming eligible for such Apprenticeship Programs, all maintained to increase the available supply of skilled craft personnel for Project Work and future construction work to be undertaken by the City.

(c) The Union shall not knowingly refer an employee currently employed by a Contractor on Project Work to any other Contractor.

**Section 4.4** Non-Discrimination in Referral, Employment, and Contracting. The Unions and Contractors agree that they will not discriminate against any employee or applicant for employment on the basis of race, color, religion, gender, national origin, age, Union status, sex, sexual orientation, marital status, political affiliation, or disability. Further, it is recognized that the City has certain policies, programs, and goals for the utilization of Disadvantaged Business Enterprises. The Parties shall jointly endeavor to assure that these commitments are fully met, and that any provisions of this PLA that may appear to interfere with Disadvantaged Business Enterprises successfully bidding for work on Covered Projects shall be carefully reviewed, and adjustments made as may be appropriate and agreed upon among the Parties, to ensure full compliance with the spirit and letter of the City's policies and commitment to its goals for the significant utilization of Disadvantaged Business Enterprises as Contractors, vendors or suppliers on Project Work.

**Section 4.5** Employment of City Residents and Targeted Workers.

(a) In recognition of the City's mission to serve the City and its residents, the Unions and Contractors agree that, to the extent allowed by law, and as long as they possess the requisite skills and qualifications, residents of the City of San Diego, hereafter "City Residents", shall be first referred for Project Work. A "City Resident" is defined as a City of San Diego permanent resident at the time of initial employment on a Covered Project or a Veteran residing anywhere. The

list of qualifying zip codes for City Residents is included within Attachment B-1, Workforce Dispatch Request Form.

(b) The Contractors and Unions agree to work together to achieve a goal of at least thirty-five (35) percent of the total construction craft hours worked on each Covered Project be performed by City Residents.

(c) The Contractors and Unions agree to work together to achieve a goal of at least ten (10) percent of the total construction craft hours worked on each Covered Project be performed by Targeted Workers. Hours worked by Targeted Workers who are also City Residents may be applied to the City Resident participation goal.

(d) Professional services agreements entered into by the City for covered surveying or inspection services, which are separate and apart from the Construction Contract for a Covered Project, are exempt from the foregoing City Resident and Targeted Worker hiring goals.

(e) To facilitate the dispatch of City Residents, as well as all Contractor requests for referral and dispatch of workers from the applicable Union referral system, all Contractors are required to utilize the Workforce Dispatch Request Form for Covered Projects, a sample of which is attached as Attachment B-1.

(f) The Project Labor Coordinator shall work with the Unions and Contractors in the administration, monitoring, and the reporting of the foregoing City Resident and Targeted Worker hiring goals.

(g) The Parties recognize that the Pure Water Program Phase I Projects have multiple funding sources. If a particular funding source applied by the City to a Covered Project does not allow geographic preference for hiring local craft workers, the foregoing City Resident participation requirement will not be applicable to that Covered Project. The City reserves the right to apply Pure Water Program Phase I funding as it chooses and will make every effort to fund the Covered Projects to encourage inclusivity of City Residents.

**Section 4.6** Core Employees. This Section only applies to Contractors who are not directly signatory to an applicable Schedule A.

(a) Disadvantaged Business Enterprise. The Parties recognize the City's interest in promoting competition and inclusion of Disadvantaged Business Enterprises, which may not be signatory to a current Schedule A. In order to promote participation and attract Disadvantaged Business Enterprises to work

under this Agreement, and subject to the limitations set forth below, each Contractor that is a Disadvantaged Business Enterprise may first employ three (3) of its core employees per craft on each Covered Project prior to employing an employee through the appropriate Union hiring hall. The next (fourth) employee shall be hired from the appropriate Union hiring hall and thereafter, such Contractor may employ, as needed, two (2) additional Core Employees in an alternating manner with Union referrals, up to a total of five (5) Core Employees. Thereafter, all additional employees in the affected trade or craft shall be requested and referred from the appropriate Union hiring hall.

The foregoing Core Employee hiring procedure for Disadvantaged Business Enterprises is subject to the following limitations:

(1) Disadvantaged Business Enterprises with an individual subcontract value of \$500,000 or less and;

(2) Disadvantaged Business Enterprises are limited to utilizing the foregoing Core Employee hiring procedure to one (1) subcontract per Covered Project and;

(3) The total value of all subcontracts utilizing the foregoing Core Employee hiring procedure shall not exceed ten (10) percent of the total value of each Covered Project; and

(4) In order to assist the Project Labor Coordinator monitor compliance with this Section, each Prime Contractor will be responsible for tracking, reporting and providing notice to the Project Labor Coordinator describing each Disadvantaged Business Enterprise subcontract that qualifies for the foregoing hiring procedure prior to work commencing.

(b) Employers who do not qualify for the hiring procedure set forth in Section 4.6(a), and who are not otherwise signatory to a current Schedule A, may employ, as needed, first, a Core Employee, then an employee through a referral from the appropriate Union hiring hall, then a second Core Employee, then a second employee through the referral system, and so on until a maximum of three (3) Core Employees are employed per craft on each Covered Project. Thereafter, all additional employees in the affected trade or craft shall be requested and referred from the appropriate Union hiring hall in accordance with this Article. Contractors employing more than fifty (50) craft workers at the same time in a specific trade on a Covered Project may hire an additional two (2) Core Employees.

(c) Section 4.6 only applies to Contractors who are not directly signatory to a current Schedule A for the craft worker in its employ and is not intended to limit the transfer provisions of the Schedule A of any trade. As part of this process, and in order to facilitate the contract administration procedures, as well as appropriate fringe benefit fund coverage, all Contractors shall require their Core Employees and any other persons employed other than through the referral process, to register with the appropriate Union hiring hall, if any, prior to their first day of employment working under the Construction Contract at the project site.

(d) Prior to each Contractor performing any work on a Covered Project, each Contractor shall provide a list of Core Employees to the Project Labor Coordinator and the Council. After submitting the Core Employee list prior to commencing work, Contractors shall not make any changes or substitutions to the Core Employee list for the duration of the Covered Project. Failure to submit the Core Employee list prior to work commencing will prohibit the Contractor from using any Core Employees for 30 calendar days after the list is provided to the Project Labor Coordinator and Council.

(e) Upon request by any Party to this Agreement, the Contractor hiring any Core Employee shall provide satisfactory proof (i.e., payroll records, quarterly tax records, and such other documentation) evidencing the Core Employee's qualification as a Core Employee to the Project Labor Coordinator and the Council.

(f) Core Employees must meet the following eligibility requirements to qualify for employment on Covered Projects:

(1) A Core Employee must be either a journeyman or Apprentice and appear on the Contractor's active payroll for at least ninety (90) of the last one-hundred-eighty (180) working days prior to being designated as a Core Employee. The date a Core Employee is designated is the date the Core Employee list is submitted to the Project Labor Coordinator and Council prior to the Contractor commencing work; and

(2) A Core Employee must possess any license required by state or federal law for the Project Work to be performed; and

(3) A Core Employee must have the ability to safely perform the basic functions of the applicable trade.



(g) In addition to the core employee provisions set forth herein, all Contractors may avail themselves of any opportunity provided for in the applicable Schedule A's to call for specific employees by name.

(h) During any layoffs or reductions in workforce, Contractors shall layoff employees in an order and manner consistent with the Core Employee hiring procedures and maintain the required Core Employee-to-Union referral ratios required by this Section for the duration of each Covered Project.

**Section 4.7** Time for Referral. If any Union's registration and referral system does not fulfill the requirements for specific classifications of covered employees (including City Residents) requested by any Contractor within forty-eight (48) hours (excluding Saturdays, Sundays, and holidays), that Contractor may employ Core Employees without reference to the ratio requirements in Section 4.6 or use employment sources other than the Union registration and referral services, and may employ applicants from any other available source. The Contractor should promptly inform the Union of any applicants hired from other sources, and such applicants shall register with the appropriate hiring hall, if any.

**Section 4.8** Lack of Referral Procedure. If a signatory local Union does not have a job referral system as set forth in Section 4.3 above, the Contractors shall give the Union equal opportunity to refer applicants. The Contractors shall notify the Union of employees so hired, as set forth in Section 4.7.

**Section 4.9** Union Membership. Employees are not required to become or remain union members as a condition of performing Covered Work under this Agreement. Employers shall make and transmit all deductions for union dues, fees, and assessments that have been authorized by employees in writing in accordance with the applicable Schedule A. Nothing in this Section 4.9 is intended to supersede the requirements of the applicable Schedule A's as to those Employers otherwise signatory to such Schedule A and as to the employees of those Employers who are performing Covered Work.

**Section 4.10** Foremen. The selection and number of craft foremen and/or general foremen shall be the responsibility of the Contractor, consistent with the Schedule A's. All foremen shall take orders exclusively from the designated Contractor representatives. Craft foremen shall be designated as working foreman at the request of the Contractors.

**Section 4.11** Skilled and Trained Workforce. All Contractors performing Project Work are required to provide the City with an enforceable commitment that a skilled and

trained workforce will be used to complete the construction contract or project, in accordance with City Council Resolution Number R-312062.

## ARTICLE 5

### UNION ACCESS AND STEWARDS

**Section 5.1** Access to Project Sites. Authorized representatives of the Union shall have access to Project Work, provided that they do not interfere with the work of employees and further provided that such representatives fully comply with posted visitor, security, and safety rules.

**Section 5.2** Stewards.

(a) Each signatory local Union shall have the right to dispatch a working journeyman as a steward for each shift, and shall notify the Contractor in writing of the identity of the designated steward or stewards prior to the assumption of such person's duties as steward. Such designated steward or stewards shall not exercise any supervisory functions. There will be no non-working stewards. Stewards will receive the regular rate of pay for their respective crafts.

(b) In addition to his/her work as an employee, the steward should have the right to receive, but not to solicit, complaints or grievances and to discuss and assist in the adjustment of the same with the employee's appropriate supervisor. Each steward should be concerned only with the employees of the steward's Contractor and not with the employees of any other Contractor. The Contractor will not discriminate against the steward in the proper performance of his/her Union duties.

(c) When a Contractor has multiple, non-contiguous work locations at one site, the Contractor may request and the Union shall appoint such additional working stewards as the Contractor requests to provide independent coverage of one or more such locations. In such cases, a steward may not service more than one work location without the approval of the Contractor.

(d) The stewards shall not have the right to determine when overtime shall be worked or who shall work overtime.

**Section 5.3** Steward Layoff/Discharge. The Contractor agrees to notify the appropriate Union twenty-four (24) hours before the layoff of a steward, except in the case of

disciplinary discharge for just cause. If the steward is protected against such layoff by the provisions of the applicable Schedule A, such provisions shall be recognized when the steward possesses the necessary qualifications to perform the remaining work. In any case in which the steward is discharged or disciplined for just cause, the appropriate Union will be notified immediately by the Contractor, and such discharge or discipline shall not become final (subject to any later filed grievance) until twenty-four (24) hours after such notice has been given.

**Section 5.4** Employees on Non-Project Work. On work where the personnel of the City may be working in close proximity to the construction activities covered by this PLA, the Union agrees that the Union representatives, stewards, and individual workers will not interfere with the City personnel, or with personnel employed by any other employer not a Party to this PLA.

## ARTICLE 6

### WAGES AND BENEFITS

**Section 6.1** Wages. At a minimum, all employees covered by this PLA shall be classified in accordance with work performed and paid the hourly wage rates for those classifications in compliance with the Applicable Prevailing Wage Determination established pursuant to the California Labor Code by the California Department of Industrial Relations.

**Section 6.2** Benefits.

(a) Subject to the exception set forth below for Disadvantaged Business Enterprises, otherwise, for all employees performing Project Work, Contractors shall pay all fringe benefits and other required employer contributions to the established Union employee benefit funds in the amounts required by the applicable Schedule A. In addition, the Contractors and Unions agree that only such bona fide employee benefits that accrue to the direct benefit of the employees (such as pension and annuity, health and welfare, vacation, apprenticeship, and training funds) shall be included in this requirement and required to be paid by the Contractor on Covered Projects. These Contractor contributions shall not exceed the contribution amounts set forth in the Applicable Prevailing Wage Determination.

Union Benefit Fund Contributions for Disadvantaged Business Enterprises.

Disadvantaged Business Enterprises are exempt from paying fringe benefits and

other required employer contributions on behalf of their Core Employees to the Union employee benefit funds, subject to the following exemption limitations:

(1) The exemption is only applicable to Disadvantaged Business Enterprises with an individual subcontract value of \$500,000 or less and;

(2) Disadvantaged Business Enterprises are limited to utilizing this exemption for one subcontract per Covered Project and;

(3) The total value of all subcontracts utilizing this exemption shall not exceed ten (10) percent of the total value of each Covered Project; and

(4) Disadvantaged Business Enterprises utilizing this exemption are still required to pay all fringe benefits and other required employer contributions to the established Union employee benefit funds for all employees other than their Core Employees, and must comply with the applicable prevailing wage requirements, including the payment of fringe benefits, for all employees performing Project Work; and

(5) In order to assist the Project Labor Coordinator monitor utilization of this exemption, each Prime Contractor will be responsible for tracking, reporting and providing notice to the Project Labor Coordinator about each Disadvantaged Business Enterprise subcontract that qualifies and intends to utilize this exemption prior to work commencing.

(b) Where applicable, the Contractor adopts and agrees to be bound by the written terms of the applicable, legally established, Union trust agreement(s) specifying the detailed basis how payments will be made into, and benefits paid out of, such trust funds for its employees. The Contractor authorizes the Parties to such trust funds to appoint trustees and successors' trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the Contractor. The Contractor obligations to the applicable Union benefit fund(s) and trust agreement(s) are limited to work performed on a Covered Project. The applicable Union benefit funds and trust agreement(s) to each Contractor are determined by the pre-job conference and Union work assignment process described in Articles 8 and 16.

(c) Each Contractor is required to certify to the Project Labor Coordinator that it has paid all benefit contributions due and owing to the appropriate Union trust(s) and benefit funds prior to the receipt of its final payment and/or retention. Further, upon timely notification by a Union to the Project Labor Coordinator, the Project Labor Coordinator shall work with any Contractor who is delinquent in

payments to assure that proper benefit contributions are made, to the extent of requesting the City or the prime Contractor to withhold payments otherwise due such Contractor, until such contributions have been made or otherwise guaranteed.

(d) Notwithstanding any other provisions, this Agreement is an agreement under Section 8(f) of the National Labor Relations Act (NLRA), which covers work performed in the building and construction industry. In addition, the work performed under this Agreement qualifies for the Construction Industry Exemption under the Employee Retirement and Income Security Act of 1974 (“ERISA”), as amended as well. If any Union Pension Trust Fund (“Fund”) covered by the terms and conditions of this Agreement does not qualify for the Construction Industry Exemption authorized by Section 4203 (B)(1)(i), of the Employee Retirement Income Security Act of 1974 (“ERISA”) as amended, 29 U.S.C. 1383(b)(1)(i), or has not taken the necessary steps to amend the Fund documents to qualify for the Construction Industry Exemption as authorized by Section 4203(B)(1)(ii) of ERISA, as amended, 29 U.S.C. 1383(b)(1)(B)(ii); and to recognize the work performed under this Agreement to qualify for the Construction Industry Exemption, the Contractors signatory to this Agreement will not be obligated to make pension fund contributions to that Fund. In such an event, the Contractor shall pay all required amounts otherwise allocated for payment toward the non-exempt Fund to the employees’ wages or other bona fide retirement plan program pursuant to applicable prevailing wage requirements.

**Section 6.3** Wage Premiums. Wage premiums, including, but not limited to, pay based on height of work, shift premiums, hazard pay, scaffold pay, and special skills shall not be applicable to work under this PLA, except to the extent provided for in any applicable prevailing wage determination.

**Section 6.4** Compliance with Prevailing Wage Laws. All complaints regarding possible prevailing wage violations may be referred to the Project Labor Coordinator or Labor Compliance Program, if any, for processing, investigation and resolution, and if not resolved within thirty (30) calendar days, may be referred by any Party to the State Labor Commissioner. To facilitate compliance with applicable prevailing wage laws, the City and each Contractor agree to provide copies of certified payroll reports, redacted only to the extent required by law, to the Unions (or to any Labor Management Cooperation Committee in which a Union or its affiliate participates) within ten (10) days of their request.

## ARTICLE 7

### WORK STOPPAGES AND LOCKOUTS

**Section 7.1** No Work Stoppages or Disruptive Activity. The Council and the Unions signatory hereto agree that they, nor their respective officers, or agents or representatives, shall incite or encourage, condone or participate in any strike, walk-out, slowdown, picketing, observation of picket lines, or other activity of any nature or kind whatsoever, for any cause or dispute whatsoever with respect to or any way related to Project Work, or which interferes with or otherwise disrupts Project Work, or with respect to or related to the City or Contractors or subcontractors, including, but not limited to, economic strikes, unfair labor practice strikes, safety strikes, sympathy strikes, and jurisdictional strikes whether or not the underlying dispute is arbitrable. Any such actions by the Council, or Unions, or their members, agents, representatives, or the employees they represent shall constitute a material violation of this PLA. The Council and the Union shall take all steps necessary to obtain compliance with this Article.

**Section 7.2** Employee Violations. The Contractor may discharge any employee violating Section 7.1 above, and any such employee will not be eligible for rehire under this PLA.

**Section 7.3** Standing to Enforce. The City, the Project Labor Coordinator, or any Contractor affected by an alleged violation of Section 7.1 shall have standing and the right to enforce the obligations established therein.

**Section 7.4** Expiration of Schedule A's. If a collective bargaining agreement between a signatory Contractor and one or more of the Union(s) expires before the Contractor completes the performance of a Covered Contract for a Covered Project, and the Union or the Contractor gives notice of demand for a new or modified collective bargaining agreement, the Unions agree that they will not strike the Contractor on any Covered Project, and the Union and the Contractor agree that the expired collective bargaining agreement will continue in full force and effect for the Project Work until a new or modified collective bargaining agreement is reached between the Union and the Contractor. If the new or modified collective bargaining agreement reached between the Union and the Contractor provides that any terms of the collective bargaining agreement shall be retroactive, the Contractor agrees to comply, consistent with the terms of this PLA and the Prevailing Wage Statute, with any retroactive terms of the new or modified collective bargaining agreement which are applicable to employees of said Contractor that are employed on a Covered Project within seven (7) days at

no cost to the City. All employees shall continue to work and to perform all their obligations with respect to Project Work despite the expiration of a Schedule A agreement. Should a Contractor engaged in Project Work enter into an interim agreement with the Unions for work being performed elsewhere after the expiration, and before the renewal of a local collective bargaining agreement forming the basis for Schedule A, such interim agreement shall be utilized by that Contractor for Project Work, subject to the provisions of Section 21.3.

**Section 7.5** No Lock Outs. Contractors shall not cause, incite, encourage, condone or participate in any lock-out of employees with respect to Project Work during the term of this PLA. The term “lock-out” refers only to a Contractor's exclusion of employees in order to secure collective bargaining advantage, and does not refer to the discharge, termination, or layoff of employees by the Contractor for any reason in the exercise of rights pursuant to any provision of this PLA, or any other agreement, nor does “lock-out” include the City's decision to stop, suspend, or discontinue any Project Work or any portion thereof for any reason.

**Section 7.6** Best Efforts to End Violations.

(a) If a Contractor contends that there is any violation of this Article, it shall, at least twenty-four (24) hours prior to invoking the procedures of Section 7.7, provide written notification to the Council of the involved Union(s) and to the Project Labor Coordinator, setting forth the facts which the Contractor contends violates this Article. The Council and the leadership of the involved Union(s) will immediately instruct, order, and use their best efforts to cause the cessation of any violation of the Article.

(b) If the Union contends that any Contractor has violated this Article, it will notify the Contractor and the Project Labor Coordinator, setting forth the facts which the Union contends violate this Article, at least twenty-four (24) hours prior to invoking the procedures of Section 7.7. The Project Labor Coordinator shall promptly order the involved Contractor(s) to cease any violation of the Article.

**Section 7.7** Expedited Enforcement Procedure. Any Party, including the City, which is an intended beneficiary of this Article, or the Project Labor Coordinator, may institute the following procedures, in lieu of or in addition to any other action at law or equity, when a breach of this Article is alleged.

(a) The Party invoking this procedure shall notify Thomas Pagan, who has been selected by the negotiating Parties, and whom the Parties agree shall be the permanent arbitrator under this procedure, or Barry Winograd, as the alternate

arbitrator under this procedure. If the permanent arbitrator is unavailable at any time, the alternate will be contacted. If neither is available, then a selection shall be made from the list of arbitrators as set forth in Article 10. Notice to the arbitrator shall be by the most expeditious means available, with notices to the Parties alleged to be in violation, and to the Project Labor Coordinator and Council. For purposes of this Article, written notice may be given by email, facsimile, hand delivery, or overnight mail and will be deemed effective upon receipt.

(b) Upon receipt of said notice, the arbitrator named above or his/her alternate shall sit and hold a hearing within twenty-four (24) hours if it is contended that the violation still exists, but not sooner than twenty-four (24) hours after notice has been dispatched to the Council of the involved Union(s) and/or Contractor as required by Section 7.6, above.

(c) The arbitrator shall notify the Parties of the place and time chosen for this hearing. Said hearing shall be completed in one session, which, with appropriate recesses at the arbitrator's discretion, shall not exceed twenty-four (24) hours unless otherwise agreed upon by all Parties. A failure of any Party or Parties to attend said hearings shall not delay the hearing of evidence or the issuance of any award by the arbitrator.

(d) The sole issue at the hearing shall be whether or not a violation of this Article has in fact occurred. The arbitrator shall have no authority to consider any matter in justification, explanation, or mitigation of such violation or to award damages, (except for damages as set forth in Section 7.8 below) which issue is reserved for court proceedings, if any. The award shall be issued in writing within three (3) hours after the close of the hearing and may be issued without an opinion. If any Party desires a written opinion, one shall be issued within fifteen (15) days, but its issuance shall not delay compliance with, or enforcement of, the award. The arbitrator may order cessation of the violation of the Article and other appropriate relief, and such award shall be served on all Parties by hand or registered mail upon issuance.

(e) Such award shall be final and binding on all Parties and may be enforced by any court of competent jurisdiction upon the filing of this PLA and all other relevant documents referred to herein above in the following manner. Written notice of the filing of such enforcement proceedings shall be given to the other Party. In any judicial proceeding to obtain a temporary order enforcing the arbitrator's award as issued under Section 7.7(d) of this Article, all Parties waive the right to a hearing and agree that such proceedings may be ex parte. Such



agreement does not waive any Party's right to participate in a hearing for a final order of enforcement. The court's order or orders enforcing the arbitrator's award shall be served on all Parties by hand or by delivery to their address as shown on this PLA (for a Union), as shown on their business contract for work under this PLA (for a Contractor) and to the representing Union (for an employee), by certified mail by the Party or Parties first alleging the violation.

(f) Any rights created by statute or law governing arbitration proceedings inconsistent with the above procedure or which interfere with compliance hereto are hereby waived by the Parties to whom they accrue.

(g) The fees and expenses of the arbitrator shall be equally divided between the Party or Parties initiating this procedure and the respondent Party or Parties.

**Section 7.8** Liquidated Damages.

(a) If the arbitrator determines in accordance with Section 7.7 above that a work stoppage has occurred, the respondent Union(s) shall, within eight (8) hours of receipt of the Award, direct all the employees they represent on the project to immediately return to work. If the craft(s) involved do not return to work by the beginning of the next regularly scheduled shift following such eight (8) hour period after receipt of the arbitrator's Award, and the respondent Union(s) have not complied with their obligations to immediately instruct, order, and use their best efforts to cause a cessation of the violation and return the employees they represent to work, then the non-complying Union(s) shall each pay a sum as liquidated damages to the City, and each will pay an additional sum per shift, as set forth in (c), below, for each shift thereafter on which the craft(s) has not returned to work.

(b) If the arbitrator determines in accordance with Section 7.7 above that a lock out has occurred, the respondent Contractor(s) shall, within eight (8) hours after receipt of the award, return all the affected employees to work on the Project, or otherwise correct the violations found by the arbitrator. If the respondent Contractor(s) do not take such action by the beginning of the next regular scheduled shift following the eight (8) hour period, each non-complying respondent Contractor shall pay or give as liquidated damages, to the affected Union(s) (to be apportioned among the affected employees and the benefit funds to which contributions are made on their behalf, as designated by the arbitrator) and each shall pay an additional sum per shift, as set forth in (c), below, for each shift thereafter in which compliance by the respondent Contractor(s) has not been completed.

(c) The Parties agree that project delays caused by violations of this Article will cause the City to sustain damages. They agree that it would be impractical or extremely difficult to fix the amount of such damages. Therefore, the Parties agree that, in the event of a breach of either of these provisions, the Party in breach shall pay to the City the sum of not less than \$10,000.00 and no more than \$20,000.00 per shift from the time the arbitrator determines that a delay has occurred until the arbitrator determines that the project is again on construction schedule. The payment, when made, shall constitute a damages remedy of the City for the delay specified, but shall not prevent the City from seeking an injunctive or other monetary relief, including termination of this PLA. Payment of these sums as liquidated damages is not intended as a forfeiture or penalty within the meaning of California Civil Code sections 3275 or 3369, but instead, is intended to constitute liquidated damages to the City pursuant to section 1671 of the California Civil Code.

## ARTICLE 8

### **WORK ASSIGNMENTS AND JURISDICTIONAL DISPUTES**

**Section 8.1** No Jobsite Disruption. There will be no strikes, work stoppages, picketing, sympathy strikes, slowdowns, or other interferences with the work because of jurisdictional disputes between Unions. The assignment of work will be solely the responsibility of the Contractor performing the work involved; and such work assignments will be in accordance with the Plan for Settlement of Jurisdictional Disputes in the Construction Industry (the “Plan”) or any successor Plan.

**Section 8.2** All jurisdictional disputes on this project shall be settled and adjusted according to the present Plan established by the Building and Construction Trades Department or any other plan or method of procedure that may be adopted by the Building and Construction Trades Department. Decisions rendered shall be final and binding and conclusive on the Contractors and Unions parties to this PLA.

All jurisdictional disputes shall be resolved without the occurrence of any of the activities prohibited in Article 7 (Work Stoppages and Lockouts), and the Contractor’s assignment shall be adhered to until the dispute is resolved. Individuals violating this section shall be subject to immediate discharge.

**Section 8.2.1** If a dispute arising under this Article involves the Southwest Regional Council of Carpenters or any of its subordinate bodies, an arbitrator shall be chosen by the procedures specified in Article V, Section 5, of the Plan from a list composed of Thomas Pagan, Thomas Angelo, Robert Hirsch, and John Kagel, and the

arbitrator's hearing on the dispute shall be held at the offices of the Council within fourteen (14) days of the selection of the arbitrator. All other procedures shall be as specified in the Plan.

**Section 8.3** Failure to Comply. If any Union or Contractor fails to immediately and fully comply with the final decision rendered by the Plan, affected Union(s) or Contractor(s) may seek legal redress for such conduct, including, but not limited to, injunctive relief and/or damages.

**Section 8.4** Pre-job Conference. It is required that a pre-job conference be held not later than fourteen (14) calendar days prior to the start of work by each Contractor for the Covered Project in accordance with the procedure described in Article 16.

## ARTICLE 9

### MANAGEMENT RIGHTS

**Section 9.1** Contractor and City Rights. The Contractors and the City have the sole and exclusive right and authority to oversee and manage construction operations on Project Work without any limitations unless expressly limited by a specific provision of this PLA. In addition to the following and other rights of the Contractors enumerated in this PLA, the Contractors expressly reserve their management rights and all the rights conferred upon them by law. The Contractor's rights include, but are not limited to, the right to:

- (a) Plan, direct, and control operations of all work; and
- (b) Hire, promote, transfer, and layoff their own employees, respectively, as deemed appropriate to satisfy work and/or skill requirements; and
- (c) Promulgate and require all employees to observe reasonable job rules and security and safety regulations; and
- (d) Discharge, suspend, or discipline their own employees for just cause; and
- (e) Utilize, in accordance with City approval, any work methods, procedures, or techniques, and select, use, and install any types or kinds of materials, apparatus, or equipment, regardless of source of manufacture or construction; and
- (f) Assign and schedule work at their discretion; and

(g) Assign overtime, determine when it will be worked and the number and identity of employees engaged in such work, subject to such provisions in the applicable Schedule A(s) requiring such assignments be equalized or otherwise made in a nondiscriminatory manner.

**Section 9.2** Specific City Rights. In addition to the following and other rights of the City enumerated in this PLA, the City expressly reserves its management rights and all the rights conferred on it by law and contract. The City's rights (and those of the Project Labor Coordinator on its behalf) include, but are not limited to the right to:

(a) Inspect any construction site or facility to ensure that the Contractor follows the applicable safety and other work requirements; and

(b) At its sole option, terminate, delay, and/or suspend any and all portions of the Project Work at any time; prohibit some or all work on certain days or during certain hours of the day to accommodate the ongoing operations of the City and/or to mitigate the effect of ongoing Project Work on businesses and residents in the neighborhood of the Project sites; and/or require any other operational or schedule changes it deems necessary, in its sole judgment, to meet Project deadlines and remain a good neighbor to those in the area of the Covered Projects. (In order to permit the Contractors and Unions to make appropriate scheduling plans, the City will provide the Project Labor Coordinator, and the affected Contractor[s] and Union[s] with reasonable notice of any changes it requires pursuant to this section); and

(c) Approve any work methods, procedures, and techniques used by Contractors whether or not these methods, procedures, or techniques are part of industry practices or customs; and

(d) Investigate and process complaints or disagreements, through its Project Labor Coordinator.

**Section 9.3** Use of Materials. There should be no limitations or restrictions by the Union upon a Contractor's choice of materials or design, nor, regardless of source or location, upon the full use and utilization of equipment, machinery, packaging, precast, prefabricated, prefinished, or preassembled materials, tools, or other labor-saving devices, subject to the application of the California Public Contract and Labor Codes. Generally, the onsite installation or application of such items shall be performed by the craft having jurisdiction over such work.

**Section 9.4** Special Equipment, Warranties, and Guaranties.

(a) It is recognized that certain equipment of a highly technical and specialized nature may be installed at Covered Project sites. The nature of the equipment, together with the requirements for manufacturer's warranties, may dictate that it be prefabricated, pre-piped, and/or pre-wired and that it be installed under the supervision and direction of the City's and/or manufacturer's personnel. The Unions agree that such equipment is to be installed without incident.

(b) The Parties recognize that the Contractor will initiate from time to time the use of new technology, equipment, machinery, tools, and other labor-savings devices and methods of performing Project Work. The Unions agree that they will not restrict the implementation of such devices or work methods. The Unions will accept and will not refuse to handle, install, or work with any standardized and/or catalogue parts, assemblies, accessories, prefabricated items, preassembled items, partially assembled items, or materials whatever their source of manufacture or construction.

(c) If any disagreement between the Contractor and the Unions concerning the methods of implementation or installation of any equipment, device, or item, or method of work arises, or whether a particular part or pre-assembled item is a standardized or catalog part or item, the work will proceed as directed by the Contractor, and the Parties shall immediately consult over the matter. If the disagreement is not resolved, the affected Union(s) shall have the right to proceed through the procedures set forth in Article 10.

## **ARTICLE 10**

### **SETTLEMENT OF GRIEVANCES AND DISPUTES**

#### **Section 10.1** Cooperation and Harmony on Site.

(a) This PLA is intended to establish and foster continued close cooperation between management and labor. The Council shall assign a representative to this Project for the purpose of assisting the local Unions, and working with the Project Labor Coordinator, together with the Contractors, to complete construction of the Project Work economically, efficiently, continuously, and without any interruption, delays, or work stoppages.

(b) The Project Labor Coordinator, the Contractors, Unions, and employees collectively and individually, realize the importance to all Parties of maintaining continuous and uninterrupted performance of Project Work, and agree to resolve

disputes in accordance with the grievance provisions set forth in this Article or, as appropriate, those of Article 7 or 8.

(c) The Project Labor Coordinator shall observe the processing of grievances under this Article and Articles 7 and 8, including the scheduling and arrangements of facilities for meetings, selection of the arbitrator from the agreed-upon panel to hear the case, and any other administrative matters necessary to facilitate the timely resolution of any dispute; provided, however, it is the responsibility of the principal Parties to any pending grievance to ensure the time limits and deadlines are met.

**Section 10.2** Processing Grievances. Any questions arising out of and during the term of this PLA involving its interpretation and application, which includes applicable provisions of the Schedule A's, but not alleged violations of Articles 7 or 8, shall be considered a grievance and subject to resolution under the following procedures.

Step 1. (a) Employee Grievances. When any employee subject to the provisions of this PLA feels aggrieved by an alleged violation of this PLA, the employee shall, through his local Union business representative or job steward, within ten (10) working days after the occurrence of the violation, give notice to the work site representative of the involved Contractor stating the provision(s) alleged to have been violated, the details of the alleged violation and the remedy sought to resolve the matter. A grievance shall be considered null and void if notice of the grievance is not given within the ten (10) day period. A business representative of the local Union or the job steward and the work site representative of the involved Contractor shall meet and endeavor to adjust the matter within ten (10) working days after timely notice has been given. If they fail to resolve the matter within the prescribed period, the grieving Party may, within ten (10) working days thereafter, pursue Step 2 of this grievance procedure provided the grievance is reduced to writing, setting forth the relevant information, including a short description thereof, the date on which the alleged violation occurred, and the provision(s) of the applicable agreement alleged to have been violated. Grievances and disputes settled at Step 1 shall be non-precedential except as to the Parties directly involved.

(b) Union or Contractor Grievances. Should the Union(s) or any Contractor have a dispute with the other Party(ies) and, if after conferring within ten (10) working days after the disputing Party knew or should have known of the facts or occurrence giving rise to the dispute, a settlement is not reached within five (5) working days, the dispute shall be reduced to writing and processed to Step 2 in

the same manner as outlined in Step 1(a) above for the adjustment of an employee complaint.

Step 2. The business manager of the involved local Union or his designee, together with the site representative of the involved Contractor, and the labor relations representative of the Project Labor Coordinator shall meet within seven (7) working days of the referral of the dispute to this second step to arrive at a satisfactory settlement thereof. If the Parties fail to reach an agreement, the dispute may be appealed in writing in accordance with the provisions of Step 3 within seven (7) calendar days after the initial meeting at Step 2.

Step 3. (a) If the grievance shall have been submitted but not resolved under Step 2, either the Union or Contractor Party may request in writing to the Project Labor Coordinator (with copy[ies] to the other Party[ies]) within seven (7) calendar days after the initial Step 2 meeting, that the grievance be submitted to an arbitrator selected from the agreed-upon list below, on a rotational basis in the order listed. Those arbitrators are: (1) Thomas Pagan; (2) David Hart; (3) Edna Francis; (4) Mike Rappaport; (5) Michael Prihar; (6) Fred Horowitz; and (7) Sara Adler. The decision of the arbitrator shall be final and binding on all Parties, and the fee and expenses of such arbitrations shall be borne equally by the involved Contractor(s) and the involved Union(s).

(b) Failure of the grieving Party to adhere to the time limits established herein shall render the grievance null and void. The time limits established herein may be extended only by written consent of the Parties involved at the particular step where the extension is agreed upon. The arbitrator shall have the authority to make decisions only on issues presented and shall not have the authority to change, amend, add to, or detract from any of the provisions of this PLA.

**Section 10.3** Limit on Use of Procedures. Procedures contained in this Article shall not be applicable to any alleged violation of Article 7 or 8, with a single exception that any employee discharged for violation of Section 7.2 may resort to the procedures of this Article to determine only if he/she was, in fact, engaged in that violation.

**Section 10.4** Notice. The Project Labor Coordinator (and the City, in the case of any grievance regarding the Scope of this PLA), shall be notified by the involved Contractor of all actions at Steps 2 and 3, and further, the Project Labor Coordinator shall, upon its own request, be permitted to participate fully in all proceedings at such steps.

## ARTICLE 11

### COMPLIANCE

**Section 11.1** Compliance with All Laws. The Council and all Unions, Contractors, and their employees shall comply with all applicable federal and state laws, ordinances, and regulations including, but not limited to, those relating to safety and health, employment, and applications for employment. All employees shall comply with the safety regulations established by the City, the Project Labor Coordinator, and the Contractor. Employees must promptly report any injuries or accidents to a supervisor.

**Section 11.2** Monitoring Compliance. The Parties agree that the City shall require, and that the Project Labor Coordinator and Council shall monitor, compliance by all Contractors with all federal and state laws and regulations that, from time to time may apply to Project Work. It shall be the responsibility of both the Council and the Project Labor Coordinator (on behalf of the City) to investigate or monitor compliance with these various laws and regulations. The Council may recommend to the Project Labor Coordinator and/or the City procedures to encourage compliance with these laws and regulations.

**Section 11.3** Prevailing Wage Compliance. The Council or Union may refer all complaints regarding any potential prevailing wage violation to the Project Labor Coordinator, who may process, investigate, and resolve such complaints. The Council or Union, as appropriate, shall be advised in a timely manner with regard to the facts and resolution, if any, of any complaint. It is understood that this Section does not restrict any individual rights as established under the State Labor Code, including the rights of an individual to file a complaint with the State Labor Commissioner.

**Section 11.4** Violations of Law. Based upon a finding of violation by the City of a federal and state law, and upon notice to the Contractor that it is in such violation, the City, in the absence of the Contractor remedying such violation, shall take such action as it is permitted by law or contract to encourage the Contractor to come into compliance, including, but not limited to, assessing fines and penalties and/or removing the offending Contractor from Project Work.



## ARTICLE 12

### **SAFETY AND PROTECTION OF PERSON AND PROPERTY**

#### **Section 12.1** Safety.

(a) It shall be the responsibility of each Contractor to ensure safe working conditions and employee compliance with all applicable safety laws and regulations and any safety rules contained herein or established by the City, the Project Labor Coordinator, or the Contractor. It is understood that employees have an individual obligation to use diligent care to perform their work in a safe manner and to protect themselves and the property of the Contractor and the City.

(b) All Parties and Contractor employees shall be bound by the safety, security, and visitor rules established by the Contractor, the Project Labor Coordinator, and the City. These rules will be published and posted. An employee's failure to satisfy his/her obligations under this Section will subject him/her to discipline, up to and including discharge.

**Section 12.2** Drug and Alcohol Testing Policy. The Parties agree to adopt the Drug and Alcohol Testing Policy attached hereto as Attachment C, which is the exclusive Drug and Alcohol Testing Policy for Covered Projects.

**Section 12.3** Inspection. The inspection of shipments of equipment, machinery, and construction materials of every kind shall be performed at the discretion of the Contractor by individuals of its choice.

## ARTICLE 13

### **TRAVEL AND SUBSISTENCE**

**Section 13.1** Travel expenses, travel time, subsistence allowances and/or zone rates, and parking reimbursements shall not be applicable to work under this PLA, except to the extent provided for in any applicable prevailing wage determination. Parking for employees covered by this PLA shall be provided by the Contractor(s) according to the provision of the Schedule A(s) existing on the Effective Date of this PLA and upon presentation of proof of any expense incurred.

## ARTICLE 14

### APPRENTICES

**Section 14.1** Importance of Training. The Parties recognize the need to maintain continuing support of the programs designed to develop adequate numbers of competent workers in the construction industry, the obligation to capitalize on the availability of the local work force in the area served by the City, and the opportunities to provide continuing work on Covered Projects for City Residents and Targeted Workers. To these ends, and consistent with any laws or regulations, the Parties will facilitate, encourage, and assist City Residents and Targeted Workers commence and progress in Apprenticeship Programs and/or apprenticeship readiness programs in the construction industry leading to participation in such Apprenticeship Programs. The City, the Project Labor Coordinator, other City consultants, the Contractors, and the Council and Unions, will work cooperatively to identify, or establish and maintain, effective programs and procedures for persons interested in entering the construction industry and which will help prepare them for the entry into Apprenticeship Programs. Apprentices, if utilized, must be enrolled in a California Apprenticeship Council-approved Apprenticeship Program.

**Section 14.2** Use of Apprentices.

(a) The Unions and Contractors agree to cooperate in referring and employing Apprentices up to the maximum percentage allowed by the State Labor Code and the standards of each State-Approved Apprenticeship Program. The minimum ratios for Apprentice to journey person hours worked shall be in compliance, at a minimum, with the applicable provisions of the State Labor Code relating to utilization of Apprentices. The City, unless otherwise required by law, shall encourage such utilization, and, both as to Apprentices and the overall supply of experienced workers, the Project Labor Coordinator will work with the Council, Apprenticeship Programs, and Contractors to assure appropriate and maximum utilization of Apprentices and the continuing availability of both Apprentices and journey persons.

(b) The Parties agree that all Contractors will comply with all applicable laws and regulations in the request for dispatch and employment of Apprentices.

(c) The Parties agree that Apprentices will not be dispatched to Contractors working under this PLA unless there is a journeyman or other Contractor employee working on the Project where the Apprentice is to be employed who is

qualified to assist and oversee the Apprentice's progress through the program in which he/she is participating.

## ARTICLE 15

### LEGAL ACTION

**Section 15.1** Legal Action. The City, Council and Unions recognize the substantial legal costs (including all attorney's fees and associated disbursements) that might accrue with regard to any legal challenge over the adoption by the City of this PLA, and related to claims directly challenging the legality of this PLA, or a particular section or language that has been adopted herein. In the event of a legal challenge, the Council, on behalf of itself and affiliated Unions, agrees to seek to intervene in the legal action and actively participate in the litigation or other action to defend the legality of this PLA, or a particular section or language herein. The failure of the Council to seek to intervene in the legal action and actively participate to defend the legality of this PLA will constitute a material breach of this PLA. In the event the Council is denied leave to intervene in the legal action, the Council shall have its counsel coordinate with the City's counsel, at the Council's own expense, regarding how the Council can best support the City's legal position.

## ARTICLE 16

### PRE-JOB CONFERENCE

**Section 16.1** Each Contractor is required to conduct a pre-job conference with the Unions not later than fourteen (14) calendar days prior to commencing work. The purpose of the conference will be to, among other things, convey craft manpower needs, the schedule of work for the Covered Project, project work rules, and propose preliminary Union work assignments. The Project Labor Coordinator may work with the Prime Contractor and Council to facilitate the scheduling of all pre-job conferences, but ensuring each Contractor conducts a pre-job conference in accordance with this Agreement is the responsibility of the Prime Contractor. All preliminary Union work assignments shall be disclosed by each Contractor at a pre-job conference. Should there be work within the scope of a Construction Contract for a Covered Project that was not previously assigned at a pre-job conference, or additional work be added to the scope of the Covered Project, the Contractor(s) performing such work will conduct a separate pre-job conference.

Any Union in disagreement with a proposed assignment shall notify the affected Contractor of its position in writing, with a copy sent to the Project Labor Coordinator, within seven (7) calendar days after the pre-job conference occurred. Within seven (7) calendar days after the period allowed for Union notices of disagreement with the Employer's proposed assignments, but prior to the commencement of any work, the Employer shall make final assignments in writing with copies sent to the Project Labor Coordinator and Council.

## ARTICLE 17

### **LABOR/MANAGEMENT AND COOPERATION**

**Section 17.1** Joint Committee. The Parties to this PLA will form a joint committee consisting of three (3) representatives selected by the Council and three (3) representatives selected by the Project Labor Coordinator, to be chaired jointly by a representative of the Project Labor Coordinator and the Council. The purpose of the Committee shall be to promote harmonious and stable labor management relations on this Project, to ensure effective and constructive communication between labor and management Parties, to advance the proficiency of work in the industry, and to evaluate and ensure an adequate supply of skilled labor for all Project Work. Representatives of the City may participate upon its request, and all Parties will be invited to attend.

**Section 17.2** Functions of Joint Committee. The Committee shall meet on a schedule to be determined by the Committee or at the call of the joint chairs, to discuss the administration of the PLA, the progress of the project, general labor management problems that may arise, and any other matters consistent with this PLA. Substantive grievances or disputes arising under Articles 7, 8, or 10 shall not be reviewed or discussed by this Committee, but shall be processed pursuant to the provisions of the appropriate Article.

The Project Labor Coordinator shall be responsible for scheduling of the meetings and the preparation of the agenda topics for the meetings, with input from the Unions, the Contractors, and the City. Notice of the date, time and place of meetings, shall be given to the Committee members at least three (3) days prior to the meeting. The City shall be notified of the meetings and invited to send a representative(s) to participate.

The Project Labor Coordinator shall prepare quarterly reports on Apprentice utilization and the training and employment of City Residents, and a schedule of Project work and estimated number of craft workers needed. The Committee, or

an appropriate subcommittee, may review such reports and make any recommendations for improvement, if necessary, including increasing the availability of skilled trades, and the employment of local residents or other individuals who should be assisted with appropriate training to qualify for Apprenticeship Programs.

**Section 17.3** Subcommittees. The Committee may form subcommittees to consider and advise the full Committee with regard to safety and health issues affecting the Project and other similar issues affecting the overall Project, including any workers' compensation program initiated under this PLA.

## ARTICLE 18

### **SAVINGS AND SEPARABILITY**

**Section 18.1** Savings Clause. It is not the intention of the City, the Project Labor Coordinator, Contractor, or the Union Parties to violate any laws governing the subject matter of this PLA. The Parties hereto agree that in the event any provision of this PLA is finally held or determined to be illegal or void as being in contravention of any applicable law or regulation, the remainder of the PLA shall remain in full force and effect unless the part or parts so found to be void are wholly inseparable from the remaining portions of this PLA. Further, the Parties agree that if and when any provision(s) of this PLA is finally held or determined to be illegal or void by a court of competent jurisdiction, the Parties will promptly enter into negotiations concerning the substantive effect of such decision for the purposes of achieving conformity with the requirements of any applicable laws and the intent of the Parties hereto. If the legality of this PLA is challenged and any form of injunctive relief is granted by any court, suspending temporarily or permanently the implementation of this PLA, then the Parties agree that all Project Work that would otherwise be covered by this PLA should be continued to be bid and constructed without application of this PLA so that there is no delay or interference with the ongoing planning, bidding, and construction of any Project Work.

**Section 18.2** Effect of Injunctions or Other Court Orders. The Parties recognize the right of the City to withdraw, at its absolute discretion, the utilization of the PLA as part of any bid specification should a court of competent jurisdiction issue any order, or any applicable statute that could result, temporarily or permanently, in delay of the bidding, awarding, and/or construction on the Project.

## ARTICLE 19

### WAIVER

**Section 19.1** Waiver. A waiver of or a failure to assert any provisions of this PLA by any or all of the Parties hereto shall not constitute a waiver of such provision for the future. Any such waiver shall not constitute a modification of the PLA or change in the terms and conditions of the PLA and shall not relieve, excuse or release any of the Parties from any of their rights, duties, or obligations hereunder.

## ARTICLE 20

### AMENDMENTS

**Section 20.1** Amendments. The provisions of this PLA can be renegotiated, supplemented, rescinded, or otherwise altered only by mutual agreement in writing, hereafter signed by the Parties.

## ARTICLE 21

### DURATION OF THE PLA

**Section 21.1** Duration. This Agreement shall be effective on June 16, 2020, provided that the Council has signed the Agreement. The Agreement shall continue in full force and effect until all of the work within the scope of a Covered Contract is completed and accepted by the City.

**Section 21.2** Turnover and Final Acceptance of Completed Work.

(a) Construction of any phase, portion, section, or segment of Project Work shall be deemed complete when such phase, portion, section or segment has been turned over to the City by the Contractor and the City has accepted such phase, portion, section, or segment. As areas and systems of the Project are inspected and construction-tested and/or approved and accepted by the City or third parties with approval of the City, the PLA shall have no further force or effect on such items or areas, except when the Contractor is directed by the City to engage in repairs or modifications required by its Contract(s) with the City.

(b) Notice of each final acceptance received by the Contractor will be provided to the Council with the description of what portion, segment, etc. has

been accepted. Final acceptance may be subject to a “punch” list, and in such case, the PLA will continue to apply to each such item on the list until it is completed to the satisfaction of the City and Notice of Acceptance is given by the City or its representative to the Contractor.

**Section 21.3** Continuation of Schedule A’s. Schedule A's incorporated as part of this PLA shall continue in full force and effect, as previously stated, until the Contractor and Union Parties to the collective bargaining agreement(s), which are the basis for such Schedule A's, notify the Project Labor Coordinator of the mutually agreed upon changes in such agreements and their effective date(s).

The Parties agree to recognize and implement all applicable changes on their effective dates, except as otherwise provided by this PLA; provided, however, that any such provisions negotiated in said collective bargaining agreements will not apply to work covered by this PLA if such provisions are less favorable to the Contractor under the PLA than those uniformly required of Contractors for construction work normally covered by those agreements; nor shall any provision be recognized or applied if it may be construed to apply exclusively or predominantly to work covered by this PLA. Any disagreement between the Parties over the incorporation into a Schedule A of any such provision agreed upon in a negotiation of the local collective bargaining agreement that is the basis for a Schedule A shall be resolved under the procedures established in Article 10.

**Section 21.4** Final Termination. Final termination of all obligations, rights, and liabilities, and disagreements shall occur upon receipt by the Council of a Notice from the City saying that no work remains within the scope of the PLA.

**Section 21.5** Pure Water Program Phase II Projects. The City and the Unions intend to have this Agreement or a succeeding Agreement include all construction projects in Pure Water Program Phase II. The Pure Water Program Phase II Projects are in the early development stage and cannot be specifically identified at this time to be included in the scope of this Agreement. Therefore, to reopen negotiations to include Pure Water Program Phase II Projects into this Agreement, the Council shall send written notice to the City’s Project Labor Coordinator after the City has approved Pure Water Program Phase II Projects' Environmental Impact Report and no later than ninety (90) days after the City’s final approval of the Environmental Impact Report.

## ARTICLE 22

### WORK AND ECONOMIC OPPORTUNITY

**Section 22.1** The magnitude, duration, and complexity of the Pure Water Program Phase I Projects will require large numbers of skilled craft personnel and create significant economic opportunities for City Residents, Targeted Workers, Disadvantaged Business Enterprises and other businesses. It is therefore the understanding and intention of the Parties to use the opportunities provided by the extensive amount of work to collaborate and implement programs and procedures, which may include, for example, North America's Building Trades Unions Multi-Craft Core Curriculum (MC3) apprenticeship readiness programs, to prepare persons, especially City Residents and Targeted Workers, for entrance into Apprenticeship Programs to begin or continue their construction careers on Covered Projects. Further, the Parties agree to maximize the inclusion of Disadvantage Business Enterprises through outreach, training, and subcontracting for Covered Projects. With assistance from the Project Labor Coordinator, the City, the Contractors, the Unions and their affiliated regional and national organizations will work jointly to promptly develop and implement procedures for the identification of craft needs, the scheduling of work to facilitate the utilization of available craft workers, and the securing of services of craft workers in sufficient numbers to meet the high demands of the Project Work to be undertaken.

**Section 22.2** The City, together with the Parties, supports the development of increased numbers of skilled construction workers who are City Residents and Targeted Workers to meet the labor needs of Covered Projects. Towards that end, the Parties, together with the City and its Project Labor Coordinator, agree to develop and implement a work opportunities program for City Residents and Targeted Workers to maximize construction career opportunities and create a construction career pipeline to becoming employed on Covered Projects. Further, the City together with the Parties, will create opportunities for Disadvantaged Business Enterprises consistent with the City's goals and inclusion programs for such businesses. In furtherance of the foregoing, the Council and Unions specifically agree to work with the City and the Project Labor Coordinator to:

- (a) Collaborate with existing or newly created MC3 apprenticeship readiness programs in San Diego to offer opportunities for City Residents and Targeted Workers, including students, to enroll in free short-term construction apprenticeship readiness training to prepare them to enter into Apprenticeship Programs and become employed by a Contractor on a Covered Project. The



Project Labor Coordinator, with the assistance of the Parties, will assist with the recruitment, career placement, and tracking of such City Residents and Targeted Workers who graduate from these apprenticeship readiness programs; and

(b) The Parties will cooperate and collaborate with the City and Project Labor Coordinator to conduct outreach to and include City Residents and Targeted Workers from traditionally underrepresented segments of the City's population in the construction craft workforce for each Covered Project; and

(c) The Council will provide accurate data on a quarterly basis to the City and Project Labor Coordinator pertaining to their level of economic support provided to meet these objectives. Further, the Project Labor Coordinator shall produce detailed quarterly reports for the City and Council to measure and report the outcomes of the policies, requirements, and programs established in this Agreement; and

(d) The Unions will partner with the City and Project Labor Coordinator to conduct outreach and recruitment activities by establishing or continuing to maintain existing centers, programs, and events to facilitate the entry of City Residents and Targeted Workers into the building and construction trades. These programs shall serve as a resource for preliminary orientation, assessment of construction aptitude, referral to MC3 apprenticeship readiness programs or Apprenticeship Programs, referral to hiring halls, and provide tailored orientation and mentoring for women and Targeted Workers; and

(e) The Unions shall assist City Residents and Targeted Workers with contacting the Apprenticeship Programs for the crafts and trades they are interested in. The Unions shall assist City Residents and Targeted Workers who are seeking employment on Covered Projects and provide opportunities for Union membership by assessing their work experience and giving them credit for provable past experience in their relevant craft or trade, including experience gained working for non-Union Contractors. The Unions shall put on their rolls qualified bona fide City Residents and Targeted Workers for employment on Covered Projects.

**Section 22.3** Joint Subcommittee on Work and Economic Opportunity. To carry out the intent and purpose of this Article, a subcommittee of the Labor Management Committee established pursuant to Article 17 shall be established, jointly chaired by a designee of the City and a designee of the Council, to oversee the effective development and implementation of the programs and policies described herein, and to work with representatives of each apprenticeship committee and representatives of the MC3 apprenticeship readiness programs to maximize

employment opportunities for City Residents and Targeted workers who reflect the diversity of the communities surrounding each Covered Project and who may not be previously qualified for the construction career opportunities created by the Covered Projects. The subcommittee will meet as necessary at the call of the joint chairs to promptly facilitate its purposes in an expeditious manner as soon as this PLA becomes effective. In addition to the joint chairs, the membership of the committee will consist of at least three (3) representatives of the signatory local Unions and three (3) representatives of Contractors (or organization to which the Contractors belong) signatory to this PLA and experienced in overseeing and participating in Apprenticeship Programs.

## ARTICLE 23

### **HELMETS TO HARDHATS**


**Section 23.1** Veterans Entry into Building and Construction Trades. The Parties recognize a desire to facilitate the entry into the building and construction trades of Veterans who are interested in careers in the building and construction industry. The Contractors and Unions agree to utilize the services of the Center for Military Recruitment, Assessment and Veterans Employment (hereinafter “Center”) and the Center’s “Helmets to Hardhats” program to serve as a resource for preliminary orientation, assessment, and construction aptitude, referral to Apprenticeship Programs or hiring halls, counseling and mentoring, support network, employment opportunities, and other needs as identified by the Parties.

**Section 23.2** Integrated Database. The Unions and Contractors agree to coordinate with the Center to create and maintain an integrated database of Veterans interested in working on this Covered Project and of apprenticeship and employment opportunities for this Covered Project.

In witness whereof, the Parties have caused this Project Labor Agreement for City of San Diego Pure Water Program Phase I Projects to be executed as of the date and year above stated.

Dated: July 9, 2020

SAN DIEGO BUILDING AND CONSTRUCTION  
TRADES COUNCIL

DocuSigned by:  
  
ADB86106CE1E414...

By: \_\_\_\_\_  
Tom Lemmon, Business Manager

SIGNATORY UNIONS AND  
(See Attached)

SIGNATORY UNIONS

DocuSigned by:  
Michael Patterson  
38B4C81867E341A...  
By: Allied Workers Local 5

By: Chad Boggio Chad Boggio  
Bricklayer & Allied Crafts Local 4

DocuSigned by:  
By: 4111C0A1543D4C8  
Electrical Workers Local 569

DocuSigned by:  
By: 3380E1140A31459...  
Glaziers, Floor Coverings & Painters Local 1399

DocuSigned by:  
Valentine R. Macedo  
AC5993278764412...  
By: Laborers Local 89

DocuSigned by:  
James Preciado  
By: Plasterer Tenders Local 1414

By: Operating Engineers Local 12

DocuSigned by:  
Mike Hartley  
363A0846720A48F...  
By: Plumbers & Pipefitters Local 230

DocuSigned by:  
Paul Colmenero  
97581004B0E0439...  
By: Roofers & Waterproofers Local 45

DocuSigned by:  
By: B569A3D2C62940C...  
Laborers Local 1184

DocuSigned by:  
Ed Uarn  
AEBFEA548C4F413...  
By: Laborers Local 345

DocuSigned by:  
Ricardo Perez  
8C144FFD6F5F464...  
By: UA Local 345

DocuSigned by:  
Stephen Ariza  
B66C6F62284F439...  
By: Southwest Regional Council of Carpenters

DocuSigned by:  
Luis Miramontes  
997D1F49D5364AD...  
By: Boilermakers Local 92

DocuSigned by:  
Jack Alvarado  
5C661A00E44B47F...  
By: Cement Masons Local 500 / Area 744

By: Frank Belio, Jr. For BM Gazzaniga  
Elevator Constructors Local 18

DocuSigned by:  
David Osborne  
0679DF11AEC34C3...  
By: Iron Workers Local 229

DocuSigned by:  
Tom Castleman  
D99E7C175E1E4A7...  
By: Plasterers Local 200

By: Ronald A. ...  
Operating Engineers Local 12

By: Operating Engineers Local 12

DocuSigned by:  
Todd Barry  
B9584FD2117949F...  
By: Road Sprinkler Fitters Local 669

DocuSigned by:  
Dave Gauthier  
D3C0E4114ADC482...  
By: Sheet Metal Workers Local 206

DocuSigned by:  
Douglas R Tracy  
By: Sheet Metal Workers Local 206

DocuSigned by:  
Jose Estrada  
530AF0ECACB1492...  
By: Teamsters Local 166

DocuSigned by:  
By: 3380E1140A31459...  
Tradeshow & Sign Craft Local 831

DocuSigned by:  
By: Laborers Local 300

**ATTACHMENT A – LETTER OF ASSENT**

To be signed by all Contractors awarded work covered by the Project Labor Agreement prior to commencing work.

[CONTRACTOR’S LETTERHEAD]

DATE

Project Labor Coordinator

Address

Address

Address

Attention: \_\_\_\_\_

**Re: City of San Diego Project Labor Agreement for  
Pure Water Program Phase I Project**

Dear Sir:

This is to confirm [Name of Company] agrees to be party to and bound by the City of San Diego Project Labor Agreement for Construction of Pure Water Program Phase I Projects, effective May 1, 2020, as such Agreement may from time to time be amended by the negotiating Parties or interpreted pursuant to its terms. Such obligation to be a Party and bound by this Agreement shall extend to all work covered by the Agreement undertaken by this Company on the Project pursuant to [City Contract No. \_\_\_\_\_ and Name of Covered Project], and this Company shall require all of its subcontractors of whatever tier to be similarly bound for all work within the scope of the Agreement by signing and furnishing to you an identical Letter of Assent prior to their commencement of work.

Sincerely,

[Name of Construction Company]

By:

[Name and Title of Authorized Executive]

[Copies of this Letter must be submitted to the Project Labor Coordinator and to the Council consistent with Article 3, Section 3.3(b)]

## ATTACHMENT B-1 – WORKFORCE DISPATCH REQUEST FORM

The City of San Diego’s Project Labor Agreement for Pure Water Program Phase I Projects establishes a goal of at least thirty-five percent (35%) of the total craft hours on each Covered Project be performed by City Residents. The Unions and Contractors agree that, to the extent allowed by law, and as long as they possess the requisite skills and qualifications, City Residents shall be first referred for Project Work. A “City Resident” is defined as a City of San Diego permanent resident at the time of initial employment on a Covered Project or a Veteran residing anywhere.

\*The list of qualifying zip codes for City Residents includes: 92014, 92037, 92038, 92067, 92093, 92101, 92102, 92103, 92104, 92105, 92106, 92107, 92108, 92109, 92110, 92111, 92113, 92114, 92115, 92116, 92117, 92119, 92120, 92121, 92122, 92123, 92124, 92126, 92127, 92128, 92129, 92130, 92131, 92132, 92134, 92137, 92138, 92139, 92145, 92154, 92166, 92167, 92169, 92171, 92173, 92177.

### C O N T R A C T O R U S E O N L Y

Please complete and fax or email this form to the applicable union to request craft workers that fulfill the hiring requirements for this project. After faxing your request, please call the Local to verify receipt and substantiate their capacity to furnish workers as specified below. Please print your Fax or Email Transmission Verification Reports and keep copies for your records.

<b>TO:</b>	Local Union and #	
	Email	
	Fax	

<b>CC:</b>	<b>City of San Diego Project Labor Coordinator</b>	
	Email	
	Fax	

<b>FROM:</b>	Contractor	
	Issued by	
	Email	
	Phone	
	Fax	

### UNION CRAFT WORKER REQUEST:

Craft Classification	Journey person or Apprentice	City Resident and/or Veteran	# of Workers
	<input type="checkbox"/> JM <input type="checkbox"/> APP	YES*	
	<input type="checkbox"/> JM <input type="checkbox"/> APP	YES*	
	<input type="checkbox"/> JM <input type="checkbox"/> APP	YES*	
	<input type="checkbox"/> JM <input type="checkbox"/> APP	YES*	

### WORKER REPORTING INSTRUCTIONS:

<b>Reporting Date:</b>	
<b>Reporting Time:</b>	
<b>Project Name:</b>	
<b>Project Location:</b>	
<b>Reporting To:</b>	
<b>On Site Phone:</b>	
<b>Special Instructions:</b>	

### U N I O N U S E O N L Y

Please complete the “Union Use Only” section and fax or email both pages to the requesting Contractor and Project Labor Coordinator.

<b>Date Dispatch Received:</b>	
<b>Dispatch Received by:</b>	

<b>Date Worker(s) Dispatched:</b>			
Name	Veteran (Y/N)	Zip Code	JM or App
			<input checked="" type="checkbox"/> JM <input type="checkbox"/> APP
			<input type="checkbox"/> JM <input type="checkbox"/> APP
			<input type="checkbox"/> JM <input checked="" type="checkbox"/> APP
			<input type="checkbox"/> JM <input type="checkbox"/> APP

**ATTACHMENT B-2 – CONTRACTOR CORE WORKFORCE FORM**

C O N T R A C T O R   I N F O R M A T I O N			
Project Name:			
Contractor/Firm Name:			
Prime Tier:			
Submitted by:			
Email:		Phone:	

In accordance with the Project Labor Agreement, Article 4, Section 4.6 (f), a Core Employee must be either a journeyman or Apprentice and appear on the Contractor’s active payroll for at least ninety (90) of the last one-hundred-eighty (180) working days prior to being designated as a Core Employee; and must possess any license required by state or federal law for the Project Work to be performed; and must have the ability to safely perform the basic functions of the applicable.

Prior to each Contractor performing any work on a Covered Project, each Contractor shall provide a list of Core Employees to the Project Labor Coordinator and the Council. After submitting the Core Employee list prior to commencing work, Contractors shall not make any changes or substitutions to the Core Employee list for the duration of the Covered Project. Failure to submit the Core Employee list prior to work commencing will prohibit the Contractor from using any Core Employees for 30 calendar days after the list is provided to the Project Labor Coordinator and Council.

***Please check all that apply:***

Our firm will not be self-performing any work on this project.  
We will be subcontracting our work to: \_\_\_\_\_

PLA Section 4.6 regarding Core Employees is not applicable to Contractors that are signatory to one or more Schedule As, which are the Master Labor Agreements of the Unions. If your company is signatory, please list the union and local number below. For crafts that you are not signatory, please complete the core employee list below.

Indicate Signatory Union Trade: \_\_\_\_\_ Local # \_\_\_\_\_  
 Indicate Signatory Union Trade: \_\_\_\_\_ Local # \_\_\_\_\_  
 Indicate Signatory Union Trade: \_\_\_\_\_ Local # \_\_\_\_\_

We are not a union signatory contractor and will be using core employees on this project as indicated below:

Craft/Trade	Employee Name	MC3 Apprentice Y/N?	Last 4 SSN	Hire Date	Date Last Employed

## ATTACHMENT C – DRUG AND ALCOHOL TESTING POLICY

The Parties recognize the problems that drug and alcohol abuse have created in the construction industry and the need to develop drug and alcohol abuse prevention programs. Accordingly, the Parties agree that in order to enhance the safety of the workplace and to maintain a drug and alcohol-free work environment, individual Contractors shall require applicants or employees to undergo drug and alcohol testing in accordance with this PLA and this policy, Attachment C – Drug and Alcohol Testing Policy, hereafter “Policy.”

1. It is understood that the use, possession, transfer, or sale of illegal drugs, narcotics, or other unlawful substances, as well as being under the influence of alcohol and the possession of or consuming alcohol is absolutely prohibited while employees are on the Contractor’s job premises or while working on any jobsite in connection with work performed under the PLA.
2. No Contractor may implement a drug and alcohol testing program that does not conform in all respects to the provisions of this Policy.
3. No Contractor may implement drug and alcohol testing at any jobsite unless written notice is given to the Union setting forth the location of the jobsite, a description of the project under construction, and the name and telephone number of the Prime Contractor's project manager. Said notice shall be provided at the pre-job conferences for each Covered Project. Failure to give such notice shall make any drug and alcohol testing engaged in by the Contractor a violation of the Agreement and subject to the Article 10 grievance procedure.
4. A Contractor who elects to implement drug and alcohol testing pursuant to this Policy shall require all craft employees on the Covered Project to be tested. With respect to individuals who become employed on the Covered Project subsequent to the proper implementation of a valid drug and alcohol testing program, such test shall be administered upon the commencement of employment on the project, whether by referral from a Union Dispatch Office, transfer from another project, or another method. Individuals who were employed on the project prior to proper implementation of a valid drug and alcohol testing program may only be subjected to testing for the reasons set forth in paragraphs 5(g)(1) through 5(g)(3) and paragraphs 6(a) through 6(e) of this Policy. Refusal to undergo such testing shall be considered sufficient grounds to deny employment on the project.
5. The following procedure shall apply to all drug and alcohol testing:
  - a. The Contractor may request urine samples only. The applicant or employee shall not be observed when the urine specimen is given. An applicant or employee, at his or her sole option, shall, upon request, receive a blood test in lieu of a urine test. No employee of the Contractor shall draw blood from a bargaining unit employee, touch



- or handle urine specimens, or in any way become involved in the chain of custody of urine or blood specimens. A Union Business Representative, subject to the approval of the individual applicant or employee, shall be permitted to accompany the applicant or employee to the collection facility to observe the collection, bottling, and sealing of the specimen.
- b. A Contractor may request an applicant or employee promptly, within four (4) hours of the Contractor's request, perform an alcohol breathalyzer test at a certified laboratory only, and cutoff levels shall be those mandated by applicable state or federal law.
  - c. The testing shall be done by a laboratory approved by the Substance Abuse & Mental Health Services Administration (SAMHSA), which is chosen by the Contractor and the Union.
  - d. An initial test shall be performed using the Enzyme Multiplied Immunoassay Technique (EMIT). In the event a question or positive result arises from the initial test, a confirmation test must be utilized before action can be taken against the applicant or employee. The confirmation test will be by Gas Chromatography/Mass Spectrometry (GC/MS). Cutoff levels for both the initial test and confirmation test will be those established by SAMHSA and this Policy. Should these SAMHSA levels be changed during the course of the PLA or new testing procedures are approved, then these new regulations will be deemed as part of this existing PLA. Confirmed positive samples will be retained by the testing laboratory in secured long-term frozen storage for a minimum of one (1) year. Handling and transportation of each sample must be documented through strict chain-of-custody procedures.
  - e. In the event of a confirmed positive test result, the applicant or employee may request, within forty-eight (48) hours, a sample of his/her specimen from the testing laboratory for purposes of a second test to be performed at a second laboratory, designated by the Union and approved by SAMHSA. The retest must be performed within ten (10) days of the request. Chain of custody for this sample shall be maintained by the Contractor between the original testing laboratory and the Union's designated laboratory. Retesting shall be performed at the applicant's or employee's expense. In the event of conflicting test results, the Contractor may require a third test, at the Contractor's expense.
  - f. If, as a result of the above testing procedure, it is determined that an applicant or employee has tested positive, this shall be considered sufficient grounds to deny the applicant or employee his/her employment on the project.
  - g. No individual who tests negative for drugs and alcohol pursuant to the above procedure and becomes employed on the project shall again be subjected to drug and alcohol testing with the following exceptions:
    - 1) Employees who are involved in industrial accidents resulting in damage to plant, property, or equipment or injury to him/her or others may be tested for drugs or alcohol pursuant to the procedures stated hereinabove.

- 2) The Contractor may test employees following thirty (30) days' advance written notice to the employee(s) to be tested and to the applicable Union. Notice to the applicable Union shall be sent by certified mail to the affected Union with a copy to the Project Labor Coordinator. Such testing shall be pursuant to the procedures stated hereinabove.
  - 3) The Contractor may test an employee where the Contractor has reasonable cause to believe that the employee is impaired from performing his/her job. Reasonable cause shall be defined as being aberrant or unusual behavior, the type of which is a recognized and accepted symptom of impairment (e.g., slurred speech, unusual lack of muscular coordination). Such behavior must be actually observed by at least two (2) persons, one (1) of whom shall be a supervisor who has been trained to recognize the symptoms of drug and alcohol abuse or impairment and the other of whom shall be the Job Steward. If the Job Steward is unavailable or there is no Job Steward on the Covered Project, the other person shall be a member of the applicable Union's bargaining unit. Testing shall be pursuant to the procedures stated hereinabove. Employees who are tested pursuant to the exceptions set forth in this paragraph and who test positive will be removed from the Contractor's payroll.
  - h. Applicants or employees who do not test positive shall be paid for all time lost while undergoing drug and alcohol testing. Payment shall be at the applicable wage and benefit rates set forth in the applicable Union's Master Labor Agreement. Applicants who have been dispatched from the Union and who are not put to work pending the results of a test will be paid waiting time until such time as they are put to work. It is understood that an applicant must pass the test as a condition of employment. Applicants who are put to work pending the results of a test will be considered probationary employees.
6. The Contractors will be allowed to conduct periodic jobsite drug and alcohol testing on the Project under the following conditions:
- a. The entire jobsite must be tested, including any employee or subcontractor's employee who worked on that project three (3) working days before or after the date of the test;
  - b. Jobsite testing cannot commence sooner than fifteen (15) days after start of the work on the project;
  - c. Prior to start of periodic testing, a Business Representative will be allowed to conduct an educational period on company time to explain periodic jobsite testing program to affected employees;
  - d. Testing shall be conducted by an SAMHSA-certified laboratory, pursuant to the provisions set forth in paragraph 5 hereinabove.
  - e. Only two (2) periodic tests may be performed in a twelve (12)-month period.

7. It is understood that the unsafe use of prescribed medication, or where the use of prescribed medication impairs the employee's ability to perform work, is a basis for the Contractor to remove the employee from the jobsite.
8. Any grievance or dispute that may arise out of the application of this Policy shall be subject to the grievance and arbitration procedures set forth in the PLA.
9. The establishment or operation of this Policy shall not curtail any right of any employee found in any law, rule, or regulation. Should any part of this Policy be found unlawful by a court of competent jurisdiction or a public agency having jurisdiction over the Parties, the remaining portions of the Agreement shall be unaffected, and the Parties shall enter negotiations to replace the affected provision.
10. Present employees, if tested positive, shall have the prerogative for rehabilitation program at the employee's expense. When such program has been successfully completed, the Contractor shall not discriminate in any way against the employee. If work for which the employee is qualified exists, he/she may be reinstated.
11. The Contractor agrees that results of urine and blood tests performed hereunder will be considered medical records held confidential to the extent permitted or required by law. Such records shall not be released to any persons or entities other than designated Contractor representatives and the applicable Union. Such release to the applicable Union shall only be allowed upon the signing of a written release by the employee, and the information contained therein shall not be used to discourage the employment of the individual applicant or employee on any subsequent occasion.
12. Employees who seek voluntary assistance for substance abuse may not be disciplined for seeking such assistance. Requests from employees for such assistance shall remain confidential and shall not be revealed to other employees or management personnel without the employee's consent. Employees enrolled in substance abuse programs will be subject to all Contractor rules, regulations, and job performance standards with the understanding that an employee enrolled in such a program is receiving treatment for an illness.
13. The Contractor shall indemnify and hold the Union harmless against any and all claims, demands, suits, or liabilities that may arise out of the application of this Policy.
14. This Policy shall constitute the only Policy in effect between the Parties concerning drug and alcohol abuse, prevention, and testing. Any modifications thereto must be accomplished pursuant to collective bargaining negotiations between the Parties.

## SPECIMEN REPORTING CRITERIA

Initial Test Analyte	Initial Test Cutoff <sup>1</sup>	Confirmatory Test Analyte	Confirmatory Test Cutoff Concentration
Marijuana metabolites (THCA) <sup>2</sup>	50 ng/ml <sup>3</sup>	THCA	15 ng/ml
Cocaine metabolite (Benzoylecgonine)	150 ng/ml <sup>3</sup>	Benzoylecgonine	100 ng/ml
Codeine/ Morphine	2000 ng/ml	Codeine Morphine	2000 ng/ml 2000 ng/ml
Hydrocodone/ Hydromorphone	300 ng/ml	Hydrocodone Hydromorphone	100 ng/ml 100 ng/ml
Alcohol	0.02%	Ethanol	0.02%
Oxycodone/ Oxymorphone	100 ng/ml	Oxycodone Oxymorphone	100 ng/ml 100 ng/ml
6-Acetylmorphine	10 ng/ml	6-Acetylmorphine	10 ng/ml
Phencyclidine	25 ng/ml	Phencyclidine	25 ng/ml
Amphetamine/ Methamphetamine	500 ng/ml	Amphetamine Methamphetamine	250 ng/ml 250 ng/ml
MDMA <sup>4</sup> /MDA <sup>5</sup>	500 ng/ml	MDMA MDA	250 ng/ml 250 ng/ml
Initial Test Analyte	Initial Test Cutoff	Confirmatory Test Analyte	Confirmatory Test Cutoff Concentration
Barbiturates	300 ng/ml	Barbiturates	200 ng/ml
Benzodiazepines	300 ng/ml	Benzodiazepines	300 ng/ml
Methadone <sup>6</sup>	300 ng/ml	Methadone	100 ng/ml
Methaqualone	300 ng/ml	Methaqualone	300 ng/ml
Propoxyphene	300 ng/ml	Propoxyphene	100 ng/ml

<sup>1</sup> For grouped analytes (i.e., two or more analytes that are in the same drug class and have the same initial test cutoff):

**Immunoassay:** The test must be calibrated with one analyte from the group identified as the target analyte. The cross-reactivity of the immunoassay to the other analyte(s) within the group must be 80 percent or greater; if not, separate immunoassays must be used for the analytes within the group.

**Alternate technology:** Either one analyte or all analytes from the group must be used for calibration, depending on the technology. At least one analyte within the group must have a concentration equal to or greater than the initial test cutoff or, alternatively, the sum of the analytes present (i.e., equal to or greater than the laboratory's validated limit of quantification) must be equal to or greater than the initial test cutoff.

<sup>2</sup> An immunoassay must be calibrated with the target analyte, 9-tetrahydrocannabinol-9- carboxylic acid (THCA).

<sup>3</sup> **Alternate technology (THCA and benzoylecgonine):** The confirmatory test cutoff must be used for an alternate technology initial test that is specific for the target analyte (i.e., 15 ng/ml for THCA, 100 ng/ml for benzoylecgonine).

<sup>4</sup> Methylenedioxyamphetamine (MDMA)

<sup>5</sup> Methylenedioxymphetamine (MDA)

<sup>6</sup> Employees with a prescription for methadone who are using the medication as prescribed, and are not impaired and can safely perform their work, will not be considered to have violated this Policy.

**MEMORANDUM OF UNDERSTANDING REGARDING  
“QUICK” DRUG SCREENING TESTS PURSUANT TO  
ATTACHMENT C – DRUG AND ALCOHOL TESTING POLICY**

It is hereby agreed between the Parties hereto that a Contractor who has otherwise properly implemented drug and alcohol testing, as set forth in the Policy, shall have the right to offer an applicant or employee a "quick" drug screening test. This “quick” screen test shall consist either of the “ICUP” urine screen or similar test or an oral screen test. The applicant or employee shall have the absolute right to select either of the two “quick” screen tests, or to reject both and request a full drug test.

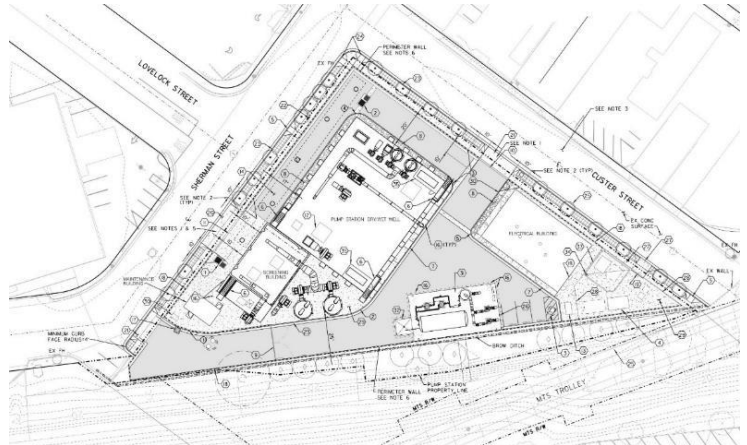
An applicant or employee who selects one of the "quick" screen tests, and who passes the test, shall be put to work immediately. An applicant or employee who fails the "quick" screen test, or who rejects the "quick" screen tests, shall be tested pursuant to the procedures set forth in the Policy. The sample used for the "quick" screen test shall be discarded immediately upon conclusion of the test. An applicant or employee shall not be deprived of any rights granted to them by the Policy as a result of any occurrence related to the “quick” screen test.

## APPENDIX A – SAN DIEGO PURE WATER PROGRAM PHASE I COVERED PROJECTS

### 1. Morena PS/PL Construction Package 1: Morena Pump Station

- **Associated Pure Water Project:** Morena PS/PL Project
- **Summary:** The package is the construction of a new pump station that will transport approximately 32 mgd of wastewater to the NCWRP, where it will be treated before being sent to the NCPWF for further purification. Construction of the pump station will be on Sherman Street.
- **Summary of Major Construction Package Components**
  - 4+1 Dual Stage Sewer Pump Station
  - Screening Facility
  - High Purity Oxygen System
  - 48-inch to 60-inch diameter influent diversion sewers in Friars Road
  - 66-inch Overflow Sewer
  - Electrical and Instrumentation

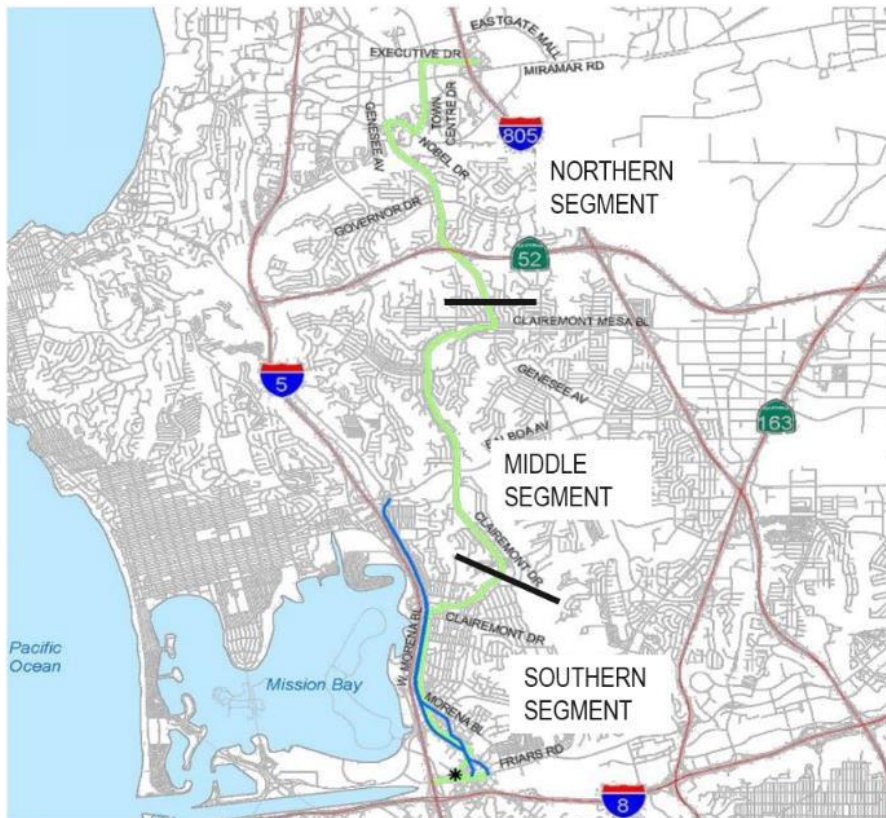
#### Morena Pump Station Rendering and Site Plan



## 2. Morena PS/PL Construction Package 2: Morena Northern Alignment and Tunnels

- **Associated Pure Water Project:** Morena PS/PL Project
- **Summary:** Two pipelines that will start at approximately Genesee Avenue/Highway 52, and will continue through University City to the NCWRP. Three short length tunnels are included in this section, each approximately 1000 feet; one at Highway 52, one at Rose Creek in University City and one at Interstate 805. One pipeline will transport wastewater to the NCWRP, while the other will transport salt and contaminants removed from the water at the NCPWF to the Point Loma Wastewater Treatment Plant.
- **Summary of Major Construction Package Components**
  - 4 miles of 48-inch force main
  - 4 miles of 36-inch brine/centrate pipeline
  - Tunnel crossing of I-805
  - Tunnel crossing of MTS/NCTD railroad at Rose Creek Canyon
  - Tunnel crossing at San Clemente Creek

### Morena Conveyance Northern, Middle and Southern Segments Site Plan



### **3. Morena PS/PL Construction Package 3: Morena Middle Alignment**

- **Associated Pure Water Project:** Morena PS/PL Project
- **Summary:** Two pipelines will start at Iroquois Avenue and will terminate at Genesee Avenue/Highway 52. One pipeline will transport wastewater to the NCWRP, while the other will transport salt and contaminants removed from the water at the NCPWF to the Point Loma Wastewater Treatment Plant.
- **Summary of Major Construction Package Components**
  - 3.6 miles of 48-inch welded steel force main
  - 3.6 miles of 36-inch brine/centrate high density polyethylene pipeline

### **4. Morena PS/PL Construction Package 4: Morena Southern Alignment**

- **Associated Pure Water Project:** Morena PS/PL Project
- **Summary:** Two pipelines will start at Sherman Street, follow West Morena Boulevard and terminate at Iroquois Avenue. One pipeline will transport wastewater to the NCWRP, while the other will transport salt and contaminants removed from the water at the NCPWF to the Point Loma Wastewater Treatment Plant. A 36-inch diameter welded steel water transmission main will be constructed and a 16 inch steel water distribution main will be replaced by 16 inch PVC in this package.
- **Summary of Major Construction Package Components**
  - 3.2 miles of 48-inch force main
  - 3.2 miles of 30-inch brine/centrate pipeline
  - Brine/centrate pressure reducing station
  - 3.2 Miles of existing 16-inch steel water distribution main replacement with PVC
  - 3.3 miles of new 36-inch water transmission main



## 5. NCWRP Expansion Construction Package 1: NCWRP Flow Equalization Basin

- **Associated Pure Water Project:** NCWRP Expansion
- **Summary:** This package includes the construction of one concrete equalization tank that will balance high/low wastewater flows from primary effluent and will provide for consistent flow to the biological treatment basins.
- **Summary of Major Construction Package Components**
  - 2.35-million-gallon flow equalization basin
  - Grading, yard piping and stormwater basin
  - Electrical and instrumentation

### NCWRP Equalization Basin Package 1 Rendering



## 6. NCWRP Construction Packages 2 and 3: NCWRP Expansion and NCPWF Influent Conveyance

- **Associated Pure Water Project:** NCWRP Expansion
- **Summary:** This package will increase the amount of recycled water that the plant produces to meet the needs of both the non-potable reuse recycled water system and the new NCPWF. Plant expansion includes the construction of a 42.5 mgd pump station that will convey water to the NCPWF across Eastgate Mall Road.
- **Summary of Major Construction Package Components**
  - Plant expansion from 30 mgd to 52 mgd
  - 42-mgd Influent Pump Station and pipeline to the NCPWF
  - New primary clarifiers, new bioreactor basins and retrofit of existing basins, secondary clarifiers, new tertiary filter, chemical facilities, and yard piping
  - Equipment and electrical substation replacements
  - Electrical and instrumentation

### *NCWRP Expansion Rendering*



## 7. NCPWF Construction Package 1: NCPWF and NCPW Pump Station

- **Associated Pure Water Project:** NCWPF
- **Summary:** A new Pure Water Facility will be built on Eastgate Mall across the street from the existing NCWRP to clean the recycled water further and produce 30 mgd of a safe, high-quality drinking water source. A new pump station will be constructed adjacent to the NCPWF on Eastgate Mall Road to pump an annual average of 30 mgd to Miramar Reservoir. The package includes widening a portion of Eastgate Mall Road.
- **Summary of Major Construction Package Components**
  - New 34-mgd Pure Water Facility, including:
    - Ozone Generation and Contactor
    - Biologically Active Carbon (BAC) Filters
    - Membrane Filtration (MF) System
    - Reverse Osmosis (RO)
    - Ultraviolet Disinfection and Advanced Oxidation (UV/AOP)
  - Chemical Feed Systems
  - Operations Building
  - 30-mgd Pump Station (3 + 1 vertical turbine pumps)
  - Electrical and instrumentation

### NCPWF and NCPW Pump Station Rendering





## 8. NCPW PS/PL Construction Package 1: NCPW Pipeline and Dechlorination Facility

- **Associated Pure Water Project:** NCPW PS/PL
- **Summary:** This package includes infrastructure to convey 30 mgd of purified water produced by the NCPWF to Miramar Reservoir. The pipeline will start on Eastgate Mall, follow Miramar Road, continue through Scripps Ranch and end at Miramar Reservoir. The package includes the replacement of 6.4 miles of asbestos cement watermains with PVC.
- **Summary of Major Construction Package Components**
  - 8 Miles of 48-inch welded steel pipe transmission main (purified water pipeline)
  - Dechlorination Facility
  - Standpipe
  - 6.4 miles of watermain replacement of 6, 12 and 16-inch asbestos cement (AC) pipe with 16-inch polyvinylchloride (PVC) pipe.

### Pure Water Pipeline Alignment



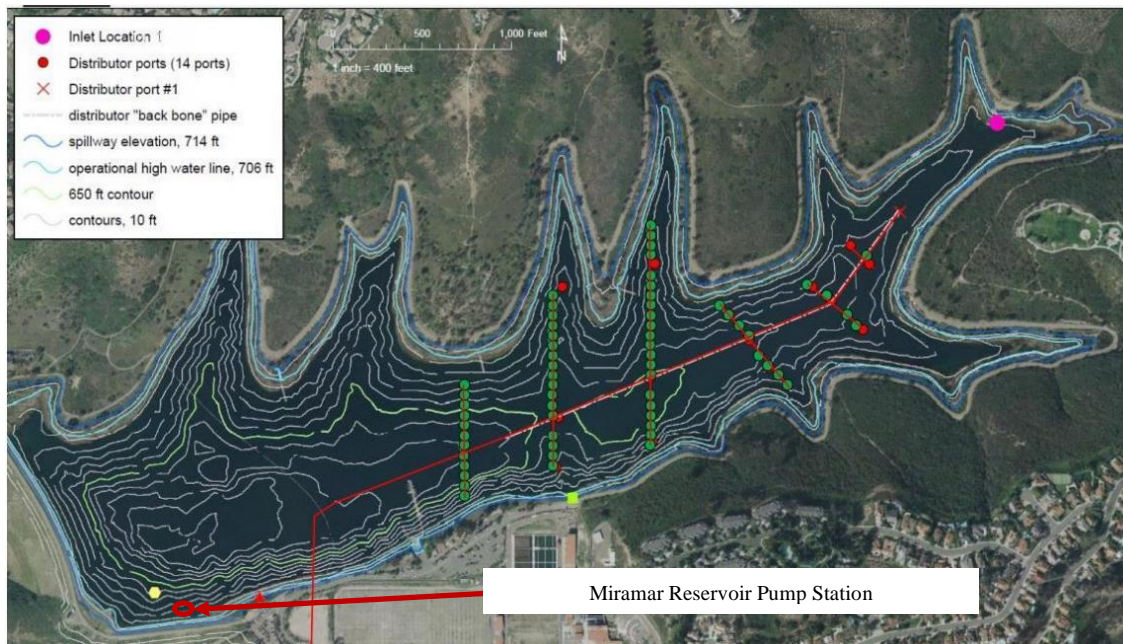
### Dechlorination Facility Rendering



## 9. NCPW PS/PL Construction Package 2: Subaqueous Pipeline and Miramar Reservoir Pump Station Improvements

- **Associated Pure Water Project:** NCPW PS/PL
- **Summary:** This package includes 0.9 miles of pipeline with duckbill outlets placed at the bottom of Miramar Reservoir together with the rehabilitation of a 100 mgd pump station that delivers raw water from Miramar Reservoir to the Miramar Water Treatment Plant.
- **Summary of Major Construction Package Components**
  - 54-inch to 8-inch Subaqueous pipe
  - 94 Dual duckbill valve outlet ports
  - Miramar Reservoir Pump Station Improvements
  - Electrical and instrumentation

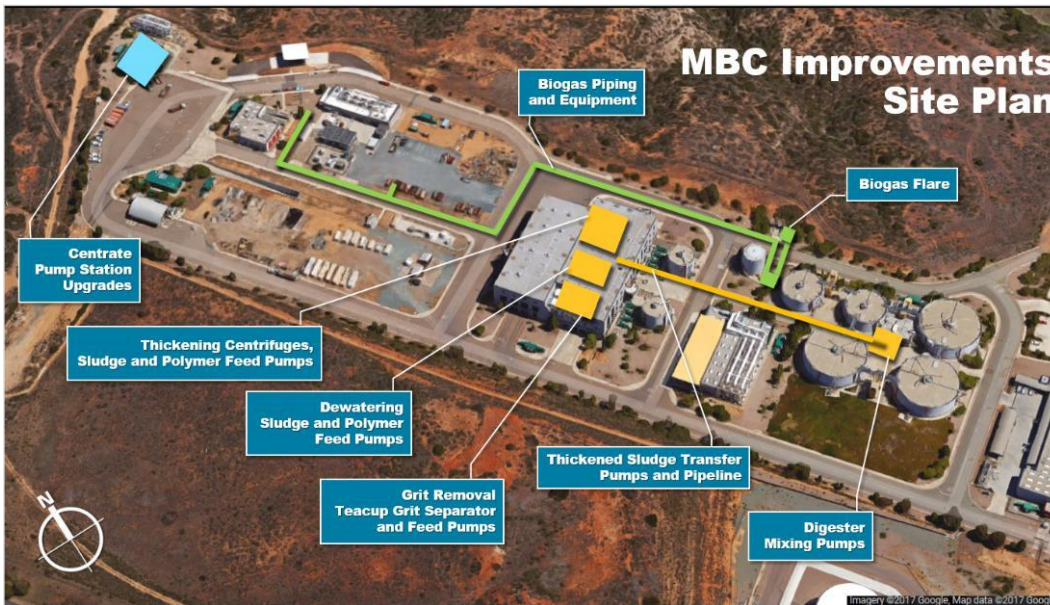
### Subaqueous Pipeline Site Plan



## 10. MBC Construction Package 1: Metropolitan Biosolids Center Improvements

- **Associated Pure Water Project:** MBC Improvements
- **Summary:** This package will consist of improvements to the existing City biosolids center.
- **Summary of Major Construction Package Components**
  - Thickening centrifuges, sludge feed and polymer pumps, transfer pumps and supply pipeline
  - Digester mixing pump replacements, nozzles, overflow lines, biogas compressors, flare and biogas pipeline
  - Dewatering sludge feed pumps and polymer pumps
  - Centrate Pump Station pump and VFD replacements
  - Electrical and instrumentation

### Metropolitan Biosolids Center Improvements Site Plan



**APPENDIX B**

**MEMORANDUM OF UNDERSTANDING #1**

**PROJECT LABOR AGREEMENT SECTION 3.1**

The City and the Parties agree that Project Work includes all onsite physical craft work that is part of startup and commissioning, including, but not limited to, system flushes and testing, loop checks, rework and modifications, and functional and operational testing up to and including the final running test. It is understood that the City's personnel and/or its representatives, together with the manufacturer's and/or vendor's representatives, and/or plant operating personnel may supervise and direct the startup, commissioning, rework, and modification activity, and that the onsite physical craft work is typically performed as part of a joint effort with these representatives and personnel. A manufacturer or its representatives may perform industry standard startup and commissioning work to satisfy its guarantee or warranty on a piece of equipment, and such work will be exempt from the Project Labor Agreement to the extent the work is excluded by Section 3.2(e) and/or Section 3.2(f).

**MEMORANDUM OF UNDERSTANDING #2**

**NO DISCRIMINATION AND HARASSMENT**

The City hereby provides notice that the City and its Contractors must not unlawfully discriminate, harass, or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religious creed, national origin, sexual orientation, physical disability (including HIV and AIDS), mental disability, medical condition (cancer), age (over 40), marital status, denial of family care leave, or genetic information, gender, gender identity, gender expression, or military and veteran status. The City and Contractors will ensure that the evaluation and treatment of their employees and applicants for employment are free from such discrimination and harassment. The City and Contractors must comply with the provisions of the Fair Employment and Housing Act and the applicable regulations promulgated thereunder. (Govt. Code §12990, subs. (a)-(f) et seq.; Cal. Code Regs., tit. 2 §7285, et seq.) These terms will be incorporated into every contract and subcontract for the Covered Project.

Dated: 9-18-20

SAN DIEGO BUILDING AND CONSTRUCTION  
TRADES COUNCIL



By: \_\_\_\_\_  
Tom Lemmon, Business Manager



## **CERTIFICATIONS AND FORMS**

The Bidder, by submitting its electronic bid, agrees to and certifies under penalty of perjury under the laws of the State of California, that the certifications, forms and affidavits submitted as part of this bid are true and correct.

## **BIDDER'S GENERAL INFORMATION**

To the City of San Diego:

Pursuant to "Notice Inviting Bids", specifications, and requirements on file with the City Clerk, and subject to all provisions of the Charter and Ordinances of the City of San Diego and applicable laws and regulations of the United States and the State of California, the undersigned hereby proposes to furnish to the City of San Diego, complete at the prices stated herein, the items or services hereinafter mentioned. The undersigned further warrants that this bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

The undersigned bidder(s) further warrants that bidder(s) has thoroughly examined and understands the entire Contract Documents (plans and specifications) and the Bidding Documents therefore, and that by submitting said Bidding Documents as its bid proposal, bidder(s) acknowledges and is bound by the entire Contract Documents, including any addenda issued thereto, as such Contract Documents incorporated by reference in the Bidding Documents.

**NON-COLLUSION AFFIDAVIT TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID  
UNDER 23 UNITED STATES CODE 112 AND PUBLIC CONTRACT CODE 7106**

State of California

County of San Diego

The bidder, being first duly sworn, deposes and says that he or she is authorized by the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

## **CONTRACTOR CERTIFICATION**

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### **DRUG-FREE WORKPLACE**

I hereby certify that I am familiar with the requirements of San Diego City Council Policy No. 100-17 regarding Drug-Free Workplace as outlined in the WHITEBOOK, Section 5-1.3, "Drug-Free Workplace", of the project specifications, and that;

This company has in place a drug-free workplace program that complies with said policy. I further certify that each subcontract agreement for this project contains language which indicates the subcontractor's agreement to abide by the provisions of subdivisions a) through c) of the policy as outlined.

## **CONTRACTOR CERTIFICATION**

---

### **AMERICANS WITH DISABILITIES ACT (ADA) COMPLIANCE CERTIFICATION**

I hereby certify that I am familiar with the requirements of San Diego City Council Policy No. 100-4 regarding the Americans With Disabilities Act (ADA) outlined in the WHITEBOOK, Section 5-1.2, "California Building Code, California Code of Regulations Title 24 and Americans with Disabilities Act", of the project specifications, and that:

This company has in place workplace program that complies with said policy. I further certify that each subcontract agreement for this project contains language which indicates the subcontractor's agreement to abide by the provisions of the policy as outlined.

## **CONTRACTOR CERTIFICATION**

---

### **CONTRACTOR STANDARDS – PLEDGE OF COMPLIANCE**

I declare under penalty of perjury that I am authorized to make this certification on behalf of the company submitting this bid/proposal, that as Contractor, I am familiar with the requirements of City of San Diego Municipal Code § 22.3004 regarding Contractor Standards as outlined in the WHITEBOOK, Section 5-1.4, ("Contractor Standards and Pledge of Compliance"), of the project specifications, and that Contractor has complied with those requirements.

I further certify that each of the Contractor's subcontractors has completed a Pledge of Compliance attesting under penalty of perjury of having complied with City of San Diego Municipal Code § 22.3004.

## **CONTRACTOR CERTIFICATION**

---

### **EQUAL BENEFITS ORDINANCE CERTIFICATION**

I declare under penalty of perjury that I am familiar with the requirements of and in compliance with the City of San Diego Municipal Code § 22.4300 regarding Equal Benefits Ordinance.

## **CONTRACTOR CERTIFICATION**

---

### **EQUAL PAY ORDINANCE CERTIFICATION**

Contractor shall comply with the Equal Pay Ordinance (EPO) codified in the San Diego Municipal Code (SDMC) at section 22.4801 through 22.4809, unless compliance is not required based on an exception listed in SDMC section 22.4804.

Contractor shall require all of its subcontractors to certify compliance with the EPO in their written subcontracts.

Contractor must post a notice informing its employees of their rights under the EPO in the workplace or job site.

By signing this Contract with the City of San Diego, Contractor acknowledges the EPO requirements and pledges ongoing compliance with the requirements of SDMC Division 48, section 22.4801 et seq., throughout the duration of this Contract.



**AFFIDAVIT OF DISPOSAL**

(To be submitted upon completion of Construction pursuant to the contracts Certificate of Completion)

**WHEREAS**, on the \_\_\_\_\_ DAY OF \_\_\_\_\_, 2\_\_\_\_\_ the undersigned entered into and executed a contract with the City of San Diego, a municipal corporation, for:

**Pure Water Program: Metro Biosolids Center Improvements**

(Project Title)

as particularly described in said contract and identified as Bid No. **K-21-1867-DBB-3-A**; SAP No. (WBS) **B-17006, S-17013**; and **WHEREAS**, the specification of said contract requires the Contractor to affirm that "all brush, trash, debris, and surplus materials resulting from this project have been disposed of in a legal manner"; and **WHEREAS**, said contract has been completed and all surplus materials disposed of:

\_\_\_\_\_  
\_\_\_\_\_

**NOW, THEREFORE**, in consideration of the final payment by the City of San Diego to said Contractor under the terms of said contract, the undersigned Contractor, does hereby affirm that all surplus materials as described in said contract have been disposed of at the following location(s)

\_\_\_\_\_  
\_\_\_\_\_

and that they have been disposed of according to all applicable laws and regulations.

Dated this \_\_\_\_\_ DAY OF \_\_\_\_\_, \_\_\_\_\_.

By: \_\_\_\_\_  
Contractor

**ATTEST:**

State of \_\_\_\_\_ County of \_\_\_\_\_

On this \_\_\_\_\_ DAY OF \_\_\_\_\_, 2\_\_\_\_\_, before the undersigned, a Notary Public in and for said County and State, duly commissioned and sworn, personally appeared \_\_\_\_\_ known to me to be the \_\_\_\_\_ Contractor named in the foregoing Release, and whose name is subscribed thereto, and acknowledged to me that said Contractor executed the said Release.

Notary Public in and for said County and State

**LIST OF SUBCONTRACTORS**

**\*\*\* PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY \*\*\* TO BE SUBMITTED IN ELECTRONIC FORMAT ONLY\*\*\* SEE INSTRUCTIONS TO BIDDERS, FOR FURTHER INFORMATION**

In accordance with the requirements of the "Subletting and Subcontracting Fair Practices Act", Section 4100, of the California Public Contract Code (PCC), the Bidder is to list below the name, address and license number of each Subcontractor who will perform work, labor, render services or specially fabricate and install a portion [type] of the work or improvement, in an amount of or in excess of 0.5% of the Contractor's total Bid. Failure to comply with this requirement may result in the Bid being rejected as non-responsive. The Contractor is to list only one Subcontractor for each portion of the Work. The Bidder's attention is directed to the Special Provisions - Section 3-2, "SELF-PERFORMANCE", which stipulates the percentage of the Work to be performed with the Bidder's own forces. The Bidder is to also list all SLBE, ELBE, DBE, DVBE, MBE, WBE, OBE, SDB, WoSB, HUBZone, and SDVOSB Subcontractors for which the Bidders are seeking recognition towards achieving any mandatory, voluntary, or both subcontracting participation percentages.

NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB <sup>①</sup>	WHERE CERTIFIED <sup>②</sup>	CHECK IF JOINT VENTURE PARTNERSHIP
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							

- ① As appropriate, Bidder shall identify Subcontractor as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):
- |   |        |  |         |
|---|--------|--|---------|
| Certified Minority Business Enterprise        | MBE    | Certified Woman Business Enterprise            | WBE     |
| Certified Disadvantaged Business Enterprise   | DBE    | Certified Disabled Veteran Business Enterprise | DVBE    |
| Other Business Enterprise                     | OBE    | Certified Emerging Local Business Enterprise   | ELBE    |
| Certified Small Local Business Enterprise     | SLBE   | Small Disadvantaged Business                   | SDB     |
| Woman-Owned Small Business                    | WoSB   | HUBZone Business                               | HUBZone |
| Service-Disabled Veteran Owned Small Business | SDVOSB |  |         |
- ② As appropriate, Bidder shall indicate if Subcontractor is certified by:
- |  |        |  |          |
|--|--------|--|----------|
| City of San Diego                                    | CITY   | State of California Department of Transportation | CALTRANS |
| California Public Utilities Commission               | CPUC   |  |          |
| State of California's Department of General Services | CADoGS | City of Los Angeles                              | LA       |
| State of California                                  | CA     | U.S. Small Business Administration               | SBA      |

**The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.**

**NAMED EQUIPMENT/MATERIAL SUPPLIER LIST**

**\*\*\* PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY \*\*\* TO BE SUBMITTED IN ELECTRONIC FORMAT ONLY \*\*\* SEE INSTRUCTIONS TO BIDDERS FOR FURTHER INFORMATION**

NAME, ADDRESS AND TELEPHONE NUMBER OF VENDOR/SUPPLIER	MATERIALS OR SUPPLIES	DOLLAR VALUE OF MATERIAL OR SUPPLIES	SUPPLIER (Yes/No)	MANUFACTURER (Yes/No)	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB <sup>①</sup>	WHERE CERTIFIED <sup>②</sup>
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____						
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____						

- ① As appropriate, Bidder shall identify Vendor/Supplier as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):
- |   |        |  |         |
|---|--------|--|---------|
| Certified Minority Business Enterprise        | MBE    | Certified Woman Business Enterprise            | WBE     |
| Certified Disadvantaged Business Enterprise   | DBE    | Certified Disabled Veteran Business Enterprise | DVBE    |
| Other Business Enterprise                     | OBE    | Certified Emerging Local Business Enterprise   | ELBE    |
| Certified Small Local Business Enterprise     | SLBE   | Small Disadvantaged Business                   | SDB     |
| Woman-Owned Small Business                    | WoSB   | HUBZone Business                               | HUBZone |
| Service-Disabled Veteran Owned Small Business | SDVOSB |  |         |
- ② As appropriate, Bidder shall indicate if Vendor/Supplier is certified by:
- |  |        |  |          |
|--|--------|--|----------|
| City of San Diego                                    | CITY   | State of California Department of Transportation | CALTRANS |
| California Public Utilities Commission               | CPUC   |  |          |
| State of California's Department of General Services | CADoGS | City of Los Angeles                              | LA       |
| State of California                                  | CA     | U.S. Small Business Administration               | SBA      |

**The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.**

# City of San Diego Pure Water Project OCIP Notice of Subcontract Award

Today's Date \_\_\_\_\_

<b>To:</b>	<b>From:</b>
<b>Email:</b>	<b>Email:</b>
<b>Phone #:</b>	<b>Phone #:</b>
<b>Fax #:</b>	<b>Fax #:</b>

The subcontractor named below will be issued a contract to perform work on the following:

Project: \_\_\_\_\_

Contract Number: \_\_\_\_\_ Contract Value: \$ \_\_\_\_\_

- Check here if the subcontractor is to be enrolled in the OCIP
- Check here if the subcontractor is to be excluded from the OCIP
- Check here if the subcontractor will be an excluded prime tier fabricator with eligible (enrolled) sub-tier erector/installer

1. Name of subcontractor:	
2. Prime sub or GC name:	
3. Subcontractor FEIN:	
4. Subcontractor contact person:	
5. Subcontractor phone number:	
6. Subcontractor address:	
7. Subcontractor email address:	
8. General description of work:	
9. Date of award:	
10. Anticipated on-site start date:	
11. Anticipated completion date:	





**INSURANCE COST WORKSHEET**  
**(Fixed Price Type Contracts)**  
 Numbers reference attached instructions

**City of San Diego Pure Water OCIP**  
 Project Name:

**Complete a separate form for each contractor, known subcontractor and trade not currently awarded to a subcontractor. Duplicate this form as needed. Completion of this form is a required part of your bid and must accompany your bid documents.**

**A. Contractor Information**

1. Enter your company's Federal ID number. This number can be found on filings made to the federal government such as your tax return.
2. Enter your company's name, mailing address and phone/fax number for your company's main office location in the space provided below.
3. Enter the name of the person AON should contact if questions arise. Include the mailing address, phone/fax and e-mail address if different than A-2.

**B. Bid Information**

1. Enter the Bid Package Number, Contract Number or Purchase Order Number that was included in The City of San Diego originating documentation.
2. Provide a brief description of the work you will be performing at the project site.
3. Identify the total amount of your bid. Include both labor and material.
4. Identify the amount of work that you anticipate will be self-performed. Include both labor and material.
5. Check the appropriate box that identifies if you contract directly with The City of San Diego or are a subcontractor.
6. If you are a subcontractor identify the entity with whom you are under contract.

**C. Workers Compensation Insurance Information**

- 1
  - a. Enter the two letter abbreviation for the state in which the work will be performed.
  - b. Enter each Workers Compensation class code that applies to your work identified in B2. (Most states use a 4 digit Number).
  - c. Enter the Workers Compensation class code description that applies to each class code identified in C1b.
  - d. Enter the Workers Compensation rate that applies to the specified class code.
  - e. Enter the estimated Work Hours required to complete the described work for each Workers Compensation class code.
  - f. Enter the estimated Payroll required to complete your work. Use only unburdened payroll and exclude the premium portion of any overtime pay.
  - g. Calculate the WC Premium by multiplying the Payroll (C1f) by the Rate (C1d) and dividing the result by 100. Repeat this calculation for each WC class code.
2. Total the estimated Work Hours for each class code. Be sure to include information from additional pages if used.
3. Total the estimated Payroll for each class code. Be sure to include information from additional pages if used.
4. Total the Workers Compensation Premium for each class code. Be sure to include information from additional pages if used.
5. Enter the amount of the Claim Retention/ Deductible your company has on their existing Worker's Compensation.
6. Enter you WC experience Modifier. This information can be located on your Workers Compensation policy or on your NCCI Bureau Rating Sheet.
7. Calculate the Modified Premium by multiplying the WC Premium (C4) by the Experience Modifier (C6).
8. Enter your Employer's Liability Insurance Rate. This information can be found in your Workers Compensation Policy.
9. Calculate your Employer's Liability Premium by multiplying the Modified Premium (C7) by the Employer's Liab. Rate (C8).
10. Identify the Modifiers that apply to your Workers Compensation Premium. This information can be located on your Workers Compensation Policy.
11. Enter the rate for each identified Modifier. The information can be located on your Workers Compensation Policy.
12. Calculate the Modified Premium Factor Amount by multiplying the Modified Premium (C7) by the Modified Premium Rate (C11) and dividing by 100. Be sure to identify if the Modification factor is an addition or reduction to your premium.
13. Total the Modified Premium Amounts by adding the numbers in column C12.
14. Calculate the Total Workers Compensation Premium by adding the Modified Premium (C7) to the Employer's Liab Premium (C9) and adding the Premium Modifications (C12).

**D. General Liability & Umbrella/Excess Liability Insurance**

1. Enter the general liability Rate. This number can be found on your General Liability Policy.
2. Identify the base the General Liability Rate applies to. If the base is other than Payroll or Revenue, enter the amount and the description in the space provided.
3. Identify the General Liability Rate factor by marking the box.
4. Identify the amount of your Claim Retention.
5. Calculate the General Liability Premium by multiplying the Bases (D2) by the Rate and dividing by the factor (D3).
6. Enter the Excess/Umbr Liability Rate. This number can be found on your Excess/Umbr Liability Policy.
7. Identify the base the Excess/Umbr Liab. Rate applies to. If the base is other than Payroll or Revenue, enter the amount and description in the space provided.
8. Identify the Excess/Umbr Liability Rate factor by marking the box.
9. Calculate the Excess/Umbr Liability Premium by multiplying the Bases (D7) by the Rate (D6) and dividing by the factor (100 or 1,000).

**E. Builder's Risk / Installation Floater**

1. Enter the Builder's Risk / Installation Floater Rate. Locate this information on your Property Policy or Builder's Risk Policy.
2. Identify the base factor that it applies to (100 or 1,000).
3. Calculate the Premium by multiplying the Proposed Contract Price (B3) by the Rate (E1) and dividing it by the Factor (E2).

**F. Other Insurance Premiums**

1. For each of the Insurance Lines of Coverage identified below, identify the Rate, Base and Factor. Calculate the Premium by multiplying the Base x Rate ÷ Factor. Total the Other Insurance Premiums in the space provided and carry that amount to the front page.

Line of Coverage	Rate	Base	Factor	Premium	Total Premium
------------------	------	------	--------	---------	---------------

**G. Totals**

1. Calculate the Total of all Insurance Premium by adding Workers Compensation (C14), General Liability (D5), Excess/Umbr Liability (D9), Builder's Risk/Installation Floater (E3), and Other Insurance Premiums (F1).
2. Identify the Overhead & Profit Percentage that was applied to this project during the tabulation of the Proposed Contract Price.
3. Calculate the Overhead & Profit Amount by Multiplying the Total of all Insurance Costs (G1) by your Overhead & Profit Percentage (G2).
4. Calculate the Total Initial Insurance Cost by adding the Overhead & Profit Amount (G3) with the Total of all Insurance Premium (G1).
5. Calculate your rate by Dividing the Total Initial Insurance Cost (G4) by the Estimated Payroll (C3) and multiplying by 100.

**H. Signature Block**

**Note: Please provide copies of the following documents as part of your submittal:**

- |  |   |
|--|---|
| <input type="checkbox"/> Rate Pages                                      | <input type="checkbox"/> General Liability declaration and rate pages   |
| <input type="checkbox"/> Workers Compensation declaration and rate pages | <input type="checkbox"/> Umbrella / Excess Liability declaration and rate pages   |
|  | <input type="checkbox"/> 5 years actual loss experience for each line of coverage in which Contractor retains more than \$5,000 |

**Enrollment Application**  
Numbers reference attached instructions

**City of San Diego Pure Water OCIP**  
Project Name: \_\_\_\_\_

**This form is to be used by a Prime Contractor to summarize subcontract activity. This form may also be used by Subcontracts that must summarize subcontract activity of any tier. Submit this form with your Bid Documents.**

<b>A. Contractor Information</b>	Federal ID # or Soc. Sec. #	1	<b>Business Information (headquarters)</b>	2	<b>Contract Information (address questions to...)</b>	3
Company Name & dba: Contract Name & Title: _____						
Address: _____						
City, State, Zip Code: _____						
Telephone: _____						
Fax: _____						
Email Address: _____						
Indicate your Organization's Structure: _____ 4						
		<input type="checkbox"/> Corporation			<input type="checkbox"/> Partnership	<input type="checkbox"/> S-Corporation
		<input type="checkbox"/> Joint Venture			<input type="checkbox"/> Sole Proprietor	<input type="checkbox"/> Other

<b>B. Contract Information:</b>	Contract No.:	1			
Date Contract Awarded:	2				
Description of Work:	3				
Proposed Contract Price:	4	Are you Submitting a bid to The City of San Diego?		6	<input type="checkbox"/> Yes <input type="checkbox"/> No
		If No, identify to whom: _____ 7			
Amount of Self Performed Work \$:	5	<input type="checkbox"/> Actual			<input type="checkbox"/> Actual
8		<input type="checkbox"/> Estimated	9		<input type="checkbox"/> Estimated
Start Date:			Completion Date:		

**C. Contacts: (Complete if Applicable)**

Position	1 Name & Title	2 Phone	3 Fax	4 Email Address
Project Manager:				
Resident Engineer:				
Insurance:				
Contract Administrator:				
Payroll:				
Claims:				
Safety Representative:				
Provide Location of payroll records if different than Corporate address:	5	Phone:		
City, State, Zip Code:		Fax:		

**D. Workers Compensation Insurance Information for Work Described Above: (attach a separate sheet, if necessary)**

a State	b Class Code	c Description	d Work Hours	e Payroll
1				
<b>Totals:</b>			2	3

**E. Provide your current Off-Site Workers Compensation Information: (for each state you will perform work in)**

Applicable State	Risk ID Number	Rating Bureau	Anniversary Rating Date
1	2	3	4

Your WC Insurance Carrier \_\_\_\_\_ 5

Policy # \_\_\_\_\_ 6      Effective Date \_\_\_\_\_ 7      Expiration Date \_\_\_\_\_ 8

1 Subcontractor	2 Subcontract \$	3 Contact Person	4 Address	5 Phone & Fax No.	6 Estimated Start Date

**F. Signature Block: This form must be signed by a representative of your company knowledgeable of its accuracy.**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

(please print)

Title: \_\_\_\_\_ Signature: \_\_\_\_\_

Project Name:

**This form must be completed and submitted by each successful Contractor and Subcontractor of any tier prior to Site mobilization for each contract awarded. The Contractor and Subcontractor will submit the completed form to Aon Risk Services. Upon receipt of this form, Aon will issue to the Contractor or Subcontractor a Certificate of Insurance evidencing coverage in the Controlled Insurance Program. The completed Certificate of Insurance and Workers Compensation insurance policy will be mailed to the Enrolled party.**

**A. Contractor Information**

- 1 Enter your company's Federal ID number. This number can be found on filings made to the federal government such as your tax return.
- 2 Enter your company's name, mailing address and phone/fax number for your company's primary office location.
- 3 Enter the name of the person Aon should contact if questions arise. Include mailing address, phone/fax and email address, if different than A2.
- 4 Identify your company's legal structure by checking the box that applies. If the correct legal structure is not specifically listed, please check the "Other" box and specify in the space provided.

**B. Contract Information**

- 1 Enter the Contract Number or Purchase Order Number that was included in The City of San Diego's originating documentation.
- 2 Supply the Date this Contract was awarded to your organization.
- 3 Provide a brief description of the work you will be performing at the project site.
- 4 Identify the total amount of your contract. Include both labor and material.
- 5 Identify the amount of work that you anticipate will be self-performed. Include both labor and material.
- 6 Check the appropriate box that identifies if you contract directly with The City of San Diego or are a Subcontractor.
- 7 If you are a Subcontractor, identify the entity with whom you are under contract.
- 8 Enter the Date you anticipate starting work and then mark whether the date provided is actual or estimated.
- 9 Enter the Date you anticipate completing the described work and then mark whether the date provided is actual or estimated.

**C. Contacts** *(Requested Contact information is for specific functions. It is possible to have a single person fulfill multiple responsibilities.)*

- 1 Identify the name of the person and their title for each function. These individuals should be located, if at all possible, on-site.
- 2 Provide the phone number for each person identified above.
- 3 Provide the fax number for each person identified above.
- 4 Provide the email address for each person identified above, if applicable.
- 5 Identify the physical location where your payroll records are retained. Provide the Address, City, State, Zip Code, Telephone, Fax Number and Email Address of the person responsible for maintaining the payroll information.

**D. Workers Compensation Information** (Duplicate or attach additional sheets if necessary. You may create an electronic version of this document if all requested information is included.):

- 1
  - a Enter the two letter abbreviation for the state in which the work will be performed.
  - b Enter each Workers Compensation class code that applies to the work identified in B2. (Most states use a 4 digit Number)
  - c Enter the Workers Compensation class code description that applies to the work identified in D1b.
  - d Enter the estimated Work Hours required to complete the described work by Workers Compensation class code.
  - e Enter the estimated Payroll required to complete the described work for each Workers Compensation class code. Use only unburdened payroll and exclude the premium portions of any overtime pay.
- 2 Total all estimated Work Hours for each class code. Be sure to include information from additional pages if used.
- 3 Total all estimated Payroll for each class code. Be sure to include information from additional pages if used.

**E. Current Off-Site Workers Compensation Information** (Information relates to your corporation's existing coverage; identify each modification factor that applies.)

- 1 Enter the State that the Modification Information applies to.
- 2 Enter your Bureau File Number also referred to as your Risk Identification Number. This number can also be found on your Modification worksheets.
- 3 Enter the Bureau Rating Agency. In most states this is NCCI.
- 4 Provide your Company's Anniversary Rating Date. Information can be located on your bureau's WC Experience Modification worksheets.
- 5 Identify your insurance carrier for Workers Compensation Coverage.
- 6 Provide your Workers Compensation Policy Number.
- 7 Provide the effective date of your Workers Compensation policy.
- 8 Provide the expiration date of your Workers Compensation policy.

**F. Subcontractor Information** (Provide the following information for each Subcontractor that will be performing work at the project site. Use additional sheets, if necessary.)

- 1 Identify the name of the Subcontracting firm.
- 2 Provide the estimated value of the subcontracted activity.
- 3 Provide a contact name, preferably the project manager, for the Subcontractor.
- 4 Provide the mailing address for the Subcontractor.
- 5 Provide the phone number for the Subcontractor.
- 6 Provide the date the Subcontractor is scheduled to begin work.

**G. Enrollment Questions**

- 1 Determine if you will have any locations, off-site, that will be 100% dedicated to this project. Include material/supply storage as a possible location. Mark the appropriate box (yes/no). If you answer yes – provide the address of each location you identified as 100% dedicated.
- 2 Mark the box or boxes that apply. Contemplate only work performed under this contract.
- 3 Mark the box or boxes that apply. Employee Leasing Firm are those firms that supply the labor force for your company (You direct the activities of the Leasing Company's employees). Temporary Labor Firms supplement your labor force.

**H. Warranty Statements:**

- 1-6 Read each Warranty statement thoroughly. If you have questions regarding any of these statements, contact the Aon administrator identified on page 2.

**I. Signature Block:** This form must be signed by a representative of your company knowledgeable of its accuracy.

**Forward the completed Enrollment Application to the Aon administrator identified at the bottom of page 2 of this form. The administrator prior to the start of your work on-site must receive this form.**



Insert Company Letterhead

**Skilled and Trained Workforce Certification Form**

Month: \_\_\_\_\_ Year: \_\_\_\_\_

In accordance with Public Utilities Code section 132354.7 and Public Contract Code sections 2600-2602, \_\_\_\_\_ (the "Prime Contractor") certifies that all the workers performing work in an

(Prime Contractor Name)

apprenticeable occupation utilized on the project known as \_\_\_\_\_ (the "Project") during this monthly reporting period are either skilled journeypersons or apprentices registered in an apprenticeship

(Project Name)

program approved by the Chief of the Division of Apprenticeship Standards of the California Department of Industrial Relations (the "Chief").

"Skilled journeyperson" means a worker who either:

- (1) Graduated from an apprenticeship program for the applicable occupation that was approved by the Chief or apprenticeship program located outside California and approved for federal purposes, pursuant to the apprenticeship regulations adopted by the Federal Secretary of Labor.
- (2) Has at least as many hours of on-the-job experience in the applicable occupation as would be required to graduate from an apprenticeship program that is approved by the Chief.

In addition, the Prime Contractor certifies that it has met the requirements of Public Contract Code 2601(d), subject to certain exceptions set forth therein, that the required percentage of the skilled journeypersons or skilled journeyperson hours employed to perform work on the Project by the Prime Contractor and all subcontractors are graduates of an apprenticeship program for the applicable apprenticeable occupation<sup>1</sup>.

A graduate of an apprenticeship program means either of the following:

- (1) An individual that has been issued a certificate of completion under the authority of the California Apprenticeship Council for completing an apprenticeship program approved by the Chief pursuant to Section 3075 of the Labor Code, or
- (2) An individual that has completed an apprenticeship program located outside California and approved for federal purposes pursuant to the apprenticeship regulations adopted by the federal Secretary of Labor.

I declare, under penalty of perjury under the laws of the State of California, that the foregoing is true and correct. I certify that the attached Skilled and Trained Workforce Monthly Compliance Reports are complete and accurate.

Full Name: \_\_\_\_\_

Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date Signed: \_\_\_\_\_

Please upload the completed form to the Labor Compliance Monitoring System (LCMS) monthly.

\*\*Insert contractor name/letterhead here\*\*

### Skilled and Trained Workforce Monthly Compliance Report

DIRECTIONS: This form is required to be submitted by the Prime for all contractors regardless of tier by the 15th of the following month for work performed corresponding to this reporting period. Items with a red asterisk (\*) indicate a required field.

Project Title *			
Project Number *			
Prime Contractor *			
Subcontractor *			
Contact Name *			
Contact Number *			
Work Month & Year *	Month	Year	
Exemptions *	The contractor or subcontractor need not meet the apprenticeship graduation requirements if either (1) is true, or (2)(A) and (2)(B) are both true:	Please select * (True/False)	Exempt or non-exempt?
	(1) The contractor or subcontractor employed skilled journeypersons to perform fewer than 10 hours of work on the project during this reporting period?		Exempt if (1) is "True".
	(2) (A) The subcontractor was not a listed subcontractor under Section 4104 or a substitute for a listed subcontractor.		Exempt if both (2)(A) and (2)(B) are "True".
	(2) (B) The subcontract does not exceed one-half of 1 percent of the price of the prime contract.		

Report \* Please fill out the following report for all apprenticesable occupations utilized in this reporting period.

SKILLED JOURNEYPerson (SJ) REPORT							
Apprenticesable Occupation (use dropdown menu) *	Required minimum SJ: Apprentice Graduate percentage (see 2nd page attachment) *	Number of Skilled Journeypersons (SJ) employed by the contractor to perform work on the project		SJ ratio between the number of SJ: Apprentice Graduates to SJ: On-The-Job Experience workers	Number of hours worked by SJ employed by the contractor to perform work on the project		SJ ratio of hours worked by SJ: Apprentice Graduates compared with SJ: On-The-Job Experience workers
		SJ: Apprentice Graduate *	SJ: On-The-Job Experience *		SJ: Apprentice Graduate *	SJ: On-The-Job Experience *	
**EXAMPLE** Laborer	40%	7	3	70%	30	70	30%

Terms	Definitions
Apprentice	Defined in Labor Code 3077
Skilled Journeyperson: Apprentice Graduate	Defined in Public Contracts Code 2601 (e) (1)
Skilled Journeyperson: On-The-Job Experience	Defined in Public Contracts Code 2601 (e) (2)

Apprenticeable Occupations (San Diego County)	Annual Apprenticeship Graduation Rate Minimum Requirements for Employed Skilled Journeypersons (%)		
	January 1 2018	January 1 2019	January 1 2020
Asbestos Worker, Heat and Frost Insulator	40	50	60
Boilermaker - Blacksmith	40	50	60
Bricklayer	30	30	30
Bricktender	40	50	60
Bridge Carpenter	30	30	30
Building Construction Inspector and Field Soils and Material Tester	30	30	30
Carpenter	30	30	30
Carpet, Linoleum and Resilient Floor Layer	40	50	60
Cement Mason	30	30	30
Drywall Finisher	40	50	60
Drywall Installer/Lather (Carpenter)	30	30	30
Electrician: Inside Wireman	40	50	60
Electrician: Sound and Signal Technician	40	50	60
Electrical Utility Lineman	40	50	60
Elevator Constructor	40	50	60
Field Surveyor: Chainman/Rodman	30	30	30
Field Surveyor: Chief of Party	30	30	30
Glazier	40	50	60
Horizontal Directional Drilling (Laborer)	40	50	60
Ironworker	40	50	60
Laborer	40	50	60
Landscape/Irrigation Fitter	40	50	60
Landscape/Irrigation Laborer	40	50	60
Marble Finisher	30	30	30
Metal Roofing Systems Installer	40	50	60
Millwright	40	50	60
Modular Furniture Installer (Carpenter)	30	30	30
Operating Engineer	30	30	30
Operating Engineer: Dredger	30	30	30
Operating Engineer: Landscape Construction	30	30	30
Painter	40	50	60
Painter: Industrial Painter	40	50	60
Parking and Highway Improvement (Striper-Laborer)	40	50	60
Pile Driver (Carpenter)	30	30	30
Plasterer	30	30	30
Plaster Tender	40	50	60
Plumber, Pipefitter, Steamfitter	40	50	60
Roofer	30	30	30
Sheet Metal Worker	40	50	60
Sprinkler Fitter (Fire Protection/Fire Control Systems)	40	50	60
Stator Rewinder	40	50	60
Terrazzo Finisher (Carpenter)	30	30	30
Terrazzo Installer (Carpenter)	30	30	30
Terrazzo Finisher	30	30	30
Terrazzo Worker	30	30	30
Tile Finisher	30	30	30
Tile Layer	30	30	30

Please visit the California Legislative Information website for further information on Public Contracts Code (PCC) 2600-2602, <https://leginfo.legislature.ca.gov/>.

## **ELECTRONICALLY SUBMITTED FORMS**

**FAILURE TO FULLY COMPLETE AND SUBMIT ANY OF THE FOLLOWING FORMS WILL DEEM YOUR BID NON-RESPONSIVE.**

**PLANETBIDS WILL NOT ALLOW FOR BID SUBMISSIONS WITHOUT THE ATTACHMENT OF THESE FORMS**

The following forms are to be completed by the bidder and submitted (uploaded) electronically with the bid in PlanetBids.

- A. BID BOND – See Instructions to Bidders, Bidders Guarantee of Good Faith (Bid Security) for further instructions**
- B. CONTRACTOR’S CERTIFICATION OF PENDING ACTIONS**
- C. MANDATORY DISCLOSURE OF BUSINESS INTERESTS FORM**
- D. DEBARMENT AND SUSPENSION CERTIFICATION (PRIME CONTRACTOR)**
- E. DEBARMENT AND SUSPENSION CERTIFICATION (SUBCONTRACTORS/SUPPLIERS/MANUFACTURERS)**
- F. DISCLOSURE OF LOBBYING ACTIVITIES**
- G. FORM 4500-3: DBE SUBCONTRACTOR PERFORMANCE FORM**
- H. FORM 4500-4: DBE SUBCONTRACTOR UTILIZATION FORM**
- I. COMMITMENT TO COMPLY WITH SKILLED AND TRAINED WORKFORCE REQUIREMENTS**

*OWNER'S ORIGINAL*

**BID BOND**

**See Instructions to Bidders, Bidder Guarantee of Good Faith  
(Bid Security)**

KNOW ALL MEN BY THESE PRESENTS,

That PCL Construction, Inc. as Principal,  
and Fidelity and Deposit Company of Maryland as Surety, are held and firmly bound unto The City of San Diego hereinafter called "OWNER," in the sum of **10% OF THE TOTAL BID AMOUNT** for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Principal has submitted a Bid to said OWNER to perform the WORK required under the bidding schedule(s) of the OWNER's Contract Documents entitled

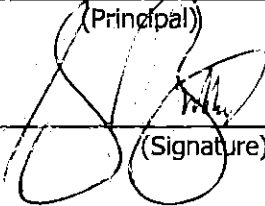
Pure Water Program: Metro Biosolids Center Improvements

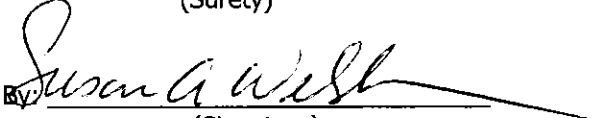
NOW THEREFORE, if said Principal is awarded a contract by said OWNER and, within the time and in the manner required in the "Notice Inviting Bids" enters into a written Agreement on the form of agreement bound with said Contract Documents, furnishes the required certificates of insurance, and furnishes the required Performance Bond and Payment Bond, then this obligation shall be null and void, otherwise it shall remain in full force and effect. In the event suit is brought upon this bond by said OWNER and OWNER prevails, said Surety shall pay all costs incurred by said OWNER in such suit, including a reasonable attorney's fee to be fixed by the court.

SIGNED AND SEALED, this 9th day of April, 2021

PCL Construction, Inc. (SEAL)

Fidelity and Deposit Company of Maryland (SEAL)

(Principal)  
By:  (Signature)  
Shawn W. Britton  
Secretary / Treasurer

(Surety)  
By:  (Signature) Attorney-in-Fact  
Susan A. Welsh (Signature) Attorney-in-Fact

(SEAL AND NOTARIAL ACKNOWLEDGEMENT OF SURETY)

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT**

State of ARIZONA

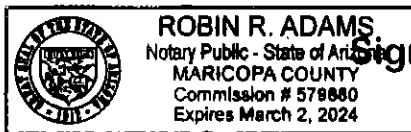
County of MARICOPA

On 4/12/21 before me, ROBIN ADAMS, Notary Public, personally appeared SHAWN BRITTON who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

(seal)



Signature

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT**

A Notary Public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

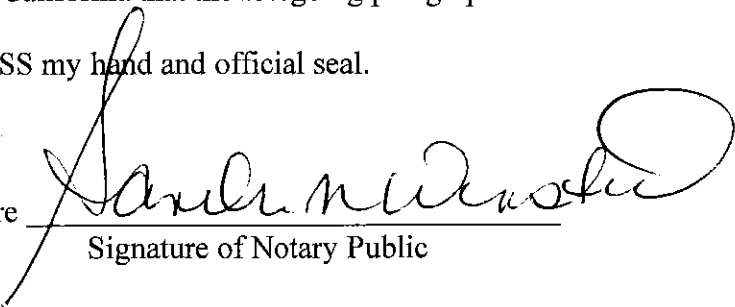
State of Illinois

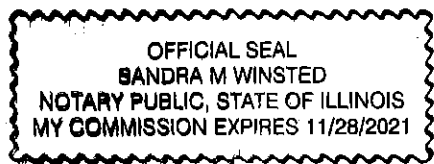
County of Cook

On 9<sup>th</sup> day of April, 2021, before me, Sandra M. Winsted, Notary Public, personally appeared Susan A. Welsh who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature   
Signature of Notary Public



**ZURICH AMERICAN INSURANCE COMPANY  
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY  
FIDELITY AND DEPOSIT COMPANY OF MARYLAND  
POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Illinois, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Illinois (herein collectively called the "Companies"), by **Robert D. Murray, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Sandra M. WINSTED, Diane M. O'LEARY, Susan A. WELSH, Judith A. LUCKY-EFTIMOV, James B. MCTAGGART, Debra J. DOYLE, Sandra M. NOWAK, Jessica B. DEMPSEY, Christina L. SANDOVAL, Kristin L HANNIGAN and Samantha CHERICI, all of Chicago, Illinois**, EACH, its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: any and all bonds and undertakings, and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland, and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland, in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 8<sup>th</sup> day of April, A.D. 2020.



**ATTEST:  
ZURICH AMERICAN INSURANCE COMPANY  
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY  
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**

By: *Robert D. Murray*  
Vice President

By: *Dawn E. Brown*  
Secretary

**State of Maryland  
County of Baltimore**

On this 8th day of April, A.D. 2020, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **Robert D. Murray, Vice President and Dawn E. Brown, Secretary** of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, depose and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.



Constance A. Dunn, Notary Public  
My Commission Expires: July 9, 2023



**EXTRACT FROM BY-LAWS OF THE COMPANIES**

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify or revoke any such appointment or authority at any time."

**CERTIFICATE**

I, the undersigned, Secretary of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 9 day of April 2001



*Brian M. Hodges*

By: Brian M. Hodges  
Vice President

**TO REPORT A CLAIM WITH REGARD TO A SURETY BOND, PLEASE SUBMIT A COMPLETE DESCRIPTION OF THE CLAIM INCLUDING THE PRINCIPAL ON THE BOND, THE BOND NUMBER, AND YOUR CONTACT INFORMATION TO:**

Zurich Surety Claims  
1299 Zurich Way  
Schaumburg, IL 60196-1056  
[www.reportsfclaims@zurichna.com](http://www.reportsfclaims@zurichna.com)  
800-626-4577

### CONTRACTOR'S CERTIFICATION OF PENDING ACTIONS

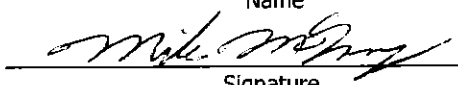
As part of its bid or proposal (Non-Price Proposal in the case of Design-Build contracts), the Bidder shall provide to the City a list of all instances within the past 10 years where a complaint was filed or pending against the Bidder in a legal or administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers, and a description of the status or resolution of that complaint, including any remedial action taken.

**CHECK ONE BOX ONLY.**

- The undersigned certifies that within the past 10 years the Bidder has NOT been the subject of a complaint or pending action in a legal administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers.
- The undersigned certifies that within the past 10 years the Bidder has been the subject of a complaint or pending action in a legal administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers. A description of the status or resolution of that complaint, including any remedial action taken and the applicable dates is as follows:

DATE OF CLAIM	LOCATION	DESCRIPTION OF CLAIM	LITIGATION (Y/N)	STATUS	RESOLUTION/REMEDIAL ACTION TAKEN
01/23/2015	Phoenix, AZ	Claim of wrongful termination with the DFEH due to discrimination.	N	Closed	Internal investigation found no evidence supporting the allegations.
09/24/2015	Page, AZ	Claim of discrimination with the Office of Navajo Labor Relations.	N	Closed	Office of Navajo Labor Relations dismissed the claim.
12/30/2015	Page, AZ	Claim of discrimination with the Office of Navajo Labor Relations.	N	Closed	Office of Navajo Labor Relations dismissed the claim. Follow up leader training was facilitated.

Contractor Name: PCL Construction, Inc.

Certified By Mike McKinney Title \_\_\_\_\_  
President  
 Name \_\_\_\_\_  
  
 Signature \_\_\_\_\_ Date 4-20-2021

**USE ADDITIONAL FORMS AS NECESSARY**

## Mandatory Disclosure of Business Interests Form

### BIDDER/PROPOSER INFORMATION

<b>Legal Name</b>		<b>DBA</b>	
PCL Construction, Inc.			
<b>Street Address</b>	<b>City</b>	<b>State</b>	<b>Zip</b>
3750 Schaufele Avenue, Suite #270, Long Beach		CA	90808
<b>Contact Person, Title</b>		<b>Phone</b>	<b>Fax</b>
Jeff Newman, Area Manager		602-799-4650	480-829-8252

Provide the name, identity, and precise nature of the interest\* of all persons who are directly or indirectly involved\*\* in this proposed transaction (SDMC § 21.0103).

\* The precise nature of the interest includes:

- the percentage ownership interest in a party to the transaction,
- the percentage ownership interest in any firm, corporation, or partnership that will receive funds from the transaction, the value of any financial interest in the transaction,
- any contingent interest in the transaction and the value of such interest should the contingency be satisfied, and any philanthropic, scientific, artistic, or property interest in the transaction.

\*\* Directly or indirectly involved means pursuing the transaction by:

- communicating or negotiating with City officers or employees,
- submitting or preparing applications, bids, proposals or other documents for purposes of contracting with the City, or directing or supervising the actions of persons engaged in the above activity.

<b>Name</b>	<b>Title/Position</b>
Mike McKinney	President
<b>City and State of Residence</b>	<b>Employer (if different than Bidder/Proposer)</b>
Chandler, Arizona	PCL Construction, Inc.
<b>Interest in the transaction</b>	
0%	

<b>Name</b>	<b>Title/Position</b>
Shawn Britton	Secretary / Treasurer
<b>City and State of Residence</b>	<b>Employer (if different than Bidder/Proposer)</b>
Chandler, Arizona	PCL Construction, Inc.
<b>Interest in the transaction</b>	
0%	

### \* Use Additional Pages if Necessary \*

Under penalty of perjury under the laws of the State of California, I certify that I am responsible for the completeness and accuracy of the responses contained herein, and that all information provided is true, full and complete to the best of my knowledge and belief. I agree to provide written notice to the Mayor or Designee within five (5) business days if, at any time, I learn that any portion of this Mandatory Disclosure of Business Interests Form requires an updated response. Failure to timely provide the Mayor or Designee with written notice is grounds for Contract termination.

Mike McKinney  
President



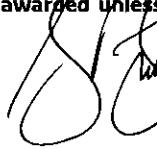
4-20-2021

Print Name, Title

Signature

Date

**Failure to sign and submit this form with the bid/proposal shall make the bid/proposal non-responsive. In the case of an informal solicitation, the contract will not be awarded unless a signed and completed Mandatory Disclosure of Business Interests Form is submitted.**



Shawn W. Britton  
Secretary / Treasurer

**From:** [Shawn Britton](#)  
**To:** [Riego, Rosa](#)  
**Cc:** [Craig Yakubow](#); [Mike McKinney](#); [Lisa Plante](#)  
**Subject:** [EXTERNAL] FW: K-21-1867-DBB-3 Pure Water Program: Metro Biosolids Center Improvements - Mandatory Disclosure Form  
**Date:** Wednesday, April 21, 2021 10:51:13 AM  
**Attachments:** [PCL- Business Interest Form.pdf](#)  
[External corporate structure chart.pdf](#)

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**\*\*This email came from an external source. Be cautious about clicking on any links in this email or opening attachments.\*\***

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Rosa,

Per our conversation we believe the forms are correct in stating 0% interest for the following reasons:

1. PCL Construction, Inc. is a wholly owned subsidiary of PCL Infrastructure Management, Inc.
2. PCL Family of Companies include a number of operating units that roll up to a parent company (see attached chart).
3. PCL is 100% employee owned.

Please call me if you'd like to discuss further.

Regards,

**Shawn Britton**  
**Sr. Manager, Finance and Administration**

**PCL Construction, Inc.**  
1711 W. Greentree Drive, Suite 201  
Tempe, AZ 85284  
T: 480-763-2740  
M: 602-885-0303  
[Swbritton@pcl.com](mailto:Swbritton@pcl.com)

[www.pcl.com](http://www.pcl.com)

**TOGETHER WE BUILD SUCCESS**

---

**From:** Craig Yakubow <[CYakubow@pcl.com](mailto:CYakubow@pcl.com)>  
**Sent:** Wednesday, April 21, 2021 10:20 AM  
**To:** Shawn Britton <[SWBritton@pcl.com](mailto:SWBritton@pcl.com)>  
**Cc:** Mike McKinney <[MAMckinney@pcl.com](mailto:MAMckinney@pcl.com)>; Lisa Plante <[laplante@pcl.com](mailto:laplante@pcl.com)>  
**Subject:** FW: K-21-1867-DBB-3 Pure Water Program: Metro Biosolids Center Improvements - Mandatory Disclosure Form

Shawn,

In Ken's absence can you please help update per the following request. I have the original forms.

Thanks,  
Craig

---

**From:** Riego, Rosa <[RRiego@sandiego.gov](mailto:RRiego@sandiego.gov)>

**Sent:** Wednesday, April 21, 2021 10:18 AM

**To:** Craig Yakubow <[CYakubow@pcl.com](mailto:CYakubow@pcl.com)>; Lisa Plante <[laplante@pcl.com](mailto:laplante@pcl.com)>

**Subject:** K-21-1867-DBB-3 Pure Water Program: Metro Biosolids Center Improvements - Mandatory Disclosure Form

[External Email]

Good Morning,

The City of San Diego is currently reviewing the bid your firm submitted and upon further review it has been determine the following form requires attention:

Mandatory Disclosure Form

You have listed individuals in the form. However, there is no value in the percentage. Please update with 1%-100%.

Once corrections have been made, please resubmit the form to my attention via email before the end of the week.

Any questions let me know.

Thank you,

**Rosa Isela Riego**

Senior Contract Specialist

City of San Diego

Engineering & Capital Projects

O (619) 533-3426

[www.sandiego.gov](http://www.sandiego.gov) [[sandiego.gov](http://sandiego.gov)]

**CONFIDENTIAL COMMUNICATION**

This electronic mail message and any attachments are intended only for the use of the addressee(s) named above and may contain information that is privileged, confidential and exempt from disclosure under applicable law. If you are not an intended recipient, or the employee or agent responsible for delivering this e-mail to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you receive the e-mail in error, please immediately notify sender by replying to this message or by telephone. Thank you.

**DEBARMENT AND SUSPENSION CERTIFICATION  
PRIME CONTRACTOR  
FAILURE TO COMPLETE AND SUBMIT AT TIME OF BID SHALL RENDER BID NON-RESPONSIVE**

**EFFECT OF DEBARMENT OR SUSPENSION**

To promote integrity in the City's contracting processes and to protect the public interest, the City shall only enter into contracts with responsible- bidders and contractors. In accordance with San Diego Municipal Code §22.0814 (a): *Bidders and contractors* who have been *debarred* or *suspended* are excluded from submitting bids, submitting responses to requests for proposal or qualifications, receiving *contract* awards, executing *contracts*, participating as a *subcontractor*, employee, agent or representative of another *person* contracting with the City.

As part of its bid or proposal (Non-Price Proposal in the case of Design-Build contracts), the Bidder shall provide to the City a list of Names of the Principal Individual owner(s).

The names of all persons interested in the foregoing proposal as Principals are as follows:

NAME	TITLE
Mike McKinney	President
Shawn Britton	Secretary / Treasurer
Richard Hewitt	Operations Manager
Jeff Newman	Area Manager

**IMPORTANT NOTICE:** If Bidder or other interested person is a corporation, state secretary, treasurer, and manager thereof; if a co-partnership, state true name of firm, also names of all individual co-partners composing firm; if Bidder or other interested person is an individual, state first and last names in full.

The Bidder, under penalty of perjury, certifies that, except as noted below, he/she or any person associated therewith in the capacity of owner, partner, director, officer, manager:

- Is not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any Federal, State or local agency;
- has not been suspended, debarred, voluntarily excluded or determined ineligible by any Federal, State or local agency within the past 3 years;
- does not have a proposed debarment pending; and
- has not been indicted, convicted, or had a civil judgment rendered against it by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

If there are any exceptions to this certification, insert the exceptions in the following space.

N/A

Exceptions will be considered in determining bidder responsibility. For any exception noted above, indicate below to whom it applies, initiating agency, and dates of action.

Contractor Name: PCL Construction, Inc.

Certified By Mike McKinney Title \_\_\_\_\_  
President

Name Mike McKinney Date 4-20-2021  
 Signature

**NOTE:** Providing false information may result in criminal prosecution or administrative sanctions.

**DEBARMENT AND SUSPENSION CERTIFICATION  
SUBCONTRACTORS, SUPPLIERS AND MANUFACTURERS  
\*TO BE COMPLETED BY BIDDER\*  
FAILURE TO COMPLETE AND SUBMIT AT TIME OF BID SHALL RENDER BID NON-RESPONSIVE**

Names of the Principal individual owner(s)

As part of its bid or proposal (Non-Price Proposal in the case of Design-Build contracts), the Bidder shall provide to the City a list of Names of the Principal Individual owner(s) for their subcontractor/supplier/manufacturers.

Please indicate if principal owner is serving in the capacity of **subcontractor, supplier, and/or manufacturer:**

SUBCONTRACTOR       SUPPLIER       MANUFACTURER

NAME	TITLE
Marcia Binney (Techno Coatings)	Owner

SUBCONTRACTOR       SUPPLIER       MANUFACTURER

NAME	TITLE
Vincent Joe (Paramount Metal)	President

SUBCONTRACTOR       SUPPLIER       MANUFACTURER

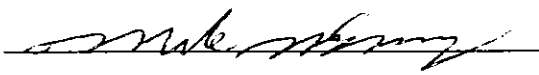
NAME	TITLE
Kevin Murphy (Ferguson)	President & Ceo Director

SUBCONTRACTOR       SUPPLIER       MANUFACTURER

NAME	TITLE
Suzanne Lykacs (Hydro Interceptor)	Financial Controller

Contractor Name: PCL Construction, Inc.

Certified By Mike McKinney Title President

Name  
  
Signature

Date 4-20-2021

**\*USE ADDITIONAL FORMS AS NECESSARY\*\***

## **LOBBY PROHIBITION, CERTIFICATION AND DISCLOSURE**

In acknowledgment that funds received under this agreement have been provided pursuant to a Federal grant, recipient hereby recognizes the prohibitions against lobbying the Federal government with any of these funds. Recipient agrees that it shall comply with the laws set forth at 31 U.S.C. § 1352 (1989) and 24 C.F.R. part 87, to wit:

### A. Conditions on use of funds

Recipient shall not expend any funds received pursuant to this agreement to pay any person to influence an officer or employee of Federal agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with any of the following Covered Federal actions:

- (1) The awarding of any federal contract
- (2) The making of any Federal grant
- (3) The making of any Federal Loan
- (4) The entering into of any cooperative agreement
- (5) The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

For purposes of defining the terms of this part of the agreement, the definitions set forth in 24 C.F.R. § 87.105 are hereby adopted and incorporated herein by reference.

### B. Certification and Disclosure

Each recipient at every tier under this agreement shall file a certification regarding lobbying, and a Disclosure Form-LLL, where required by 24 C.F.R. § 87.110. The certification form and Disclosure Form-LLL are attached to this agreement.

### C. Certifications must be filed:

- (1) By any person upon each submission that initiates agency consideration for an award of a Federal contract, grant, or cooperative agreement exceeding \$100,000, or a Federal loan or loan guarantee exceeding \$150,000.
- (2) Upon receipt by any person of a Federal contract, grant, or cooperative agreement exceeding \$100,000, or upon receipt of a Federal loan or loan guarantee exceeding \$150,000.
- (3) By any person who requests or receives from a person referred to in subsections 1 and 2 of this paragraph:
  - a. A subcontract exceeding \$100,000 at any tier under a Federal contract;
  - b. A subgrant, contract or subcontract exceeding \$100,000 at any tier under a Federal grant;
  - c. A contract or subcontract exceeding \$100,000 at any tier under a Federal loan exceeding \$150,000;
  - d. A contract or subcontract exceeding \$100,000 at any tier under a Federal cooperative agreement.

D. Disclosure Forms-LLL must be filed in every instance when a person applies for, requests, or receives Federal appropriations exceeding \$100,000 pursuant to a contract, subcontract, grant, subgrant, loan, or cooperative agreement when such person has paid or expects to pay any sum, in cash or in kind, to influence or attempt to influence any officer or employee of an agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress. Further, Disclosure Form-LLL must be filed by recipients at any tier at the end of each calendar quarter in which there occurs any event that requires disclosure or materially affects information submitted in prior disclosures. Such events include:

- (1) 1. An increase of \$25,000 in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action;
- (2) 2. A change in the person(s) influencing or attempting to influence a covered action;
- (3) 3. A change in the officer(s), employee(s), or member(s) contacted to influence a covered action.

All disclosure Forms-LLL, but not certifications, shall be forwarded from tier to tier until received by the principal recipient, which in turn will file them with the appropriate Federal agency.



## INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Use the SF-LLLA Continuation Sheet for additional information if the space on the form is inadequate. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.


1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.
2. Identify the status of the covered Federal action.
3. Identify the appropriate classification of this report. If this is a follow up report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.
4. Enter the full name, address, city, State and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.
5. If the organization filing this report in item 4 checks "Subawardee," then enter the full name, address, city, State and zip code of the prime Federal recipient. Include Congressional District, if known.
6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.
7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.
8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitation for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."
9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.
10. (a) Enter the full name, address, city, State and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influence the covered Federal action.  
(b) Enter the full names of the individual(s) performing services, and include full address if different from 10 (a). Enter Last Name, First Name, and Middle Initial (MI).
11. Enter the amount of compensation paid or reasonably expected to be paid by the reporting entity (item 4) to the lobbying entity (item 10). Indicate whether the payment has been made (actual) or will be made (planned). Check all boxes that apply. If this is a material change report, enter the cumulative amount of payment made or planned to be made.
12. Check the appropriate box(es). Check all boxes that apply. If payment is made through an in-kind contribution, specify the nature and value of the in-kind payment.
13. Check the appropriate box(es). Check all boxes that apply. If other, specify nature.
14. Provide a specific and detailed description of the services that the lobbyist has performed, or will be expected to perform, and the date(s) of any services rendered. Include all preparatory and related activity, not just time spent in actual contact with Federal officials. Identify the Federal official(s) or employee(s) contacted or the officer(s), employee(s), or Member(s) of Congress that were contacted.
15. Check whether or not a SF-LLLA Continuation Sheet(s) is attached.
16. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

According to the Paperwork Reduction Act, as amended, no persons are required to respond to a collection of information unless it displays a valid OMB Control Number. The valid OMB control number for this information collection is OMB No. 0348-0046. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, DC 20503.

# DISCLOSURE OF LOBBYING ACTIVITIES

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352  
(See reverse for public burden disclosure)

Approved by OMB  
0348-0046

<b>1. Type of Federal Action:</b> <input type="checkbox"/> a. Contract  a. Grant b. Cooperative agreement c. Loan d. Loan guarantee e. Loan insurance	<b>2. Status of Federal Action:</b> <input checked="" type="checkbox"/> a. bid/offer/application  b. initial award  c. post-award	<b>3. Report Type:</b> <input type="checkbox"/> a. initial finding <input type="checkbox"/> b. material change <b>For Material Change Only</b> year _____ quarter _____ date of last report _____
<b>4. Name and Address of Reporting Entity:</b> <input checked="" type="checkbox"/> Prime <input type="checkbox"/> Subawardee  Tier _____, if known:  PCL Construction, Inc. 3750 Schaufele Avenue, Suite #270 Long Beach, CA 90808  Congressional District, if known:		<b>5. If Reporting Entity in No. 4 is a Subawardee, Enter Name and Address of Prime:</b>   Congressional District, if known:
<b>6. Federal Department/Agency:</b>	<b>7. Federal Program Name/Description:</b>   CFDA Number, if applicable: _____	
<b>8. Federal Action Number, if known:</b>	<b>9. Award Amount, if known:</b>  \$	
<b>10. a. Name and Address of Lobbying Entity</b> (if individual, last name, first name, M)  N/A  (attach Continuation Sheet(s) SF-LLL4, if necessary)	<b>b. Individuals Performing Services</b> (including address if different from No. 10a)      N/A (last name, first name, MI):  (attach Continuation Sheet(s) SF-LLL4, if necessary)	
<b>11. Amount of Payment</b> (check all that apply)      N/A \$ _____ <input type="checkbox"/> actual <input type="checkbox"/> planned	<b>13. Type of Payment</b> (check all that apply) <input type="checkbox"/> a. retainer      N/A <input type="checkbox"/> b. one-time fee <input type="checkbox"/> c. commission <input type="checkbox"/> d. contingent fee <input type="checkbox"/> e. deferral <input type="checkbox"/> f. other: specify: _____	
<b>12. Form of Payment</b> (check all that apply)      N/A <input type="checkbox"/> a, cash <input type="checkbox"/> b. in-kind: specify: nature _____ Value _____		
<b>14. Brief Description of Services Performed or to be Performed and Date(s) of Service, Including officer(s), employee(s), or Member(s), contacted, for Payment indicated in item 11:</b>  N/A  (attach Continuation Sheet(s) SF-LLLA, if necessary)		
<b>15. Continuation Sheet(s) SF-LLLA attached:</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
<b>16.</b> Information requested through this for misauthorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.	Signature:  Print Name: Mike McKinney Title: President Telephone No.: 602-402-2771 Date: 4-20-2021	
<b>Federal Use Only:</b>		Authorized for Local Reproduction Standard Form LLL (Rev. 7-07)



**Disadvantaged Business Enterprise (DBE) Program  
DBE Subcontractor Performance Form**

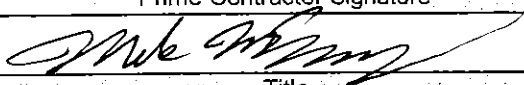
This form is intended to capture the DBE<sup>1</sup> subcontractor's<sup>2</sup> description of work to be performed and the price of the work submitted to the prime contractor. A Financial Assistance Agreement Recipient must require its prime contractor to have its DBE subcontractors complete this form and include all completed forms in the prime contractor's bid or proposal package.

Subcontractor Name <b>G.T.E. Metal Erectors, Inc.</b>		Project Name <b>Pure Water Metro Biosolids Center Improvements</b>	
Bid / Proposal No. <b>K-21-1867-DBB-3</b>	Assistance Agreement ID No. (if known)	Point of Contact <b>Scott Gunter</b>	
Address <b>P.O. Box 877 / 24530 S. Cass RD Canby, OR 97013</b>			
Telephone No. <b>503-266-6433</b>		Email Address <b>Sgunter@canby.com</b>	
Prime Contractor Name <b>JCL Construction, Inc.</b>		Issuing/Funding Entity <b>City of San Diego</b>	

Contract Item Number	Description of Work Submitted from the Prime Contractor Involving Construction, Services, Equipment or Supplies	Price of Work Submitted to the Prime Contractor
DIV 5	Supply and Install Structural, Misc, & Ornamental Metals	557,065
DBE Certified By: <input type="checkbox"/> DOT <input type="checkbox"/> SBA Other: <u>City of L.A. / MWD</u>		Meets/exceeds EPA certification standards? YES NO <b>Unknown</b>

<sup>1</sup> A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.2015 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.  
<sup>2</sup> Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an award of financial assistance.

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
	Mike McKinney
Title	Date
Vice President & District Manager	4-20-2021

Subcontractor Signature	Print Name
<b>Scott Gunter</b> <small>Digitally signed by Scott Gunter            DN: cn=Scott Gunter, ou=C.T.E. Metal Fabric Inc, ou=VP, /P=, email=Sgunter@carby.com, c=US            Date: 2021.04.20 13:02:51 -0700</small>	Scott Gunter
Title	Date
Vice President	4/20/2021

The public reporting and record keeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Do not send the completed form to this address.

**FORM 4500-3 (DBE Subcontractor Performance Form)**

CITY OF LOS ANGELES  
CALIFORNIA



ERIC GARCETTI  
MAYOR

BOARD OF PUBLIC WORKS  
MEMBERS

KEVIN JAMES  
PRESIDENT

HEATHER MARIE REPENNING  
VICE PRESIDENT

MICHAEL R. DAVIS  
PRESIDENT PRO TEMPORE

JOEL F. JACINTO  
COMMISSIONER

VACANT  
COMMISSIONER

DR. FERNANDO CAMPOS  
EXECUTIVE OFFICER

JOHN L. REAMER, JR.  
Inspector of Public Works  
and  
Director  
BUREAU OF  
CONTRACT ADMINISTRATION  
1149 S. BROADWAY, SUITE 300  
LOS ANGELES, CA 90015  
(213) 847-1922  
<http://bca.lacity.org>

Scott Gunter, Vice President  
G.T.E. Metal Erectors, Inc.  
24530 S. Cass Road  
Canby, OR 97013

File No. - 200

**RE: SMALL BUSINESS ENTERPRISE (PROPRIETARY) CERTIFICATION APPROVAL**

Dear Mr. Gunter:

Based on a thorough review of the submitted documents, we are pleased to inform you that your firm has been certified as a Small Business Enterprise (Proprietary) and has been placed in the SBE (Proprietary) Database as a firm specializing in:

**NAICS Code**

**Description**

**238120**

**Structural Steel & Preset Concrete Contractors**

This certification is valid for two years from the date of this letter. If there are any changes in your firm that may affect your eligibility as a small business, you are required to notify this office of those changes in writing. Also, please include your file number on each page of correspondence relating to these matters.

The City reserves the right to withdraw this certification if at any time, it is determined certification was knowingly obtained by false, misleading or incorrect information. The City also reserves the right to request additional information at any time during the certification period to verify any documentation submitted with your application. By accepting certification, the firm of G.T.E. Metal Erectors, Inc. hereby consents to the examination of its books, records and documents by the City.

Your SBE (Proprietary) certification status will be honored by each of the Proprietary Departments of the City of Los Angeles (i.e. LAWA, Harbor, and DWP).

For information on contracting opportunities, and to register your firm as certified SBE (Proprietary), please register or update your profile at <http://LABAVN.org>.

If you have any questions, please contact me at (213) 847-2650 or e-mail at [shaun.shimoda-kobayashi@lacity.org](mailto:shaun.shimoda-kobayashi@lacity.org).

Sincerely,

SHAUN SHIMODA-KOBAYASHI, LAWA Certification Manager  
Office of Contract Compliance  
Bureau of Contract Administration





Certified Small Business Enterprise

**Vendor Account Number:** 165786

Scott Gunter  
GTE Metal Erectors, Inc.  
24530 S. Cass Rd.  
Canby, OR 97013

Thank you for submitting your Vendor Application seeking Small Business Enterprise recognition with the Coalition of Southern California Public Agencies. Per our evaluation of the information you provided in your application and the North American Industry Classification System codes you identified, your status as a Small Business Enterprise (SBE) has been approved. This certification is recognized by the following organizations:

- Metropolitan Water District of Southern California**
- Port of Long Beach**
- San Diego County Water Authority**
- Los Angeles Unified School District**
- Los Angeles Community College District**

Metropolitan is pleased to issue this SBE Certificate subject to the terms and conditions identified below:

**NAICS code(s) for which SBE status is recognized:**

- 332999 - All Other Miscellaneous Fabricated Metal Product Manufacturing**
- 336612 - Boat Building**
- 236220 - Commercial and Institutional Building Construction**
- 332312 - Fabricated Structural Metal Manufacturing**
- 236210 - Industrial Building Construction**
- 332323 - Ornamental and Architectural Metal Work Manufacturing**

**SBE Certificate Effective Date: 06/30/20**  
**SBE Certificate Expiration Date: 06/30/23**

Work Performed by your firm that falls within the above-mentioned NAICS code(s) will be counted as SBE participation for work performed on contracts procured by the above agencies.

The agencies reserve the right to withdraw this certification if at any time it is determined that certification was knowingly obtained by false, misleading or incorrect information and reserve the right to audit all statements. If any firm attempts to falsify or misrepresent information to obtain certification, the firm may be disqualified from participation in any contracts for a period of up to five years.

**SBE Certification is valid for a period of three (3) years. To maintain SBE status, firms must update their existing SBE Vendor Application on or before the expiration date mentioned above. All information is subject to verification.**

If there are any changes in your status that may impact your certification, you are required to update your account information online. A copy of your information can be viewed by logging into your Vendor Profile, and visiting the Small Business Certification tab.

Sincerely,  
John J. Arena  
Metropolitan Water District of Southern California  
Business Outreach Program Manager

700 N. Alameda Street, Los Angeles, California 90012 Mailing Address: Box 54153, Los Angeles, CA 90054-0153  
Telephone (213) 217-7444



**Disadvantaged Business Enterprise (DBE) Program  
DBE Subcontractor Performance Form**

This form is intended to capture the DBE<sup>1</sup> subcontractor's<sup>2</sup> description of work to be performed and the price of the work submitted to the prime contractor. A Financial Assistance Agreement Recipient must require its prime contractor to have its DBE subcontractors complete this form and include all completed forms in the prime contractor's bid or proposal package.

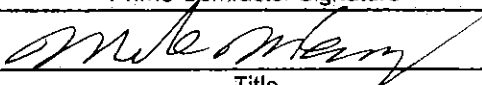
Subcontractor Name <i>GF</i>		Project Name METRO BIOSOLIDS CENTER IMPROVEMENTS	
Bid / Proposal No. K-21-1867-DBB-3	Assistance Agreement ID No. (if known)	Point of Contact <i>Michael Phillips</i>	
Address <i>13653 Alondra Blvd, Santa Fe Springs, CA 90670</i>			
Telephone No. <i>562-229-0227</i>		Email Address <i>M.Phillips@gfconcretecutting.com</i>	
Prime Contractor Name PCL Construction, Inc.		Issuing/Funding Entity CWSRF/CASRF	

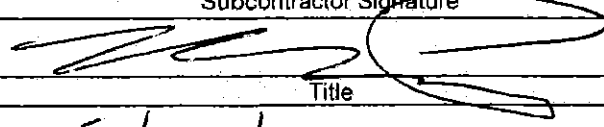
Contract Item Number	Description of Work Submitted from the Prime Contractor Involving Construction, Services, Equipment or Supplies	Price of Work Submitted to the Prime Contractor
# 24	Concrete cutting	\$ 5744. <sup>00</sup>
DBE Certified By: <input checked="" type="checkbox"/> DOT <input type="checkbox"/> SBA Other: _____		Meets/exceeds EPA certification standards? YES    NO <input checked="" type="checkbox"/> Unknown

<sup>1</sup> A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.2015 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

<sup>2</sup> Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an award of financial assistance.

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
	Mike McKinley
Title	Date
Vice President	4/20/21

Subcontractor Signature	Print Name
	Michael Phillips
Title	Date
Estimator	4-19-21

The public reporting and record keeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Do not send the completed form to this address.

**FORM 4500-3 (DBE Subcontractor Performance Form)**





**Disadvantaged Business Enterprise (DBE) Program  
DBE Subcontractor Utilization Form**

This form is intended to capture the prime contractor's actual and/or anticipated use of identified certified DBE<sup>1</sup> subcontractor's<sup>2</sup> and the estimated dollar amount of each subcontract. A Financial Assistance Agreement Recipient must require its prime contractors to complete this form and include it in the bid or proposal package. Prime contractors should also maintain a copy of this form on file.

Prime Contractor Name PCL Construction, Inc.		Project Name Pure Water Program: Metro Biosolids Center Improvements
Bid / Proposal No. K-21-1867-DBB-3	Assistance Agreement ID No. (if known)	Point of Contact Jeff Newman
Address 3750 Schaufele Avenue, Suite #270, Long Beach, CA 90808		
Telephone No. 602-799-4650	Email Address JNewman@pcl.com	
Issuing/Funding Entity		

I have identified potential DBE certified subcontractors.  YES  NO  
 If yes, please complete the table below. If no, please explain:

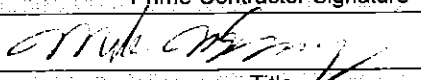
Subcontractor Name/ Company Name	Company Address / Phone / Email	Estimated Dollar Amount	Currently DBE Certified?
G&F Concrete Cutting	13653 Alondra Blvd, Santa Fe Springs, CA 562-229-0227	5744	✓
GTE Metals	PO Box 877 / 24580 S. Cass Rd, Canby, OR 503-266-4433	557,005	✓

--Continue on back if needed--

<sup>1</sup> A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.2015 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

<sup>2</sup> Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an award of financial assistance.

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
	MIKE MCKINNEY
Title	Date
PRESIDENT	4-20-2021

The public reporting and record keeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Do not send the completed form to this address.

**FORM 4500-4 (DBE Subcontractor Utilization Form)**

## COMMITMENT TO COMPLY WITH SKILLED AND TRAINED WORKFORCE REQUIREMENTS

Bidder, on behalf of itself and its subcontractor(s) at every tier, hereby commits that a skilled and trained workforce will be used to perform all work on the Project that falls within an apprenticeship occupation in the building or construction trades in accordance with Chapter 2.9 (commencing with Section 2600) of Part 1 of Division 2 of the Public Contract Code. Pursuant to Public Contract Code section 2601, as of January 1, 2018:

"Skilled and trained workforce" means a workforce that meets all of the following conditions: All the workers performing work in an apprenticeable occupation in the building and construction trades are either skilled journeypersons or apprentices registered in an apprenticeship program approved by the chief.

For work performed on or after January 1, 2018, at least 40 percent of the skilled journeypersons employed to perform work on the contract or project by every contractor and each of its subcontractors at every tier are graduates of an apprenticeship program for the applicable occupation. This requirement shall not apply to work performed in the following occupations: acoustical installer, bricklayer, carpenter, cement mason, drywall installer or lather, marble mason, finisher, or setter, modular furniture or systems installer, operating engineer, pile driver, plasterer, roofer or waterproofer, stone mason, surveyor, teamster, terrazzo worker or finisher, and tile layer, setter, or finisher.

For work performed on or after January 1, 2019, at least 50 percent of the skilled journeypersons employed to perform work on the contract or project by every contractor and each of its subcontractors at every tier are graduates of an apprenticeship program for the applicable occupation. This requirement shall not apply to work performed in the following occupations: acoustical installer, bricklayer, carpenter, cement mason, drywall installer or lather, marble mason, finisher, or setter, modular furniture or systems installer, operating engineer, pile driver, plasterer, roofer or waterproofer, stone mason, surveyor, teamster, terrazzo worker or finisher, and tile layer, setter, or finisher.

For work performed on or after January 1, 2020, at least 60 percent of the skilled journeypersons employed to perform work on the contract or project by every contractor and each of its subcontractors at every tier are graduates of an apprenticeship program for the applicable occupation. This requirement shall not apply to work performed in the following occupations: acoustical installer, bricklayer, carpenter, cement mason, drywall installer or lather, marble mason, finisher, or setter, modular furniture or systems installer, operating engineer, pile driver, plasterer, roofer or waterproofer, stone mason, surveyor, teamster, terrazzo worker or finisher, and tile layer, setter, or finisher.

**NOTE:** The above commitment is required by California Public Utilities Code section 132354.7 and must be submitted by Bidder in order for the Bid to be responsive to the IFB.

Name of Bidder: PCL Construction, Inc.

Name and Title of Bidder's Authorized Representative: \_\_\_\_\_

Mike McKinney  
President

Signature of Bidder's Representative: \_\_\_\_\_

  
(SIGN HERE)

Date: 4-20-2021

# City of San Diego

**CITY CONTACT:** Rosa Riego, Senior Contract Specialist, Email: [RRiego@sandiego.gov](mailto:RRiego@sandiego.gov)  
Phone No. (619) 533-3426

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## ADDENDUM A



**FOR**

## **PURE WATER PROGRAM: METRO BIOSOLIDS CENTER IMPROVEMENTS**

BID NO.:	<b>K-21-1867-DBB-3</b>
SAP NO. (WBS/IO/CC):	<b>B-17006, S-17013</b>
CLIENT DEPARTMENT:	<b>2000</b>
COUNCIL DISTRICT:	<b>6</b>
PROJECT TYPE:	<b>BO</b>

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### **BID DUE DATE:**


**2:00 PM  
APRIL 6, 2021**

**CITY OF SAN DIEGO'S ELECTRONIC BIDDING SITE, PLANETBIDS**

<http://www.sandiego.gov/cip/bidopps/index.shtml>

**ENGINEER OF WORK**

The Engineering Specifications and Special Provisions contained herein have been prepared by or under the direction of the following Registered Engineer:



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1) Registered Engineer

3/17/2021

---

Date

Seal:



---

2) For City Engineer

3/17/2021

---

Date

Seal:



## **A. CHANGES TO CONTRACT DOCUMENTS**

The following changes to the Contract Documents are hereby made effective as though originally issued with the bid package. Bidders are reminded that all previous requirements to this solicitation remain in full force and effect.

## **B. BIDDER'S QUESTIONS**

Q1. Project: SAN DIEGO NORTH CITY METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

The following Existing Motor Control Centers require new equipment for the above referenced project. Please provide manufacturers and model numbers for said Motor Control Centers.

76MCC7A01	Sht. 76-E-611
76MCC7A02	Sht. 76-E-612
76MCC76D01	Sht. 76-E-617
76MCC76D02	Sht. 76-E-618
80MCC8001	Sht. 80-E-611
80MCC8002	Sht. 80-E-612
80MCC8003	Sht. 80-E-613
80MCC8004	Sht. 80-E-614
80MCC8005	Sht. 80-E-615
80MCC8006	Sht. 80-E-616

A1. Referenced MCCS are Cutler Hammer 2100 Series.

Q2. Specification 01-50-00:  
2.01.F. A Standard trailer is 24 x 60 is this acceptable?

A2. Yes, one 24' x 60' or two 12' x 60' trailers would be acceptable for CM trailer.

Q3. Specification 01-50-00:  
2.01.G. A Standard trailer is 1440 square feet. Is this acceptable?

A3. Yes.

Q4. Specification 01-50-00:  
2.01.H. A Standard trailer is T111 Hardy Board or pressed hard board. Is this acceptable?

A4. Confirmed, no exception taken to material change but trailer shall be submitted for approval.

- Q5. Specification 01-50-00:  
2.01.H. What is meant by "insulated double walls, floor, roof"?
- A5. Bid as specified.
- Q6. Specification 01-50-00:  
3.01.I Please confirm there is 568B currently available at the "D Mark" at the site.
- A6. Question is unclear, define "D Mark". 568B is available at site.
- Q7. Specification 01-50-00:  
3.02.A.1. & 2. Please confirm power is available at or near the site for 6ea (12 x 60) office trailers. The last time we did a project at this plant, there was no available power for even one small trailer.
- A7. North side of Area 76 has an outdoor disconnect switch with a 400A fuse, 480 Volts, 3 phase, 3-wire that is fed from 76MCCD01-F3D that will be available to Contractor for CM Trailer.
- Q8. Specification 01-50-00:  
3.02.A.2. I can't image you want a generator running for 3.3 years. Please clarify if and where power is available.
- A8. Plant power will be made available to Contractor and coordinated during construction. Contractor shall propose locations, and all facilities to step down and convey power as needed.
- Q9. Specification 01-50-00:  
3.02.F.1. & 3.01.G. & 2.01.P.15. Are cells phones acceptable?
- A9. Yes.
- Q10. Will a site visit be allowed to bidders?
- A10. No, due to the current Covid-19 restrictions the City is unable to allow site visits. However, Notice Inviting Bids Item 14 provides links for site videos, narrative and site map. Refer to modification to Instruction to Bidders Item 23 in this Addendum.
- Q11. With the number of projects bidding concurrently through the month of March and April we are concerned that we will not attract DBEs to propose on this contract (K-21-1867-DBB-3) and therefore request the bid due date be moved to May 4, 2021.
- A11. Bid as specified.

Q12. Please reference spec 01 31 13 1.10-E. Time Lapse Construction Video.

Please review this requirement to determine feasibility. The majority of the scope of the work is inside buildings, so one camera mounted at the site will show little if any work being completed. Can this requirement be removed from the specifications?

A12. Time lapse video cameras are being installed on other North City projects and will serve as construction record, support public outreach efforts and monitoring. Bid as specified.

Q13. Sht. 76-E-140 shows DC Polymer Feed Pumps 76-P-61 thru 76-P-68, What is the physical location for the VFD's feeding this equipment?

Sht. 76-E-150 shows TC Polymer Feed Pumps 76-P-21 thru 76-P25, what is the physical location for the VFD's feeding this equipment?

Please provide the room location for these VFD's.

A13. There are no modifications to these VFDs under the Work, so locations are not shown on the Drawings.

Q14. The RFP contains a section for "Certifications and Forms" that includes the form "Named Equipment/Material Supplier List" which is not listed on the list of Electronically Submitted Forms due with the bid. Please clarify if the "Named Equipment/Material Supplier List" form is due with the bid.

If yes, please confirm that the "Named Equipment/Material Supplier List" is for equipment/material suppliers who will provide equipment/material in an amount of or in excess of 0.5% of the Contractor's total bid.

Also, if yes please provide electronic versions of the above referenced forms.

A14. Named Equipment/Material Supplier List is due at the precon.

Q15. Please confirm that the Debarment Suspension Certification for Subcontractors/Suppliers/Manufacturers is only asking for list of individual principal owners, and not specify any exceptions to the Debarment Suspension Certification.

A15. Confirmed.

Q16. Please confirm that the "Debarment Suspension Certification for Subcontractors/Suppliers/Manufacturers" must be submitted only for the List of Subcontractors that are in accordance with the requirements of the



Subletting and Subcontracting Fair Practices Act Section 4100 of the California Public Contract Code, and the suppliers listed in the "Named Equipment Material Supplier List".

- A16. No, All KNOWN subcontractors at time of bid.
- Q17. In the Instruction to Bidders page 20, item 23 "EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE OF WORK", The Bidder shall examine carefully the Project Site, the Plans and Specifications, other materials as described in the Special Provisions, Section 3-9, "TECHNICAL STUDIES AND SUBSURFACE DATA", and the proposal forms (e.g., Bidding Documents). The submission of a Bid shall be conclusive evidence that the Bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality, and scope of Work, the quantities of materials to be furnished, and as to the requirements of the Bidding Documents Proposal, Plans, and Specifications.
- a. With the extensive mechanical demolition scope and installation of new scope Filanc requests access to the site to examine the Project Site to be in compliance with the bid documents.
- A17. No, due to the current Covid-19 restrictions the City is unable to allow site visits. However, Notice Inviting Bids Item 14 provides links for site videos, narrative and site map. Refer to modification to Instruction to Bidders Item 23 in this Addendum.
- Q18. When overlaying sheets 27 and 185, it looks as though there are multiple trees required to be removed in order complete the installation of new BG system. Please confirm the tree diameters, height and species so to price the removal.
- A18. Trees shall be removed for installation of the biogas system as noted on Drawing C-100 and coordinated during construction. Trees are visible on-site videos and publicly available mapping such as Google Earth.
- Q19. Sheet 31 shows the biogas yard pipe. There are multiple trees shown very close to the alignment from station 21+00 to 22+00. Please confirm that these trees to not need to be removed to facilitate installation of the pipe. If they require removal, please provide the tree diameters, height and species so to price the removal.
- A19. Trees shall be protected as specified in Specification Sections 01 50 00 and 01 56 39 and any removals coordinated during construction.

### C. NOTICE INVITING BIDS

1. To Item 3, ESTIMATED CONSTRUCTION COST, page 7, **DELETE** in its entirety and **SUBSTITUTE** with the following:
  3. **ESTIMATED CONSTRUCTION COST:** The City's estimated total construction cost for this project is **\$40,798,000**.

### D. INSTRUCTIONS TO BIDDERS

1. To Item 23, EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE OF WORK, page 20, **DELETE** in its entirety and **SUBSTITUTE** with the following:
  23. **EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE OF WORK:** The Bidder shall examine carefully the Project Site via the Video Link and Narrative and Site Map, the Plans and Specifications, other materials as described in the Special Provisions, Section 3-9, "TECHNICAL STUDIES AND SUBSURFACE DATA", and the proposal forms (e.g., Bidding Documents). The submission of a Bid shall be conclusive evidence that the Bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality, and scope of Work, the quantities of materials to be furnished, and as to the requirements of the Bidding Documents Proposal, Plans, and Specifications.

### E. ATTACHMENTS

1. To Attachment D, FUNDING AGENCY PROVISIONS, pages 32 through 92, **DELETE** in their entirety and **SUBSTITUTE** with pages 11 through 75 of this Addendum.

### F. SUPPLEMENTARY SPECIAL PROVISIONS

1. To SECTION 6 – PROSECUTION AND PROGRESS OF THE WORK, page 145. **ADD** the following:

- 6-1.1 Construction Schedule.** To the "GREENBOOK", paragraph (1), sentence (1), **DELETE** in its entirety and **SUBSTITUTE** with the following:

After notification of award of the Contract and prior to the start of any Work, you shall submit your proposed Cost Loaded Construction Schedule to the Engineer at the pre-construction meeting.

**6-1.1.2 Contracts More Than \$500,000 In Value.** To the "WHITEBOOK", item 1, DELETE in its entirety and SUBSTITUTE with the following:

1. Provide the Schedule to the Engineer in accordance with 6-1.1, "Construction Schedule" and 6-1.2, "Commencement of the Work".

To the "WHITEBOOK", item 2, DELETE in its entirety.

**6-1.2 Commencement of the Work.** To the "WHITEBOOK", ADD the following:

5. You shall submit a Cost Loaded Construction Schedule in accordance with 6-1.1, "Construction Schedule" at the scheduled pre-construction meeting.
  6. If a Cost Loaded Construction Schedule is not provided, the pre-construction meeting will still be held. The Contract Time shall commence at issuance of the NTP, but you shall be limited to the following activities until the Cost Loaded Construction Schedule has been submitted to the Resident Engineer with no exceptions taken:
    - a) Mobilization of your trailers, associated utility setup, and grading for trailer area
    - b) Permit Procurement
    - c) Fencing and temporary utilities for your storage areas
    - d) Submittal of anticipated critical path submittals
2. To Technicals, Section 01 29 00, PAYMENT PROCEDURES, PART 1, GENERAL, Section 1.10, BID ITEMS, sub-section J, Page 175, **DELETE** Items 2 and 3 and **SUBSTITUTE** with the following:
2. General: New larger dewatering centrifuges (2) and dewatering centrifuge feed pumps (8) and polymer pumps (8).
  3. Payment is made for this item for all Work required to upgrade the sludge dewatering system. Payment for this item includes the following:
    - a. Two new increased capacity dewatering centrifuges.
    - b. Eight new feed pumps and polymer pumps, all pumps with new ASDs.

- c. Payment under this Bid Item shall be made as the lump sum price in the Bid Schedule.
- 2. To Technicals, Section 40 90 00, INSTRUMENTATION AND CONTROL, page 1037, ADD CONTROL STRATEGIES, 1 CENTRIFUGE BUILDING, 1.01 DEWATERING CENTRIFUGES on pages 76 through 79 of this Addendum.
- 3. To Technicals, Section 40 90 06, DCS BILL OF MATERIALS AND QUANTITIES, page 1096, ADD TABLE A-11, DROP 16 – 76PCM06 DCS HARDWARE on page 80 of this Addendum.
- 4. To Technicals, Section 40 90 07, SCOPE OF WORK, PART 3, EXECUTION, Section 3.03, SPECIFIC REQUIREMENTS OF PROJECT PROCUREMENT, STAGING, PROGRAMMING AND TESTING PHASE, sub-section B, Programming and Testing Phase, Item 2, sub-item e, page 1101, ADD the following item 8):
  - 8) For the Dewatering Centrifuge upgrade an additional two three-dimensional main graphic process screens, three main graphic process screens, two sub graphic (windows) process screens, and two trend groups as defined by user workshops
- 5. To Technicals, Section 40 94 24, PROCESS INPUTS/OUTPUTS (I/O), Supplement 1, DCS Input/Output List, page 1140, ADD DROP 7, 60PCM05 Input/Output List on pages 81 through 169 of this Addendum.
- 6. To Technicals, Section 40 94 24, PROCESS INPUTS/OUTPUTS (I/O), Supplement 2, Deleted DCS Input/Output List, pages 1217 through 1234, DELETE in its entirety and SUBSTITUTE DELETED DCS INPUT/OUTPUT LIST page 170 through 189 of this Addendum.
- 7. To Technicals, Section 40 98 03, INSPECTION AND TESTING SERVICES, PART 3, EXECUTION, Section 3.03, PACKAGE SYSTEM FACTORY ACCEPTANCE TESTS, sub-section A, page 1312, ADD the following item:
  - 3) Section 44 22 24, Dewatering Centrifuges.
- 8. To Technicals, ADD Section 44 22 24, DEWATERING CENTRIFUGES on pages 190 through 231 of this Addendum.

## G. ADDITIONAL CHANGES

- The following are additional changes to the Line Items in the PlanetBids Tab:

For clarity where applicable, **ADDITIONS**, if any, have been **Underlined** and **DELETIONS**, if any, have been **~~Stricken-out~~**.

Section	Item Code	Description	UoM	Quantity	Payment Reference
<u>Main Bid</u>	<u>237310</u>	<u>Curb Ramp Type A with Detectable Warning Tiles</u>	<u>EA</u>	<u>4</u>	<u>303-5.10.2</u>
<u>Main Bid</u>	<u>237310</u>	<u>Curb Ramp Type B with Detectable Warning Tiles</u>	<u>EA</u>	<u>1</u>	<u>303-5.10.2</u>
<u>Main Bid</u>	<u>237310</u>	<u>Curb Ramp Type D with Detectable Warning Tiles</u>	<u>EA</u>	<u>1</u>	<u>303-5.10.2</u>
<u>Main Bid</u>	<u>237310</u>	<u>Additional Curb</u>	<u>LF</u>	<u>80</u>	<u>303-5.10.2</u>
<u>Main Bid</u>	<u>237310</u>	<u>Additional Sidewalk</u>	<u>SF</u>	<u>320</u>	<u>303-5.10.2</u>
<u>Main Bid</u>	<u>237310</u>	<u>Remove and Replace Existing Curb and Gutter</u>	<u>LF</u>	<u>280</u>	<u>303-5.9</u>
<u>Main Bid</u>	<u>237310</u>	<u>Remove and Replace Existing Sidewalk</u>	<u>SF</u>	<u>1120</u>	<u>303-5.9</u>

## H. PLANS

- To Drawing Numbers 41198-1001-D, 41198-1030-D, 41198-1031-D, 41198-1279-D, 41198-1286-D, 41198-1294-D, 41198-1301-D, 41198-1352-D, **DELETE** in their entirety and **REPLACE** with pages 232 through 239 of this Addendum.
- To Drawings, **ADD** Drawing Numbers 41198-1060A-D, 41198-1092A-D, 41198-1106A-D, 41198-1106B-D, 41198-1106C-D, 41198-1115A-D, 41198-1115B-D, 41198-1126A-D, 41198-1158A-D, 41198-1159A-D, 41198-1159B-D, 41198-1159C-D, 41198-1159D-D, 41198-1286A-D, 41198-1286B-D, 41198-1363A-D, 41198-1363B-D with pages 240 through 256 of this Addendum.

James Nagelvoort, Director  
Engineering & Capital Projects Department

Dated: *March 17, 2021*  
San Diego, California

JN/AJ/rd

**ATTACHMENT D**

**FUNDING AGENCY PROVISSIONS**

**CLEAN WATER STATE REVOLVING FUND (CWSRF) AND ENVIRONMENTAL  
PROTECTION AGENCY (EPA) REQUIREMENTS:**

**CLEAN WATER STATE REVOLVING FUND (CWSRF)**

**DRINKING WATER STATE REVOLVING FUND (CWSRF)**

**BUREAU OF RECLAMATION (BOR)**

## FUNDING AGENCY PROVISIONS

**IN THE EVENT THAT THESE REQUIREMENTS CONFLICT WITH THE CITY'S GENERAL EOC REQUIREMENTS, THE FUNDING AGENCY'S REQUIREMENTS WILL CONTROL.**

**1. WATER INFRASTRUCTURE FINANCE AND INNOVATION ACT (WIFIA) PROGRAM, 2014 LOCAL RESOURCES PROGRAM, AND CALIFORNIA STATE REVOLVING FUND (CASRF) REQUIREMENTS.**

The City anticipates receiving financial assistance from the Federal Government, the Metropolitan Water District of Southern California, and the State of California for this project. The following requirements are conditions of the receipt of financial assistance from the United States Environmental Protection Agency under the Federal **Water Infrastructure Finance and Innovation Act (WIFIA)**, the **Metropolitan Water District** under the **2014 Local Resources Program**, and the State Water Resources Control Board under the **California Water State Revolving Fund (CASRF)** and **Proposition 68** programs. The firm contracting with the City (Contractor) shall comply with all of the following requirements. If there are other provisions in the Contract Documents that address the same subjects as this exhibit, Contractor shall comply with both provisions, with the more stringent requirements controlling. If there is a direct conflict between the Agreement and this exhibit, the requirements of this Exhibit shall control in order to preserve the City's eligibility to receive financial assistance.

**1.1. RECORDS.** The Contractor must maintain separate books, records and other material relative to the Project. The Recipient must also retain such books, records, and other material for itself and for each contractor or subcontractor who performed or performs work on this project for a minimum of thirty-six (36) years after Completion of Construction. The Recipient must require that such books, records, and other material are subject at all reasonable times (at a minimum during normal business hours) to inspection, copying, and audit by the State Water Board, the California State Auditor, the Bureau of State Audits, the United States Environmental Protection Agency (USEPA), the Office of Inspector General, the Internal Revenue Service, the Governor, or any authorized representatives of the aforementioned. The Recipient must allow and must require its contractors to allow interviews during normal business hours of any employees who might reasonably have information related to such records. The Recipient agrees to include a similar duty regarding audit, interviews, and records retention in any contract or subcontract related to the performance of this Agreement. The provisions of this section survive the term of this Agreement. (CWSRF Agmt. § 2.17(b); DWSRF Agmt. Ex. C § C.3.2(d)).

**1.2. BONDS.** Where contractors are used, the Recipient must not authorize construction to begin until each contractor has furnished a performance bond in favor of the Recipient in the following amounts: faithful performance (100%) of contract value; labor and materials (100%) of contract value. This requirement shall not apply to any contract for less than \$25,000.00. (CWSRF Agmt. § 4.3; DWSRF Agmt. Ex. C § C.3.6).

**1.3. COMPLIANCE WITH APPLICABLE LAWS, RULES, AND REQUIREMENTS.** The Recipient must, at all times, comply with and require its contractors and subcontractors to comply with all applicable federal and state laws, rules, guidelines, regulations, and requirements. Without limitation of the foregoing, to the extent applicable, the Recipient must:

- (a) Comply with the provisions of the adopted environmental mitigation plan, if any, for the term of this Agreement;
- (b) Comply with the Policy; and

- (c) Comply with and require compliance with the state and federal requirements set forth elsewhere in this Agreement. (CWSRF Agmt. § 4.5; DWSRF Agmt. Ex. C § C.3.8).

**1.4. INDEMNIFICATION.**

- a) Contractor shall defend, indemnify and hold harmless the State Water Quality Control Board, the California Infrastructure and Economic Development Bank (Bank), and any trustee, and their officers, employees, and agents for the Bonds issued by the Bank, if any, to the same extent Contractor is obligated to defend, indemnify, and hold harmless the City under the Agreement. Contractor shall require its subcontractors to similarly defend, indemnify, and hold harmless the State Water Quality Control Board, the Bank, and any trustee, and their officers, employees, and agents for the Bonds issued by the Bank, if any, to the same extent its subcontractors are obligated to defend, indemnify, and hold harmless the Contractor. CWSRF Agmt. § 4.11; DWSRF Agmt. Ex. C § C.3.17).

**1.5. NO DISCRIMINATION.**

- (a) The Contractor must comply with Government Code section 11135 and the implementing regulations (Cal. Code Regs, tit. 2, § 11140 et seq.), including, but not limited to, ensuring that no person is unlawfully denied full and equal access to the benefits of, or unlawfully subjected to discrimination in the operation of, the Project or System on the basis of sex, race, color, religion, ancestry, national origin, ethnic group identification, age, mental disability, physical disability, medical condition, genetic information, marital status, or sexual orientation as such terms are defined under California law, for as long as the Contractor retains ownership or possession of the Project.
- (b) If Project Funds are used to acquire or improve real property, the Contractor must include a covenant of nondiscrimination running with the land in the instrument effecting or recording the transfer of such real property.
- (c) The Contractor must comply with the federal American with Disabilities Act of 1990 and implementing regulations as required by Government Code section 11135(b).
- (d) The Contractor's obligations under this section shall survive the term of this Agreement.
- (e) During the performance of this Agreement, Recipient and its contractors and subcontractors must not unlawfully discriminate, harass, or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religious creed, national origin, sexual orientation, physical disability (including HIV and AIDS), mental disability, medical condition (cancer), age (over 40), marital status, denial of family care leave, or genetic information, gender, gender identity, gender expression, or military and veteran status.
- (f) The Recipient, its contractors, and subcontractors must ensure that the evaluation and treatment of their employees and applicants for employment are free from such discrimination and harassment.
- (g) The Recipient, its contractors, and subcontractors must comply with the provisions of the Fair Employment and Housing Act and the applicable regulations



promulgated thereunder. (Gov. Code, §12990, subs. (a)-(f) et seq.; Cal. Code Regs., tit. 2, § 7285 et seq.) Such regulations are incorporated into this Agreement by reference and made a part hereof as if set forth in full.

- (h) The Recipient, its contractors, and subcontractors must comply with all applicable federal civil rights regulations, including statutory and national policy requirements. (2 CFR § 200.300). This includes, to the greatest extent practicable and to the extent permitted by law, the requirement to respect and protect the freedom of persons and organizations to engage in political and religious speech. (Executive Order 13798).
- (i) The Recipient, its contractors, and subcontractors must give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.
- (j) The Recipient must comply with and include the following nondiscrimination and compliance provision in all subcontracts under this Agreement:

During the performance of this contract, the contractor agrees as follows:

"(a) The contractor will not discriminate against any employee or applicant for employment because of race, creed, color, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

"(b) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, or national origin.

"(c) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

"(d) The contractor will comply with all provisions of Executive Order No. 11246 of Sept. 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

"(e) The contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or

pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

"(f) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be cancelled,

terminated or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No.11246 of Sept 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

"(g) The contractor will include the provisions of Paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of Sept. 24, 1965, so that such

provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, That in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States."

**1.6. INSURANCE.** For any policy of insurance concerning or covering the construction of the Project, it will cause, and will require its contractors and subcontractors to cause, a certificate of insurance to be issued showing, the State, the State Water Board, its officers, agents, employees, and servants as additional insured; and must provide the Division with a copy of all such certificates prior to the commencement of construction of the Project. (CWSRF Agmt. § 4.17; DWSRF Agmt. Ex. C § C.3.25).

**1.7. EXCLUDED PARTIES.** Contractor shall not contract with any party who is debarred or suspended or otherwise excluded from or ineligible for participation in any work overseen, directed, funded, or administered by the State Water Board program for which this funding is authorized. For any work related to this Agreement, Contractor shall not contract with any individual or organization on the State Water Board's List of Disqualified Businesses and Persons that is identified as debarred or suspended or otherwise excluded from or ineligible for participation in any work overseen, directed, funded, or administered by the State Water Board program for which funding under this Agreement is authorized. The State Water Board's List of Disqualified Businesses and Persons is located at:


[http://www.waterboards.ca.gov/water\\_issues/programs/enforcement/fwa/dbp.shtm](http://www.waterboards.ca.gov/water_issues/programs/enforcement/fwa/dbp.shtm)  
(CWSRF Agmt. § 4.18; DWSRF Agmt. Ex. C § C.3.26).

**1.8. PREVAILING WAGES.** The Contractor agrees to be bound by all applicable provisions of State Labor Code regarding prevailing wages. The Contractor must monitor all agreements subject to reimbursement from this Agreement to ensure that the prevailing wage provisions of the State Labor Code are being met. In addition, the Contractor agrees to comply with the Davis-Bacon provisions incorporated by reference in Section 3 of this Agreement. (CWSRF Agmt. § 4.19; DWSRF Agmt. Ex. C § C.3.28).

**1.9. SIGNAGE.** The Contractor shall place a sign at least four feet tall by eight feet wide made of ¾ inch thick exterior grade plywood or other approved material in a prominent location on the Project site and shall maintain the sign in good condition for the duration

of the construction period. The sign must include the following disclosure statement and color logos (available from the Division):



- a)  Clean Water State Revolving Fund
- b) "Funding for this \$x.x million [name of project] project has been provided in full or in part by the Clean Water State Revolving Fund through an agreement with the State Water Resources Control Board. California's Clean Water State Revolving Fund is capitalized through a variety of funding sources, including grants from the United States Environmental Protection Agency and state bond proceeds."

The Project sign may include another agency's required promotional information so long as the above logos and disclosure statement are equally prominent on the sign. The sign shall be prepared in a professional manner. (CWSRF Agmt. Ex. A § 9; DWSRF Agmt. Ex. A § A.2.3).

See **Attachment E – Supplementary Special Provisions, Section 3-11.2, "Project Identification Sign"** for more information.

- 1.10. DISCLAIMER.** Funding for this project has been provided in full or in part through an agreement with the State Water Resources Control Board. California's Clean Water State Revolving Fund is capitalized through a variety of funding sources, including grants from the United States Environmental Protection Agency and state bond proceeds. The contents of this document do not necessarily reflect the views and policies of the foregoing, nor does mention of trade names or commercial products constitute endorsement or recommendation for use." (DWSRF Agmt. Ex. A § A.2.1).
- 1.11. FEDERAL AWARD CONDITIONS.** Contractor must comply with the following federal conditions:
- 1.12. American Iron and Steel.** Unless the City has obtained a waiver from USEPA on file with the State Water Board or unless this Project is not a project for the construction, alteration, maintenance or repair of a public water system or treatment work, Contractor shall not purchase "iron and steel products" produced outside of the United States on this Project. Unless the City has obtained a waiver from USEPA on file with the State Water Board or unless this Project is not a project for the construction, alteration, maintenance or repair of a public water system or treatment work, Contractor shall ensure that all "iron and steel products" used in the Project were or will be produced in the United States. For purposes of this section, the term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials. "Steel" means an alloy that includes at least 50 percent iron, between .02 and 2 percent carbon, and may include other elements. CWSRF Agmt. Ex. E § A(1); DWSRF Agmt. Ex. C § C.4.3.i; WIFIA Agmt. §§ 12(j), 14(l))
- 1.13. Wage Rate Requirements (Davis-Bacon).** Contractor must include in its subcontracts the full the language provided in Attachment D, Section 10, regarding federal prevailing wages. CWSRF Agmt. Ex. E § A(2); DWSRF Agmt. Ex. C § C.4.3.ii; WIFIA Agmt. §§ 12(j), 14(l)).
- 1.14. Reserved.**

**1.15. Copyright and Patent.** USEPA and the State Water Board have the right to reproduce, publish, use and authorize others to reproduce, publish and use copyrighted works or other data developed pursuant to this Agreement. Where an invention is made with Project Funds, USEPA and the State Water Board retain the right to a worldwide, nonexclusive, nontransferable, irrevocable, paid-up license to practice the invention owned by Contractor. Contractor must utilize the Interagency Edison extramural invention reporting system at <http://Edison.gov> and shall notify the State Water Board when an invention report, patent report, or utilization report is filed. (CWSRF Agmt. Ex. E § A(5)(e); DWSRF Agmt. Ex. C § C.4.3.i)

**1.16. Credit.** Contractor agrees that any reports, documents, publications or other materials developed for public distribution supported by this Agreement shall contain the following statement (CWSRF Agmt. Ex. E § A(5)(f)):

*"This project has been funded wholly or in part by the United States Environmental Protection Agency and the State Water Resources Control Board. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency or the State Water Resources Control Board, nor does the EPA or the Board endorse trade names or recommend the use of commercial products mentioned in this document."*

**1.17. Trafficking in Persons.** The Recipient, its employees, contractors and subcontractors and their employees warrants that it will not engage in severe forms of trafficking in persons, procure a commercial sex act during the term of this Agreement, or use forced labor in the performance of this Agreement. The Recipient must include this provision in its contracts and subcontracts under this Agreement. The Recipient must inform the State Water Board immediately of any information regarding a violation of the foregoing. The Recipient understands that failure to comply with this provision may subject the State Water Board to loss of federal funds. The Recipient agrees to compensate the State Water Board for any such funds lost due to its failure to comply with this condition, or the failure of its contractors or subcontractors to comply with this condition. The State Water Board may unilaterally terminate this Agreement if the Recipient that is a private entity is determined to have violated the foregoing. (CWSRF Agmt. Ex. E § A(5)(h); DWSRF Agmt. Ex. C § C.4.3.xiii).

**1.18. Influencing.** The Contractor certifies to the best of its knowledge and belief that:

- a. No federal appropriated funds have been paid or will be paid, by or on behalf of the Contractor, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.
- b. If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress in connection with this Agreement, the Contractor shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions, and notify the State Water Board.

The Contractor shall require this certification from all parties to any contract or agreement that the Recipient enters into and under which the Recipient incurs costs for which it seeks disbursements under this Agreement.

**1.19. CIVIL RIGHTS OBLIGATIONS.** Contractor shall comply with the following federal non-discrimination requirements CWSRF Agmt. Ex. E § B; DWSRF Agmt. Ex. C § C.4.3.xv; WIFIA Agmt. Ex. E):

- a) Title VI of the Civil Rights Act of 1964, which prohibits discrimination based on race, color, and national origin, including limited English proficiency (LEP).
- b) Section 504 of the Rehabilitation Act, 29 USC 794, supplemented by EO 11914, 41 FR 17871, April 29, 1976 and 11250, 30 FR 13003, October 13, 1965, which prohibits discrimination against persons with disabilities.
- c) The Age Discrimination Act of 1975, which prohibits age discrimination.
- d) Section 13 of the Federal Water Pollution Control Act Amendments of 1972, which prohibits discrimination on the basis of sex.
- e) 40 CFR Part 7, as it relates to the foregoing.
- f) If the Project relates to construction of a publicly owned treatment works, where the Recipient contracts for program management, construction management, feasibility studies, preliminary engineering, design, engineering, surveying, mapping, or architectural related services, the Recipient shall ensure that any such contract is negotiated in the same manner as a contract for architectural and engineering services is negotiated under chapter 11 of title 40, United States Code, or an equivalent State qualifications-based requirement as determined by the State Water Board.
- g) If the Project relates to construction of a publicly owned treatment works, the Recipient certifies that it has developed and is implementing a fiscal sustainability plan for the Project that includes an inventory of critical assets that are a part of the Project, an evaluation of the condition and performance of inventoried assets or asset groupings, a certification that the Recipient has evaluated and will be implementing water and energy conservation efforts as part of the plan, and a plan for maintaining, repairing, and, as necessary, replacing the Project and a plan for funding such activities.
- h) Executive Order No. 11246. Contractor shall include in its subcontracts related to the Project the following provisions (41 CFR § 60-1.4(b)):
  - "During the performance of this contract, the contractor agrees as follows:
    - (1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the City setting forth the provisions of this nondiscrimination clause.
    - (2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants

will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

- (3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.
- (4) The contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided by the City advising the labor union or workers' representatives of the contractor's commitments under section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (5) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- (6) The contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (7) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- (8) The contractor will include the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or

purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such, the contractor may request the United States to enter into such litigation to protect the interests of the United States."

- i) **Disadvantaged Business Enterprises (40 CFR Part 33).** Contractor agrees to comply with the requirements of USEPA's Program for Utilization of Small, Minority and Women's Business Enterprises. The DBE rule can be accessed at [www.epa.gov/osbp](http://www.epa.gov/osbp). Contractor shall comply with 40 CFR Section 33.301, and retain all records documenting compliance with the six good faith efforts. The Contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 40 CFR part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the Contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies. (CWSRF Agmt. Ex. E § D(2); DWSRF Agmt. Ex. A § A.2.2.5; WIFIA Agmt. Ex. E, 40 CFR 33.302(i))

**1.20. PROCUREMENT PROHIBITIONS UNDER SECTION 306 OF THE CLEAN AIR ACT AND SECTION 508 OF THE CLEAN WATER ACT, INCLUDING EXECUTIVE ORDER 11738, ADMINISTRATION OF THE CLEAN AIR ACT AND THE FEDERAL WATER POLLUTION CONTROL ACT WITH RESPECT TO FEDERAL CONTRACTS, GRANTS, OR LOANS; 42 USC § 7606; 33 USC § 1368.**

Except where the purpose of this Agreement is to remedy the cause of the violation, Contractor may not procure goods, services, or materials from suppliers excluded under the federal System for Award Management: <http://www.sam.gov/>.

**1.21. SECURE CONNECTION.** Contractor agrees that if its network or information system is connected to USEPA networks to transfer data using systems other than the Environmental Information Exchange Network or USEPA's Central Data Exchange, it will ensure that any connections are secure. (CWSRF Agmt. Ex. E § D(5); DWSRF Agmt. Ex. C § C.4.3.xxii).

**1.22. GEOSPATIAL DATA STANDARDS.** All geospatial data created pursuant to this Agreement that is submitted to the State Water Board for use by USEPA or that is submitted directly to USEPA must be consistent with Federal Geographic Data Committee endorsed standards. Information on these standards may be found at [www.fgdc.gov](http://www.fgdc.gov). (CWSRF Agmt. Ex. E § E; DWSRF Agmt. Ex. C § C.4.3.xxiii)

**1.23. TELECOMMUNICATIONS.** The Contractor certifies that no Project Funds will be used on:

- a. Video surveillance or telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities), telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities);
- b. Telecommunications or video surveillance services produced by such entities;
- c. Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the

Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country; or

- d. Other telecommunications or video surveillance services or equipment in violation of [2 CFR 200.216](#).

**2. NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246) located at 41 CFR § 60-4.2.**

**2.1.** The goal and timetables for minority and female participation, expressed in percentage terms for the Contractor’s aggregate workforce in each trade on all construction work in the covered area, as follows:

	<u>Goal</u>
1. Minority Participation:	16.9%
2. Female Participation:	6.9%

**2.2.** These goals are applicable to all the Contractor’s construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs Work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the Work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both federally involved and non-federally involved Work.

**2.3.** The Contractor’s compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals.

**2.4.** The hours of minority and female employment and training shall be substantially uniform throughout the length of the Contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor’s goals shall be a violation of the Contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

**2.5.** The Contractor shall provide written notification to the Director the Office of Federal Contract Compliance Programs within 10 Working Days of award of any Subcontract in excess of \$10,000 at any tier for Work under the Contract resulting from this solicitation. The notification shall list the name, address and telephone number of the Subcontractor; employer identification number of the Subcontractor; estimated dollar amount of the Subcontract; estimated starting and completion dates of the Subcontract; and the geographical area in which the subcontract is to be performed. The “covered area” is the City of San Diego.

**3. EQUAL OPPORTUNITY CLAUSES:**

**3.1** The following equal opportunity clauses are incorporated by reference herein:

- 1. The equal opportunity clause located 41 CFR 60.1.4(a), which specifies the obligations imposed under Executive Order 11246.



2. The equal opportunity clause located at 41 CFR 60-741.5, which contains the obligations imposed by Section 503 of the Rehabilitation Act of 1973.
3. The "Equal Opportunity Clause" (Resolution No. 765092) filed on December 4, 1978, in the Office of the City Clerk, San Diego, California and incorporated in the "Standard Federal Employment Opportunity Construction Contract Specifications (Executive Order 11246 - Document No. 769023, filed September 11, 1984, in the Office of the City Clerk, San Diego, California) is applicable to all non-exempt City construction contracts and subcontracts of \$2,000 or more.
4. Age Discrimination Act of 1975, Pub. L. 94-135.
5. Title VI of the Civil Rights Act of 1964, Pub. L. 88-352.
6. Section 13 of the Federal Water Pollution Control Acts Amendments of 1972, Pub. L. 92-5200 (the Clean Water Act).
7. Section 504 of the Rehabilitation Act of 1973, Pub. L. 93-112 (Executive Orders 11914 and 11250).
8. Women's Minority Business Enterprises, Executive Orders 11625, 12138 and 12432.
9. Section 129 of the Small Business Administration Reauthorization and Amendment Act of 1988, Pub. L. 100-590.

**4. STANDARD FEDERAL EQUAL EMPLOYMENT SPECIFICATIONS:**

**1.1** The Contractor is required to comply with the 15 "Standard Federal Equal Employment Specifications" in section 4.2 below and also located in 41 CFR 60-4.3 for federal and federally assisted construction contracts in excess of \$10,000.

**1.2** Standard Federal Equal Employment Specifications.

1. As used in these specifications:
  - a) Covered area" means the geographical area described in the solicitation from which this contract resulted;
  - b) "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
  - c) "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
  - d) Minority" includes:
    - i. Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
    - ii. Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

- iii. Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
    - iv. American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to [41 CFR 60-4.5](#)) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in item 7, paragraphs "a" through "p", of this section below. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.
5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, [Executive Order 11246](#), or the regulations promulgated pursuant thereto.
6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
- a) Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities
  - b) Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
  - c) Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
  - d) Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
  - e) Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
  - f) Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
  - g) Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any

responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

- h) Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
  - i) Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
  - j) Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.
  - k) Validate all tests and other selection requirements where there is an obligation to do so under [41 CFR part 60-3](#).
  - l) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
  - m) Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
  - n) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
  - o) Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
  - p) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (item 7, paragraphs "a" through "p", of this section). The efforts of a contractor association, joint

contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under item 7, paragraphs "a" through "p", of this section that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, sexual orientation, gender identity, or national origin.
11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to [Executive Order 11246](#).
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to [Executive Order 11246](#), as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and [Executive Order 11246](#), as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in item 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily

understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the [Public Works Employment Act of 1977](#) and the Community Development Block Grant Program).

- 1.3** Segregated Facilities (41 CFR 60-1.8). The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensuring that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. This obligation extends to all contracts containing the equal opportunity clause regardless of the amount of the contract. The term "facilities," as used in this section, means waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, wash rooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees; Provided, That separate or single-user restrooms and necessary dressing or sleeping areas shall be provided to assure privacy between the sexes.

## **5. VIOLATION OR BREACH OF REQUIREMENTS:**

- 5.1** If at any time during the course of the Contract there is a violation of the Affirmative Action or Equal Employment Opportunity requirements by the Contractor, or the Subcontractors, the City will notify the Contractor of the breach. The City may withhold any further progress payments to the Contractor until the City is satisfied that the Contractor and Subcontractors are in full compliance with these requirements.

## **6. MONTHLY EMPLOYMENT UTILIZATION REPORTS:**

- 6.1** Refer to GENERAL EQUAL OPPORTUNITY CONTRACTING PROGRAM REQUIREMENTS, CONSTRUCTION CONTRACTOR REQUIREMENTS in The WHITEBOOK and the following:
  1. Federal and Non-Federal Work in San Diego County. Submit an updated list only if work is complete or new contracts have been awarded during the span of this project.

## **7. RECORDS OF PAYMENTS TO DBEs:**

- 7.1** The Contractor shall maintain records and documents of payments to DBEs for 5 years following the NOC. These records shall be made available for inspection upon request by any authorized representative of the City, funding agency, or both. The reporting requirement shall be extended to any certified DBE Subcontractor.

## **8. FEDERAL WAGE REQUIREMENTS FOR FEDERALLY FUNDED PROJECTS:**

- 8.1** The successful Bidder's work shall be required to comply with Executive Order 11246, entitled "Equal Employment Opportunity," as amended by Executive Order 11375, and as supplemented in Department of Labor regulations (41 CFR chapter 60).

- 8.2** This Executive Order pertains to Equal Employment Opportunity regulations and contains significant changes to the regulations including new goals and timetables for women in construction and revised goals and time-tables for minorities in construction.
- 8.3** Minimum wage rates for this project have been predetermined by the Secretary of Labor and are set forth in the Decision of the Secretary and bound into the specifications book. Should there be any difference between the state or federal wage rates, including health and welfare funds for any given craft, mechanic, or similar classifications needed to execute the Work, it shall be mandatory upon the Contractor or subcontractor to pay the higher of the two rates.
- 8.4** The minimum wage rate to be paid by the Contractor and the Subcontractors shall be in accordance with the Federal Labor Standards Provisions (see below) and Federal Wage Rates (see Wage Rates below) and General Prevailing Wage Determination made by the State of California, Director of Industrial Relations pursuant to California Labor Code Part 7, Chapter 1, Article 2, Sections 1770, 1773 and 1773.1, whichever is higher.
- 8.5** A Contractor having 50 or more employees and its Subcontractors having 50 or more employees and who may be awarded a contract of \$50,000 or more will be required to maintain an affirmative action program, the standards for which are contained in the specifications.
- 8.6** To be eligible for award, each Bidder shall comply with the affirmative action requirements which are contained in the specifications
- 8.7** Women will be afforded equal opportunity in all areas of employment. However, the employment of women shall not diminish the standards of requirements for the employment of minorities.
- 9. PREVAILING WAGE RATES:** Pursuant to San Diego Municipal Code section 22.3019, construction, alteration, demolition, repair and maintenance work performed under this Contract is subject to State prevailing wage laws. For construction work performed under this Contract cumulatively exceeding \$25,000 and for alteration, demolition, repair and maintenance work performed under this Contract cumulatively exceeding \$15,000, the Contractor and its subcontractors shall comply with State prevailing wage laws including, but not limited to, the requirements listed below.
- 9.1 Compliance with Prevailing Wage Requirements.** Pursuant to sections 1720 through 1861 of the California Labor Code, the Contractor and its subcontractors shall ensure that all workers who perform work under this Contract are paid not less than the prevailing rate of per diem wages as determined by the Director of the California Department of Industrial Relations (DIR). This includes work performed during the design and preconstruction phases of construction including, but not limited to, inspection and land surveying work.
- 9.1.1** Copies of such prevailing rate of per diem wages are on file at the City and are available for inspection to any interested party on request. Copies of the prevailing rate of per diem wages also may be found at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Contractor and its subcontractors shall post a copy of the prevailing rate of per diem wages determination at each job site and shall make them available to any interested party upon request.
- 9.1.2** The wage rates determined by the DIR refer to expiration dates. If the published wage rate does not refer to a predetermined wage rate to be paid after the expiration date, then the published rate of wage shall be in effect for the life of this Contract. If the published wage rate refers to a predetermined wage rate to

become effective upon expiration of the published wage rate and the predetermined wage rate is on file with the DIR, such predetermined wage rate shall become effective on the date following the expiration date and shall apply to this Contract in the same manner as if it had been published in said publication. If the predetermined wage rate refers to one or more additional expiration dates with additional predetermined wage rates, which expiration dates occur during the life of this Contract, each successive predetermined wage rate shall apply to this Contract on the date following the expiration date of the previous wage rate. If the last of such predetermined wage rates expires during the life of this Contract, such wage rate shall apply to the balance of the Contract.

- 9.2 Penalties for Violations.** Contractor and its subcontractors shall comply with California Labor Code section 1775 in the event a worker is paid less than the prevailing wage rate for the work or craft in which the worker is employed. This shall be in addition to any other applicable penalties allowed under Labor Code sections 1720 – 1861.
- 9.3 Payroll Records.** Contractor and its subcontractors shall comply with California Labor Code section 1776, which generally requires keeping accurate payroll records, verifying and certifying payroll records, and making them available for inspection. Contractor shall require its subcontractors to also comply with section 1776. Contractor and its subcontractors shall submit weekly certified payroll records online via the City’s web-based Labor Compliance Program. Contractor is responsible for ensuring its subcontractors submit certified payroll records to the City.
- 9.3.1** Contractor their subcontractors shall also furnish records specified in Labor Code section 1776 directly to the Labor Commissioner in the manner required by Labor Code section 1771.4.
- 9.4 Apprentices.** Contractor and its subcontractors shall comply with California Labor Code sections 1777.5, 1777.6 and 1777.7 concerning the employment and wages of apprentices. Contractor is held responsible for the compliance of their subcontractors with sections 1777.5, 1777.6 and 1777.7.
- 9.5 Working Hours.** Contractor and their subcontractors shall comply with California Labor Code sections 1810 through 1815, including but not limited to: (i) restrict working hours on public works contracts to eight hours a day and forty hours a week, unless all hours worked in excess of 8 hours per day are compensated at not less than 1½ times the basic rate of pay; and (ii) specify penalties to be imposed on contractors and subcontractors of \$25 per worker per day for each day the worker works more than 8 hours per day and 40 hours per week in violation of California Labor Code sections 1810 through 1815.
- 9.6 Required Provisions for Subcontracts.** Contractor shall include at a minimum a copy of the following provisions in any contract they enter into with a subcontractor: California Labor Code sections 1771, 1771.1, 1775, 1776, 1777.5, 1810, 1813, 1815, 1860 and 1861.
- 9.7 Labor Code Section 1861 Certification.** Contractor in accordance with California Labor Code section 3700 is required to secure the payment of compensation of its employees and by signing this Contract, Contractor certifies that “I am aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers’ compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this Contract.”
- 9.8 Labor Compliance Program.** The City has its own Labor Compliance Program authorized in August 2011 by the DIR. The City will withhold contract payments when payroll records



are delinquent or deemed inadequate by the City or other governmental entity, or it has been established after an investigation by the City or other governmental entity that underpayment(s) have occurred. For questions or assistance, please contact the City of San Diego's Prevailing Wage Unit at 858-627-3200.

**9.9 Contractor and Subcontractor Registration Requirements.** This project is subject to compliance monitoring and enforcement by the DIR. A contractor or subcontractor shall not be qualified to bid on, be listed in a bid or proposal, subject to the requirements of section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, unless currently registered and qualified to perform public work pursuant to Labor Code section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

**9.9.1** A Contractor's inadvertent error in listing a subcontractor who is not registered pursuant to Labor Code section 1725.5 in response to a solicitation shall not be grounds for filing a bid protest or grounds for considering the bid non-responsive provided that any of the following apply: (1) the subcontractor is registered prior to bid opening; (2) within twenty-four hours after the bid opening, the subcontractor is registered and has paid the penalty registration fee specified in Labor Code section 1725.5; or (3) the subcontractor is replaced by another registered subcontractor pursuant to Public Contract Code section 4107.

**9.9.2** By submitting a bid or proposal to the City, Contractor is certifying that he or she has verified that all subcontractors used on this public work project are registered with the DIR in compliance with Labor Code sections 1771.1 and 1725.5, and Contractor shall provide proof of registration for themselves and all listed subcontractors to the City at the time of bid or proposal due date or upon request.

**9.10 Stop Order.** For Contractor or its subcontractors engaging in the performance of any public work contract without having been registered in violation of Labor Code sections 1725.5 or 1771.1, the Labor Commissioner shall issue and serve a stop order prohibiting the use of the unregistered contractors or unregistered subcontractor(s) on ALL public works until the unregistered contractor or unregistered subcontractor(s) is registered. Failure to observe a stop order is a misdemeanor.

**9.11 List of all Subcontractors.** The City may ask Contractor for the most current list of subcontractors (regardless of tier), along with their DIR registration numbers, utilized on this Agreement at any time during performance of this contract, and Contractor shall provide the list within ten (10) working days of the City's request. Additionally, Contractor shall provide the City with a complete list of all subcontractors utilized on this contract (regardless of tier), within ten working days of the completion of the contract, along with their DIR registration numbers. The City shall withhold final payment to Contractor until at least 30 days after this information is provided to the City.

**9.12 Exemptions for Small Projects.** There are limited exemptions for installation, alteration, demolition, or repair work done on projects of \$25,000 or less. The Contractor shall still comply with Labor Code sections 1720 et. seq. The only recognized exemptions are listed below:

**9.12.1 Registration.** The Contractor will not be required to register with the DIR for small projects. (Labor Code section 1771.1)

**9.12.2 Certified Payroll Records.** The records required in Labor Code section 1776 shall be required to be kept and submitted to the City of San Diego, but will not be required to be submitted online with the DIR directly. The Contractor will need to keep those records for at least three years following the completion of the Contract. (Labor Code section 1771.4).

**9.12.3 List of all Subcontractors.** The Contractor shall not be required to hire only registered subcontractors and is exempt from submitting the list of all subcontractors that is required in section 4.20.11 above. (Labor code section 1773.3).

**10. DAVIS-BACON WAGE RATES AND PROVISIONS:**

**10.1. WAGE RATES** This contract shall be subject to the following Davis-Bacon Wage Decisions:

"General Decision Number: CA20210001 03/05/2021

Superseded General Decision Number: CA20200001

State: California

Construction Types: Building, Heavy (Heavy and Dredging),  
Highway and Residential

County: San Diego County in California.

BUILDING CONSTRUCTION PROJECTS; DREDGING PROJECTS (does not include hopper dredge work); HEAVY CONSTRUCTION PROJECTS (does not include water well drilling); HIGHWAY CONSTRUCTION PROJECTS; RESIDENTIAL CONSTRUCTION PROJECTS (consisting of single family homes and apartments up to and including 4 stories)

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Modification Number	Publication Date
0	01/01/2021
1	01/08/2021
2	03/05/2021

ASBE0005-002 07/06/2020

	Rates	Fringes
Asbestos Workers/Insulator (Includes the application of all insulating materials, protective coverings, coatings, and finishes to all types of mechanical systems).....	\$ 45.39	23.74
Fire Stop Technician (Application of Firestopping Materials for wall openings and penetrations in walls, floors, ceilings and curtain walls).....	\$ 28.92	18.73

ASBE0005-004 07/01/2019

	Rates	Fringes
Asbestos Removal worker/hazardous material handler (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from mechanical systems, whether they contain asbestos or not)....	\$ 20.63	12.17

BOIL0092-003 03/01/2018

	Rates	Fringes
BOILERMAKER.....	\$ 44.07	33.52

BRCA0004-008 11/01/2019

	Rates	Fringes
BRICKLAYER; MARBLE SETTER.....	\$ 39.60	18.05

BRCA0018-004 06/01/2019

	Rates	Fringes
MARBLE FINISHER.....	\$ 33.43	14.11
TILE FINISHER.....	\$ 28.23	12.65
TILE LAYER.....	\$ 40.07	18.36

BRCA0018-010 09/01/2020

	Rates	Fringes
TERRAZZO FINISHER.....	\$ 33.66	14.20
TERRAZZO WORKER/SETTER.....	\$ 41.60	14.73

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CARP0409-002 07/01/2016

	Rates	Fringes
Diver		
(1) Wet.....	\$ 712.48	17.03
(2) Standby.....	\$ 356.24	17.03
(3) Tender.....	\$ 348.24	17.03
(4) Assistant Tender.....	\$ 324.24	17.03

Amounts in "'Rates' column are per day  
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CARP0409-008 08/01/2010

	Rates	Fringes
Modular Furniture Installer.....	\$ 17.00	7.41

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CARP0547-001 07/01/2018

	Rates	Fringes
CARPENTER		
(1) Bridge.....	\$ 42.34	19.17
(2) Commercial Building....	\$ 37.11	19.17
(3) Heavy & Highway.....	\$ 42.21	19.17
(4) Residential Carpenter..	\$ 29.69	19.17
(5) Residential Insulation Installer.....	\$ 18.00	8.16
MILLWRIGHT.....	\$ 42.71	19.17
PILEDRIVERMAN.....	\$ 42.34	19.17

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CARP0547-002 07/01/2017

	Rates	Fringes
Drywall		
(1) Work on wood framed construction of single family residences, apartments or condominiums under four stories		
Drywall Installer/Lather...	\$ 22.95	18.85
Drywall Stocker/Scrapper...	\$ 12.50	12.27
(2) All other work		
Drywall Installer/Lather...	\$ 32.00	17.63
Drywall Stocker/Scrapper...	\$ 12.50	12.27

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ELEC0569-001 06/01/2020

	Rates	Fringes
Electricians (Tunnel Work)		
Cable Splicer.....	\$ 51.38	3%+14.88
Electrician.....	\$ 50.63	3%+14.88
Electricians: (All Other Work, Including 4 Stories Residential)		
Cable Splicer.....	\$ 45.75	3%+14.88
Electrician.....	\$ 45.00	3%+14.88

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ELEC0569-004 06/01/2020

	Rates	Fringes
ELECTRICIAN (Sound & Communications Sound Technician).....	\$ 33.95	13.55
SCOPE OF WORK Assembly, installation, operation, service and maintenance of components or systems as used in closed circuit television, amplified master television distribution, CATV on private property, intercommunication, burglar alarm, fire alarm, life support and all security alarms, private and public telephone and related telephone interconnect, public address, paging, audio, language, electronic, background music system less than line voltage or any system acceptable for class two wiring for private, commercial, or industrial use furnished by leased wire, frequency modulation or other recording devices, electrical apparatus by means of which electricity is applied to the amplification, transmission, transference, recording or reproduction of voice, music, sound, impulses and video. Excluded from this Scope of Work - transmission, service and maintenance of background music. All of the above shall include the installation and transmission over fiber optics.		

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ELEC0569-005 06/01/2020

	Rates	Fringes
Sound & Communications Sound Technician.....	\$ 33.95	13.55
SCOPE OF WORK Assembly, installation, operation, service and maintenance of components or systems as used in closed circuit television, amplified master television distribution, CATV on private property, intercommunication, burglar alarm, fire alarm, life support and all security alarms, private and public telephone and related telephone interconnect, public address, paging, audio, language, electronic, background music system less than line voltage or any system acceptable for class two wiring for private, commercial, or industrial use furnished by leased wire, frequency modulation or other recording devices, electrical apparatus by means of which electricity is applied to the amplification, transmission, transference, recording or reproduction of voice, music, sound, impulses and video. Excluded from this Scope of Work - transmission, service and maintenance of background music. All of the above shall include the installation and transmission over fiber optics.		

SOUND TECHNICIAN: Terminating, operating and performing final check-out

ELEC0569-006 10/01/2020

Work on street lighting; traffic signals; and underground systems and/or established easements outside of buildings

	Rates	Fringes
Traffic signal, street light and underground work		
Utility Technician #1.....	\$ 33.42	3%+7.70
Utility Technician #2.....	\$ 27.85	3%+7.70

STREET LIGHT & TRAFFIC SIGNAL WORK:

UTILITY TECHNICIAN #1: Installation of street lights and traffic signals, including electrical circuitry, programmable controller, pedestal-mounted electrical meter enclosures and laying of pre-assembled cable in ducts. The layout of electrical systems and communication installation including proper position of trench depths, and radius at duct banks, location for manholes, street lights and traffic signals.

UTILITY TECHNICIAN #2: Distribution of material at jobsite, installation of underground ducts for electrical, telephone, cable TV land communication systems. The setting, leveling, grounding and racking of precast manholes, handholes and transformer pads.

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ELEC0569-008 08/31/2020

	Rates	Fringes
ELECTRICIAN (Residential, 1-3 Stories).....	\$ 35.74	7.68

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ELEC1245-001 06/01/2020

	Rates	Fringes
LINE CONSTRUCTION		
(1) Lineman; Cable splicer..	\$ 59.14	20.78
(2) Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), overhead & underground distribution line equipment).....	\$ 47.24	19.59
(3) Groundman.....	\$ 36.12	19.19
(4) Powderman.....	\$ 51.87	18.79

HOLIDAYS: New Year's Day, M.L. King Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day and day after Thanksgiving, Christmas Day

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ELEV0018-001 01/01/2021

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 59.32	35.825+a+b

FOOTNOTE:

- a. PAID VACATION: Employer contributes 8% of regular hourly rate as vacation pay credit for employees with more than 5 years of service, and 6% for 6 months to 5 years of service.
- b. PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, Friday after Thanksgiving, and Christmas Day.

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ENGI0012-003 07/01/2020

	Rates	Fringes
OPERATOR: Power Equipment (All Other Work)		
GROUP 1.....	\$ 48.25	27.20
GROUP 2.....	\$ 49.03	27.20
GROUP 3.....	\$ 49.32	27.20
GROUP 4.....	\$ 50.81	27.20
GROUP 5.....	\$ 48.96	25.25
GROUP 6.....	\$ 51.03	27.20
GROUP 8.....	\$ 51.14	27.20
GROUP 9.....	\$ 49.29	25.25
GROUP 10.....	\$ 51.26	27.20
GROUP 11.....	\$ 49.41	25.25
GROUP 12.....	\$ 51.43	27.20
GROUP 13.....	\$ 51.53	27.20
GROUP 14.....	\$ 51.56	27.20
GROUP 15.....	\$ 51.64	27.20
GROUP 16.....	\$ 51.76	27.20
GROUP 17.....	\$ 51.93	27.20
GROUP 18.....	\$ 52.03	27.20
GROUP 19.....	\$ 52.14	27.20
GROUP 20.....	\$ 52.26	27.20
GROUP 21.....	\$ 52.43	27.20
GROUP 22.....	\$ 52.53	27.20
GROUP 23.....	\$ 52.64	27.20
GROUP 24.....	\$ 52.76	27.20
GROUP 25.....	\$ 52.93	27.20
OPERATOR: Power Equipment (Cranes, Piledriving & Hoisting)		
GROUP 1.....	\$ 49.60	27.20
GROUP 2.....	\$ 50.38	27.20
GROUP 3.....	\$ 50.67	27.20
GROUP 4.....	\$ 50.81	27.20
GROUP 5.....	\$ 51.03	27.20
GROUP 6.....	\$ 51.14	27.20



	Rates	Fringes
GROUP 7.....	\$ 51.26	27.20
GROUP 8.....	\$ 51.43	27.20
GROUP 9.....	\$ 51.60	27.20
GROUP 10.....	\$ 52.60	27.20
GROUP 11.....	\$ 53.60	27.20
GROUP 12.....	\$ 54.60	27.20
GROUP 13.....	\$ 55.60	27.20
OPERATOR: Power Equipment		
(Tunnel Work)		
GROUP 1.....	\$ 50.10	27.20
GROUP 2.....	\$ 50.88	27.20
GROUP 3.....	\$ 51.17	27.20
GROUP 4.....	\$ 51.31	27.20
GROUP 5.....	\$ 51.53	27.20
GROUP 6.....	\$ 51.64	27.20
GROUP 7.....	\$ 51.76	27.20

PREMIUM PAY:

\$3.75 per hour shall be paid on all Power Equipment Operator work on the following Military Bases: China Lake Naval Reserve, Vandenberg AFB, Point Arguello, Seely Naval Base, Fort Irwin, Nebo Annex Marine Base, Marine Corp Logistics Base Yermo, Edwards AFB, 29 Palms Marine Base and Camp Pendleton

Workers required to suit up and work in a hazardous material environment: \$2.00 per hour additional. Combination mixer and compressor operator on gunite work shall be classified as a concrete mobile mixer operator.

SEE ZONE DEFINITIONS AFTER CLASSIFICATIONS

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Bargeman; Brakeman; Compressor operator; Ditch Witch, with seat or similar type equipment; Elevator operator-inside; Engineer Oiler; Forklift operator (includes loed, lull or similar types under 5 tons; Generator operator; Generator, pump or compressor plant operator; Pump operator; Signalman; Switchman

GROUP 2: Asphalt-rubber plant operator (nurse tank operator); Concrete mixer operator-skip type; Conveyor operator; Fireman; Forklift operator (includes loed, lull or similar types over 5 tons; Hydrostatic pump operator; oiler crusher (asphalt or concrete plant); Petromat laydown machine; PJU side dum jack; Screening and conveyor machine operator (or similar types); Skiploader (wheel type up to 3/4 yd. without attachment); Tar pot fireman; Temporary heating plant operator; Trenching machine oiler

GROUP 3: Asphalt-rubber blend operator; Bobcat or similar type (Skid steer); Equipment greaser (rack); Ford Ferguson (with dragtype attachments); Helicopter radioman (ground); Stationary pipe wrapping and cleaning machine operator

GROUP 4: Asphalt plant fireman; Backhoe operator (mini-max or similar type); Boring machine operator; Boxman or mixerman (asphalt or concrete); Chip spreading machine operator; Concrete cleaning decontamination machine operator; Concrete Pump Operator (small portable); Drilling machine operator, small auger types (Texoma super economatic or similar types - Hughes 100 or 200 or similar types - drilling depth of 30' maximum); Equipment greaser (grease truck); Guard rail post driver operator; Highline cableway signalman; Hydra-hammer-aero stomper; Micro Tunneling (above ground tunnel); Power concrete curing machine operator; Power concrete saw operator; Power-driven jumbo form setter operator; Power sweeper operator; Rock Wheel Saw/Trencher; Roller operator (compacting); Screed operator (asphalt or concrete); Trenching machine operator (up to 6 ft.); Vacuum or much truck

GROUP 5: Equipment Greaser (Grease Truck/Multi Shift).

GROUP 6: Articulating material hauler; Asphalt plant engineer; Batch plant operator; Bit sharpener; Concrete joint machine operator (canal and similar type); Concrete planer operator; Dandy digger; Deck engine operator; Derrickman (oilfield type); Drilling machine operator, bucket or auger types (Calweld 100 bucket or similar types - Watson 1000 auger or similar types - Texoma 330, 500 or 600 auger or similar types - drilling depth of 45' maximum); Drilling machine operator; Hydrographic seeder machine operator (straw, pulp or seed), Jackson track maintainer, or similar type; Kalamazoo Switch tamper, or similar type; Machine tool operator; Maginnis internal full slab vibrator, Mechanical berm, curb or gutter (concrete or asphalt); Mechanical finisher operator (concrete, Clary-Johnson-Bidwell or similar); Micro tunnel system (below ground); Pavement breaker operator (truck mounted); Road oil mixing machine operator; Roller operator (asphalt or finish), rubber-tired earth moving equipment (single engine, up to and including 25 yds. struck); Self-propelled tar pipelining machine operator; Skiploader operator (crawler and wheel type, over 3/4 yd. and up to and including 1-1/2 yds.); Slip form pump operator (power driven hydraulic lifting device for concrete forms); Tractor operator-bulldozer, tamper-scraper (single engine, up to 100 h.p. flywheel and similar types, up to and including D-5 and similar types); Tugger hoist operator (1 drum); Ultra high pressure waterjet cutting tool system operator; Vacuum blasting machine operator

GROUP 8: Asphalt or concrete spreading operator (tamping or finishing); Asphalt paving machine operator (Barber Greene or similar type); Asphalt-rubber distribution operator; Backhoe operator (up to and including 3/4 yd.), small ford, Case or similar; Cast-in-place pipe laying machine operator; Combination mixer and compressor operator (gunite work); Compactor operator (self-propelled); Concrete mixer operator (paving); Crushing plant operator; Drill Doctor; Drilling machine operator, Bucket or auger types (Calweld 150 bucket or similar types - Watson 1500, 2000 2500 auger or similar types - Texoma 700, 800 auger or similar types - drilling depth of 60' maximum); Elevating grader operator; Grade checker; Gradall operator; Grouting machine operator; Heavy-duty repairman; Heavy equipment robotics operator; Kalamazoo balliste regulator or similar type; Kolman belt loader and similar type; Le Tourneau blob compactor or similar type; Loader operator (Athey, Euclid, Sierra and similar types); Mobark Chipper or similar; Ozzie padder or similar types; P.C. slot saw; Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pumpcrete gun operator; Rock Drill or similar types; Rotary drill operator (excluding caisson type); Rubber-tired earth-moving equipment operator (single engine, caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator (multiple engine up to and including 25 yds. struck); Rubber-tired scraper operator (self-loading paddle wheel type-John Deere, 1040 and similar single unit); Self-propelled curb and gutter machine operator; Shuttle buggy; Skiploader operator (crawler and wheel type over 1-1/2 yds. up to and including 6-1/2 yds.); Soil remediation plant operator; Surface heaters and planer operator; Tractor compressor drill combination operator; Tractor operator (any type larger than D-5 - 100 flywheel h.p. and over, or similar-bulldozer, tamper, scraper and push tractor single engine); Tractor operator (boom attachments), Traveling pipe wrapping, cleaning and bending machine operator; Trenching machine operator (over 6 ft. depth capacity, manufacturer's rating); trenching Machine with Road Miner attachment (over 6 ft depth capacity): Ultra high pressure waterjet cutting tool system mechanic; Water pull (compaction) operator

GROUP 9: Heavy Duty Repairman

GROUP 10: Drilling machine operator, Bucket or auger types (Calweld 200 B bucket or similar types-Watson 3000 or 5000 auger or similar types-Texoma 900 auger or similar types-drilling depth of 105' maximum); Dual drum mixer, dynamic compactor LDC350 (or similar types); Monorail

locomotive operator (diesel, gas or electric); Motor patrol-blade operator (single engine); Multiple engine tractor operator (Euclid and similar type-except Quad 9 cat.); Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Pneumatic pipe ramming tool and similar types; Prestressed wrapping machine operator; Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Rubber tired earth moving equipment operator (multiple engine, Euclid, caterpillar and similar over 25 yds. and up to 50 yds. struck), Tower crane repairman; Tractor loader operator (crawler and wheel type over 6-1/2 yds.); Woods mixer operator (and similar Pugmill equipment)

GROUP 11: Heavy Duty Repairman - Welder Combination, Welder - Certified.

GROUP 12: Auto grader operator; Automatic slip form operator; Drilling machine operator, bucket or auger types (Calweld, auger 200 CA or similar types - Watson, auger 6000 or similar types - Hughes Super Duty, auger 200 or similar types - drilling depth of 175' maximum); Hoe ram or similar with compressor; Mass excavator operator less tha 750 cu. yards; Mechanical finishing machine operator; Mobile form traveler operator; Motor patrol operator (multi-engine); Pipe mobile machine operator; Rubber-tired earth- moving equipment operator (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck); Rubber-tired self- loading scraper operator (paddle-wheel-auger type self-loading - two (2) or more units)

GROUP 13: Rubber-tired earth-moving equipment operator operating equipment with push-pull system (single engine, up to and including 25 yds. struck)

GROUP 14: Canal liner operator; Canal trimmer operator; Remote- control earth-moving equipment operator (operating a second piece of equipment: \$1.00 per hour additional); Wheel excavator operator (over 750 cu. yds.)

GROUP 15: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine-up to and including 25 yds. struck)

GROUP 16: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system

(multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 17: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 50 cu. yds. struck); Tandem tractor operator (operating crawler type tractors in tandem - Quad 9 and similar type)

GROUP 18: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, up to and including 25 yds. struck)

GROUP 19: Rotex concrete belt operator (or similar types); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, up to and including 25 yds. struck)

GROUP 20: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 21: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

GROUP 22: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, up to and including 25 yds. struck)

GROUP 23: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating with the tandem push-pull system (multiple engine, up to and including 25 yds. struck)

GROUP 24: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 25: Concrete pump operator-truck mounted; Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

#### CRANES, PILEDRIVING AND HOISTING EQUIPMENT CLASSIFICATIONS

GROUP 1: Engineer oiler; Fork lift operator (includes loed, lull or similar types)

GROUP 2: Truck crane oiler

GROUP 3: A-frame or winch truck operator; Ross carrier operator (jobsite)

GROUP 4: Bridge-type unloader and turntable operator; Helicopter hoist operator

GROUP 5: Hydraulic boom truck; Stinger crane (Austin-Western or similar type); Tugger hoist operator (1 drum)

GROUP 6: Bridge crane operator; Cretor crane operator; Hoist operator (Chicago boom and similar type); Lift mobile operator; Lift slab machine operator (Vagtborg and similar types); Material hoist and/or manlift operator; Polar gantry crane operator; Self Climbing scaffold (or similar type); Shovel, backhoe, dragline, clamshell operator (over 3/4 yd. and up to 5 cu. yds. mrc); Tugger hoist operator

GROUP 7: Pedestal crane operator; Shovel, backhoe, dragline, clamshell operator (over 5 cu. yds. mrc); Tower crane repair; Tugger hoist operator (3 drum)

GROUP 8: Crane operator (up to and including 25 ton capacity); Crawler transporter operator; Derrick barge operator (up to and including 25 ton capacity); Hoist operator, stiff legs, Guy derrick or similar type (up to and including 25 ton capacity); Shovel, backhoe, dragline, clamshell operator (over 7 cu. yds., M.R.C.)

GROUP 9: Crane operator (over 25 tons and up to and including 50 tons mrc); Derrick barge operator (over 25 tons up to and including 50 tons mrc); Highline cableway operator; Hoist operator, stiff legs, Guy derrick or similar type

(over 25 tons up to and including 50 tons mrc); K-crane operator; Polar crane operator; Self erecting tower crane operator maximum lifting capacity ten tons

GROUP 10: Crane operator (over 50 tons and up to and including 100 tons mrc); Derrick barge operator (over 50 tons up to and including 100 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 50 tons up to and including 100 tons mrc), Mobile tower crane operator (over 50 tons, up to and including 100 tons M.R.C.); Tower crane operator and tower gantry

GROUP 11: Crane operator (over 100 tons and up to and including 200 tons mrc); Derrick barge operator (over 100 tons up to and including 200 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 100 tons up to and including 200 tons mrc); Mobile tower crane operator (over 100 tons up to and including 200 tons mrc)

GROUP 12: Crane operator (over 200 tons up to and including 300 tons mrc); Derrick barge operator (over 200 tons up to and including 300 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 200 tons, up to and including 300 tons mrc); Mobile tower crane operator (over 200 tons, up to and including 300 tons mrc)

GROUP 13: Crane operator (over 300 tons); Derrick barge operator (over 300 tons); Helicopter pilot; Hoist operator, stiff legs, Guy derrick or similar type (over 300 tons); Mobile tower crane operator (over 300 tons)

#### TUNNEL CLASSIFICATIONS

GROUP 1: Skiploader (wheel type up to 3/4 yd. without attachment)

GROUP 2: Power-driven jumbo form setter operator

GROUP 3: Dinkey locomotive or motorperson (up to and including 10 tons)

GROUP 4: Bit sharpener; Equipment greaser (grease truck); Slip form pump operator (power-driven hydraulic lifting device for concrete forms); Tugger hoist operator (1 drum); Tunnel locomotive operator (over 10 and up to and including 30 tons)

GROUP 5: Backhoe operator (up to and including 3/4 yd.); Small Ford, Case or similar; Drill doctor; Grouting machine operator; Heading shield operator; Heavy-duty repairperson; Loader operator (Athey, Euclid, Sierra and similar types); Mucking machine operator (1/4 yd., rubber-tired, rail or

track type); Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pneumatic heading shield (tunnel); Pumpcrete gun operator; Tractor compressor drill combination operator; Tugger hoist operator (2 drum); Tunnel locomotive operator (over 30 tons)

GROUP 6: Heavy Duty Repairman

GROUP 7: Tunnel mole boring machine operator

#### ENGINEERS ZONES

\$1.00 additional per hour for all of IMPERIAL County and the portions of KERN, RIVERSIDE & SAN BERNARDINO Counties as defined below:

That area within the following Boundary: Begin in San Bernardino County, approximately 3 miles NE of the intersection of I-15 and the California State line at that point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Continue W in a straight line to that point which is the SW corner of the northwest quarter of Section 6, T27S, R42E, Mt. Diablo Meridian. Continue North to the intersection with the Inyo County Boundary at that point which is the NE corner of the western half of the northern quarter of Section 6, T25S, R42E, MDM. Continue W along the Inyo and San Bernardino County boundary until the intersection with Kern County, as that point which is the SE corner of Section 34, T24S, R40E, MDM. Continue W along the Inyo and Kern County boundary until the intersection with Tulare County, at that point which is the SW corner of the SE quarter of Section 32, T24S, R37E, MDM. Continue W along the Kern and Tulare County boundary, until that point which is the NW corner of T25S, R32E, MDM. Continue S following R32E lines to the NW corner of T31S, R32E, MDM. Continue W to the NW corner of T31S, R31E, MDM. Continue S to the SW corner of T32S, R31E, MDM. Continue W to SW corner of SE quarter of Section 34, T32S, R30E, MDM. Continue S to SW corner of T11N, R17W, SBM. Continue E along south boundary of T11N, SBM to SW corner of T11N, R7W, SBM. Continue S to SW corner of T9N, R7W, SBM. Continue E along south boundary of T9N, SBM to SW corner of T9N, R1E, SBM. Continue S along west boundary of R1E, SBM to Riverside County line at the SW corner of T1S, R1E, SBM. Continue E along south boundary of T1S, SBM (Riverside County Line) to SW corner of T1S, R10E, SBM. Continue S along west boundary of R10E, SBM to Imperial County line at the SW corner of T8S, R10E, SBM. Continue W along Imperial and Riverside county line to NW corner of T9S, R9E, SBM. Continue S along the boundary between Imperial and San Diego Counties, along the west edge of R9E, SBM to the south boundary of Imperial County/California state line. Follow the California state line west to Arizona state line, then north to Nevada state line, then continuing NW back



to start at the point which is the NW corner of Section 1, T17N, R14E, SBM

\$1.00 additional per hour for portions of SAN LUIS OBISPO, KERN, SANTA BARBARA & VENTURA as defined below:

That area within the following Boundary: Begin approximately 5 miles north of the community of Cholame, on the Monterey County and San Luis Obispo County boundary at the NW corner of T25S, R16E, Mt. Diablo Meridian. Continue south along the west side of R16E to the SW corner of T30S, R16E, MDM. Continue E to SW corner of T30S, R17E, MDM. Continue S to SW corner of T31S, R17E, MDM. Continue E to SW corner of T31S, R18E, MDM. Continue S along West side of R18E, MDM as it crosses into San Bernardino Meridian numbering area and becomes R30W. Follow the west side of R30W, SBM to the SW corner of T9N, R30W, SBM. Continue E along the south edge of T9N, SBM to the Santa Barbara County and Ventura County boundary at that point which is the SW corner of Section 34. T9N, R24W, SBM, continue S along the Ventura County line to that point which is the SW corner of the SE quarter of Section 32, T7N, R24W, SBM. Continue E along the south edge of T7N, SBM to the SE corner to T7N, R21W, SBM. Continue N along East side of R21W, SBM to Ventura County and Kern County boundary at the NE corner of T8N, R21W. Continue W along the Ventura County and Kern County boundary to the SE corner of T9N, R21W. Continue North along the East edge of R21W, SBM to the NE corner of T12N, R21W, SBM. Continue West along the north edge of T12N, SBM to the SE corner of T32S, R21E, MDM. [T12N SBM is a thin strip between T11N SBM and T32S MDM]. Continue North along the East side of R21E, MDM to the Kings County and Kern County border at the NE corner of T25S, R21E, MDM, continue West along the Kings County and Kern County Boundary until the intersection of San Luis Obispo County. Continue west along the Kings County and San Luis Obispo County boundary until the intersection with Monterey County. Continue West along the Monterey County and San Luis Obispo County boundary to the beginning point at the NW corner of T25S, R16E, MDM.

\$2.00 additional per hour for INYO and MONO Counties and the Northern portion of SAN BERNARDINO County as defined below:

That area within the following Boundary: Begin at the intersection of the northern boundary of Mono County and the California state line at the point which is the center of Section 17, T10N, R22E, Mt. Diablo Meridian. Continue S then SE along the entire western boundary of Mono County, until it reaches Inyo County at the point which is the NE corner of the Western half of the NW quarter of Section 2, T8S, R29E, MDM. Continue SSE along the entire western boundary of Inyo County, until the intersection with Kern County at the point which is the SW corner of the SE 1/4 of Section 32, T24S, R37E, MDM.

Continue E along the Inyo and Kern County boundary until the intersection with San Bernardino County at that point which is the SE corner of section 34, T24S, R40E, MDM. Continue E along the Inyo and San Bernardino County boundary until the point which is the NE corner of the Western half of the NW quarter of Section 6, T25S, R42E, MDM. Continue S to that point which is the SW corner of the NW quarter of Section 6, T27S, R42E, MDM. Continue E in a straight line to the California and Nevada state border at the point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Then continue NW along the state line to the starting point, which is the center of Section 18, T10N, R22E, MDM.

REMAINING AREA NOT DEFINED ABOVE RECIEVES BASE RATE

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 ENGI0012-004 08/01/2020

	Rates	Fringes
OPERATOR: Power Equipment		
(DREDGING)		
(1) Leverman.....	\$ 56.40	30.00
(2) Dredge dozer.....	\$ 50.43	30.00
(3) Deckmate.....	\$ 50.32	30.00
(4) Winch operator (stern winch on dredge).....	\$ 49.77	30.00
(5) Fireman-Oiler, Deckhand, Bargeman, Leveehand.....	\$ 49.23	30.00
(6) Barge Mate.....	\$ 49.84	30.00

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 IRON0433-006 07/01/2020

	Rates	Fringes
IRONWORKER		
Fence Erector.....	\$ 34.58	24.81
Ornamental, Reinforcing and Structural.....	\$ 41.00	33.45

PREMIUM PAY:

\$6.00 additional per hour at the following locations:

China Lake Naval Test Station, Chocolate Mountains Naval Reserve-Niland, Edwards AFB, Fort Irwin Military Station, Fort Irwin Training Center-Goldstone, San Clemente Island, San Nicholas Island, Susanville Federal Prison, 29 Palms - Marine Corps, U.S. Marine Base - Barstow, U.S. Naval Air Facility - Sealey, Vandenberg AFB

\$4.00 additional per hour at the following locations:

Army Defense Language Institute - Monterey, Fallon Air Base,  
Naval Post Graduate School - Monterey, Yermo Marine Corps  
Logistics Center

\$2.00 additional per hour at the following locations:

Port Hueneme, Port Mugu, U.S. Coast Guard Station - Two Rock

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LABO0089-001 07/01/2020

	Rates	Fringes
LABORER (BUILDING and all other Residential Construction)		
Group 1.....	\$ 34.18	20.48
Group 2.....	\$ 34.86	20.48
Group 3.....	\$ 35.57	20.48
Group 4.....	\$ 36.37	20.48
Group 5.....	\$ 38.30	20.48
LABORER (RESIDENTIAL CONSTRUCTION - See definition below)		
(1) Laborer.....	\$ 30.82	18.80
(2) Cleanup, Landscape, Fencing (Chain Link & Wood).	\$ 29.53	18.80

RESIDENTIAL DEFINITION: Wood or metal frame construction of single family residences, apartments and condominiums - excluding (a) projects that exceed three stories over a garage level, (b) any utility work such as telephone, gas, water, sewer and other utilities and (c) any fine grading work, utility work or paving work in the future street and public right-of-way; but including all rough grading work at the job site behind the existing right of way

LABORER CLASSIFICATIONS

GROUP 1: Cleaning and handling of panel forms; Concrete Screeding for Rought Strike-off; Concrete, water curing; Demolition laborer; Flagman; Gas, oil and/or water pipeline laborer; General Laborer; General clean-up laborer; Landscape laborer; Jetting laborer; Temporary water and air lines laborer; Material hoseman (walls, slabs, floors and decks); Plugging, filling of Shee-bolt holes; Dry packing of concrete; Railroad maintenance, Repair Trackman and road beds, Streetcar and railroad construction trac laborers; Slip form raisers; Slurry seal crews (mixer operator, applicator operator, squeegee man, Shuttle man, top man), filling of cracks by any method on any surface;

Tarman and mortar man; Tool crib or tool house laborer; Window cleaner; Wire Mesh puling-all concrete pouring operations

GROUP 2: Asphalt Shoveler; Cement Dumper (on 1 yard or larger mixer and handling bulk cement); Cesspool digger and installer; Chucktender; Chute man, pouring concrete, the handling of the chute from ready mix trucks, such as walls, slabs, decks, floors, foundations, footings, curbs, gutters and sidewalks; Concrete curer-impervious membrane and form oiler; Cutting torch operator (demolition); Guinea chaser; Headboard man-asphalt; Laborer, packing rod steel and pans; membrane vapor barrier installer; Power broom sweepers (small); Riiprap, stonepaver, placing stone or wet sacked concrete; Roto scraper and tiller; Tank sealer and cleaner; Tree climber, faller, chain saw operator, Pittsburgh Chipper and similar type brush shredders; Underground laborers, including caisson bellower

GROUP 3: Buggymobile; Concrete cutting torch; Concrete cutting torch; Concrete pile cutter; Driller, jackhammer, 2 1/2 feet drill steel or longer; Dri Pak-it machine; High sealer (including drilling of same); Hydro seeder and similar type; Impact wrench, multi-plate; Kettlemen, potmen and men applying asphalt, lay-kold, creosote, line caustic and similar type materials (applying means applying, dipping, brushing or handling of such materials for pipe wrapping and waterproofing); Operators of pneumatic, gas, electric tools, vibrating machines, pavement breakers, air blasting, come-along, and similar mechanical tools not separately classified herein; Pipelayers back up man coating, grouting, making of joints, sealing, caulking, diapering and including rubber gasket joints, pointing and any and all other services; Rotary Scarifier or multiple head concrete chipping scarifier; Steel header board man and guideline setter; Tampers, Barko, Wacker and similar type; Trenching machine, handpropelled

GROUP 4: Asphalt raker, luterman, ironer, asphalt dumpman and asphalt spreader boxes (all types); Concrete core cutter (walls, floors or ceilings), Grinder or sander; Concrete saw man; cutting walls or flat work, scoring old or new concrete; Cribber, shorer, lagging, sheeting and trench bracing, hand-guided lagging hammer; Laser beam in connection with laborer's work; Oversize concrete vibrator operator 70 pounds and over; Pipelayer performing all services in the laying, installation and all forms of connection of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, metallic or non-metallic, conduit, and any other stationary type of tubular device used for the conveying of any substance or

element, whether water, sewage, solid, gas, air or other product whatsoever and without regard to the nature of material from which the tubular material is fabricated; No joint pipe and stripping of same; Prefabricated manhole installer; Sandblaster (nozzleman), Porta shot-blast, water blasting

GROUP 5: Blasters Powderman-All work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Driller-all power drills, excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and any and all other types of mechanical drills without regard to the form of motive power.

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LABO0089-002 11/01/2020

	Rates	Fringes
LABORER (MASON TENDER).....	\$ 33.00	19.23

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LABO0089-004 07/01/2020

HEAVY AND HIGHWAY CONSTRUCTION

	Rates	Fringes
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Laborers:		
Group 1.....	\$ 35.30	20.48
Group 2.....	\$ 35.76	20.48
Group 3.....	\$ 36.17	20.48
Group 4.....	\$ 37.01	20.48
Group 5.....	\$ 40.28	20.48

LABORER CLASSIFICATIONS

GROUP 1: Laborer: General or Construction Laborer, Landscape Laborer. Asphalt Rubber Material Loader. Boring Machine Tender (outside), Carpenter Laborer (cleaning, handling, oiling & blowing of panel forms and lumber), Concrete Laborer, Concrete Screeding for rough strike-off, Concrete water curing. Concrete Curb & Gutter laborer, Certified Confined Space Laborer, Demolition laborer & Cleaning of Brick and lumber, Expansion Joint Caulking; Environmental Remediation, Monitoring Well, Toxic waste and Geotechnical Drill tender, Fine Grader, Fire Watcher, Limbers, Brush Loader, Pilers and Debris Handlers. flagman. Gas Oil and Water Pipeline Laborer. Material Hoseman (slabs, walls, floors, decks); Plugging, filling of shee bolt holes; Dry packing of concrete and patching; Post Holer Digger (manual); Railroad maintenance, repair trackman, road beds; Rigging & signaling; Scaler, Slip-Form Raisers, Filling cracks on any surface, tool Crib or Tool House Laborer,

Traffic control (signs, barriers, barricades, delineator, cones etc.), Window Cleaner

GROUP 2: Asphalt abatement; Buggymobile; Cement dumper (on 1 yd. or larger mixers and handling bulk cement); Concrete curer, impervious membrane and form oiler; Chute man, pouring concrete; Concrete cutting torch; Concrete pile cutter; driller/Jackhammer, with drill steel 2 1/2 feet or longer; Dry pak-it machine; Fence erector; Pipeline wrapper, gas, oil, water, pot tender & form man; Grout man; Installation of all asphalt overlay fabric and materials used for reinforcing asphalt; Irrigation laborer; Kettleman-Potman hot mop, includes applying asphalt, lay-klold, creosote, lime caustic and similar tyhpes of materials (dipping, brushing, handling) and waterproofing; Membrane vapor barrier installer; Pipelayer backup man (coating, grouting, making of joints, sealing caulkiing, diapering including rubber basket joints, pointing); Rotary scarifier, multiple head concrete chipper; Rock slinger; Roto scraper & tiller; Sandblaster pot tender; Septic tank digger/installer; Tamper/wacker operator; Tank scaler & cleaner; Tar man & mortar man; Tree climber/faller, chainb saw operator, Pittsburgh chipper & similar type brush shredders.

GROUP 3: Asphalt, installation of all frabrics; Buggy Mobile Man, Bushing hammer; Compactor (all types), Concrete Curer - Impervious membrane, Form Oiler, Concrete Cutting Torch, Concrete Pile Cutter, Driller/Jackhammer with drill steel 2 1/2 ft or longer, Dry Pak-it machine, Fence erector including manual post hole digging, Gas oil or water Pipeline Wrapper - 6 ft pipe and over, Guradrail erector, Hydro seeder, Impact Wrench man (multi plate), kettleman-Potman Hot Mop includes applying Asphalt, Lay-Kold, Creosote, lime caustic and similar types of materials (dipping, brushing or handling) and waterproofing. Laser Beam in connection with Laborer work. High Scaler, Operators of Pneumatic Gas or Electric Tools, Vibrating Machines, Pavement Breakers, Air Blasting, Come-Alongs and similar mechanical tools, Remote-Controlled Robotic Tools in connection with Laborers work. Pipelayer Backup Man (Coating, grouting, m makeing of joints, sealing, caulking, diapering including rubber gasket joints, pointing and other services). Power Post Hole Digger, Rotary Scarifier (multiple head concrete chipper scarifier), Rock Slinger, Shot Blast equipment (8 to 48 inches), Steel Headerboard Man and Guideline Setter, Tamper/Wacker operator and similar types, Trenching Machine hand propelled.

GROUP 4: Any worker exposed to raw sewage. Asphalt Raker, Luteman, Asphalt Dumpman, Asphalt Spreader Boxes, Concrete

Core Cutter, Concrete Saw Man, Cribber, Shorer, Head Rock Slinger. Installation of subsurface instrumentation, monitoring wells or points, remediation system installer; Laborer, asphalt-rubber distributor bootman; Oversize concrete vibrator operators, 70 pounds or over. Pipelayer, Prefabricated Manhole Installer, Sandblast Nozzleman (Water Blasting-Porta Shot Blast), Traffic Lane Closure.

GROUP 5: Blasters Powderman-All work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Horizontal directional driller, Boring system, Electronic tracking, Driller: all power drills excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and all other types of mechanical drills without regard to form of motive power. Environmental remediation, Monitoring well, Toxic waste and Geotechnical driller, Toxic waste removal. Welding in connection with Laborer's work.

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 \* LABO0300-005 03/01/2021

	Rates	Fringes
Asbestos Removal Laborer.....	\$ 37.49	21.88

SCOPE OF WORK: Includes site mobilization, initial site cleanup, site preparation, removal of asbestos-containing material and toxic waste, encapsulation, enclosure and disposal of asbestos- containing materials and toxic waste by hand or with equipment or machinery; scaffolding, fabrication of temporary wooden barriers and assembly of decontamination stations.

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 LABO0345-001 07/01/2020

	Rates	Fringes
LABORER (GUNITE)		
GROUP 1.....	\$ 45.05	19.62
GROUP 2.....	\$ 44.10	19.62
GROUP 3.....	\$ 40.56	19.62

FOOTNOTE: GUNITE PREMIUM PAY: Workers working from a Bosn'n's Chair or suspended from a rope or cable shall receive 40 cents per hour above the foregoing applicable classification rates. Workers doing gunite and/or shotcrete work in a tunnel shall receive 35 cents per hour above the foregoing applicable classification rates, paid on a portal-to-portal basis. Any work performed on, in or above any smoke stack, silo, storage elevator or similar type of structure, when such structure is in excess of

75'-0"" above base level and which work must be performed in whole or in part more than 75'-0"" above base level, that work performed above the 75'-0"" level shall be compensated for at 35 cents per hour above the applicable classification wage rate.

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Rodmen, Nozzlemen

GROUP 2: Gunmen

GROUP 3: Reboundmen

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LABO1184-001 07/01/2020

	Rates	Fringes
Laborers: (HORIZONTAL DIRECTIONAL DRILLING)		
(1) Drilling Crew Laborer...	\$ 37.85	15.99
(2) Vehicle Operator/Hauler.	\$ 38.02	15.99
(3) Horizontal Directional Drill Operator.....	\$ 39.87	15.99
(4) Electronic Tracking Locator.....	\$ 41.87	15.99
Laborers: (STRIPING/SLURRY SEAL)		
GROUP 1.....	\$ 39.06	19.01
GROUP 2.....	\$ 40.36	19.01
GROUP 3.....	\$ 42.37	19.01
GROUP 4.....	\$ 44.11	19.01

LABORERS - STRIPING CLASSIFICATIONS

GROUP 1: Protective coating, pavement sealing, including repair and filling of cracks by any method on any surface in parking lots, game courts and playgrounds; carstops; operation of all related machinery and equipment; equipment repair technician

GROUP 2: Traffic surface abrasive blaster; pot tender - removal of all traffic lines and markings by any method (sandblasting, waterblasting, grinding, etc.) and preparation of surface for coatings. Traffic control person: controlling and directing traffic through both conventional and moving lane closures; operation of all related machinery and equipment

GROUP 3: Traffic delineating device applicator: Layout and application of pavement markers, delineating signs, rumble and traffic bars, adhesives, guide markers, other traffic



delineating devices including traffic control. This category includes all traffic related surface preparation (sandblasting, waterblasting, grinding) as part of the application process. Traffic protective delineating system installer: removes, relocates, installs, permanently affixed roadside and parking delineation barricades, fencing, cable anchor, guard rail, reference signs, monument markers; operation of all related machinery and equipment; power broom sweeper

GROUP 4: Striper: layout and application of traffic stripes and markings; hot thermo plastic; tape traffic stripes and markings, including traffic control; operation of all related machinery and equipment

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LABO1414-003 08/05/2020

	Rates	Fringes
LABORER		
PLASTER CLEAN-UP LABORER....	\$ 36.03	21.01
PLASTER TENDER.....	\$ 38.58	21.01

Work on a swing stage scaffold: \$1.00 per hour additional.

Work at Military Bases - \$3.00 additional per hour:  
 Coronado Naval Amphibious Base, Fort Irwin, Marine Corps Air Station-29 Palms, Imperial Beach Naval Air Station, Marine Corps Logistics Supply Base, Marine Corps Pickle Meadows, Mountain Warfare Training Center, Naval Air Facility-Seeley, North Island Naval Air Station, Vandenberg AFB.

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PAIN0036-001 07/01/2020

	Rates	Fringes
Painters: (Including Lead Abatement)		
(1) Repaint (excludes San Diego County).....	\$ 29.59	17.12
(2) All Other Work.....	\$ 33.12	17.24

REPAINT of any previously painted structure. Exceptions: work involving the aerospace industry, breweries, commercial recreational facilities, hotels which operate commercial establishments as part of hotel service, and sports facilities.

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PAIN0036-010 10/01/2020

	Rates	Fringes
DRYWALL FINISHER/TAPER		
(1) Building & Heavy Construction.....	\$ 36.69	18.90
(2) Residential Construction (Wood frame apartments, single family homes and multi-duplexes up to and including four stories).....	\$ 27.11	17.51

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PAIN0036-012 10/01/2020

	Rates	Fringes
GLAZIER.....	\$ 45.55	18.06

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\* PAIN0036-019 01/01/2021

	Rates	Fringes
SOFT FLOOR LAYER.....	\$ 33.52	17.59

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PLAS0200-005 08/07/2019

	Rates	Fringes
PLASTERER.....	\$ 43.73	16.03

NORTH ISLAND NAVAL AIR STATION, COLORADO NAVAL AMPHIBIOUS  
BASE, IMPERIAL BEACH NAVAL AIR STATION: \$3.00 additional  
per hour.

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PLAS0500-001 07/01/2018

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER		
GROUP 1.....	\$ 26.34	21.12
GROUP 2.....	\$ 27.99	21.12
GROUP 3.....	\$ 30.07	21.12

CEMENT MASONS - work inside the building line, meeting the  
following criteria:

GROUP 1: Residential wood frame project of any size; work  
classified as Type III, IV or Type V construction;  
interior tenant improvement work regardless the size of the  
project; any wood frame project of four stories or less.

GROUP 2: Work classified as type I and II construction

GROUP 3: All other work

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PLUM0016-006 09/01/2020

	Rates	Fringes
PLUMBER, PIPEFITTER, STEAMFITTER		
Camp Pendleton; Vandenberg Air Force Base.....	\$ 55.88	23.66
Work ONLY on new additions and remodeling of commercial buildings, bars, restaurants, and stores not to exceed 5,000 sq. ft. of floor space.....	\$ 50.70	23.73
Work ONLY on strip malls, light commercial, tenant improvement and remodel work.....	\$ 38.73	22.06
All other work except work on new additions and remodeling of bars, restaurant, stores and commercial buildings not to exceed 5,000 sq. ft. of floor space and work on strip malls, light commercial, tenant improvement and remodel work.....	\$ 52.28	24.71

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PLUM0016-011 09/01/2020

	Rates	Fringes
PLUMBER/PIPEFITTER		
Residential.....	\$ 41.62	20.63

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PLUM0345-001 09/01/2020

	Rates	Fringes
PLUMBER		
Landscape/Irrigation Fitter..	\$ 35.30	24.10
Sewer & Storm Drain Work....	\$ 39.39	21.48

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ROOF0045-001 07/01/2020

	Rates	Fringes
ROOFER.....	\$ 36.25	9.24

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SFCA0669-001 01/01/2021

	Rates	Fringes
SPRINKLER FITTER.....	\$ 41.57	24.62

SHEE0206-001 07/01/2020

	Rates	Fringes
SHEET METAL WORKER		
Camp Pendleton.....	\$ 42.62	29.55
Except Camp Pendleton.....	\$ 40.62	29.55
Sheet Metal Technician.....	\$ 30.51	9.49

SHEET METAL TECHNICIAN - SCOPE:

a. Existing residential buildings, both single and multi-family, where each unit is heated and/or cooled by a separate system b. New single family residential buildings including tracts. c. New multi-family residential buildings, not exceeding five stories of living space in height, provided each unit is heated or cooled by a separate system. Hotels and motels are excluded. d. LIGHT COMMERCIAL WORK: Any sheet metal, heating and air conditioning work performed on a project where the total construction cost, excluding land, is under \$1,000,000 e. TENANT IMPROVEMENT WORK: Any work necessary to finish interior spaces to conform to the occupants of commercial buildings, after completion of the building shell

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TEAM0166-001 09/01/2019

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 18.90	34.69
GROUP 2.....	\$ 26.49	34.69
GROUP 3.....	\$ 26.69	34.69
GROUP 4.....	\$ 26.89	34.69
GROUP 5.....	\$ 27.09	34.69
GROUP 6.....	\$ 27.59	34.69
GROUP 7.....	\$ 29.09	34.69

FOOTNOTE: HAZMAT PAY: Work on a hazmat job, where hazmat certification is required, shall be paid, in addition to the classification working in, as follows: Levels A, B and C - +\$1.00 per hour. Workers shall be paid hazmat pay in increments of four (4) and eight (8) hours.

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Fuel Man, Swamper

GROUP 2: 2-axle Dump Truck, 2-axle Flat Bed, Concrete Pumping Truck, Industrial Lift Truck, Motorized Traffic Control, Pickup Truck on Jobsite

GROUP 3: 2-axle Water Truck, 3-axle Dump Truck, 3-axle Flat Bed, Erosion Control Nozzleman, Dump Crete Truck under 6.5 yd, Forklift 15,000 lbs and over, Prell Truck, Pipeline

Work Truck Driver, Road Oil Spreader, Cement Distributor or Slurry Driver, Bootman, Ross Carrier

GROUP 4: Off-road Dump Truck under 35 tons 4-axles but less than 7-axles, Low-Bed Truck & Trailer, Transit Mix Trucks under 8 yd, 3-axle Water Truck, Erosion Control Driver, Grout Mixer Truck, Dump Crete 6.5yd and over, Dumpster Trucks, DW 10, DW 20 and over, Fuel Truck and Dynamite, Truck Greaser, Truck Mounted Mobile Sweeper 2-axle Winch Truck

GROUP 5: Off-road Dump Truck 35 tons and over, 7-axles or more, Transit Mix Trucks 8 yd and over, A-Frame Truck, Swedish Cranes

GROUP 6: Off-Road Special Equipment (including but not limited to Water Pull Tankers, Athey Wagons, DJB, B70 Wuclids or like Equipment)

GROUP 7: Repairman

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical

order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

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WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
 Wage and Hour Division  
 U.S. Department of Labor  
 200 Constitution Avenue, N.W.  
 Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
 U.S. Department of Labor  
 200 Constitution Avenue, N.W.  
 Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
 U.S. Department of Labor  
 200 Constitution Avenue, N.W.  
 Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

**10.2. CWSRF DAVIS BACON PROVISIONS.** Contractor shall include the following language in this section in all of its subcontracts for the Project. Contractor and all subcontractors working on the Project shall comply with any provisions herein applicable to contractors and subcontractors, respectively:

(1) Minimum wages.

- (i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4).

Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Sub recipients may obtain wage determinations from the U.S. Department of Labor's web site, [www.dol.gov](http://www.dol.gov).

- (ii) (A) The sub recipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:



- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the sub recipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the sub recipient (s) to the State award official. The State award official will transmit the request, to the Administrator of the Wage and Hour Division, Employment Standards

Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30- day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the sub recipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

- (iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

- (iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.
  
- (2) Withholding. The sub recipient(s), shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.
  
- (3) Payrolls and basic records.
  - (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

- (ii) (A)The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the sub recipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the sub recipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <https://www.dol.gov/whd/forms/index.htm> or its successor site.

The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker and shall provide them upon request to the sub recipient(s) for transmission to the State or EPA if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sub recipient(s).

(B)Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

1. That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;
2. That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;
3. That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of

work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's

hourly rate) specified in the contractor's or sub contractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal

employment opportunity requirements of Executive Order 11246, as amended and 29 CFR part 30.

- (5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.
- (6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may be appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.
- (7) Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
- (8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.
- (9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and sub recipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.
- (10) Certification of eligibility.
  - (i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
  - (ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
  - (iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001

## **5. Contract Provision for Contracts in Excess of \$100,000.**

- (a) Contract Work Hours and Safety Standards Act. The sub recipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the

clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

- (i) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
  - (ii) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (a)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a)(1) of this section, in the sum of \$25 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (a)(1) of this section.
  - (iii) Withholding for unpaid wages and liquidated damages. The sub recipient, upon written request of the EPA Award Official or an authorized representative of the Department of Labor, shall withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.
  - (iv) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (a)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a)(1) through (4) of this section.
- (b) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Sub recipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number,

correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid.

Further, the Sub recipient shall insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

## **6. Compliance Verification**

(a) The sub recipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(3), all interviews must be conducted in confidence. The sub recipient must use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.

(b) The sub recipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. Sub recipients must conduct more frequent interviews if the initial interviews or other information indicated that there is a risk that the contractor or subcontractor is not complying with DB.

Sub recipients shall immediately conduct interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence.

(c) The sub recipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The sub recipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable, the sub recipient should spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract. Sub recipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB. In addition, during the examinations the sub recipient shall verify evidence of fringe benefit plans and payments there under by contractors and subcontractors who claim credit for fringe benefit contributions.

(d) The sub recipient shall periodically review contractors and subcontractors use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.

(e) Sub recipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at <http://www.dol.gov/whd/america2.htm>.



## 11. AGENCY SPECIFIC PROVISIONS:

Note: Failure to comply with these specifications e.g., taking the specified steps prior to Bid opening and submitting the forms with the Bid, will lead to the Bid being declared **non-responsive** and, therefore, shall be rejected.

### 11.1 EPA Requirements:

1. Federal Disadvantaged Business Enterprise (DBE) regulations apply to this project. (Reference 40 Code of Federal Regulations Part 33 - Participation by Disadvantaged Business Enterprises in U.S. Environmental Protection Agency Programs).
2. The responsive Bid shall conform to GFE to increase DBE awareness of procurement opportunities through race and gender neutral efforts. Race and gender neutral efforts are ones which increase awareness of contracting opportunities in general, including outreach, recruitment and technical assistance.
3. Bidder agrees that it will cooperate with and assist the City in fulfilling the DBE Good Faith Effort Requirement achieving "fair share objectives" and will exercise GFE to achieve such minimum participation of small, minority and women owned businesses. In particular, in submitting a bid, the Bidder shall, in the selection of Subcontractors, and Suppliers for the procurement of equipment, supplies, construction, and services related to the project, at a minimum, undertake the affirmative GFE steps.
4. In accordance with EPA's Program for Utilization of Small, Minority Disadvantaged and Women Business Enterprises in procurement under Federal assistance programs, the Contractor agrees to the applicable "fair share objectives" as specified in **Attachment D**.
5. The provisions in the Contract Documents have been incorporated to prevent unfair practices that adversely affect DBEs.
6. If a DBE Subcontractor fails to complete the Work under the subcontract for any reason, the Contractor shall employ the 6 GFE if soliciting a replacement Subcontractor. The Contractor shall employ the 6 GFE described below even if the Contractor has achieved its fair share objectives.
7. Good Faith Efforts:
  - a. The Contractor shall demonstrate that efforts were made to attract DBEs on this contract. The "Good Faith" effort requires the Contractor and any Subcontractors to take the steps listed in these specifications to assure that DBEs are used whenever possible as sources of supplies, construction, equipment, or services even if the Contractor has achieved its fair share objectives.
  - b. If the Contractor awards subcontracts, it shall require the Subcontractors to take the steps in these specifications.
  - c. For the EPA defined GFE, see the steps below:

- i. Ensure DBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For Indian Tribal, State and Local and Government recipients, this will include placing DBEs on solicitation lists and soliciting them whenever they are potential sources.
- ii. Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes posting solicitations for bids or proposals for a minimum of 30 Calendar Days (refer to 33 CFR 33.301) before the bid or proposal closing date.
- iii. Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs. For Indian Tribal, State and local Government recipients, this will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process. Include with the GFE documentation a completed copy of the form AA61, "List of Work Made Available".
- iv. Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.
- v. Use the services and assistance of the U.S. Small Business Administration (SBA) and the Minority Business Development Agency (MBDA) of the Department of Commerce (DOC). See "DBE Potential Resources Centers" Section in a later part these specifications.
- vi. If the Contractor awards Subcontracts, the Contractor shall take the steps in the paragraphs above.

**11.2 California State Revolving Fund (CASRF) Requirements:**

**11.2.1** Refer to Subsection 11.1, "EPA Requirements" above and the following:

**11.2.1.1** The Bidder shall take affirmative steps prior to Bid opening to assure that MBE's and WBE's are used whenever possible as sources of supplies, construction and services.

**11.2.1.2** The affirmative steps are defined for contracts funded by the California State Water Resources Control Board as follows:

1. Utilization of US Small Business Administration and Minority Business Development Agency (MBDA) resources is required at no cost. These agencies offer several services, including Internet access to databases of DBEs.
2. For additional assistance, the Contractor can telephone the local offices of both agencies in their area (SBA Minority Enterprise Development Offices and DOC MBDA Regional Centers). The Internet web sites also include names, addresses, and phone or fax numbers of local SBA and MBDA centers. There are contact phone numbers listed in Step 3 that will assist you in reaching the 2 offices if the Internet is unavailable. Do not write to these sources.

3. The Contractor shall provide documentation that the local SBA/MBDA offices or web sites were notified of the contracting bid opportunity at least 30 Calendar Days prior to Bid opening and solicitation to DBE Subcontractors at least 15 Calendar Days prior to Bid opening. Documentation shall not only include the efforts to contact the information sources and list the Contract opportunity, but also the solicitation and response to the bid request.
4. Include qualified DBEs on solicitation lists and record the information. Solicitation shall be as broad as possible.
5. If DBE sources are not located, explain why and describe the efforts made.
6. The Contractor shall send invitations to at least 10 (or all, if less than 10) DBE vendors for each item of the Work referred by sources contacted. The invitations shall adequately specify the items for which bids are requested. The record of GFE shall indicate a real desire for a positive response, such as a certified mail receipt or a documented telephone conversation.
7. A regular letter or an unanswered telephone call is not an adequate "good faith" effort. A list of all Subcontractors, including the bidders not selected and non DBE Subcontractors, and bid amount for each item of the Work shall be submitted on Form AA62. If a low bid was not accepted, an explanation shall be provided.

**11.2.1.3** See "DBE Potential Resources Centers" Section in a later part these specifications.

**11.2.1.4 Annual DBE Utilization Reporting:**

The Contractor shall report to the City on an annual basis, their utilization of Minority Business Enterprise and Women's Business Enterprise Subcontractors and Suppliers using California State Revolving Funds (CASRF) Form UR-334.

**12. DBE POTENTIAL RESOURCES CENTERS:**

- 12.1** Utilization of US Small Business Administration and Minority Business Development Agency (MBDA) resources is required at no cost. These agencies offer several services, including Internet access to databases of DBEs.
- 12.2** For additional assistance the recipient or contractor can telephone the local offices of both agencies in their area (SBA Minority Enterprise Development Offices and DOC MBDA Regional Centers). The Internet web sites also include names, addresses, and phone or fax numbers of local SBA and MBDA centers. Do not write to these sources
- 12.3** The Contractor shall provide documentation that the local SBA/MBDA offices or web sites were notified of the contracting bid opportunity at least 30 Calendar Days prior to Bid opening and solicitation to DBE subcontractors at least 15 Calendar Days prior to Bid opening. Documentation shall not only include the efforts to contact the information sources and list the Contract opportunity, but also the solicitation and response to the bid request.

- 12.4** Include qualified DBEs on solicitation lists and record the information on Form AA63. Solicitation shall be as broad as possible.
- 12.5** If DBE sources are not located, explain why and describe the efforts made.
- 12.6** The Contractor shall send invitations to at least 10 (or all, if less than 10) DBE vendors for each item of work referred by sources contacted. The invitations shall adequately specify the items for which bids are requested. The record of "good faith" efforts shall indicate a real desire for a positive response, such as a certified mail receipt or a documented telephone conversation.
- 12.7** A regular letter or an unanswered telephone call is not an adequate "good faith" effort. A list of all sub-bidders, including the bidders not selected and non DBE Subcontractors, and bid amount for each item of the Work shall be submitted on Form AA62. If a low bid was not accepted, an explanation shall be provided.
- 12.8** Federal Agencies (must be contacted and solicitations posted on their websites):

Name and Address	Telephone and Web Site
<b>U.S. Small Business Administration</b>	(415) 744-6820 Extension 0
455 Market Street, Suite 600	Dynamic Small Business Search: <a href="https://catalog.data.gov/dataset/dynamic-small-business-search-dsbs-025a1">https://catalog.data.gov/dataset/dynamic-small-business-search-dsbs-025a1</a> <sup>1</sup>
San Francisco, CA 94105	Bid Notification: <a href="https://catalog.data.gov/dataset/subcontracting-network-subnet-system">https://catalog.data.gov/dataset/subcontracting-network-subnet-system</a> <sup>2</sup>
RE: Minority Enterprise Development Offices	
<b>U.S. Department of Commerce</b>	909-315-3339
Minority Business Development Agency	Website:
177 East Colorado Blvd. Suite 200 Space 2054	<a href="https://www.mbda.gov/business-center/pasadena-mbda-business-center">https://www.mbda.gov/business-center/pasadena-mbda-business-center</a>
Pasadena, CA 91105	RE: Business Development Centers

**12.9** State Agencies (must be contacted):

Name and Address	Telephone and Web Site
<b>California Department of Transportation</b>	Mailing Address: PO Box 942874
(CALTRANS) Business Enterprise Program <sup>4</sup>	Sacramento, CA 94274-0015
1820 Alhambra Blvd.	(916) 227-9599
Sacramento, CA 95816	<u>DBE Database:</u> <a href="https://dot.ca.gov/programs/civil-rights/dbe">https://dot.ca.gov/programs/civil-rights/dbe</a>
<b>CA Public Utilities Commission (CPUC)<sup>5</sup></b>	
505 Van Ness Avenue	<u>Directory:</u>
San Francisco, CA 94102-3298	<a href="https://sch.thesupplierclearinghouse.com/FrontEnd/SearchCertifiedDirectory.asp">https://sch.thesupplierclearinghouse.com/FrontEnd/SearchCertifiedDirectory.asp</a>

Notes:

1. The Contractor shall use the SBA's Dynamic Business Search database to search for potential subcontractors, suppliers, and/or manufacturers. Bidder must provide a copy of all search records for items of work made available with GFE documentation.
2. Contractor shall use SUB-Net to post subcontracting opportunities. Contractor shall post Subcontractor opportunities at least 15 Working Days prior to bid opening. Small businesses can review this web site to identify opportunities in their areas of expertise. The web site is designed primarily as a place for large businesses to post solicitations and notices. Bidder **must** provide copy of the Display Solicitation Record identifying the date solicitation notice was posted with GFE documentation.
3. Contractor may use MBDA web portal to post subcontracting opportunities. If utilized, the Contractor shall post subcontractor opportunities at least 30 Calendar Days prior to Bid opening. Small businesses can review this web site to identify opportunities in their areas of expertise. The web site is designed primarily as a place for large businesses to post solicitations and notices. Provide copy of the Offer Overview with the GFE documentation.
4. Based on the federal DBE program, CALTRANS maintains a database and provides directories of minority and woman-owned firms. Bidder must provide a copy of all search records for items of work made available with GFE documentation.
5. CPUC maintains a database of DBE-owned business enterprises and serves to inform the public. Bidder **must** provide a copy of all search records for items of work made available with GFE documentation.

**13. GOOD FAITH EFFORT DOCUMENTATION SUBMITTALS:**

- 13.1** The affirmative GFE steps documentation shall be submitted by **5 PM 4 Working Days after the Bid Opening**. If this documentation is not submitted when due, the City will declare the Bid **non-responsive** and reject it.

**13.2** The required documentation shall be submitted and logged in at the following address:

CITY OF SAN DIEGO  
ENGINEERING & CAPITAL PROJECTS DEPARTMENT, CONTRACTS DIVISION  
525 B STREET, SUITE 750  
SAN DIEGO, CA 92101

SUBJECT: AFFIRMATIVE GOOD FAITH EFFORT DOCUMENTATION

BID NO. **K-21-2005-DBB-3**

**13.3** The Contractor shall maintain the records documenting compliance with requirements including documentation of its GFE and data relied upon in formulating its fair share objectives.

**14. FORMS:**

**14.1** The Contractor shall demonstrate that efforts were made to attract DBEs on this contract. The Contractor and Subcontractors shall take the steps listed in these specifications to assure that DBEs are used whenever possible as sources of supplies, construction, equipment, or services. In addition to the specified GFE documentation, the Bidder shall submit the following forms.

**14.1.1** The following forms shall be submitted **with the Bid submittal**. Failure to include any of the forms shall cause the Bid to be deemed **non-responsive**.

1. Form 4500-3: DBE Subcontractor Performance Form
2. Form 4500-4: DBE Subcontractor Utilization Form

**14.1.2** The following forms shall be completed and submitted within **4 Working Days after the Bid opening by 5 PM**. Failure to include any of the forms shall cause the Bid to be deemed **non-responsive**.

1. Form AA61: List of Work Made Available
2. Form AA62: Summary of Bids Received
3. Form AA63: Good Faith Effort List of Subcontractors Solicited

**14.1.3** The following additional forms shall be submitted annually in accordance with Section 11 "AGENCY SPECIFIC PROVISIONS".

1. Form UR-334: California State Revolving Funds (CASRF)

**14.1.4** Bidder is to provide the following form to all DBE subcontractors participating on this contract. Submittal of form is dependent on DBE subcontractor and is to be forwarded to the DBE coordinator at any time during the project period of performance.

1. Form 4500-2: DBE Subcontractor Participation Form.

**CONTROL STRATEGIES** <sup>[ADD 1]</sup>

**CENTRIFUGE BUILDING**

1.01 DEWATERING CENTRIFUGES

- A. Reference P&ID: 76-I-121, 128.
- B. Loop Mission: There are eight dewatering centrifuges. Centrifuges 1 and 8 will be upgraded as a part of the project. The dewatering centrifuges receive digested biosolids in a concentration of 2 percent to 4 percent and dewater the biosolids to 28 percent solids. The dewatered biosolids will be discharged to the dewatered centrifuge bins. The centrate will be discharged to the centrate wetwell in the wastewater pump station. The dewatering centrifuges and centrifuge discharge diverter gates are automatically controlled by the dedicated PLCs and control panels. The dewatering centrifuges and centrifuge discharge diverter gates are automatically controlled by the dedicated PLCs and control panels.
- C. General DCS Function:
  - 1. Use Ethernet communications to allow for DCS control and interaction with the dewatering centrifuge(s).
    - a. Display dewatering centrifuge status.
    - b. Display and notify operations of dewatering centrifuge alarms.
    - c. Display operator adjustable dewatering centrifuge setpoints.
- D. DCS Manual Control Mode:
  - 1. Set dewatering centrifuge control mode.
    - a. Differential speed mode.
    - b. Auto torque mode.
  - 2. Start / Stop each dewatering centrifuge.
  - 3. Open / Close motor operated routing valves.
  - 4. Start / Stop each dewatering centrifuge feed pump.
  - 5. Select mode or position of each dewatering centrifuge Diverter Gate - solids or centrate. Note: this will also position the Cake to Centrate (C2C) Valve in the opposite position as both of these valves are interlocked.
  - 6. Select mode or position of each dewatering centrifuge Flush Valve - open or close.

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- E. DCS Automatic Control Mode:
1. Operator to select dewatering centrifuge strategy.
  2. Operator to select centrifuge(s) to operate from the dewatering centrifuge strategy.
  3. For each selected centrifuge, operator to input polymer dosage ratio and biosolids flow rate (adjustable 0 - 400 GPM). When the pump is commanded to start the inlet valve will open first. Upon open position confirmation the pump will start and will start modulating its speed to meet the flow setpoint. Time should be allowed for the valve to open, (nominal 30 seconds). This procedure allows the feed loop to be maintained at operational pressure by eliminating blow by at the centrifuge that is not demanding sludge feed.
  4. Select first polymer day tank to be used (If the tank is available).
  5. Select Cake Pump(s), once selections have been made issue cake pump strategy READY status to the centrifuge.
  6. Operator to select back drive mode of operation – AUTO LOAD or DIFFERENTIAL SPEED.
    - a. If AUTO LOAD is selected, adjust the setpoint (Top of scale 20-80 percent, range will be set as defined by parameters that will be adjusted in the back drive controller during field testing and start-up).
    - b. If DIFFERENTIAL SPEED is selected, adjust the setpoint (0.1-5.0 rpm).
  7. The LOAD and DIFFERENTIAL selection logic will be programmed in the Centrifuge PLC. DCS will interface the PLC logic and allow changing between the modes and adjusting setpoints from the DCS graphics. These parameters can be also changed in parallel from the local PLC HMI.
  8. Diverter Gate, Cake to Centrate and Flush valves control will be programmed in the Centrifuge PLC. DCS will interface the PLC logic and allow changing between AUTO/MANUAL modes and OPEN/CLOSE when in MANUAL mode from the DCS graphics. These modes can be also changed in parallel from the local PLC HMI.
  9. DCS to scan all I / O associated with the strategy and indicate a ready or not ready status as detailed on the Strategy Check list displayed on the Centrifuge Control Strategy Graphic.
  10. Operator must ensure that a polymer day tank is selected and that a Mixed Polymer Pump has been selected to be lead.
  11. When the operator initiates start - up, strategy will:
    - a. Open, if available, the first day tanks polymer outlet valves; upon confirmation.
    - b. For each selected centrifuge, check that at least one of the polymer feed line hand valves is open; upon confirmation.
    - c. Start - up each selected centrifuge.



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- d. DCS will monitor and display the following Centrifuge operating modes programmed in the centrifuge control panel PLC:
    - 1) Step 0 - Idle Step - Waiting for start request.
    - 2) Step 1 - Lube Step - Turns on lube system and gets flow established (timed step).
    - 3) Step 2 - Starting Step – Main drive and back drive motors start to rotate.
    - 4) Step 3 - Transition Step - Waiting for main drive motor to ramp to full speed (timed step).
    - 5) Step 4 - Transition Step - Waiting for main drive motor to ramp to full speed (timed step).
    - 6) Step 5 - Standby Step - Waiting for operator to select "Production" from HMI or DCS.
    - 7) Step 6 - Offline Step - Active Alarm (Turns off feed and polymer permissive signal).
    - 8) Step 7 - Production Step - Centrifuge Feed Permissive to DCS "On".
    - 9) Step 8 - Offdelay Step - Stop request received, feed off, full speed cleanout (timed step).
    - 10) Step 9 - Flush Step - Flush water valve open, and main drive ramping down (timed step).
    - 11) Step 10 - Coasting Step - Flush water valve closed, waiting for bowl to stop.
    - 12) Step 11 - CIP Step - Centrifuge in cleaning sequence.
  - e. DCS will monitor alarms issued by the centrifuge PLC. These alarms are classified as either: warning, alert or shutdown. Each of these alarms can be rest from the DCS centrifuge control strategy screen.
  - f. Once the centrifuge is up to full speed it can automatically advance to the “Production Mode” or can be configured to wait at the “Standby Mode” until Operator manually selects it to advance to the “Production Mode”
  - g. When the centrifuge is in “Production Mode” it will issue a “Feed Permissive” signal and the DCS will initiate control of the feed pumps.
  - h. Operator can switch the centrifuge back to the “Standby Mode”. It will keep the centrifuge running but the system will stop the feed pumps.
  - i. If any of the feed pumps fails during “Production Mode” the centrifuge will be returned to the “Standby Mode”
12. When the operator selects to place a centrifuge OUT OF SERVICE, strategy will inhibit control of the centrifuge and its associated auxiliary equipment. When selected to be placed back IN SERVICE, strategy will reestablish control of the centrifuge from the DCS.

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13. The Operator will be able to place in MANUAL mode and then STOP sludge feed pump and polymer feed pump. When these pumps stop the sludge feed pump inlet valve will close.
14. The flush valve will be controller by the Centrifuge PLC. DCS will interface the PLC logic and allow changing between AUTO/MANUAL modes and OPEN/CLOSE in when in MANUAL mode from the DCS graphics. These modes can be also changed in parallel from the local PLC HMI.
15. Failure Responses:
  - a. DCS Controller will monitor the datalink status between the ELC (Ethernet Link Controller) module and the PLC. The PLC will also monitor the datalink status. When the links fails the DCS will stop feed pumps and close respective feed vales while the PLC continue to run the centrifuge until it is requested to STOP by the Operator.

**END OF SECTION**

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<b>TABLE A-11 <sup>[ADD 1]</sup> DROP 16 – 76PCM06 DCS HARDWARE</b>					
<b>Item</b>	<b>Manufacturer</b>	<b>EMOD Model Number</b>	<b>PMOD Model Number</b>	<b>Qty</b>	<b>Notes</b>
Ovation Controller Module [Redundant]	Emerson	5X00481G01		0	
I/O Interface Module	Emerson	5X00226G03		0	
Analog Input [HART] Module	Emerson	5X00106G01	5X00109G02	0	8-Point
RTD Input Module	Emerson	5X00119G01	5X00121G01	0	8-Point
Analog Output Module	Emerson	5X00062G01	5X00063G01	0	8-Point
Digital Input Module	Emerson	1C31232G02	5X00034G01	0	16-Point
Digital Output Module	Emerson	5A26458G04	NONE	0	12-Point [Relay]
Serial Link Module [RS232]	Emerson	1C31166G02	1C31169G01	0	
Ethernet Link Controller Module	Emerson	5X00419G01	1X00569H01	2	
All required additional or ancillary components and cables shall be provided as required to provide a complete and functional DCS.					

**END OF SECTION**

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DCS BILL OF MATERIALS  
 AND QUANTITIES  
 40 90 06 - 11

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP7	60PCM05	5X00419G01		73VDL01 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			ET	1.1.1
			73MV1110	RAW SOLIDS FEED PUMP INLET VALVE 1				
			73MV1111	RAW SOLIDS FEED PUMP INLET VALVE 2				
			73MV1112	RAW SOLIDS FEED PUMP INLET VALVE 3				
			73MV1113	RAW SOLIDS FEED PUMP INLET VALVE 4				
			73MV1114	RAW SOLIDS FEED PUMP DISCHARGE VALVE				
			73MV1116	RECEIVING TANK 1 SAMPLE VALVE				
			73MV1117	RECEIVING TANK 2 SAMPLE VALVE				
			73MV1119	RECEIVING TANK 1 INLET VALVE 2				
			73MV1120	RECEIVING TANK 1 SOLIDS RECYCLE VALVE				
			73MV1121	RECEIVING TANK 1 INLET VALVE 1				
			73MV1125	J-TUBES INLET VALVE 1				
			73MV1131	RAW SOLIDS MIX PUMP DISCHARGE VALVE 1				
			73MV1132	RAW SOLIDS MIX PUMP DISCHARGE VALVE 2				
			73MV1134	RAW SOLIDS MIX PUMP DISCHARGE VALVE 4				
			73MV1135	RAW SOLIDS MIX PUMP DISCHARGE VALVE 3				
			73MV1144	RAW SOLIDS MIX PUMP 3 INLET VALVE				
			73MV1145	RAW SOLIDS MIX PUMP 3 DISCHARGE VALVE				
			73MV1150	RAW SOLIDS FEED PUMP 1 INLET VALVE				
			73MV1151	RAW SOLIDS FEED PUMP 1 DISCHARGE VALVE				
			73MV1152	RAW SOLIDS FEED PUMP 2 INLET VALVE				
			73MV1153	RAW SOLIDS FEED PUMP 2 DISCHARGE VALVE				
			73MV1194	RAW SOLIDS MIX PUMP 6 INLET VALVE				
			73MV1195	RAW SOLIDS MIX PUMP 6 DISCHARGE VALVE				
			73MV1305	BLENDING TANK 2 INLET VALVE				
			73MV1306	BLENDING TANK 2 DISCHARGE VALVE				
			73MV1312	BLENDING TANK 2 MIX VALVE 1				
			73MV1313	BLENDING TANK 2 MIX VALVE 2				
			73MV1330	BLENDING MIX PUMP 3 INLET VALVE				
			73MV1331	BLENDING MIX PUMP 3 DISCHARGE VALVE				
			73MV1340	BLENDING TANKS TRANSFER VALVE				
			73MV1341	BLENDING TANKS SCUM VALVE 1				
			73MV1342	BLENDING TANKS SCUM VALVE 2				
			73MV1343	BLENDING TANKS TRANSFER SAMPLE VALVE				
			73MV1350	DIGESTER FEED PUMP 1 INLET VALVE				
			73MV1351	DIGESTER FEED PUMP 1 HEADER 1 VALVE				
			73MV1352	DIGESTER FEED PUMP 1 HEADER 2 VALVE				
			73MV1355	DIGESTER FEED PUMP 2 INLET VALVE				
			73MV1356	DIGESTER FEED PUMP 2 HEADER 1 VALVE				
			73MV1357	DIGESTER FEED PUMP 2 HEADER 2 VALVE				
			DROP7	60PCM05	5X00419G01	<b>M73P0121</b>		
DROP7	60PCM05			Spare Module Address				1.1.3
DROP7	60PCM05			Spare Module Address				1.1.4

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP7	60PCM05	5X00106G01	M73ST0121	RAW SOLIDS FEED PUMP NO. 1	0	100 PCT	AI - HART	1.1.5.1	
DROP7	60PCM05	5X00106G01	M73FT2111	RAW SOLID FEED PUMPS DISCH FLW	0	3500 GPM	AI - HART	1.1.5.2	
DROP7	60PCM05	5X00106G01	M73ST0111	DIGESTER FEED PUMP NO. 1	0	100 PCT	AI - HART	1.1.5.3	
DROP7	60PCM05	5X00106G01	SPARE				AI - HART	1.1.5.4	
DROP7	60PCM05	5X00106G01	M73LT2120	RECEIVE TANK 1 LEVEL	0	45 FEET	AI - HART	1.1.5.5	
DROP7	60PCM05	5X00106G01	M73FT2121	RECEIVE TANK 1 INLET FLOW	0	3000 GPM	AI - HART	1.1.5.6	
DROP7	60PCM05	5X00106G01	SPARE				AI - HART	1.1.5.7	
DROP7	60PCM05	5X00106G01	SPARE				AI - HART	1.1.5.8	
DROP7	60PCM05	Spare Module Address							1.1.6
DROP7	60PCM05	5X00167G01	M73SC0111	DIGESTER FD PMP NO. 1 SPD DMND	0	100 PCT	AO	1.1.7.1	
DROP7	60PCM05	5X00167G01	M73SC0121	RAW SOLIDS FD PMP1 SPD DMND	0	100 PCT	AO	1.1.7.2	
DROP7	60PCM05	5X00167G01					AO	1.1.7.3	
DROP7	60PCM05	5X00167G01	M73FC2301	BLENDED TANK 1 LEVEL SETPOINT	0	13 FEET	AO	1.1.7.4	
DROP7	60PCM05	5X00167G01	M73FC9050	BLND TNKS XFR SMLPR FLOW PACE	0	100 PCT	AO	1.1.7.5	
DROP7	60PCM05	5X00167G01					AO	1.1.7.6	
DROP7	60PCM05	5X00167G01					AO	1.1.7.7	
DROP7	60PCM05	5X00167G01					AO	1.1.7.8	
DROP7	60PCM05	5X00119G01	MDPU07T1	DPU07 60PCM05 CABINET TEMP	32	154 DEG F	RTD	1.1.8.1	
DROP7	60PCM05	5X00119G01	SPARE				RTD	1.1.8.2	
DROP7	60PCM05	5X00119G01	SPARE				RTD	1.1.8.3	
DROP7	60PCM05	5X00119G01	SPARE				RTD	1.1.8.4	
DROP7	60PCM05	5X00119G01	SPARE				RTD	1.1.8.5	
DROP7	60PCM05	5X00119G01	SPARE				RTD	1.1.8.6	
DROP7	60PCM05	5X00119G01	SPARE				RTD	1.1.8.7	
DROP7	60PCM05	5X00119G01	SPARE				RTD	1.1.8.8	
DROP7	60PCM05	Spare Module Address							1.2.1
DROP7	60PCM05	5X00167G01	M73SC0112	DIGESTER FD PMP NO. 2 SPD DMND	0	100 PCT	AO	1.2.2.1	
DROP7	60PCM05	5X00167G01	M73SC0122	RAW SOLIDS FD PMP2 SPD DMND	0	100 PCT	AO	1.2.2.2	
DROP7	60PCM05	5X00167G01					AO	1.2.2.3	
DROP7	60PCM05	5X00167G01	M73FC9040	RAW SOLIDS SAMPLER FLOW PACE	0	100 PCT	AO	1.2.2.4	
DROP7	60PCM05	5X00167G01	M73TC2310	BLND MX TNK1 HEAT EXCH VLV POS	0	100 PCT	AO	1.2.2.5	
DROP7	60PCM05	5X00167G01					AO	1.2.2.6	
DROP7	60PCM05	5X00167G01					AO	1.2.2.7	
DROP7	60PCM05	5X00167G01					AO	1.2.2.8	
DROP7	60PCM05	Spare Module Address							1.2.3
DROP7	60PCM05	5X00106G01	M73ST0122	RAW SOLIDS FEED PUMP NO. 2	0	100 PCT	AI - HART	1.2.4.1	
DROP7	60PCM05	5X00106G01	SPARE				AI - HART	1.2.4.2	
DROP7	60PCM05	5X00106G01	M73ST0112	DIGESTER FEED PUMP NO. 2	0	100 PCT	AI - HART	1.2.4.3	
DROP7	60PCM05	5X00106G01	SPARE				AI - HART	1.2.4.4	
DROP7	60PCM05	5X00106G01	M73LT2125	RECEIVE TANK 1 LEVEL	0	45 FEET	AI - HART	1.2.4.5	
DROP7	60PCM05	5X00106G01	SPARE				AI - HART	1.2.4.6	
DROP7	60PCM05	5X00106G01	SPARE				AI - HART	1.2.4.7	
DROP7	60PCM05	5X00106G01	M73ZT1315	HEAT XCHNGR 1 HOT H2O SUPPLY	0	100 PCT	AI - HART	1.2.4.8	
DROP7	60PCM05	Spare Module Address							1.2.5

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DCS INPUTS OUTPUTS (IO)  
40 94 24 SUPPLEMENT 1 - 2

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METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP7	60PCM05			Spare Module Address				1.2.6
DROP7	60PCM05	5X00419G01	M73P0122	RAW SOLIDS FEED PUMP NO. 2			ET	1.2.7
DROP7	60PCM05	5X00419G01		73VDL01 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			ET	1.2.8
DROP7	60PCM05	1C31232G01	M73MI0121	RAW SOLIDS FEED PUMP NO. 1	OFF	RUNNNG	DI	1.3.1.1
DROP7	60PCM05	1C31232G01	M73QI0121	RAW SOLIDS FEED PUMP NO. 1	LOCAL	INCOMP	DI	1.3.1.2
DROP7	60PCM05	1C31232G01	M73RI0121	RAW SOLIDS FEED PUMP NO. 1	WAIT	READY	DI	1.3.1.3
DROP7	60PCM05	1C31232G01	M73UA0121	RAW SOLIDS FEED PUMP NO. 1	NORMAL	FAIL	DI	1.3.1.4
DROP7	60PCM05	1C31232G01	M73FAL0121	RAW SOLIDS FEED PUMP NO. 1	NORMAL	LOW	DI	1.3.1.5
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.1.6
DROP7	60PCM05	1C31232G01	M73MI0133A	RAW SOLIDS MIX PUMP NO. 3	NORMAL	RNFAST	DI	1.3.1.7
DROP7	60PCM05	1C31232G01	M73MI0133B	RAW SOLIDS MIX PUMP NO. 3	NORMAL	RNSLOW	DI	1.3.1.8
DROP7	60PCM05	1C31232G01	M73QI0133	RAW SOLIDS MIX PUMP NO. 3	LOCAL	INCOMP	DI	1.3.1.9
DROP7	60PCM05	1C31232G01	M73RI0133	RAW SOLIDS MIX PUMP NO. 3	WAIT	READY	DI	1.3.1.10
DROP7	60PCM05	1C31232G01	M73FAL2142	RAW SOLIDS MIX PMP 3 DISCH FLW	NORMAL	LOW	DI	1.3.1.11
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.1.12
DROP7	60PCM05	1C31232G01	M73RI1315	HEAT XCHNGR 1 HOT H2O SUPPLY	WAIT	READY	DI	1.3.1.13
DROP7	60PCM05	1C31232G01	M73JA2301	BLENDED TANK 1 LEVEL	NORMAL	F/OVER	DI	1.3.1.14
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.1.15
DROP7	60PCM05	1C31232G01	M7QC3S01	DPU07 QC DROP 3 SL01 DI PWR MON	ALARM	NORMAL	DI	1.3.1.16
DROP7	60PCM05	1C31232G01	M73MI0111	DIGESTER FEED PUMP NO. 1	OFF	RUNNNG	DI	1.3.2.1
DROP7	60PCM05	1C31232G01	M73QI0111	DIGESTER FEED PUMP NO. 1	LOCAL	INCOMP	DI	1.3.2.2
DROP7	60PCM05	1C31232G01	M73RI0111	DIGESTER FEED PUMP NO. 1	WAIT	READY	DI	1.3.2.3
DROP7	60PCM05	1C31232G01	M73UA0111	DIGESTER FEED PUMP NO. 1	NORMAL	FAIL	DI	1.3.2.4
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.2.5
DROP7	60PCM05	1C31232G01	M73ZD1126	J-TUBE DISCH VALVE 1	NORMAL	OPENED	DI	1.3.2.6
DROP7	60PCM05	1C31232G01	M73ZB1126	J-TUBE DISCH VALVE 1	NORMAL	CLOSED	DI	1.3.2.7
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.2.8
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.2.9
DROP7	60PCM05	1C31232G01	M73PAH2351	DIGESTER FD PMP 1 PRESS CUTOUT	NORMAL	HIGH	DI	1.3.2.10
DROP7	60PCM05	1C31232G01	M73PAL2351A	DIGESTER FD PMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.3.2.11
DROP7	60PCM05	1C31232G01	M73PAL2351B	DIGESTER FD PMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.3.2.12
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.2.13
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.2.14
DROP7	60PCM05	1C31232G01	SPARE				DI	1.3.2.15
DROP7	60PCM05	1C31232G01	M7QC3S02	DPU07 QC DROP 3 SL02 DI PWR MON	ALARM	NORMAL	DI	1.3.2.16

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 METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP7	60PCM05			Spare Module Address				1.3.3
DROP7	60PCM05			Spare Module Address				1.3.4
DROP7	60PCM05			Spare Module Address				1.3.5
DROP7	60PCM05			Spare Module Address				1.3.6
DROP7	60PCM05			Spare Module Address				1.3.7
DROP7	60PCM05			Spare Module Address				1.3.8
DROP7	60PCM05	1C31232G01	M73ZB1123	RECEIVE TANK 1 VAC RELIEF VLV	NORMAL	CLOSED	DI	1.4.1.1
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.1.2
DROP7	60PCM05	1C31232G01	M73ZB1133	RAW SOLID MIX PMPS1-3 ISO VLV2	NORMAL	CLOSED	DI	1.4.1.3
DROP7	60PCM05	1C31232G01	M73ZD1130	RAW SOLID MIX PMPS1-3 ISO VLV1	NORMAL	OPENED	DI	1.4.1.4
DROP7	60PCM05	1C31232G01	M73ZB1127	J-TUBE DISCH VALVE 2	NORMAL	CLOSED	DI	1.4.1.5
DROP7	60PCM05	1C31232G01	M73ZD1127	J-TUBE DISCH VALVE 2	NORMAL	OPENED	DI	1.4.1.6
DROP7	60PCM05	1C31232G01	M73MI0112	DIGESTER FEED PUMP NO. 2	OFF	RUNNING	DI	1.4.1.7
DROP7	60PCM05	1C31232G01	M73QI0112	DIGESTER FEED PUMP NO. 2	LOCAL	INCOMP	DI	1.4.1.8
DROP7	60PCM05	1C31232G01	M73RI0112	DIGESTER FEED PUMP NO. 2	WAIT	READY	DI	1.4.1.9
DROP7	60PCM05	1C31232G01	M73UA0112	DIGESTER FEED PUMP NO. 2	NORMAL	FAIL	DI	1.4.1.10
DROP7	60PCM05	1C31232G01	M73PAH2356	DIGESTER FD PMP 2 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.1.11
DROP7	60PCM05	1C31232G01	M73PAL2356A	DIGESTER FD PMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.12
DROP7	60PCM05	1C31232G01	M73PAL2356B	DIGESTER FD PMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.13
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.1.14
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.1.15
DROP7	60PCM05	1C31232G01	<b>M7QC4S01</b>	<b>DPU07 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16
DROP7	60PCM05	1C31232G01	M73MI0122	RAW SOLIDS FEED PUMP NO. 2	OFF	RUNNING	DI	1.4.2.1
DROP7	60PCM05	1C31232G01	M73QI0122	RAW SOLIDS FEED PUMP NO. 2	LOCAL	INCOMP	DI	1.4.2.2
DROP7	60PCM05	1C31232G01	M73RI0122	RAW SOLIDS FEED PUMP NO. 2	WAIT	READY	DI	1.4.2.3
DROP7	60PCM05	1C31232G01	M73UA0122	RAW SOLIDS FEED PUMP NO. 2	NORMAL	FAIL	DI	1.4.2.4
DROP7	60PCM05	1C31232G01	M73FAL0122	RAW SOLIDS FEED PUMP NO. 2	NORMAL	LOW	DI	1.4.2.5
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.2.6
DROP7	60PCM05	1C31232G01	M73QI2301A	BLENDING TANK 1 LEVEL	LOCAL	INCOMP	DI	1.4.2.7
DROP7	60PCM05	1C31232G01	M73QI2301B	BLENDING TANK 1 LEVEL	LOCAL	INCOMP	DI	1.4.2.8
DROP7	60PCM05	1C31232G01	M73QI2310	BLEND MIX TANK 1 INLET TEMP	LOCAL	INCOMP	DI	1.4.2.9
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.2.10
DROP7	60PCM05	1C31232G01	M73QI1315	HEAT XCHNGR 1 HOT H2O SUPPLY	LOCAL	INCOMP	DI	1.4.2.11
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.2.12
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.2.13
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.2.14
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.2.15
DROP7	60PCM05	1C31232G01	<b>M7QC4S02</b>	<b>DPU07 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP7	60PCM05	1C31232G01	M73ZB1122	RECEIVE TANK 1 VAC RELIEF VLV	NORMAL	CLOSED	DI	1.4.3.1
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.3.2
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.3.3
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.3.4
DROP7	60PCM05	1C31232G01	M73ZB1124	RECEIVE TANK 1 OUTLET ISO VLV	NORMAL	CLOSED	DI	1.4.3.5
DROP7	60PCM05	1C31232G01	M73ZD1124	RECEIVE TANK 1 OUTLET ISO VLV	NORMAL	OPENED	DI	1.4.3.6
DROP7	60PCM05	1C31232G01	M73ZB1130	RAW SOLID MIX PMPS1-3 ISO VLV1	NORMAL	CLOSED	DI	1.4.3.7
DROP7	60PCM05	1C31232G01	M73ZD1133	RAW SOLID MIX PMPS1-3 ISO VLV2	NORMAL	OPENED	DI	1.4.3.8
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.3.9
DROP7	60PCM05	1C31232G01	M73MI0136A	RAW SOLIDS MIX PUMP NO. 6	NORMAL	RNFAST	DI	1.4.3.10
DROP7	60PCM05	1C31232G01	M73MI0136B	RAW SOLIDS MIX PUMP NO. 6	NORMAL	RNSLOW	DI	1.4.3.11
DROP7	60PCM05	1C31232G01	M73QI0136	RAW SOLIDS MIX PUMP NO. 6	LOCAL	INCOMP	DI	1.4.3.12
DROP7	60PCM05	1C31232G01	M73RI0136	RAW SOLIDS MIX PUMP NO. 6	WAIT	READY	DI	1.4.3.13
DROP7	60PCM05	1C31232G01	M73FAL2192	RAW SOLIDS MIX PMP 6 DISCH FLW	NORMAL	LOW	DI	1.4.3.14
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.3.15
DROP7	60PCM05	1C31232G01	<b>M7QC4S03</b>	<b>DPU07 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP7	60PCM05	1C31232G01	M73FAL2322	BLEND MIX PUMP 3 DISCH FLOW	NORMAL	LOW	DI	1.4.4.1
DROP7	60PCM05	1C31232G01	M73MI0103	BLEND MIX PUMP NO. 3	OFF	RUNNING	DI	1.4.4.2
DROP7	60PCM05	1C31232G01	M73QI0103	BLEND MIX PUMP NO. 3	LOCAL	INCOMP	DI	1.4.4.3
DROP7	60PCM05	1C31232G01	M73RI0103	BLEND MIX PUMP NO. 3	WAIT	READY	DI	1.4.4.4
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.5
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.6
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.7
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.8
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.9
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.10
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.11
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.12
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.13
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.14
DROP7	60PCM05	1C31232G01	SPARE				DI	1.4.4.15
DROP7	60PCM05	1C31232G01	<b>M7QC4S04</b>	<b>DPU07 QC DROP 4 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16
DROP7	60PCM05			Spare Module Address				1.4.5
DROP7	60PCM05			Spare Module Address				1.4.6
DROP7	60PCM05			Spare Module Address				1.4.7
DROP7	60PCM05			Spare Module Address				1.4.8



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP7	60PCM05	5A26458G04	M73HS0111	DIGESTER FEED PUMP NO. 1	OFF	RUN	DO	1.5.1.1
DROP7	60PCM05	5A26458G04	M73HS0121	RAW SOLIDS FEED PUMP NO. 1	OFF	RUN	DO	1.5.1.2
DROP7	60PCM05	5A26458G04	M73HS0133A	RAW SOLIDS MIX PUMP NO. 3	OFF	FAST	DO	1.5.1.3
DROP7	60PCM05	5A26458G04	M73HS0133B	RAW SOLIDS MIX PUMP NO. 3	OFF	SLOW	DO	1.5.1.4
DROP7	60PCM05	5A26458G04	M73HS2301A	BLENDING TANK 1 LEVEL 123	OFF	SELECT	DO	1.5.1.5
DROP7	60PCM05	5A26458G04	M73HS2301C	BLENDING TANK 1 LEVEL 312	OFF	SELECT	DO	1.5.1.6
DROP7	60PCM05	5A26458G04	SPARE				DO	1.5.1.7
DROP7	60PCM05	5A26458G04	SPARE				DO	1.5.1.8
DROP7	60PCM05	5A26458G04	SPARE				DO	1.5.1.9
DROP7	60PCM05	5A26458G04	SPARE				DO	1.5.1.10
DROP7	60PCM05	5A26458G04	M73QS2310	BLEND MIX TANK 1 INLET TEMP	OFF	CMPRDY	DO	1.5.1.11
DROP7	60PCM05	5A26458G04	SPARE				DO	1.5.1.12
DROP7	60PCM05	5A26458G04	M73HS0112	DIGESTER FEED PUMP NO. 2	OFF	RUN	DO	1.6.1.1
DROP7	60PCM05	5A26458G04	M73HS0122	RAW SOLIDS FEED PUMP NO. 2	OFF	RUN	DO	1.6.1.2
DROP7	60PCM05	5A26458G04	M73HS0136A	RAW SOLIDS MIX PUMP NO. 6	OFF	FAST	DO	1.6.1.3
DROP7	60PCM05	5A26458G04	M73HS0136B	RAW SOLIDS MIX PUMP NO. 6	OFF	SLOW	DO	1.6.1.4
DROP7	60PCM05	5A26458G04	M73HS2301B	BLENDING TANK 1 LEVEL 231	OFF	SELECT	DO	1.6.1.5
DROP7	60PCM05	5A26458G04	M73HS0103	BLEND MIX PUMP NO. 3	OFF	RUN	DO	1.6.1.6
DROP7	60PCM05	5A26458G04	SPARE				DO	1.6.1.7
DROP7	60PCM05	5A26458G04	SPARE				DO	1.6.1.8
DROP7	60PCM05	5A26458G04	SPARE				DO	1.6.1.9
DROP7	60PCM05	5A26458G04	SPARE				DO	1.6.1.10
DROP7	60PCM05	5A26458G04	M73QS2301	BLENDING TANK 1 LEVEL	OFF	CMPRDY	DO	1.6.1.11
DROP7	60PCM05	5A26458G04	SPARE				DO	1.6.1.12

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP8	60PCM06	5X00419G01		73VDL02 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1
			73MV1100	NORTH CITY LINE 1 PIG STN INLET VALVE				
			73MV1101	NORTH CITY LINE 1/2 CROSSOVER VALVE				
			73MV1103	PT LOMA/FUTURE WRP INLET VALVE				
			73MV1104	NORTH CITY LINE 2 INLET VALVE				
			73MV1105	NORTH CITY LINE 2 PIG STN INLET VALVE				
			73MV1140	RAW SOLIDS MIX PUMP 1 INLET VALVE				
			73MV1141	RAW SOLIDS MIX PUMP 1 DISCHARGE VALVE				
			73MV1142	RAW SOLIDS MIX PUMP 2 INLET VALVE				
			73MV1143	RAW SOLIDS MIX PUMP 2 DISCHARGE VALVE				
			73MV1154	RAW SOLIDS FEED PUMP 3 INLET VALVE				
			73MV1155	RAW SOLIDS FEED PUMP 3 DISCHARGE VALVE				
			73MV1170	RECEIVE TANK 2 SOLIDS RECYCLE VALVE				
			73MV1171	RECEIVE TANK 2 INLET VALVE				
			73MV1172	TANK TRANSFER VALVE 2				
			73MV1173	TANK TRANSFER VALVE 1				
			73MV1175	J-TUBES INLET VALVE 2				
			73MV1181	RAW SOLIDS MIX PUMPS 4-6 DISCHARGE VALVE				
			73MV1182	RAW SOLIDS MIX PUMPS 4-6 DISCHARGE VALVE				
			73MV1184	RAW SOLIDS MIX PUMPS 4-6 DISCHARGE VALVE				
			73MV1185	RAW SOLIDS MIX PUMPS 4-6 DISCHARGE VALVE				
			73MV1190	RAW SOLIDS MIX PUMP 4 INLET VALVE				
			73MV1191	RAW SOLIDS MIX PUMP 4 DISCHARGE VALVE				
			73MV1192	RAW SOLIDS MIX PUMP 5 INLET VALVE				
			73MV1193	RAW SOLIDS MIX PUMP 5 DISCHARGE VALVE				
			73MV1300	BLEEDING TANK 1 INLET VALVE				
			73MV1301	BLEEDING TANK 1 DISCHARGE VALVE				
			73MV1310	BLEND TANK 1 MIX VALVE 1				
			73MV1311	BLEND TANK 1 MIX VALVE 2				
			73MV1320	BLEND MIX PUMP 1 INLET VALVE				
			73MV1321	BLEND MIX PUMP 1 DISCHARGE VALVE				
			73MV1325	BLEND MIX PUMP 2 INLET VALVE				
			73MV1326	BLEND MIX PUMP 2 DISCHARGE VALVE				
			73MV1360	DIGESTER FEED PUMP 3 INLET VALVE				
73MV1361	DIGESTER FEED PUMP 3 HEADER 1 VALVE							
73MV1362	DIGESTER FEED PUMP 3 HEADER 2 VALVE							
DROP8	60PCM06	5X00419G01	<b>M80GFL03</b>	<b>BIOGAS FLARE 3</b>			ET	1.1.2
DROP8	60PCM06			Spare Module Address				1.1.3

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP8	60PCM06	5X00106G01	M73FT2171	RECEIVE TANK 2 INLET FLOW	0	3000 GPM	AI - HART	1.1.4.1	
DROP8	60PCM06	5X00106G01	M73LT2170	RECEIVE TANK 2 LEVEL	0	45 FEET	AI - HART	1.1.4.2	
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.1.4.3	
DROP8	60PCM06	5X00106G01	M73PT2101	NORTH CITY LINE 2 INLET PRESS	0	50 PSI	AI - HART	1.1.4.4	
DROP8	60PCM06	5X00106G01	M73PT2104	POINT LOMA LINE 1 INLET PRESS	0	570 PSI	AI - HART	1.1.4.5	
DROP8	60PCM06	5X00106G01	M80PT2660	BIOGAS COLLECTION HEADER PRESS	0	16 IN H2O	AI - HART	1.1.4.6	
DROP8	60PCM06	5X00106G01	M80TI9110	FLARE 1 FLAME TEMPERATURE	0	2472 DEG F	AI - HART	1.1.4.7	
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.1.4.8	
DROP8	60PCM06	5X00106G01	M73FT2108	POINT LOMA LINE 1 INLET FLOW	0	3000 GPM	AI - HART	1.1.5.1	
DROP8	60PCM06	5X00106G01	M80PT2680	GAS STORAGE TANK PRESSURE	0	16 IN H2O	AI - HART	1.1.5.2	
DROP8	60PCM06	5X00106G01	M73ST0123	RAW SOLIDS FEED PUMP NO. 3	0	100 PCT	AI - HART	1.1.5.3	
DROP8	60PCM06	5X00106G01	M73ST0113	DIGESTER FEED PUMP NO. 3	0	100 PCT	AI - HART	1.1.5.4	
DROP8	60PCM06	5X00106G01	M73PT2313	BLEND MIX TANK 2 INLET PRESS	0	30 PSI	AI - HART	1.1.5.5	
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.1.5.6	
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.1.5.7	
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.1.5.8	
DROP8	60PCM06	Spare Module Address							1.1.6
DROP8	60PCM06	5X00167G01	M73SC0113	DIGESTER FD PMP3 SPD DMND	0	100 PCT	AO	1.1.7.1	
DROP8	60PCM06	5X00167G01	M73SC0123	RAW SOLIDS FD PUMP3 SPD DMND	0	100 PCT	AO	1.1.7.2	
DROP8	60PCM06	5X00167G01	M73TC2312	BLND MX TNK2 HT EXCH VLV POS	0	100 PCT	AO	1.1.7.3	
DROP8	60PCM06	5X00167G01	SPARE	SPARE			AO	1.1.7.4	
DROP8	60PCM06	5X00167G01	SPARE	SPARE			AO	1.1.7.5	
DROP8	60PCM06	5X00167G01	SPARE	SPARE			AO	1.1.7.6	
DROP8	60PCM06	5X00167G01	M80FC1670	BIOGAS COMPRESSOR 1 INLET VLVE	0	100 PCT	AO	1.1.7.7	
DROP8	60PCM06	5X00167G01	M80FC1672	BIOGAS COMPRESSOR 2 INLET VLVE	0	100 PCT	AO	1.1.7.8	
DROP8	60PCM06	5X00119G01	MDPU08T1	DPU08 CABINET TEMP	32	154 DEG F	RTD	1.1.8.1	
DROP8	60PCM06	5X00119G01	SPARE				RTD	1.1.8.2	
DROP8	60PCM06	5X00119G01	SPARE				RTD	1.1.8.3	
DROP8	60PCM06	5X00119G01	SPARE				RTD	1.1.8.4	
DROP8	60PCM06	5X00119G01	SPARE				RTD	1.1.8.5	
DROP8	60PCM06	5X00119G01	SPARE				RTD	1.1.8.6	
DROP8	60PCM06	5X00119G01	SPARE				RTD	1.1.8.7	
DROP8	60PCM06	5X00119G01	SPARE				RTD	1.1.8.8	
DROP8	60PCM06	Spare Module Address							1.2.1
DROP8	60PCM06	Spare Module Address							1.2.2
DROP8	60PCM06	Spare Module Address							1.2.3

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP8	60PCM06	5X00106G01	M73FT2102	NORTH CITY LINE 2 INLET FLOW	0	2000 GPM	AI - HART	1.2.4.1
DROP8	60PCM06	5X00106G01	M73FT2105	POINT LOMA LINE 1 INLET FLOW	0	1600 GPM	AI - HART	1.2.4.2
DROP8	60PCM06	5X00106G01	M73PT2107	PLOMA LINE1 INLT PRSS/FUTR WRP	0	600 PSI	AI - HART	1.2.4.3
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.2.4.4
DROP8	60PCM06	5X00106G01	M80FT2662	BIOGAS COLLECTION HEADER FLOW	0	1000 SCFM	AI - HART	1.2.4.5
DROP8	60PCM06	5X00106G01	M80FT2692	BIOGAS FLOW TO FLARES	0	1000 SCFM	AI - HART	1.2.4.6
DROP8	60PCM06	5X00106G01	M80TI9111	FLARE 2 FLAME TEMPERATURE	0	2472 DEG F	AI - HART	1.2.4.7
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.2.4.8
DROP8	60PCM06	5X00106G01	M80LT2681	GAS STORAGE TANK LEVEL	0	23 FEET	AI - HART	1.2.5.1
DROP8	60PCM06	5X00106G01	M73LT2175	RECEIVE TANK 2 LEVEL	0	45 FEET	AI - HART	1.2.5.2
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.2.5.3
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.2.5.4
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.2.5.5
DROP8	60PCM06	5X00106G01	SPARE				AI - HART	1.2.5.6
DROP8	60PCM06	5X00106G01	M80ZT1670	BIOGAS COMPRESSOR 1 INLET VLVE	0	100 PCT	AI - HART	1.2.5.7
DROP8	60PCM06	5X00106G01	M80ZT1672	BIOGAS COMPRESSOR 2 INLET VLVE	0	100 PCT	AI - HART	1.2.5.8
DROP8	60PCM06			Spare Module Address				1.2.6
DROP8	60PCM06	5X00419G01	M73P0123	RAW SOLIDS FEED PUMP NO. 3			ET	1.2.7
DROP8	60PCM06	5X00419G01		73VDL02 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8
DROP8	60PCM06	1C31232G01	M73FAL0123	RAW SOLIDS FEED PUMP NO. 3	NORMAL	LOW	DI	1.3.1.1
DROP8	60PCM06	1C31232G01	M73MI0113	DIGESTER FEED PUMP NO. 3	OFF	RUNNNG	DI	1.3.1.2
DROP8	60PCM06	1C31232G01	M73MI0123	RAW SOLIDS FEED PUMP NO. 3	OFF	RUNNNG	DI	1.3.1.3
DROP8	60PCM06	1C31232G01	M73PAH2361	DGSTR FEED PMP3 PRESS CUTOUT	NORMAL	HIGH	DI	1.3.1.4
DROP8	60PCM06	1C31232G01	M73PAL2361A	DGSTR FEED PMP3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.1.5
DROP8	60PCM06	1C31232G01	M73PAL2361B	DGSTR FEED PMP3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.1.6
DROP8	60PCM06	1C31232G01	M73QI0113	DIGESTER FEED PUMP NO. 3	LOCAL	INCOMP	DI	1.3.1.7
DROP8	60PCM06	1C31232G01	M73QI0123	RAW SOLIDS FEED PUMP NO. 3	LOCAL	INCOMP	DI	1.3.1.8
DROP8	60PCM06	1C31232G01	M73RI0113	DIGESTER FEED PUMP NO. 3	WAIT	READY	DI	1.3.1.9
DROP8	60PCM06	1C31232G01	M73RI0123	RAW SOLIDS FEED PUMP NO. 3	WAIT	READY	DI	1.3.1.10
DROP8	60PCM06	1C31232G01	M73UA0113	DIGESTER FEED PUMP NO. 3	NORMAL	FAIL	DI	1.3.1.11
DROP8	60PCM06	1C31232G01	M73UA0123	RAW SOLIDS FEED PUMP NO. 3	NORMAL	FAIL	DI	1.3.1.12
DROP8	60PCM06	1C31232G01	M73ZB1176	J-TUBE DISCH VLV 3	NORMAL	CLOSED	DI	1.3.1.13
DROP8	60PCM06	1C31232G01	M73ZD1176	J-TUBE DISCH VLV 3	NORMAL	OPENED	DI	1.3.1.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.1.15
DROP8	60PCM06	1C31232G01	M8QC3S01	DP08 QC DROP 3 SL01 DI PWR MON	ALARM	NORMAL	DI	1.3.1.16
DROP8	60PCM06	1C31232G01	M73FAL2140	RAW SOLID MX PMP1 DISCH FLOW	NORMAL	LOW	DI	1.3.2.1
DROP8	60PCM06	1C31232G01	M73FAL2320	BLEND MIX PUMP 1 DISCH FLOW	NORMAL	LOW	DI	1.3.2.2
DROP8	60PCM06	1C31232G01	M73MI0101	BLEND MIX PUMP NO. 1	OFF	RUNNNG	DI	1.3.2.3
DROP8	60PCM06	1C31232G01	M73MI0131A	RAW SOLIDS MIX PUMP NO. 1	NORMAL	RNFAST	DI	1.3.2.4
DROP8	60PCM06	1C31232G01	M73MI0131B	RAW SOLIDS MIX PUMP NO. 1	NORMAL	RNSLOW	DI	1.3.2.5
DROP8	60PCM06	1C31232G01	M73MI1375	ODOR CNTRL FAN NO. 1	OFF	RUNNNG	DI	1.3.2.6
DROP8	60PCM06	1C31232G01	M73PDAH2375	ODR CNTRL FAN 1 NORML PRESS DRP	NORMAL	HIDIFF	DI	1.3.2.7
DROP8	60PCM06	1C31232G01	M73QI0101	BLEND MIX PUMP NO. 1	LOCAL	INCOMP	DI	1.3.2.8
DROP8	60PCM06	1C31232G01	M73QI0131	RAW SOLIDS MIX PUMP NO. 1	LOCAL	INCOMP	DI	1.3.2.9
DROP8	60PCM06	1C31232G01	M73QI1375	ODOR CNTRL FAN NO. 1	LOCAL	INCOMP	DI	1.3.2.10
DROP8	60PCM06	1C31232G01	M73RI0101	BLEND MIX PUMP NO. 1	WAIT	READY	DI	1.3.2.11
DROP8	60PCM06	1C31232G01	M73RI0131	RAW SOLIDS MIX PUMP NO. 1	WAIT	READY	DI	1.3.2.12

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP8	60PCM06	1C31232G01	M73RI1375	ODOR CNTRL FAN NO. 1	WAIT	READY	DI	1.3.2.13
DROP8	60PCM06	1C31232G01	M73ZD1180	RAW SOLID MX PMPS4-6 ISO VLV 1	NORMAL	OPENED	DI	1.3.2.14
DROP8	60PCM06	1C31232G01	M73ZD1183	RAW SOLID MX PMPS4-6 ISO VLV 2	NORMAL	OPENED	DI	1.3.2.15
DROP8	60PCM06	1C31232G01	<b>M8QC3S02</b>	<b>DPU08 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16
DROP8	60PCM06	1C31232G01	M73FAL2191	RAW SOLID MX PMP5 DISCH FLOW	NORMAL	LOW	DI	1.3.3.1
DROP8	60PCM06	1C31232G01	M73MI0135A	RAW SOLIDS MIX PUMP NO. 5	NORMAL	RNFAST	DI	1.3.3.2
DROP8	60PCM06	1C31232G01	M73MI0135B	RAW SOLIDS MIX PUMP NO. 5	NORMAL	RNSLOW	DI	1.3.3.3
DROP8	60PCM06	1C31232G01	M73QI0135	RAW SOLIDS MIX PUMP NO. 5	LOCAL	INCOMP	DI	1.3.3.4
DROP8	60PCM06	1C31232G01	M73RI0135	RAW SOLIDS MIX PUMP NO. 5	WAIT	READY	DI	1.3.3.5
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.3.6
DROP8	60PCM06	1C31232G01	M80LAHH2661	RECEIVE TNK 1 SEDIMENT TRP LVL	NORMAL	HI-HI	DI	1.3.3.7
DROP8	60PCM06	1C31232G01	M80LAHH2665	CONDENSATE SUMP LEVEL ALARMS	NORMAL	HI-HI	DI	1.3.3.8
DROP8	60PCM06	1C31232G01	M80LAHH2685	GAS FLARE INLT SEDIMNT TRP LVL	NORMAL	HI-HI	DI	1.3.3.9
DROP8	60PCM06	1C31232G01	M80LALL2661	RECEIVE TNK 1 SEDIMENT TRP LVL	NORMAL	LO-LO	DI	1.3.3.10
DROP8	60PCM06	1C31232G01	M80LALL2665	CONDENSATE SUMP LEVEL ALARMS	NORMAL	LO-LO	DI	1.3.3.11
DROP8	60PCM06	1C31232G01	M80LALL2685	GAS FLARE INLT SEDIMNT TRP LVL	NORMAL	LO-LO	DI	1.3.3.12
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.3.13
DROP8	60PCM06	1C31232G01	M80ZB1680	GAS ST TNK PRESS RELIEF VLV 2	NORMAL	CLOSED	DI	1.3.3.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.3.15
DROP8	60PCM06	1C31232G01	<b>M8QC3S03</b>	<b>DPU08 QC DROP 3 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.3.16
DROP8	60PCM06	1C31232G01	M80ZB1697	GAS FLARE NO. 2 INLET VLV	NORMAL	CLOSED	DI	1.3.4.1
DROP8	60PCM06	1C31232G01	M80ZD1697	GAS FLARE NO. 2 INLET VLV	NORMAL	OPENED	DI	1.3.4.2
DROP8	60PCM06	1C31232G01	M80QI1697	GAS FLARE NO. 2 INLET VLV	LOCAL	INCOMP	DI	1.3.4.3
DROP8	60PCM06	1C31232G01	M80RI1697	GAS FLARE NO. 2 INLET VLV	WAIT	READY	DI	1.3.4.4
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.4.5
DROP8	60PCM06	1C31232G01	M80BI9107	GAS FLARE NO. 2 FLAME ANALYZER	NORMAL	FLAME	DI	1.3.4.6
DROP8	60PCM06	1C31232G01	M80PDAH9106	GAS FLARE NO. 2 B/GAS FLM TRP D/P	NORMAL	HIDIFF	DI	1.3.4.7
DROP8	60PCM06	1C31232G01	M80UA9105	GAS FLARE NO. 2 IGNITION SYSTEM	FAIL	NORMAL	DI	1.3.4.8
DROP8	60PCM06	1C31232G01	M80QI9109	GAS FLARE NO. 2 BIOGAS SWITCH	LOCAL	INCOMP	DI	1.3.4.9
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.4.10
DROP8	60PCM06	1C31232G01	M80ZB1682	GAS HOLDING TANK INLET VLV	NORMAL	CLOSED	DI	1.3.4.11
DROP8	60PCM06	1C31232G01	M80ZD1682	GAS HOLDING TANK INLET VLV	NORMAL	OPENED	DI	1.3.4.12
DROP8	60PCM06	1C31232G01	M80QI1682	GAS HOLDING TANK INLET VLV	LOCAL	INCOMP	DI	1.3.4.13
DROP8	60PCM06	1C31232G01	M80RI1682	GAS HOLDING TANK INLET VLV	WAIT	READY	DI	1.3.4.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.4.15
DROP8	60PCM06	1C31232G01	<b>M8QC3S04</b>	<b>DPU08 QC DROP 3 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.4.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP8	60PCM06	1C31232G01	M80ZB1681	GAS ST TNK PRESS RELIEF VLV 1	NORMAL	CLOSED	DI	1.3.5.1
DROP8	60PCM06	1C31232G01	M80ZD1681	GAS ST TNK PRESS RELIEF VLV 1	NORMAL	OPENED	DI	1.3.5.2
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.3
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.4
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.5
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.6
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.7
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.8
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.9
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.10
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.11
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.12
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.13
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.3.5.15
DROP8	60PCM06	1C31232G01	<b>M8QC3S05</b>	<b>DPU08 QC DROP 3 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.5.16
DROP8	60PCM06			Spare Module Address				1.3.6
DROP8	60PCM06			Spare Module Address				1.3.7
DROP8	60PCM06			Spare Module Address				1.3.8
DROP8	60PCM06	1C31232G01	M80ZB1692	GAS FLARE NO. 1 INLET VLV	NORMAL	CLOSED	DI	1.4.1.1
DROP8	60PCM06	1C31232G01	M80ZD1692	GAS FLARE NO. 1 INLET VLV	NORMAL	OPENED	DI	1.4.1.2
DROP8	60PCM06	1C31232G01	M80QI1692	GAS FLARE NO. 1 INLET VLV	LOCAL	INCOMP	DI	1.4.1.3
DROP8	60PCM06	1C31232G01	M80RI1692	GAS FLARE NO. 1 INLET VLV	WAIT	READY	DI	1.4.1.4
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.1.5
DROP8	60PCM06	1C31232G01	M80BI9102	GAS FLARE NO. 1 FLAME ANALYZER	NORMAL	FLAME	DI	1.4.1.6
DROP8	60PCM06	1C31232G01	M80PDAH9101	GAS FLARE NO. 1 B/GAS FLM TRP D/P	NORMAL	HIDIFF	DI	1.4.1.7
DROP8	60PCM06	1C31232G01	M80UA9100	GAS FLARE NO. 1 IGNITION SYSTEM	FAIL	NORMAL	DI	1.4.1.8
DROP8	60PCM06	1C31232G01	M80QI9104	GAS FLARE NO. 1 BIOGAS SWITCH	LOCAL	INCOMP	DI	1.4.1.9
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.1.10
DROP8	60PCM06	1C31232G01	M73ZB1115	POINT LOMA LINE 1 INLET VLV	NORMAL	CLOSED	DI	1.4.1.11
DROP8	60PCM06	1C31232G01	M73ZD1115	POINT LOMA LINE 1 INLET VLV	NORMAL	OPENED	DI	1.4.1.12
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.1.13
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.1.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.1.15
DROP8	60PCM06	1C31232G01	<b>M8QC4S01</b>	<b>DPU08 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16
DROP8	60PCM06	1C31232G01	<b>M80ZB1693</b>	<b>GAS FLARE NO. 3 INLET VLV</b>	<b>NORMAL</b>	<b>CLOSED</b>	DI	1.4.2.1
DROP8	60PCM06	1C31232G01	<b>M80ZD1693</b>	<b>GAS FLARE NO. 3 INLET VLV</b>	<b>NORMAL</b>	<b>OPENED</b>	DI	1.4.2.2
DROP8	60PCM06	1C31232G01	<b>M80QI1693</b>	<b>GAS FLARE NO. 3 INLET VLV</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.4.2.3
DROP8	60PCM06	1C31232G01	<b>M80RI1693</b>	<b>GAS FLARE NO. 3 INLET VLV</b>	<b>WAIT</b>	<b>READY</b>	DI	1.4.2.4
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.5
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.6

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DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.7
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.8
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.9
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.10
DROP8	60PCM06	1C31232G01	M73ZB1107	PT LOMA PIG CTCHR RUPT DISC 1	NORMAL	CLOSED	DI	1.4.2.11
DROP8	60PCM06	1C31232G01	M73ZD1107	PT LOMA PIG CTCHR RUPT DISC 1	NORMAL	OPENED	DI	1.4.2.12
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.13
DROP8	60PCM06	1C31232G01	M80ZD1680	GAS ST TNK PRESS RELIEF VLV 2	NORMAL	OPENED	DI	1.4.2.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.2.15
DROP8	60PCM06	1C31232G01	<b>M8QC4S02</b>	<b>DPU08 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16
DROP8	60PCM06	1C31232G01	M73FAL2141	RAW SOLID MX PMP2 DISCH FLOW	NORMAL	LOW	DI	1.4.3.1
DROP8	60PCM06	1C31232G01	M73FAL2321	BLEND MIX PUMP 2 DISCH FLOW	NORMAL	LOW	DI	1.4.3.2
DROP8	60PCM06	1C31232G01	M73MI0102	BLEND MIX PUMP NO. 2	OFF	RUNNING	DI	1.4.3.3
DROP8	60PCM06	1C31232G01	M73MI0132A	RAW SOLIDS MIX PUMP NO. 2	NORMAL	RNFAST	DI	1.4.3.4
DROP8	60PCM06	1C31232G01	M73MI0132B	RAW SOLIDS MIX PUMP NO. 2	NORMAL	RNSLOW	DI	1.4.3.5
DROP8	60PCM06	1C31232G01	M73QI0102	BLEND MIX PUMP NO. 2	LOCAL	INCOMP	DI	1.4.3.6
DROP8	60PCM06	1C31232G01	M73QI0132	RAW SOLIDS MIX PUMP NO. 2	LOCAL	INCOMP	DI	1.4.3.7
DROP8	60PCM06	1C31232G01	M73QI1314	HEAT XCHNGR 2 HOT WATER SUPPLY	LOCAL	INCOMP	DI	1.4.3.8
DROP8	60PCM06	1C31232G01	M73QI2312	BLEND MIX TANK 2 INLET TEMP	LOCAL	INCOMP	DI	1.4.3.9
DROP8	60PCM06	1C31232G01	M73RI0102	BLEND MIX PUMP NO. 2	WAIT	READY	DI	1.4.3.10
DROP8	60PCM06	1C31232G01	M73RI0132	RAW SOLIDS MIX PUMP NO. 2	WAIT	READY	DI	1.4.3.11
DROP8	60PCM06	1C31232G01	M73RI1314	HEAT XCHNGR 2 HOT WATER SUPPLY	WAIT	READY	DI	1.4.3.12
DROP8	60PCM06	1C31232G01	M73LAH2828	AREA7376 FeCl2 LEAK DETECT ALM	LEAK	NORMAL	DI	1.4.3.13
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.3.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.3.15
DROP8	60PCM06	1C31232G01	<b>M8QC4S03</b>	<b>DPU08 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP8	60PCM06	1C31232G01	M73FAL2190	RAW SOLID MIX PMP4 DISCH FLOW	NORMAL	LOW	DI	1.4.4.1
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.4.2
DROP8	60PCM06	1C31232G01	M73MI0134A	RAW SOLIDS MIX PUMP NO. 4	NORMAL	RNFAST	DI	1.4.4.3
DROP8	60PCM06	1C31232G01	M73MI0134B	RAW SOLIDS MIX PUMP NO. 4	NORMAL	RNSLOW	DI	1.4.4.4
DROP8	60PCM06	1C31232G01	M73QI0134	RAW SOLIDS MIX PUMP NO. 4	LOCAL	INCOMP	DI	1.4.4.5
DROP8	60PCM06	1C31232G01	M73RI0134	RAW SOLIDS MIX PUMP NO. 4	WAIT	READY	DI	1.4.4.6
DROP8	60PCM06	1C31232G01	M73ZB1177	J-TUBE DISCH VLV 4	NORMAL	CLOSED	DI	1.4.4.7
DROP8	60PCM06	1C31232G01	M73ZB1180	RAW SOLID MIX PMPS4-6 ISO VLV 1	NORMAL	CLOSED	DI	1.4.4.8
DROP8	60PCM06	1C31232G01	M73ZB1183	RAW SOLID MIX PMPS4-6 ISO VLV 2	NORMAL	CLOSED	DI	1.4.4.9
DROP8	60PCM06	1C31232G01	M73ZD1177	J-TUBE DISCH VLV 4	NORMAL	OPENED	DI	1.4.4.10
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.4.11
DROP8	60PCM06	1C31232G01	M73ZB1174	RECEIVE TANK 2 OUTLET ISO VLV	NORMAL	CLOSED	DI	1.4.4.12
DROP8	60PCM06	1C31232G01	M73ZD1174	RECEIVE TANK 2 OUTLET ISO VLV	NORMAL	OPENED	DI	1.4.4.13
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.4.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.4.15
DROP8	60PCM06	1C31232G01	<b>M8QC4S04</b>	<b>DPU08 QC DROP 4 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16

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DROP8	60PCM06	1C31232G01	M73XS9000	NORTH CITY PIG CTCHR PRESS	NORMAL	PIG	DI	1.4.5.1
DROP8	60PCM06	1C31232G01	M73ZB1102	NORTH CITY PIG CTCHR DRAIN VLV	NORMAL	CLOSED	DI	1.4.5.2
DROP8	60PCM06	1C31232G01	M73ZD1102	N CITY PIG CTCHR DRAIN VLV	NORMAL	OPENED	DI	1.4.5.3
DROP8	60PCM06	1C31232G01	M73ZB1106	N CITY PIG STATION INLET VLV	NORMAL	CLOSED	DI	1.4.5.4
DROP8	60PCM06	1C31232G01	M73ZD1106	N CITY PIG STATION INLET VLV	NORMAL	OPENED	DI	1.4.5.5
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.6
DROP8	60PCM06	1C31232G01	M73ZB1108	PT LOMA PIG CTCHR RUPT DISC 2	NORMAL	CLOSED	DI	1.4.5.7
DROP8	60PCM06	1C31232G01	M73ZD1108	PT LOMA PIG CTCHR RUPT DISC 2	NORMAL	OPENED	DI	1.4.5.8
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.9
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.10
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.11
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.12
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.13
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.14
DROP8	60PCM06	1C31232G01	SPARE				DI	1.4.5.15
DROP8	60PCM06	1C31232G01	M8QC4S05	DPU08 QC DROP 4 SL05 DI PWR MON	ALARM	NORMAL	DI	1.4.5.16
DROP8	60PCM06			Spare Module Address				1.4.6
DROP8	60PCM06			Spare Module Address				1.4.7
DROP8	60PCM06			Spare Module Address				1.4.8
DROP8	60PCM06	5A26458G04	M73HS0102	BLEND MIX PUMP NO. 2	OFF	RUN	DO	1.5.1.1
DROP8	60PCM06	5A26458G04	M73HS0123	RAW SOLIDS FEED PUMP NO. 3	OFF	RUN	DO	1.5.1.2
DROP8	60PCM06	5A26458G04	M73HS0132A	RAW SOLIDS MIX PUMP NO. 2	OFF	FAST	DO	1.5.1.3
DROP8	60PCM06	5A26458G04	M73HS0132B	RAW SOLIDS MIX PUMP NO. 2	OFF	SLOW	DO	1.5.1.4
DROP8	60PCM06	5A26458G04	M73HS0134A	RAW SOLIDS MIX PUMP NO. 4	OFF	FAST	DO	1.5.1.5
DROP8	60PCM06	5A26458G04	M73HS0134B	RAW SOLIDS MIX PUMP NO. 4	OFF	SLOW	DO	1.5.1.6
DROP8	60PCM06	5A26458G04	SPARE				DO	1.5.1.7
DROP8	60PCM06	5A26458G04	SPARE				DO	1.5.1.8
DROP8	60PCM06	5A26458G04	M80HS1697A	GAS FLARE NO. 2 INLET VLV	OFF	OPEN	DO	1.5.1.9
DROP8	60PCM06	5A26458G04	M80HS1697B	GAS FLARE NO. 2 INLET VLV	OFF	CLOSE	DO	1.5.1.10
DROP8	60PCM06	5A26458G04	M80HS9109A	BIOGAS FLARE NO. 2 START	STOP	START	DO	1.5.1.11
DROP8	60PCM06	5A26458G04	M80HS9109B	BIOGAS FLARE NO. 2 RESET	NORMAL	RESET	DO	1.5.1.12

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP8	60PCM06	5A26458G04	M73HS0101	BLEND MIX PUMP NO. 1	OFF	RUN	DO	1.6.1.1
DROP8	60PCM06	5A26458G04	M73HS0113	DIGESTER FEED PUMP NO. 3	OFF	RUN	DO	1.6.1.2
DROP8	60PCM06	5A26458G04	M73HS0131A	RAW SOLIDS MIX PUMP NO. 1	OFF	FAST	DO	1.6.1.3
DROP8	60PCM06	5A26458G04	M73HS0131B	RAW SOLIDS MIX PUMP NO. 1	OFF	SLOW	DO	1.6.1.4
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.1.5
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.1.6
DROP8	60PCM06	5A26458G04	M80HS1682A	GAS HOLDING TANK INLET VLV	OFF	OPEN	DO	1.6.1.7
DROP8	60PCM06	5A26458G04	M80HS1682B	GAS HOLDING TANK INLET VLV	OFF	CLOSE	DO	1.6.1.8
DROP8	60PCM06	5A26458G04	M80HS1692A	GAS FLARE NO. 1 INLET VLV	OFF	OPEN	DO	1.6.1.9
DROP8	60PCM06	5A26458G04	M80HS1692B	GAS FLARE NO. 1 INLET VLV	OFF	CLOSE	DO	1.6.1.10
DROP8	60PCM06	5A26458G04	M80HS9104A	BIOGAS FLARE NO. 1 START	STOP	START	DO	1.6.1.11
DROP8	60PCM06	5A26458G04	M80HS9104B	BIOGAS FLARE NO. 1 RESET	NORMAL	RESET	DO	1.6.1.12
DROP8	60PCM06	5A26458G04	M73HS1375	ODOR CNTRL FAN NO. 1	OFF	RUN	DO	1.6.2.1
DROP8	60PCM06	5A26458G04	M73QS2312	BLEND MIX TANK 2 INLET TEMP	OFF	CMPRDY	DO	1.6.2.2
DROP8	60PCM06	5A26458G04	M73HS0135A	RAW SOLIDS MIX PUMP NO. 5	OFF	FAST	DO	1.6.2.3
DROP8	60PCM06	5A26458G04	M73HS0135B	RAW SOLIDS MIX PUMP NO. 5	OFF	SLOW	DO	1.6.2.4
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.2.5
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.2.6
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.2.7
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.2.8
DROP8	60PCM06	5A26458G04	<b>M80HS1693A</b>	<b>GAS FLARE NO. 3 INLET VLV</b>	<b>OFF</b>	<b>OPEN</b>	DO	1.6.2.9
DROP8	60PCM06	5A26458G04	<b>M80HS1693B</b>	<b>GAS FLARE NO. 3 INLET VLV</b>	<b>OFF</b>	<b>CLOSE</b>	DO	1.6.2.10
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.2.11
DROP8	60PCM06	5A26458G04	SPARE				DO	1.6.2.12

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP10	76PCM01	5X00419G01		76VDL01 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1	
			76MV1151	THICKENING CENTRIFUGE FEED PUMP 1 VALVE					
			76MV1152	THICKENING CENTRIFUGE FEED PUMP 1 DISCHARGE VALVE					
			76MV1153	THICKENING CENTRIFUGE FEED PUMP 1 BYPASS VALVE					
			76MV1155	THICKENING CENTRIFUGE FEED PUMP 2 INLET VALVE					
			76MV1156	THICKENING CENTRIFUGE FEED PUMP 2 DISCHARGE VALVE					
			76MV1157	THICKENING CENTRIFUGE FEED PUMP 2 BYPASS VALVE					
			76MV1274	NORTH CITY SCUM PUMP HOT WATER VALVE					
			76MV1275	NORTH CITY SCUM PUMP INLET VALVE					
			76MV1276	NORTH CITY SCUM PUMP DISCHARGE VALVE					
			76MV1277	NORTH CITY SCUM PUMP SCREEN VALVE					
			76MV1285	THICKENED SOLIDS TRANSFER PUMP 1 INLET VALVE					
			76MV1286	THICKENED SOLIDS TRANSFER PUMP 1 DISCHARGE VALVE					
			76MV1710	POLYMER DAY TANK 1 INLET VALVE					
			76MV1711	POLYMER DAY TANK 1 DISCHARGE VALVE 1					
			76MV1712	POLYMER DAY TANK 1 DISCHARGE VALVE 2					
			76MV1735	THICKENING CENTRIFUGE POLYMER FEED PUMP 1 INLET VALVE					
			76MV1736	THICKENING CENTRIFUGE POLYMER FEED PUMP 1 DISCHARGE VALVE					
			76MV1737	THICKENING POLYMER FEED PUMP 1 BYPASS VALVE					
			76MV1740	THICKENING CENTRIFUGE POLYMER FEED PUMP 2 INLET VALVE					
			76MV1741	THICKENING CENTRIFUGE POLYMER FEED PUMP 2 DISCHARGE VALVE					
			76MV1742	THICKENING CENTRIFUGE POLYMER FEED PUMP 2 BYPASS VALVE					
			DROP10	76PCM01	5X00419G01	M76TC01			TC NO. 1
M76P0111	TC FEED PUMP NO. 1								
M76TC02	TC NO. 2								
M76P0112	TC FEED PUMP NO. 2								
DROP10	76PCM01	5X00106G01	M76FT2152	TC FEED PUMP NO.1 SLUDGE FLOW	0	1500 GPM	AI - HART	1.1.3.1	
DROP10	76PCM01	5X00106G01	M76FT2736	TC POLY FEED PUMP NO.1 POLYMER FLW	0	30 GPM	AI - HART	1.1.3.2	
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.1.3.3	
DROP10	76PCM01	5X00106G01	M76PT2153	TC FEED PUMP NO.1 DISCH PRESS	0	45 PSI	AI - HART	1.1.3.4	
DROP10	76PCM01	5X00106G01	M76PT2289	THICK XFER PUMP NO.1 DISCH PRESS	0	130 PSI	AI - HART	1.1.3.5	
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.1.3.6	
DROP10	76PCM01	5X00106G01	M76PT2735	TC POLY FEED PMP NO.1 DISCH PRESS	0	45 PSI	AI - HART	1.1.3.7	
DROP10	76PCM01	5X00106G01	M76LT2710	POLY DAY TANK NO.1 LEVEL	0	10 FEET	AI - HART	1.1.3.8	
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.1.4.1	
DROP10	76PCM01	5X00106G01	M76FT2738	TC POLY FEED PUMP NO.1 ROTAMETER	0	20 GPM	AI - HART	1.1.4.2	
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.1.4.3	
DROP10	76PCM01	5X00106G01	M76ST0521	TC POLY FEED PUMP NO.1 SPEED	0	100 PCT	AI - HART	1.1.4.4	
DROP10	76PCM01	5X00106G01	M76FT2288	THICK XFER PUMP NO.1 DISCH FLOW	0	300 GPM	AI - HART	1.1.4.5	
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.1.4.6	
DROP10	76PCM01	5X00106G01	M76ST0701	OC EXHST FAN1 SPEED	0	100 PCT	AI - HART	1.1.4.7	
DROP10	76PCM01	5X00106G01	M76PT2701	PIPE LUBE RING 10 PRESSURE	0	1500 PSI	AI - HART	1.1.4.8	
DROP10	76PCM01		Spare Module Address						1.1.5

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP10	76PCM01	Spare Module Address							1.1.6
DROP10	76PCM01	5X00167G01	M73FC2111	RAW SOLIDS FD PMPS SPD STPNT	0	100 PCT	AO	1.1.7.1	
DROP10	76PCM01	5X00167G01	<b>M76SC0521</b>	<b>TC POLY FEED PUMP NO.1 SPD CMD</b>	<b>0</b>	<b>100 PCT</b>	AO	1.1.7.2	
DROP10	76PCM01	5X00167G01	SPARE				AO	1.1.7.3	
DROP10	76PCM01	5X00167G01	M76SC0701	OC EXHST FAN1 OUT DMD	0	100 PCT	AO	1.1.7.4	
DROP10	76PCM01	5X00167G01	SPARE				AO	1.1.7.5	
DROP10	76PCM01	5X00167G01	SPARE				AO	1.1.7.6	
DROP10	76PCM01	5X00167G01	SPARE				AO	1.1.7.7	
DROP10	76PCM01	5X00167G01	SPARE				AO	1.1.7.8	
DROP10	76PCM01	5X00119G01	MDPU10T1	DPU10 76PCM01 CABINET TEMP	32	154 DEG F	RTD	1.1.8.1	
DROP10	76PCM01	5X00119G01	SPARE				RTD	1.1.8.2	
DROP10	76PCM01	5X00119G01	SPARE				RTD	1.1.8.3	
DROP10	76PCM01	5X00119G01	SPARE				RTD	1.1.8.4	
DROP10	76PCM01	5X00119G01	SPARE				RTD	1.1.8.5	
DROP10	76PCM01	5X00119G01	SPARE				RTD	1.1.8.6	
DROP10	76PCM01	5X00119G01	SPARE				RTD	1.1.8.7	
DROP10	76PCM01	5X00119G01	SPARE				RTD	1.1.8.8	
DROP10	76PCM01	1C31232G01	M76MI0810	PIPELINE LUBE PUMP NO. 10	OFF	RUNNNG	DI	1.2.1.1	
DROP10	76PCM01	1C31232G01	M76UA0810	PIPELINE LUBE PUMP NO. 10	NORMAL	FAIL	DI	1.2.1.2	
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.3	
DROP10	76PCM01	1C31232G01	M73JA2111	RAW SOLID FD PMPS DISCH FLW	NORMAL	F OVER	DI	1.2.1.4	
DROP10	76PCM01	1C31232G01	M73QI2111A	RAW SOLIDS FD PUMPS DISCH FLOW	LOCAL	INCOMP	DI	1.2.1.5	
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.6	
DROP10	76PCM01	1C31232G01	M76PAH2151	TC FEED PUMP 1 PRESS CUTOUT	NORMAL	HIGH	DI	1.2.1.7	
DROP10	76PCM01	1C31232G01	M76PAL2151A	TC FEED PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.2.1.8	
DROP10	76PCM01	1C31232G01	M76PAL2151B	TC FEED PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.2.1.9	
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.10	
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.11	
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.12	
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.13	
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.14	
DROP10	76PCM01	1C31232G01	SPARE				DI	1.2.1.15	
DROP10	76PCM01	1C31232G01	<b>M10QC2S01</b>	<b>DPU10 QC DROP 2 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.2.1.16	
DROP10	76PCM01	5X00167G01	M76FC2635	CENTRATE SAMPLER FLW PACE/DMND	0	100 PCT	AO	1.2.2.1	
DROP10	76PCM01	5X00167G01	<b>M76SC0522</b>	<b>TC POLY FEED PUMP NO.2 SPD CMD</b>	<b>0</b>	<b>100 PCT</b>	AO	1.2.2.2	
DROP10	76PCM01	5X00167G01	SPARE				AO	1.2.2.3	
DROP10	76PCM01	5X00167G01	M76SC0703	OC EXHST FAN3 OUT DMD	0	100 PCT	AO	1.2.2.4	
DROP10	76PCM01	5X00167G01	SPARE				AO	1.2.2.5	
DROP10	76PCM01	5X00167G01	SPARE				AO	1.2.2.6	
DROP10	76PCM01	5X00167G01	SPARE				AO	1.2.2.7	
DROP10	76PCM01	5X00167G01	SPARE				AO	1.2.2.8	

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP10	76PCM01			Spare Module Address				1.2.3
DROP10	76PCM01			Spare Module Address				1.2.4
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.2.5.1
DROP10	76PCM01	5X00106G01	M76FT2743	TC POLY FEED PUMP 2 ROTAMETER	0	20 GPM	AI - HART	1.2.5.2
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.2.5.3
DROP10	76PCM01	5X00106G01	M76ST0522	TC POLY FEED PUMP NO. 2 SPEED	0	100 PCT	AI - HART	1.2.5.4
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.2.5.5
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.2.5.6
DROP10	76PCM01	5X00106G01	M76ST0703	OC EXHST FAN3 SPEED	0	100 PCT	AI - HART	1.2.5.7
DROP10	76PCM01	5X00106G01	M76PT2700	PIPE LUBE RING 9 PRESSURE	0	1500 PSI	AI - HART	1.2.5.8
DROP10	76PCM01	5X00106G01	M76FT2156	TC FEED PUMP NO.2 SLUDGE FLOW	0	1500 GPM	AI - HART	1.2.6.1
DROP10	76PCM01	5X00106G01	M76FT2741	TC FEED PUMP NO.2 POLYMER FLW	0	30 GPM	AI - HART	1.2.6.2
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.2.6.3
DROP10	76PCM01	5X00106G01	M76PT2157	TC FEED PUMP NO.2 DISCH PRESS	0	45 PSI	AI - HART	1.2.6.4
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.2.6.5
DROP10	76PCM01	5X00106G01	M76LT2260	THICKENED SOLIDS WET WELL LVL	0	20 FEET	AI - HART	1.2.6.6
DROP10	76PCM01	5X00106G01	M76PT2740	TC POLY FEED PMP NO.2 DISCH PRESS	0	45 PSI	AI - HART	1.2.6.7
DROP10	76PCM01	5X00106G01	SPARE				AI - HART	1.2.6.8
DROP10	76PCM01			Spare Module Address				1.2.7
DROP10	76PCM01	5X00419G01		76VDL01 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8
DROP10	76PCM01	1C31232G01	M76QI1900	CFUGE BIN 1 AIR INLET DMPR 1	LOCAL	INCOMP	DI	1.3.1.1
DROP10	76PCM01	1C31232G01	M76RI1900	CFUGE BIN 1 AIR INLET DMPR 1	WAIT	READY	DI	1.3.1.2
DROP10	76PCM01	1C31232G01	M76ZB1900	CFUGE BIN 1 AIR INLET DMPR 1	NORMAL	CLOSED	DI	1.3.1.3
DROP10	76PCM01	1C31232G01	M76ZD1900	CFUGE BIN 1 AIR INLET DMPR 1	NORMAL	OPENED	DI	1.3.1.4
DROP10	76PCM01	1C31232G01	M76QI1901	CFUGE BIN 1 AIR INLET DMPR 2	LOCAL	INCOMP	DI	1.3.1.5
DROP10	76PCM01	1C31232G01	M76RI1901	CFUGE BIN 1 AIR INLET DMPR 2	WAIT	READY	DI	1.3.1.6
DROP10	76PCM01	1C31232G01	M76ZB1901	CFUGE BIN 1 AIR INLET DMPR 2	NORMAL	CLOSED	DI	1.3.1.7
DROP10	76PCM01	1C31232G01	M76ZD1901	CFUGE BIN 1 AIR INLET DMPR 2	NORMAL	OPENED	DI	1.3.1.8
DROP10	76PCM01	1C31232G01	M76QI1902	CFUGE BIN1 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.1.9
DROP10	76PCM01	1C31232G01	M76RI1902	CFUGE BIN1 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.1.10
DROP10	76PCM01	1C31232G01	M76ZB1902	CFUGE BIN1 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.1.11
DROP10	76PCM01	1C31232G01	M76ZD1902	CFUGE BIN1 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.1.12
DROP10	76PCM01	1C31232G01	M76PDAH2930	OC FAN 1 NORMAL PRESS DROP	NORMAL	HIDIFF	DI	1.3.1.13
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.1.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.1.15
DROP10	76PCM01	1C31232G01	M10QC3S01	DPU10 QC DROP 3 SL01 DI PWR MON	ALARM	NORMAL	DI	1.3.1.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP10	76PCM01	1C31232G01	M76QI1910	CFUGE BIN 3 AIR INLET DMPR 1	LOCAL	INCOMP	DI	1.3.2.1
DROP10	76PCM01	1C31232G01	M76RI1910	CFUGE BIN 3 AIR INLET DMPR 1	WAIT	READY	DI	1.3.2.2
DROP10	76PCM01	1C31232G01	M76ZB1910	CFUGE BIN 3 AIR INLET DMPR 1	NORMAL	CLOSED	DI	1.3.2.3
DROP10	76PCM01	1C31232G01	M76ZD1910	CFUGE BIN 3 AIR INLET DMPR 1	NORMAL	OPENED	DI	1.3.2.4
DROP10	76PCM01	1C31232G01	M76QI1911	CFUGE BIN 3 AIR INLET DMPR 2	LOCAL	INCOMP	DI	1.3.2.5
DROP10	76PCM01	1C31232G01	M76RI1911	CFUGE BIN 3 AIR INLET DMPR 2	WAIT	READY	DI	1.3.2.6
DROP10	76PCM01	1C31232G01	M76ZB1911	CFUGE BIN 3 AIR INLET DMPR 2	NORMAL	CLOSED	DI	1.3.2.7
DROP10	76PCM01	1C31232G01	M76ZD1911	CFUGE BIN 3 AIR INLET DMPR 2	NORMAL	OPENED	DI	1.3.2.8
DROP10	76PCM01	1C31232G01	M76QI1912	CFUGE BIN3 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.2.9
DROP10	76PCM01	1C31232G01	M76RI1912	CFUGE BIN3 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.2.10
DROP10	76PCM01	1C31232G01	M76ZB1912	CFUGE BIN3 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.2.11
DROP10	76PCM01	1C31232G01	M76ZD1912	CFUGE BIN3 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.2.12
DROP10	76PCM01	1C31232G01	M76PDAH2900	OC FAN 3 NORMAL PRESS DROP	NORMAL	HIDIFF	DI	1.3.2.13
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.2.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.2.15
DROP10	76PCM01	1C31232G01	<b>M10QC3S02</b>	<b>DPU10 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.3.1
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.3.2
DROP10	76PCM01	1C31232G01	M76ZB1903	DW CFUGE 1 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.3.3
DROP10	76PCM01	1C31232G01	M76ZD1903	DW CFUGE 1 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.3.4
DROP10	76PCM01	1C31232G01	M76QI1908	DW CFUGE 2 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.3.5
DROP10	76PCM01	1C31232G01	M76RI1908	DW CFUGE 2 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.3.6
DROP10	76PCM01	1C31232G01	M76ZB1908	DW CFUGE 2 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.3.7
DROP10	76PCM01	1C31232G01	M76ZD1908	DW CFUGE 2 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.3.8
DROP10	76PCM01	1C31232G01	M76QI1904	DW CFUGE 3 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.3.9
DROP10	76PCM01	1C31232G01	M76RI1904	DW CFUGE 3 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.3.10
DROP10	76PCM01	1C31232G01	M76ZB1904	DW CFUGE 3 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.3.11
DROP10	76PCM01	1C31232G01	M76ZD1904	DW CFUGE 3 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.3.12
DROP10	76PCM01	1C31232G01	M76ZB1419	PIPELINE LUBE PMP 10 DISCH VLV	NORMAL	CLOSED	DI	1.3.3.13
DROP10	76PCM01	1C31232G01	M76ZD1419	PIPELINE LUBE PMP 10 DISCH VLV	NORMAL	OPENED	DI	1.3.3.14
DROP10	76PCM01	1C31232G01	M76ZB1418	PIPELINE LUBE PUMP 10 INLT VLV	NORMAL	CLOSED	DI	1.3.3.15
DROP10	76PCM01	1C31232G01	<b>M10QC3S03</b>	<b>DPU10 QC DROP 3 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.3.16
DROP10	76PCM01	1C31232G01	M76QI1914	DW CFUGE 7 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.4.1
DROP10	76PCM01	1C31232G01	M76RI1914	DW CFUGE 7 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.4.2
DROP10	76PCM01	1C31232G01	M76ZB1914	DW CFUGE 7 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.4.3
DROP10	76PCM01	1C31232G01	M76ZD1914	DW CFUGE 7 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.4.4
DROP10	76PCM01	1C31232G01	M76MI0701	OC EXHST FAN1 ON	OFF	RUNNG	DI	1.3.4.5
DROP10	76PCM01	1C31232G01	M76QI0701	OC EXHST FAN1 REMOTE	LOCAL	INCOMP	DI	1.3.4.6
DROP10	76PCM01	1C31232G01	M76RI0701	OC EXHST FAN1 CTRL PWR	NRDY	READY	DI	1.3.4.7
DROP10	76PCM01	1C31232G01	M76LAH2711	POLY DAY TANK 1 LEVEL ALARMS	NORMAL	HIGH	DI	1.3.4.8
DROP10	76PCM01	1C31232G01	M76LAL2711	POLY DAY TANK 1 LEVEL ALARMS	NORMAL	LOW	DI	1.3.4.9
DROP10	76PCM01	1C31232G01	M76LM2711	POLY DAY TANK 1 LEVEL ALARMS	NORMAL	MIDPNT	DI	1.3.4.10
DROP10	76PCM01	1C31232G01	M76MI0501	POLY DAY TANK 1 MIXER	OFF	RUNNG	DI	1.3.4.11
DROP10	76PCM01	1C31232G01	M76QI0501	POLY DAY TANK 1 MIXER	LOCAL	INCOMP	DI	1.3.4.12
DROP10	76PCM01	1C31232G01	M76RI0501	POLY DAY TANK 1 MIXER	WAIT	READY	DI	1.3.4.13
DROP10	76PCM01	1C31232G01	M76PAH2737	TC POLY FD PUMP 1 PRESS CUTOUT	NORMAL	HIGH	DI	1.3.4.14
DROP10	76PCM01	1C31232G01	M76PAL2737A	TC POLY FD PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.3.4.15
DROP10	76PCM01	1C31232G01	<b>M10QC3S04</b>	<b>DPU10 QC DROP 3 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.4.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP10	76PCM01	1C31232G01	M76QI1909	DW CFUGE 4 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.5.1
DROP10	76PCM01	1C31232G01	M76RI1909	DW CFUGE 4 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.5.2
DROP10	76PCM01	1C31232G01	M76ZB1909	DW CFUGE 4 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.5.3
DROP10	76PCM01	1C31232G01	M76ZD1909	DW CFUGE 4 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.5.4
DROP10	76PCM01	1C31232G01	M76QI1913	DW CFUGE 5 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.5.5
DROP10	76PCM01	1C31232G01	M76RI1913	DW CFUGE 5 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.5.6
DROP10	76PCM01	1C31232G01	M76ZB1913	DW CFUGE 5 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.5.7
DROP10	76PCM01	1C31232G01	M76ZD1913	DW CFUGE 5 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.5.8
DROP10	76PCM01	1C31232G01	M76QI1918	DW CFUGE 6 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.3.5.9
DROP10	76PCM01	1C31232G01	M76RI1918	DW CFUGE 6 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.3.5.10
DROP10	76PCM01	1C31232G01	M76ZB1918	DW CFUGE 6 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.3.5.11
DROP10	76PCM01	1C31232G01	M76ZD1918	DW CFUGE 6 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.3.5.12
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.5.13
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.5.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.5.15
DROP10	76PCM01	1C31232G01	<b>M10QC3S05</b>	<b>DPU10 QC DROP 3 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.5.16
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.6.1
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.6.2
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.6.3
DROP10	76PCM01	1C31232G01	M76ZB1190	TC 1 POLY INJECT VLV1	NORMAL	CLOSED	DI	1.3.6.4
DROP10	76PCM01	1C31232G01	M76ZD1190	TC 1 POLY INJECT VLV1	NORMAL	OPENED	DI	1.3.6.5
DROP10	76PCM01	1C31232G01	M76ZB1191	TC 1 POLY INJECT VLV2	NORMAL	CLOSED	DI	1.3.6.6
DROP10	76PCM01	1C31232G01	M76ZD1191	TC 1 POLY INJECT VLV2	NORMAL	OPENED	DI	1.3.6.7
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.6.8
DROP10	76PCM01	1C31232G01	M76QI1931	TOT SOLIDS WW FA DISCH DMPR	LOCAL	INCOMP	DI	1.3.6.9
DROP10	76PCM01	1C31232G01	M76RI1931	TOT SOLIDS WW FA DISCH DMPR	WAIT	READY	DI	1.3.6.10
DROP10	76PCM01	1C31232G01	M76ZB1931	THICK SOLIDS WW FA DISCH DMPR	NORMAL	CLOSED	DI	1.3.6.11
DROP10	76PCM01	1C31232G01	M76ZD1931	THICKND SOLID WW FA DISCH DMPR	NORMAL	OPENED	DI	1.3.6.12
DROP10	76PCM01	1C31232G01	M76LAH2261	THICKEND SOLIDS WW LEVEL ALRMS	NORMAL	HIGH	DI	1.3.6.13
DROP10	76PCM01	1C31232G01	M76LAL2261	THICKEND SOLIDS WW LEVEL ALRMS	NORMAL	LOW	DI	1.3.6.14
DROP10	76PCM01	1C31232G01	M76QI2260A	THICKENED SOLIDS WET WELL LVL	LOCAL	INCOMP	DI	1.3.6.15
DROP10	76PCM01	1C31232G01	<b>M10QC3S06</b>	<b>DPU10 QC DROP 3 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.6.16
DROP10	76PCM01	1C31232G01	M76PAH2287	THICK XFER PUMP 1 PRESS CUTOUT	NORMAL	HIGH	DI	1.3.7.1
DROP10	76PCM01	1C31232G01	M76PAL2287A	THICK XFER PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.3.7.2
DROP10	76PCM01	1C31232G01	M76PAL2287B	THICK XFER PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.3.7.3
DROP10	76PCM01	1C31232G01	M76MI0131	THICK XFER PUMP NO. 1	OFF	RUNNING	DI	1.3.7.4
DROP10	76PCM01	1C31232G01	M76QI0131	THICK XFER PUMP NO. 1	LOCAL	INCOMP	DI	1.3.7.5
DROP10	76PCM01	1C31232G01	M76RI0131	THICK XFER PUMP NO. 1	WAIT	READY	DI	1.3.7.6
DROP10	76PCM01	1C31232G01	<b>M76UA0131</b>	<b>THICK XFER PUMP NO. 1</b>	<b>NORMAL</b>	<b>FAIL</b>	DI	1.3.7.7
DROP10	76PCM01	1C31232G01	M76QI1936	TC 4 FA DISCH DMPR	LOCAL	INCOMP	DI	1.3.7.8
DROP10	76PCM01	1C31232G01	M76RI1936	TC 4 FA DISCH DMPR	WAIT	READY	DI	1.3.7.9
DROP10	76PCM01	1C31232G01	M76ZB1936	TC 4 FA DISCH DMPR	NORMAL	CLOSED	DI	1.3.7.10
DROP10	76PCM01	1C31232G01	M76ZD1936	TC 4 FA DISCH DMPR	NORMAL	OPENED	DI	1.3.7.11
DROP10	76PCM01	1C31232G01	M76QI1935	TC 6 FA DISCH DMPR	LOCAL	INCOMP	DI	1.3.7.12
DROP10	76PCM01	1C31232G01	M76RI1935	TC 6 FA DISCH DMPR	WAIT	READY	DI	1.3.7.13
DROP10	76PCM01	1C31232G01	M76ZB1935	TC 6 FA DISCH DMPR	NORMAL	CLOSED	DI	1.3.7.14
DROP10	76PCM01	1C31232G01	M76ZD1935	TC 6 FA DISCH DMPR	NORMAL	OPENED	DI	1.3.7.15
DROP10	76PCM01	1C31232G01	<b>M10QC3S07</b>	<b>DPU10 QC DROP 3 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.7.16

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METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP10	76PCM01	1C31232G01	M76MI0703	OC EXHST FAN1 ON	OFF	RUNNG	DI	1.3.8.1
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.8.2
DROP10	76PCM01	1C31232G01	M76QI0703	OC EXHST FAN3 REMOTE	LOCAL	INCOMP	DI	1.3.8.3
DROP10	76PCM01	1C31232G01	M76RI0703	OC EXHST FAN3 CTRL PWR	NRDY	READY	DI	1.3.8.4
DROP10	76PCM01	1C31232G01	M76MI0521	TC POLY FEED PUMP NO. 1	OFF	RUNNG	DI	1.3.8.5
DROP10	76PCM01	1C31232G01	<b>M76QI0521</b>	<b>TC POLY FEED PUMP NO. 1</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.3.8.6
DROP10	76PCM01	1C31232G01	M76RI0521	TC POLY FEED PUMP NO. 1	WAIT	READY	DI	1.3.8.7
DROP10	76PCM01	1C31232G01	M76UA0521	TC POLY FEED PUMP NO. 1	NORMAL	FAIL	DI	1.3.8.8
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.8.9
DROP10	76PCM01	1C31232G01	M76QI1930	TOT SOLIDS WW AIR INLT DMPR	LOCAL	INCOMP	DI	1.3.8.10
DROP10	76PCM01	1C31232G01	M76RI1930	TOT SOLIDS WW AIR INLET DMPR	WAIT	READY	DI	1.3.8.11
DROP10	76PCM01	1C31232G01	M76ZB1930	THICK SOLIDS WW AIR INLET DMPR	NORMAL	CLOSED	DI	1.3.8.12
DROP10	76PCM01	1C31232G01	M76ZD1930	THICKND SOLID WW AIR INLT DMPR	NORMAL	OPENED	DI	1.3.8.13
DROP10	76PCM01	1C31232G01	SPARE				DI	1.3.8.14
DROP10	76PCM01	1C31232G01	M73XS2103	POINT LOMA LINE 1 PIG DETECTOR	NORMAL	PIG	DI	1.3.8.15
DROP10	76PCM01	1C31232G01	<b>M10QC3S08</b>	<b>DPU10 QC DROP 3 SL08 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.8.16
DROP10	76PCM01	1C31232G01	M76QI1905	CFUGE BIN 2 AIR INLET DMPR 1	LOCAL	INCOMP	DI	1.4.1.1
DROP10	76PCM01	1C31232G01	M76RI1905	CFUGE BIN 2 AIR INLET DMPR 1	WAIT	READY	DI	1.4.1.2
DROP10	76PCM01	1C31232G01	M76ZB1905	CFUGE BIN 2 AIR INLET DMPR 1	NORMAL	CLOSED	DI	1.4.1.3
DROP10	76PCM01	1C31232G01	M76ZD1905	CFUGE BIN 2 AIR INLET DMPR 1	NORMAL	OPENED	DI	1.4.1.4
DROP10	76PCM01	1C31232G01	M76QI1906	CFUGE BIN 2 AIR INLET DMPR 2	LOCAL	INCOMP	DI	1.4.1.5
DROP10	76PCM01	1C31232G01	M76RI1906	CFUGE BIN 2 AIR INLET DMPR 2	WAIT	READY	DI	1.4.1.6
DROP10	76PCM01	1C31232G01	M76ZB1906	CFUGE BIN 2 AIR INLET DMPR 2	NORMAL	CLOSED	DI	1.4.1.7
DROP10	76PCM01	1C31232G01	M76ZD1906	CFUGE BIN 2 AIR INLET DMPR 2	NORMAL	OPENED	DI	1.4.1.8
DROP10	76PCM01	1C31232G01	M76QI1907	CFUGE BIN2 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.4.1.9
DROP10	76PCM01	1C31232G01	M76RI1907	CFUGE BIN2 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.4.1.10
DROP10	76PCM01	1C31232G01	M76ZB1907	CFUGE BIN2 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.4.1.11
DROP10	76PCM01	1C31232G01	M76ZD1907	CFUGE BIN2 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.4.1.12
DROP10	76PCM01	1C31232G01	M76PDAH2935	OC FAN 2 NORMAL PRESS DROP	NORMAL	HIDIFF	DI	1.4.1.13
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.1.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.1.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S01</b>	<b>DPU10 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16
DROP10	76PCM01	1C31232G01	M76QI1915	CFUGE BIN 4 AIR INLET DMPR 1	LOCAL	INCOMP	DI	1.4.2.1
DROP10	76PCM01	1C31232G01	M76RI1915	CFUGE BIN 4 AIR INLET DMPR 1	WAIT	READY	DI	1.4.2.2
DROP10	76PCM01	1C31232G01	M76ZB1915	CFUGE BIN 4 AIR INLET DMPR 1	NORMAL	CLOSED	DI	1.4.2.3
DROP10	76PCM01	1C31232G01	M76ZD1915	CFUGE BIN 4 AIR INLET DMPR 1	NORMAL	OPENED	DI	1.4.2.4
DROP10	76PCM01	1C31232G01	M76QI1916	CFUGE BIN 4 AIR INLET DMPR 2	LOCAL	INCOMP	DI	1.4.2.5
DROP10	76PCM01	1C31232G01	M76RI1916	CFUGE BIN 4 AIR INLET DMPR 2	WAIT	READY	DI	1.4.2.6
DROP10	76PCM01	1C31232G01	M76ZB1916	CFUGE BIN 4 AIR INLET DMPR 2	NORMAL	CLOSED	DI	1.4.2.7
DROP10	76PCM01	1C31232G01	M76ZD1916	CFUGE BIN 4 AIR INLET DMPR 2	NORMAL	OPENED	DI	1.4.2.8
DROP10	76PCM01	1C31232G01	M76QI1917	CFUGE BIN4 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.4.2.9
DROP10	76PCM01	1C31232G01	M76RI1917	CFUGE BIN4 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.4.2.10
DROP10	76PCM01	1C31232G01	M76ZB1917	CFUGE BIN4 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.4.2.11
DROP10	76PCM01	1C31232G01	M76ZD1917	CFUGE BIN4 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.4.2.12
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.2.13
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.2.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.2.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S02</b>	<b>DPU10 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP10	76PCM01	1C31232G01	M73XS2106	FUTURE WRP PIG DETECTOR	NORMAL	PIG	DI	1.4.3.1
DROP10	76PCM01	1C31232G01	M73XS2100	NORTH CITY LINE 2 PIG DETECTOR	NORMAL	PIG	DI	1.4.3.2
DROP10	76PCM01	1C31232G01	M76MI0531	NORTH CITY SCUM PUMP	OFF	RUNNING	DI	1.4.3.3
DROP10	76PCM01	1C31232G01	M76QI0531	NORTH CITY SCUM PUMP	LOCAL	INCOMP	DI	1.4.3.4
DROP10	76PCM01	1C31232G01	M76RI0531	NORTH CITY SCUM PUMP	WAIT	READY	DI	1.4.3.5
DROP10	76PCM01	1C31232G01	M76ZI2274	N. CITY SCUM PUMP INLET PSTN	NORMAL	IN POS	DI	1.4.3.6
DROP10	76PCM01	1C31232G01	M76PAH2277	N. CITY SCUM PUMP PRESS CUTOUT	NORMAL	HIGH	DI	1.4.3.7
DROP10	76PCM01	1C31232G01	M76PAL2277A	N. CITY SCUM PUMP PRESS CUTOUT	NORMAL	LOW	DI	1.4.3.8
DROP10	76PCM01	1C31232G01	M76PAL2277B	N. CITY SCUM PUMP PRESS CUTOUT	NORMAL	LOW	DI	1.4.3.9
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.3.10
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.3.11
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.3.12
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.3.13
DROP10	76PCM01	1C31232G01	<b>M76QI0522</b>	<b>TC POLY FEED PUMP NO. 2</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.4.3.14
DROP10	76PCM01	1C31232G01	M76RI0522	TC POLY FEED PUMP NO. 2	WAIT	READY	DI	1.4.3.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S03</b>	<b>DPU10 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP10	76PCM01	1C31232G01	M76QI1919	DW CFUGE 8 FOUL AIR DISCH DMPR	LOCAL	INCOMP	DI	1.4.4.1
DROP10	76PCM01	1C31232G01	M76RI1919	DW CFUGE 8 FOUL AIR DISCH DMPR	WAIT	READY	DI	1.4.4.2
DROP10	76PCM01	1C31232G01	M76ZB1919	DW CFUGE 8 FOUL AIR DISCH DMPR	NORMAL	CLOSED	DI	1.4.4.3
DROP10	76PCM01	1C31232G01	M76ZD1919	DW CFUGE 8 FOUL AIR DISCH DMPR	NORMAL	OPENED	DI	1.4.4.4
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.4.5
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.4.6
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.4.7
DROP10	76PCM01	1C31232G01	M76PAH2155	TC FEED PUMP 2 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.4.8
DROP10	76PCM01	1C31232G01	M76PAL2155A	TC FEED PUMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.4.9
DROP10	76PCM01	1C31232G01	M76PAL2155B	TC FEED PUMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.4.10
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.4.11
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.4.12
DROP10	76PCM01	1C31232G01	M76UA0703A	OC EXHST FAN3 FAIL	NORMAL	FAIL	DI	1.4.4.13
DROP10	76PCM01	1C31232G01	M76UA0703B	OC EXHST FAN3 ALARM	NORMAL	ALARM	DI	1.4.4.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.4.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S04</b>	<b>DPU10 QC DROP 4 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP10	76PCM01	1C31232G01	M76UPSALA	AREA 76 UPS TROUBLE ALARM	ALARM	NORMAL	DI	1.4.5.1
DROP10	76PCM01	1C31232G01	M76UPSBY	AREA 76 UPS IN USE	NORMAL	BYPASS	DI	1.4.5.2
DROP10	76PCM01	1C31232G01	M76UPSLOW	AREA 76 UPS LOW BATTERY ALARM	NORMAL	LOW	DI	1.4.5.3
DROP10	76PCM01	1C31232G01	M76UPSNO	AREA 76 UPS FEED OK/NORML MODE	ALARM	NORMAL	DI	1.4.5.4
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.5.5
DROP10	76PCM01	1C31232G01	M76MI0809	PIPELINE LUBE PUMP NO. 9	OFF	RUNNING	DI	1.4.5.6
DROP10	76PCM01	1C31232G01	M76UA0809	PIPELINE LUBE PUMP NO. 9	NORMAL	FAIL	DI	1.4.5.7
DROP10	76PCM01	1C31232G01	M76ZB1417	PIPELINE LUBE PUMP 9 DISCH VLV	NORMAL	CLOSED	DI	1.4.5.8
DROP10	76PCM01	1C31232G01	M76ZD1417	PIPELINE LUBE PUMP 9 DISCH VLV	NORMAL	OPENED	DI	1.4.5.9
DROP10	76PCM01	1C31232G01	M76ZB1416	PIPELINE LUBE PUMP 9 INLET VLV	NORMAL	CLOSED	DI	1.4.5.10
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.5.11
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.5.12
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.5.13
DROP10	76PCM01	1C31232G01	M76UA0701A	OC EXHST FAN1 FAIL	NORMAL	FAIL	DI	1.4.5.14
DROP10	76PCM01	1C31232G01	M76UA0701B	OC EXHST FAN1 ALARM	NORMAL	ALARM	DI	1.4.5.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S05</b>	<b>DPU10 QC DROP 4 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.5.16
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.6.1
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.6.2
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.6.3
DROP10	76PCM01	1C31232G01	M76ZB1200	TC 2 POLY INJECT VLV1	NORMAL	CLOSED	DI	1.4.6.4
DROP10	76PCM01	1C31232G01	M76ZD1200	TC 2 POLY INJECT VLV1	NORMAL	OPENED	DI	1.4.6.5
DROP10	76PCM01	1C31232G01	M76ZB1201	TC 2 POLY INJECT VLV2	NORMAL	CLOSED	DI	1.4.6.6
DROP10	76PCM01	1C31232G01	M76ZD1201	TC 2 POLY INJECT VLV2	NORMAL	OPENED	DI	1.4.6.7
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.6.8
DROP10	76PCM01	1C31232G01	M76QI1934	TC 1 FA DISCH DMPR	LOCAL	INCOMP	DI	1.4.6.9
DROP10	76PCM01	1C31232G01	M76RI1934	TC 1 FA DISCH DMPR	WAIT	READY	DI	1.4.6.10
DROP10	76PCM01	1C31232G01	M76ZB1934	TC 1 FA DISCH DMPR	NORMAL	CLOSED	DI	1.4.6.11
DROP10	76PCM01	1C31232G01	M76ZD1934	TC 1 FA DISCH DMPR	NORMAL	OPENED	DI	1.4.6.12
DROP10	76PCM01	1C31232G01	M76QI1933	TC 3 FA DISCH DMPR	LOCAL	INCOMP	DI	1.4.6.13
DROP10	76PCM01	1C31232G01	M76RI1933	TC 3 FA DISCH DMPR	WAIT	READY	DI	1.4.6.14
DROP10	76PCM01	1C31232G01	M76ZB1933	TC 3 FA DISCH DMPR	NORMAL	CLOSED	DI	1.4.6.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S06</b>	<b>DPU10 QC DROP 4 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.6.16
DROP10	76PCM01	1C31232G01	M76QI1937	TC 2 FA DISCH DMPR	LOCAL	INCOMP	DI	1.4.7.1
DROP10	76PCM01	1C31232G01	M76RI1937	TC 2 FA DISCH DMPR	WAIT	READY	DI	1.4.7.2
DROP10	76PCM01	1C31232G01	M76ZB1937	TC 2 FA DISCH DMPR	NORMAL	CLOSED	DI	1.4.7.3
DROP10	76PCM01	1C31232G01	M76ZD1937	TC 2 FA DISCH DMPR	NORMAL	OPENED	DI	1.4.7.4
DROP10	76PCM01	1C31232G01	M76QI1932	TC 5 FA DISCH DMPR	LOCAL	INCOMP	DI	1.4.7.5
DROP10	76PCM01	1C31232G01	M76RI1932	TC 5 FA DISCH DMPR	WAIT	READY	DI	1.4.7.6
DROP10	76PCM01	1C31232G01	M76ZB1932	TC 5 FA DISCH DMPR	NORMAL	CLOSED	DI	1.4.7.7
DROP10	76PCM01	1C31232G01	M76ZD1932	TC 5 FA DISCH DMPR	NORMAL	OPENED	DI	1.4.7.8
DROP10	76PCM01	1C31232G01	M76QI2260B	THICKENED SOLIDS WET WELL LVL	LOCAL	INCOMP	DI	1.4.7.9
DROP10	76PCM01	1C31232G01	M76PAL2737B	TC POLY FD PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	1.4.7.10
DROP10	76PCM01	1C31232G01	M73QI2111B	RAW SOLIDS FD PUMPS DISCH FLOW	LOCAL	INCOMP	DI	1.4.7.11
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.7.12
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.7.13
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.7.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.7.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S07</b>	<b>DPU10 QC DROP 4 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.7.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP10	76PCM01	1C31232G01	M76PAL2742A	TC POLY FEED PUMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.8.1
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.8.2
DROP10	76PCM01	1C31232G01	M76MI0522	TC POLY FEED PUMP NO. 2	OFF	RUNNING	DI	1.4.8.3
DROP10	76PCM01	1C31232G01	M76PAL2742B	TC POLY FD PUMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.8.4
DROP10	76PCM01	1C31232G01	M76ZD1416	PIPELINE LUBE PUMP 9 INLET VLV	NORMAL	OPENED	DI	1.4.8.5
DROP10	76PCM01	1C31232G01	M76UA0522	TC POLY FEED PUMP NO. 2	NORMAL	FAIL	DI	1.4.8.6
DROP10	76PCM01	1C31232G01	M76ZD1418	PIPELINE LUBE PUMP 10 INLT VLV	NORMAL	OPENED	DI	1.4.8.7
DROP10	76PCM01	1C31232G01	M76LAH2712	POLY DAY TNKS 1 & 2 FLOOD ALRM	FLOOD	NORMAL	DI	1.4.8.8
DROP10	76PCM01	1C31232G01	M76PAH2742	TC POLY FD PUMP 2 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.8.9
DROP10	76PCM01	1C31232G01	M76ZD1933	TC 3 FA DISCH DMPR	NORMAL	OPENED	DI	1.4.8.10
DROP10	76PCM01	1C31232G01	M76BUPSNORMALMOD	THICKENING UPS FD OK NRML MODE	ALARM	NORMAL	DI	1.4.8.11
DROP10	76PCM01	1C31232G01	M76BUPSBYPASSMOD	THICKENING UPS IN USE	BYPASS	NORMAL	DI	1.4.8.12
DROP10	76PCM01	1C31232G01	M76BUPSLOBATTERY	THICKENING UPS LO BATTERY ALRM	LOWBAT	NORMAL	DI	1.4.8.13
DROP10	76PCM01	1C31232G01	M76BUPSALARM	THICKENING UPS NO TRBL/ALARM	ALARM	NORMAL	DI	1.4.8.14
DROP10	76PCM01	1C31232G01	SPARE				DI	1.4.8.15
DROP10	76PCM01	1C31232G01	<b>M10QC4S08</b>	<b>DPU10 QC DROP 4 SL08 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.8.16
DROP10	76PCM01	5A26458G04	M76HS1914A	DW CFUGE 7 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.5.1.1
DROP10	76PCM01	5A26458G04	M76HS1930A	THICKND SOLID WW AIR INLT DMPR	OPEN	CLOSE	DO	1.5.1.2
DROP10	76PCM01	5A26458G04	M76HS1902A	CFUGE BIN1 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.5.1.3
DROP10	76PCM01	5A26458G04	M76HS1901A	CFUGE BIN 1 AIR INLET DMPR 2	OPEN	CLOSE	DO	1.5.1.4
DROP10	76PCM01	5A26458G04	M76HS1900A	CFUGE BIN 1 AIR INLET DMPR 1	OPEN	CLOSE	DO	1.5.1.5
DROP10	76PCM01	5A26458G04	M76HS1936A	TC 4 FA DISCH DMPR	OPEN	CLOSE	DO	1.5.1.6
DROP10	76PCM01	5A26458G04	M76HS1905A	CFUGE BIN 2 AIR INLET DMPR 1	OPEN	CLOSE	DO	1.5.1.7
DROP10	76PCM01	5A26458G04	M76HS1906A	CFUGE BIN 2 AIR INLET DMPR 2	OPEN	CLOSE	DO	1.5.1.8
DROP10	76PCM01	5A26458G04	M76HS1907A	CFUGE BIN2 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.5.1.9
DROP10	76PCM01	5A26458G04	M76HS1919A	DW CFUGE 8 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.5.1.10
DROP10	76PCM01	5A26458G04	M76HS1933A	TC 3 FA DISCH DMPR	OPEN	CLOSE	DO	1.5.1.11
DROP10	76PCM01	5A26458G04	M76HS1932A	TC 5 FA DISCH DMPR	OPEN	CLOSE	DO	1.5.1.12
DROP10	76PCM01	5A26458G04	M76HS1904A	DW CFUGE 3 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.5.2.1
DROP10	76PCM01	5A26458G04	M76HS1910A	CFUGE BIN 3 AIR INLET DMPR 1	OPEN	CLOSE	DO	1.5.2.2
DROP10	76PCM01	5A26458G04	M76HS1911A	CFUGE BIN 3 AIR INLET DMPR 2	OPEN	CLOSE	DO	1.5.2.3
DROP10	76PCM01	5A26458G04	M76HS1912A	CFUGE BIN3 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.5.2.4
DROP10	76PCM01	5A26458G04	M76HS1931A	TOT SOLIDS WW FA DISCH DMPR	OPEN	CLOSE	DO	1.5.2.5
DROP10	76PCM01	5A26458G04	M76HS1917A	CFUGE BIN4 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.5.2.6
DROP10	76PCM01	5A26458G04	M76HS1934A	TC 1 FA DISCH DMPR	OPEN	CLOSE	DO	1.5.2.7
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.2.8
DROP10	76PCM01	5A26458G04	M76HS1916A	CFUGE BIN 4 AIR INLET DMPR 2	OPEN	CLOSE	DO	1.5.2.9
DROP10	76PCM01	5A26458G04	M76HS1915A	CFUGE BIN 4 AIR INLET DMPR 1	OPEN	CLOSE	DO	1.5.2.10
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.2.11
DROP10	76PCM01	5A26458G04	M76HS1937A	TC 2 FA DISCH DMPR	OPEN	CLOSE	DO	1.5.2.12

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP10	76PCM01	5A26458G04	M76HS0521	TC POLY FEED PUMP NO.1 START/STOP	OFF	RUN	DO	1.5.3.1
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.3.2
DROP10	76PCM01	5A26458G04	M76HS0501	POLY DAY TANK 1 MIXER	OFF	RUN	DO	1.5.3.3
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.3.4
DROP10	76PCM01	5A26458G04	M76HS0131	THICK XFER PUMP NO. 1	OFF	RUN	DO	1.5.3.5
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.3.6
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.3.7
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.3.8
DROP10	76PCM01	5A26458G04	M73HS2111C	RAW SOLIDS FD PUMPS DISCH FLOW	NORMAL	312	DO	1.5.3.9
DROP10	76PCM01	5A26458G04	M73QS2111	DCS in Control	OFF	CMPRDY	DO	1.5.3.10
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.3.11
DROP10	76PCM01	5A26458G04	SPARE				DO	1.5.3.12
DROP10	76PCM01	5A26458G04	M76HS1909A	DW CFUGE 4 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.6.1.1
DROP10	76PCM01	5A26458G04	M76HS1913A	DW CFUGE 5 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.6.1.2
DROP10	76PCM01	5A26458G04	M76HS1918A	DW CFUGE 6 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.6.1.3
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.1.4
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.1.5
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.1.6
DROP10	76PCM01	5A26458G04	M76HS0531	NORTH CITY SCUM PUMP	OFF	RUN	DO	1.6.1.7
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.1.8
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.1.9
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.1.10
DROP10	76PCM01	5A26458G04	M73HS2111A	RAW SOLIDS FD PUMPS DISCH FLOW	NORMAL	123	DO	1.6.1.11
DROP10	76PCM01	5A26458G04	M73HS2111B	RAW SOLIDS FD PUMPS DISCH FLOW	NORMAL	231	DO	1.6.1.12
DROP10	76PCM01	5A26458G04	M76HS0522	TC POLY FEED PUMP NO.2 START/STOP	OFF	RUN	DO	1.6.2.1
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.2.2
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.2.3
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.2.4
DROP10	76PCM01	5A26458G04	M76HS1935A	TC 6 FA DISCH DMPR	OPEN	CLOSE	DO	1.6.2.5
DROP10	76PCM01	5A26458G04	M76HS1908A	DW CFUGE 2 FOUL AIR DISCH DMPR	OPEN	CLOSE	DO	1.6.2.6
DROP10	76PCM01	5A26458G04	SPARE				DO	1.6.2.7
DROP10	76PCM01	5A26458G04	M76HS0701	OC EXHST FAN1 RUN CMD	OFF	RUN	DO	1.6.2.8
DROP10	76PCM01	5A26458G04	M76HS2260A	THICKENED SOLIDS WET WELL LVL	NORMAL	123	DO	1.6.2.9
DROP10	76PCM01	5A26458G04	M76HS2260B	THICKENED SOLIDS WET WELL LVL	NORMAL	231	DO	1.6.2.10
DROP10	76PCM01	5A26458G04	M76HS2260C	THICKENED SOLIDS WET WELL LVL	NORMAL	312	DO	1.6.2.11
DROP10	76PCM01	5A26458G04	M76QS2260	THICKENED SOLIDS WET WELL LVL	OFF	CMPRDY	DO	1.6.2.12
DROP10	76PCM01			Spare Module Address				1.6.3

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DROP11	76PCM02	5X00419G01		76VDL02 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1
			76MV1160	THICKENING CENTRIFUGE FEED PUMP 3 INLET VALVE				
			76MV1161	THICKENING CENTRIFUGE FEED PUMP 3 DISCHARGE VALVE				
			76MV1162	THICKENING CENTRIFUGE FEED PUMP 3 BYPASS VALVE				
			76MV1165	THICKENING CENTRIFUGE FEED PUMP 4 INLET VALVE				
			76MV1166	THICKENING CENTRIFUGE FEED PUMP 4 DISCHARGE VALVE				
			76MV1167	THICKENING CENTRIFUGE FEED PUMP 4 BYPASS VALVE				
			76MV1290	THICKENED TRANSFER PUMP 2 INLET VALVE				
			76MV1291	THICKENED TRANSFER PUMP 2 DISCHARGE VALVE				
			76MV1295	THICKENED TRANSFER PUMP 3 INLET VALVE				
			76MV1296	THICKENED TRANSFER PUMP 3 DISCHARGE VALVE				
			76MV1715	POLYMER DAY TANK 2 INLET VALVE				
			76MV1716	POLYMER DAT TANK 2 DISCHARGE VALVE 1				
			76MV1717	POLYMER DAY TANK 2 DISCHARGE VALVE 2				
			76MV1745	THICKENING CENTRIFUGE POLYMER FEED PUMP 3 INLET VALVE				
			76MV1746	THICKENING CENTRIFUGE POLYMER FEED PUMP 3 DISCHARGE VALVE				
			76MV1747	THICKENING CENTRIFUGE POLYMER FEED PUMP 3 BYPASS VALVE				
			76MV1750	THICKENING CENTRIFUGE POLYMER FEED PUMP 4 INLET VALVE				
			76MV1751	THICKENING CENTRIFUGE POLYMER FEED PUMP 4 DISCHARGE VALVE				
			76MV1752	THICKENING CENTRIFUGE POLYMER FEED PUMP 4 BYPASS VALVE				
DROP11	76PCM02	5X00419G01	M76TC03	TC NO. 3			ET	1.1.2
			M76P0113	TC FEED PUMP NO. 3				
			M76TC04	TC NO. 4				
			M76P0114	TC FEED PUMP NO. 4				
DROP11	76PCM02	5X00106G01	M76FT2161	THICK CENTRIFUGE 3 SLUDGE FLOW	0	1500 GPM	AI - HART	1.1.3.1
DROP11	76PCM02	5X00106G01	M76FT2746	THICKENING CFUGE 3 POLYMER FLW	0	30 GPM	AI - HART	1.1.3.2
DROP11	76PCM02	5X00106G01	M76FT2748	TC POLY FEED PUMP 3 ROTAMETER	0	20 GPM	AI - HART	1.1.3.3
DROP11	76PCM02	5X00106G01	M76PT2745	TC POLY FEED PUMP 3 DISCH PRESS	0	45 PSI	AI - HART	1.1.3.4
DROP11	76PCM02	5X00106G01	M76ST0523	TC POLY FEED PUMP NO. 3 SPEED	0	100 PCT	AI - HART	1.1.3.5
DROP11	76PCM02	5X00106G01	M76PT2162	TC FEED PUMP 3 DISCH PRESS	0	45 PSI	AI - HART	1.1.3.6
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.1.3.7
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.1.3.8
DROP11	76PCM02	5X00106G01	M76FT2298	THICK XFER PUMP 3 DISCH FLOW	0	300 GPM	AI - HART	1.1.4.1
DROP11	76PCM02	5X00106G01	M76PT2299	THICK XFER PUMP 3 DISCH PRESS	0	130 PSI	AI - HART	1.1.4.2
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.1.4.3
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.1.4.4
DROP11	76PCM02	5X00106G01	M76LT2715	POLY DAY TANK 2 LEVEL	0	10 FEET	AI - HART	1.1.4.5
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.1.4.6
DROP11	76PCM02	5X00106G01	M86ST0703	OC EXHST FAN3 SPEED	0	100 PCT	AI - HART	1.1.4.7
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.1.4.8

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DROP11	76PCM02			Spare Module Address				1.1.5
DROP11	76PCM02			Spare Module Address				1.1.6
DROP11	76PCM02	5X00167G01	M76SC0523	TC POLY FEED PUMP NO.3 SPD CMD	0	100 PCT	AO	1.1.7.1
DROP11	76PCM02	5X00167G01	SPARE				AO	1.1.7.2
DROP11	76PCM02	5X00167G01	SPARE				AO	1.1.7.3
DROP11	76PCM02	5X00167G01	M76SC0702	OC EXHST FAN2 OUT DMD	0	100 PCT	AO	1.1.7.4
DROP11	76PCM02	5X00167G01	SPARE				AO	1.1.7.5
DROP11	76PCM02	5X00167G01	SPARE				AO	1.1.7.6
DROP11	76PCM02	5X00167G01	SPARE				AO	1.1.7.7
DROP11	76PCM02	5X00167G01	SPARE				AO	1.1.7.8
DROP11	76PCM02	5X00119G01	MDPU11T1	DPU11 76PCM02A CABINET TEMP	32	154 Deg F	RTD	1.1.8.1
DROP11	76PCM02	5X00119G01	SPARE				RTD	1.1.8.2
DROP11	76PCM02	5X00119G01	SPARE				RTD	1.1.8.3
DROP11	76PCM02	5X00119G01	SPARE				RTD	1.1.8.4
DROP11	76PCM02	5X00119G01	SPARE				RTD	1.1.8.5
DROP11	76PCM02	5X00119G01	SPARE				RTD	1.1.8.6
DROP11	76PCM02	5X00119G01	SPARE				RTD	1.1.8.7
DROP11	76PCM02	5X00119G01	SPARE				RTD	1.1.8.8
DROP11	76PCM02			Spare Module Address				1.2.1
DROP11	76PCM02	5X00167G01	M76SC0524	TC POLY FEED PUMP NO.4 SPD CMD	0	100 PCT	AO	1.2.2.1
DROP11	76PCM02	5X00167G01	SPARE				AO	1.2.2.2
DROP11	76PCM02	5X00167G01	SPARE				AO	1.2.2.3
DROP11	76PCM02	5X00167G01	M86SC0703	OC EXHST FAN3 OUT DMD	0	100 PCT	AO	1.2.2.4
DROP11	76PCM02	5X00167G01	SPARE				AO	1.2.2.5
DROP11	76PCM02	5X00167G01	SPARE				AO	1.2.2.6
DROP11	76PCM02	5X00167G01	SPARE				AO	1.2.2.7
DROP11	76PCM02	5X00167G01	SPARE				AO	1.2.2.8
DROP11	76PCM02			Spare Module Address				1.2.3
DROP11	76PCM02			Spare Module Address				1.2.4
DROP11	76PCM02	5X00106G01	M76FT2293	THICK XFER PUMP 2 DISCH FLOW	0	300 GPM	AI - HART	1.2.5.1
DROP11	76PCM02	5X00106G01	M76PT2294	THICK XFER PUMP 2 DISCH PRESS	0	130 PSI	AI - HART	1.2.5.2
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.2.5.3
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.2.5.4
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.2.5.5
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.2.5.6
DROP11	76PCM02	5X00106G01	M76ST0702	OC EXHST FAN2 SPEED	0	100 PCT	AI - HART	1.2.5.7
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.2.5.8

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP11	76PCM02	5X00106G01	M76FT2166	THICK CENTRIFUGE 4 SLUDGE FLOW	0	1500 GPM	AI - HART	1.2.6.1	
DROP11	76PCM02	5X00106G01	M76FT2751	THICKENING CFUGE 4 POLYMER FLW	0	30 GPM	AI - HART	1.2.6.2	
DROP11	76PCM02	5X00106G01	M76FT2753	TC POLY FEED PUMP 4 ROTAMETER	0	20 GPM	AI - HART	1.2.6.3	
DROP11	76PCM02	5X00106G01	M76PT2750	TC POLY FEED PUMP 4 DISCH PRESS	0	45 PSI	AI - HART	1.2.6.4	
DROP11	76PCM02	5X00106G01	M76ST0524	TC POLY FEED PUMP NO. 4 SPEED	0	100 PCT	AI - HART	1.2.6.5	
DROP11	76PCM02	5X00106G01	M76PT2167	TC FEED PUMP 4 DISCH PRESS	0	45 PSI	AI - HART	1.2.6.6	
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.2.6.7	
DROP11	76PCM02	5X00106G01	SPARE				AI - HART	1.2.6.8	
DROP11	76PCM02	Spare Module Address							1.2.7
DROP11	76PCM02	5X00419G01		76VDL02 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8	
DROP11	76PCM02	1C31232G01	<b>M76QS0523</b>	<b>TC POLY FEED PUMP NO. 3</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.3.1.1	
DROP11	76PCM02	1C31232G01	M76RI0523	TC POLY FEED PUMP NO. 3	WAIT	READY	DI	1.3.1.2	
DROP11	76PCM02	1C31232G01	M76MI0523	TC POLY FEED PUMP NO. 3	OFF	RUNNING	DI	1.3.1.3	
DROP11	76PCM02	1C31232G01	M76UA0523	TC POLY FEED PUMP NO. 3	NORMAL	FAIL	DI	1.3.1.4	
DROP11	76PCM02	1C31232G01	M76PAH2747	TC POLY FD PUMP 3 PRESS CUTOUT	NORMAL	HIGH	DI	1.3.1.5	
DROP11	76PCM02	1C31232G01	M76PAL2747A	TC POLY FD PUMP 3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.1.6	
DROP11	76PCM02	1C31232G01	M76PAL2747B	TC POLY FD PUMP 3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.1.7	
DROP11	76PCM02	1C31232G01	M76ZB1210	THICK CFUGE3 POLY INJECT VLV 1	NORMAL	CLOSED	DI	1.3.1.8	
DROP11	76PCM02	1C31232G01	M76ZD1210	THICK CFUGE3 POLY INJECT VLV 1	NORMAL	OPENED	DI	1.3.1.9	
DROP11	76PCM02	1C31232G01	M76ZB1211	THICK CFUGE3 POLY INJECT VLV 2	NORMAL	CLOSED	DI	1.3.1.10	
DROP11	76PCM02	1C31232G01	M76ZD1211	THICK CFUGE3 POLY INJECT VLV 2	NORMAL	OPENED	DI	1.3.1.11	
DROP11	76PCM02	1C31232G01	M76PAH2160	TC FEED PUMP 3 PRESS CUTOUT	NORMAL	HIGH	DI	1.3.1.12	
DROP11	76PCM02	1C31232G01	M76PAL2160A	TC FEED PUMP 3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.1.13	
DROP11	76PCM02	1C31232G01	M76PAL2160B	TC FEED PUMP 3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.1.14	
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.1.15	
DROP11	76PCM02	1C31232G01	<b>M11QC3S01</b>	<b>DPU11 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16	
DROP11	76PCM02	1C31232G01	M76MI0133	THICK XFER PUMP NO. 3	OFF	RUNNING	DI	1.3.2.1	
DROP11	76PCM02	1C31232G01	M76QI0133	THICK XFER PUMP NO. 3	LOCAL	INCOMP	DI	1.3.2.2	
DROP11	76PCM02	1C31232G01	M76RI0133	THICK XFER PUMP NO. 3	NORMAL	READY	DI	1.3.2.3	
DROP11	76PCM02	1C31232G01	<b>M76UA0133</b>	<b>THICK XFER PUMP NO. 3</b>	<b>NORMAL</b>	<b>FAIL</b>	DI	1.3.2.4	
DROP11	76PCM02	1C31232G01	M76PAH2297	THICK XFER PUMP 3 PRESS CUTOUT	NORMAL	HIGH	DI	1.3.2.5	
DROP11	76PCM02	1C31232G01	M76PAL2297A	THICK XFER PUMP 3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.2.6	
DROP11	76PCM02	1C31232G01	M76PAL2297B	THICK XFER PUMP 3 PRESS CUTOUT	NORMAL	LOW	DI	1.3.2.7	
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.2.8	
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.2.9	
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.2.10	
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.2.11	
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.2.12	
DROP11	76PCM02	1C31232G01	M76QI9998	BLDG 76 SITE LIGHTING 1	LOCAL	INCOMP	DI	1.3.2.13	
DROP11	76PCM02	1C31232G01	M76QI9999	BLDG 76 LITE LIGHTING 2	LOCAL	INCOMP	DI	1.3.2.14	
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.2.15	
DROP11	76PCM02	1C31232G01	<b>M11QC3S02</b>	<b>DPU11 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16	

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP11	76PCM02	1C31232G01	M76ZD9264	76USSD - FEED B BREAKER	NORMAL	OPENED	DI	1.3.3.1
DROP11	76PCM02	1C31232G01	M76ZD9266	76USSD - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.3.3.2
DROP11	76PCM02	1C31232G01	M76ZD9268	76USSD - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.3.3.3
DROP11	76PCM02	1C31232G01	M76ZD9270	76USSD - 76MCC76D01 FD BREAKER	NORMAL	OPENED	DI	1.3.3.4
DROP11	76PCM02	1C31232G01	M76ZD9272	76USSD - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.3.3.5
DROP11	76PCM02	1C31232G01	M76ZD9274	76USSD - 76-TC-03 FEED BREAKER	NORMAL	OPENED	DI	1.3.3.6
DROP11	76PCM02	1C31232G01	M86QI0703	OC EXHST FAN3 REMOTE	LOCAL	INCOMP	DI	1.3.3.7
DROP11	76PCM02	1C31232G01	M86MI0703	OC EXHST FAN3 ON	OFF	RUNNG	DI	1.3.3.8
DROP11	76PCM02	1C31232G01	M86RI0703	OC EXHST FAN3 CTRL PWR	NRDY	RDY	DI	1.3.3.9
DROP11	76PCM02	1C31232G01	M86UA0703A	OC EXHST FAN3 FAIL	NORMAL	FAIL	DI	1.3.3.10
DROP11	76PCM02	1C31232G01	M86UA0703B	OC EXHST FAN3 ALARM	NORMAL	ALARM	DI	1.3.3.11
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.3.12
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.3.13
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.3.14
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.3.15
DROP11	76PCM02	1C31232G01	<b>M11QC3S03</b>	<b>DPU11 QC DROP 3 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.3.16
DROP11	76PCM02	1C31232G01	M76UA9261	76USSD - LINE A TRANSFORMER	NORMAL	TRBL	DI	1.3.4.1
DROP11	76PCM02	1C31232G01	M76ZA9263	76USSD - FEED A BREAKER	NORMAL	TRIPPD	DI	1.3.4.2
DROP11	76PCM02	1C31232G01	M76ZA9265	76USSD - TIE BREAKER	NORMAL	TRIPPD	DI	1.3.4.3
DROP11	76PCM02	1C31232G01	M76ZA9267	76USSD - 76-TC-06 FEED BREAKER	TRIPPD	NORMAL	DI	1.3.4.4
DROP11	76PCM02	1C31232G01	M76ZA9269	76USSD - 76-TC-05 FEED BREAKER	TRIPPD	NORMAL	DI	1.3.4.5
DROP11	76PCM02	1C31232G01	M76ZA9271	76USSD - 76MCC76D02 FD BREAKER	TRIPPD	NORMAL	DI	1.3.4.6
DROP11	76PCM02	1C31232G01	M76ZA9273	76USSD - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.3.4.7
DROP11	76PCM02	1C31232G01	M76ZA9275	76USSD - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.3.4.8
DROP11	76PCM02	1C31232G01	M76ZB9263	76USSD - FEED A BREAKER	NORMAL	CLOSED	DI	1.3.4.9
DROP11	76PCM02	1C31232G01	M76ZB9265	76USSD - TIE BREAKER	NORMAL	CLOSED	DI	1.3.4.10
DROP11	76PCM02	1C31232G01	M76ZB9267	76USSD - 76-TC-06 FEED BREAKER	NORMAL	CLOSED	DI	1.3.4.11
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.4.12
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.4.13
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.4.14
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.4.15
DROP11	76PCM02	1C31232G01	<b>M11QC3S04</b>	<b>DPU11 QC DROP 3 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.4.16
DROP11	76PCM02	1C31232G01	M76ZD9263	76USSD - FEED A BREAKER	NORMAL	OPENED	DI	1.3.5.1
DROP11	76PCM02	1C31232G01	M76ZD9265	76 USSD TIE BREAKER	NORMAL	OPENED	DI	1.3.5.2
DROP11	76PCM02	1C31232G01	M76ZD9267	76USSD - 76-TC-06 FEED BREAKER	NORMAL	OPENED	DI	1.3.5.3
DROP11	76PCM02	1C31232G01	M76ZD9269	76USSD - 76-TC-05 FEED BREAKER	NORMAL	OPENED	DI	1.3.5.4
DROP11	76PCM02	1C31232G01	M76ZD9271	76USSD - 76MCC76D02 FD BREAKER	NORMAL	OPENED	DI	1.3.5.5
DROP11	76PCM02	1C31232G01	M76ZD9273	76USSD - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.3.5.6
DROP11	76PCM02	1C31232G01	M76ZD9275	76USSD - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.3.5.7
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.5.8
DROP11	76PCM02	1C31232G01	M76EAL9261	76USSD - LINE A TRANSFORMER	U/VOLT	NORMAL	DI	1.3.5.9
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.5.10
DROP11	76PCM02	1C31232G01	M76ZB9269	76USSD - 76-TC-05 FEED BREAKER	NORMAL	CLOSED	DI	1.3.5.11
DROP11	76PCM02	1C31232G01	M76ZB9271	76USSD - 76MCC76D02 FD BREAKER	NORMAL	CLOSED	DI	1.3.5.12
DROP11	76PCM02	1C31232G01	M76ZB9273	76USSD - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.3.5.13
DROP11	76PCM02	1C31232G01	M76ZB9275	76USSD - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.3.5.14
DROP11	76PCM02	1C31232G01	SPARE				DI	1.3.5.15
DROP11	76PCM02	1C31232G01	<b>M11QC3S05</b>	<b>DPU11 QC DROP 3 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.5.16



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP11	76PCM02			Spare Module Address				1.3.6
DROP11	76PCM02			Spare Module Address				1.3.7
DROP11	76PCM02			Spare Module Address				1.3.8
DROP11	76PCM02	1C31232G01	M76MI0132	THICK XFER PUMP NO. 2	OFF	RUNNNG	DI	1.4.1.1
DROP11	76PCM02	1C31232G01	M76QI0132	THICK XFER PUMP NO. 2	LOCAL	INCOMP	DI	1.4.1.2
DROP11	76PCM02	1C31232G01	M76RI0132	THICK XFER PUMP NO. 2	NORMAL	READY	DI	1.4.1.3
DROP11	76PCM02	1C31232G01	<b>M76UA0132</b>	<b>THICK XFER PUMP NO. 2</b>	<b>NORMAL</b>	<b>FAIL</b>	DI	1.4.1.4
DROP11	76PCM02	1C31232G01	M76PAH2292	THICK XFER PUMP 2 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.1.5
DROP11	76PCM02	1C31232G01	M76PAL2292A	THICK XFER PUMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.6
DROP11	76PCM02	1C31232G01	M76PAL2292B	THICK XFER PUMP 2 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.7
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.1.8
DROP11	76PCM02	1C31232G01	M76MI0502	POLY DAY TANK 2 MIXER	OFF	RUNNNG	DI	1.4.1.9
DROP11	76PCM02	1C31232G01	M76QI0502	POLY DAY TANK 2 MIXER	LOCAL	INCOMP	DI	1.4.1.10
DROP11	76PCM02	1C31232G01	M76RI0502	POLY DAY TANK 2 MIXER	NORMAL	READY	DI	1.4.1.11
DROP11	76PCM02	1C31232G01	M76LAH2716	POLY DAY TANK 2 LEVEL ALARMS	NORMAL	HIGH	DI	1.4.1.12
DROP11	76PCM02	1C31232G01	M76LM2716	POLY DAY TANK 2 LEVEL ALARMS	NORMAL	MIDPNT	DI	1.4.1.13
DROP11	76PCM02	1C31232G01	M76LAL2716	POLY DAY TANK 2 LEVEL ALARMS	NORMAL	LOW	DI	1.4.1.14
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.1.15
DROP11	76PCM02	1C31232G01	<b>M11QC4S01</b>	<b>DPU11 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16
DROP11	76PCM02	1C31232G01	M76EAL9262	76USSD - LINE B TRANSFORMER	U/VOLT	NORMAL	DI	1.4.2.1
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.2
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.3
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.4
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.5
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.6
DROP11	76PCM02	1C31232G01	M76QI0702	OC EXHST FAN2 REMOTE	LOCAL	INCOMP	DI	1.4.2.7
DROP11	76PCM02	1C31232G01	M76MI0702	OC EXHST FAN2 ON	OFF	RUNNNG	DI	1.4.2.8
DROP11	76PCM02	1C31232G01	M76RI0702	OC EXHST FAN2 CTRL PWR	NRDY	RDY	DI	1.4.2.9
DROP11	76PCM02	1C31232G01	M76UA0702A	OC EXHST FAN2 FAIL	NORMAL	FAIL	DI	1.4.2.10
DROP11	76PCM02	1C31232G01	M76UA0702B	OC EXHST FAN2 ALARM	NORMAL	ALARM	DI	1.4.2.11
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.12
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.13
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.14
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.2.15
DROP11	76PCM02	1C31232G01	<b>M11QC4S02</b>	<b>DPU11 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP11	76PCM02	1C31232G01	M76MI0524	TC POLY FEED PUMP NO. 4	OFF	RUNNING	DI	1.4.3.1
DROP11	76PCM02	1C31232G01	<b>M76QS0524</b>	<b>TC POLY FEED PUMP NO. 4</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.4.3.2
DROP11	76PCM02	1C31232G01	M76RI0524	TC POLY FEED PUMP NO. 4	WAIT	READY	DI	1.4.3.3
DROP11	76PCM02	1C31232G01	M76UA0524	TC POLY FEED PUMP NO. 4	NORMAL	FAIL	DI	1.4.3.4
DROP11	76PCM02	1C31232G01	M76PAH2752	TC POLY FD PUMP 4 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.3.5
DROP11	76PCM02	1C31232G01	M76PAL2752A	TC POLY FD PUMP 4 PRESS CUTOUT	NORMAL	LOW	DI	1.4.3.6
DROP11	76PCM02	1C31232G01	M76PAL2752B	TC POLY FD PUMP 4 PRESS CUTOUT	NORMAL	LOW	DI	1.4.3.7
DROP11	76PCM02	1C31232G01	M76ZB1220	THICK CFUGE4 POLY INJECT VLV 1	NORMAL	CLOSED	DI	1.4.3.8
DROP11	76PCM02	1C31232G01	M76ZD1220	THICK CFUGE4 POLY INJECT VLV 1	NORMAL	OPENED	DI	1.4.3.9
DROP11	76PCM02	1C31232G01	M76ZB1221	THICK CFUGE4 POLY INJECT VLV 2	NORMAL	CLOSED	DI	1.4.3.10
DROP11	76PCM02	1C31232G01	M76ZD1221	THICK CFUGE4 POLY INJECT VLV 2	NORMAL	OPENED	DI	1.4.3.11
DROP11	76PCM02	1C31232G01	M76PAH2165	TC FEED PUMP 4 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.3.12
DROP11	76PCM02	1C31232G01	M76PAL2165A	TC FEED PUMP 4 PRESS CUTOUT	NORMAL	LOW	DI	1.4.3.13
DROP11	76PCM02	1C31232G01	M76PAL2165B	TC FEED PUMP 4 PRESS CUTOUT	NORMAL	LOW	DI	1.4.3.14
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.3.15
DROP11	76PCM02	1C31232G01	<b>M11QC4S03</b>	<b>DPU11 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.4.1
DROP11	76PCM02	1C31232G01	M76UA9262	76USSD - LINE B TRANSFORMER	NORMAL	TRBL	DI	1.4.4.2
DROP11	76PCM02	1C31232G01	M76ZA9264	76USSD - FEED B BREAKER	NORMAL	TRIPPD	DI	1.4.4.3
DROP11	76PCM02	1C31232G01	M76ZA9266	76USSD - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.4.4.4
DROP11	76PCM02	1C31232G01	M76ZA9268	76USSD - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.4.4.5
DROP11	76PCM02	1C31232G01	M76ZA9270	76USSD - 76MCC76D01 FD BREAKER	TRIPPD	NORMAL	DI	1.4.4.6
DROP11	76PCM02	1C31232G01	M76ZA9272	76USSD - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.4.4.7
DROP11	76PCM02	1C31232G01	M76ZA9274	76USSD - 76-TC-03 FEED BREAKER	TRIPPD	NORMAL	DI	1.4.4.8
DROP11	76PCM02	1C31232G01	M76ZB9264	76USSD - FEED B BREAKER	NORMAL	CLOSED	DI	1.4.4.9
DROP11	76PCM02	1C31232G01	M76ZB9266	76USSD - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.4.4.10
DROP11	76PCM02	1C31232G01	M76ZB9268	76USSD - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.4.4.11
DROP11	76PCM02	1C31232G01	M76ZB9270	76USSD - 76MCC76D01 FD BREAKER	NORMAL	CLOSED	DI	1.4.4.12
DROP11	76PCM02	1C31232G01	M76ZB9272	76USSD - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.4.4.13
DROP11	76PCM02	1C31232G01	M76ZB9274	76USSD - 76-TC-03 FEED BREAKER	NORMAL	CLOSED	DI	1.4.4.14
DROP11	76PCM02	1C31232G01	SPARE				DI	1.4.4.15
DROP11	76PCM02	1C31232G01	<b>M11QC4S04</b>	<b>DPU11 QC DROP 4 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16
DROP11	76PCM02			Spare Module Address				1.4.6
DROP11	76PCM02			Spare Module Address				1.4.7
DROP11	76PCM02			Spare Module Address				1.4.8

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP11	76PCM02	5A26458G04	<b>M76HS0523</b>	<b>TC POLY FEED PUMP NO.3 START/STOP</b>	<b>OFF</b>	<b>RUN</b>	DO	1.5.1.1
DROP11	76PCM02	5A26458G04	M76HS0133	THICK XFER PUMP NO. 3	OFF	RUN	DO	1.5.1.2
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.3
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.4
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.5
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.6
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.7
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.8
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.9
DROP11	76PCM02	5A26458G04	SPARE				DO	1.5.1.10
DROP11	76PCM02	5A26458G04	M76HS9998	BLDG 76 SITE LIGHTING 1	OFF	RUN	DO	1.5.1.11
DROP11	76PCM02	5A26458G04	M86HS0703	OC EXHST FAN3 RUN CMD	OFF	RUN	DO	1.5.1.12
DROP11	76PCM02	5A26458G04	<b>M76HS0524</b>	<b>TC POLY FEED PUMP NO.4 START/STOP</b>	<b>OFF</b>	<b>RUN</b>	DO	1.6.1.1
DROP11	76PCM02	5A26458G04	M76HS0132	THICK XFER PUMP NO. 2	OFF	RUN	DO	1.6.1.2
DROP11	76PCM02	5A26458G04	SPARE				DO	1.6.1.3
DROP11	76PCM02	5A26458G04	M76HS0502	POLY DAY TANK 2 MIXER	OFF	RUN	DO	1.6.1.4
DROP11	76PCM02	5A26458G04	SPARE				DO	1.6.1.5
DROP11	76PCM02	5A26458G04	SPARE				DO	1.6.1.6
DROP11	76PCM02	5A26458G04	SPARE				DO	1.6.1.7
DROP11	76PCM02	5A26458G04	SPARE				DO	1.6.1.8
DROP11	76PCM02	5A26458G04	SPARE				DO	1.6.1.9
DROP11	76PCM02	5A26458G04	SPARE				DO	1.6.1.10
DROP11	76PCM02	5A26458G04	M76HS9999	BLDG 76 LITE LIGHTING 2	OFF	RUN	DO	1.6.1.11
DROP11	76PCM02	5A26458G04	M76HS0702	OC EXHST FAN2 RUN CMD	OFF	RUN	DO	1.6.1.12

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP13	76PCM03	5X00419G01		76VDL03 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1
			76MV1170	THICKENING CENTRIFUGE FEED PUMP 5 INLET VALVE				
			76MV1171	THICKENING CENTRIFUGE FEED PUMP 5 DISCH VALVE				
			76MV1172	THICKENING CENTRIFUGE FEED PUMP 5 BYPASS VAVLE				
			76MV1755	THICKENING CENTRIFUGE POLY FEED PUMP 5 INLET VALVE				
			76MV1756	THICKENING CENTRIFUGE POLY FEED PUMP 5 DISCH VALVE				
			76MV1757	THICKENING CENTRIFUGE POLY FEED PUMP 5 BYPASS VALVE				
DROP13	76PCM03	5X00419G01	M76TC05	TC NO. 5			ET	1.1.2
			M76P0115	TC FEED PUMP NO. 5				
DROP13	76PCM03		Spare Module Address					1.1.3
DROP13	76PCM03		Spare Module Address					1.1.4
DROP13	76PCM03	5X00106G01	M76FT2171	THICK CENTRIFUGE 5 SLUDGE FLOW	0	1500 GPM	AI - HART	1.1.5.1
DROP13	76PCM03	5X00106G01	M76FT2756	TC 5 POLYMER FLOW	0	30 GPM	AI - HART	1.1.5.2
DROP13	76PCM03	5X00106G01	M76FT2758	TC POLY FEED PUMP 5 ROTAMETER	0	20 GPM	AI - HART	1.1.5.3
DROP13	76PCM03	5X00106G01	M76PT2755	TC POLY FD PUMP 5 DISCH PRESS	0	45 PSI	AI - HART	1.1.5.4
DROP13	76PCM03	5X00106G01	M76ST0525	TC POLY FEED PUMP NO. 5 SPEED	0	100 PCT	AI - HART	1.1.5.5
DROP13	76PCM03	5X00106G01	M76PT2172	TC FEED PUMP 5 DISCH PRESS	0	45 PSI	AI - HART	1.1.5.6
DROP13	76PCM03	5X00106G01	SPARE				AI - HART	1.1.5.7
DROP13	76PCM03	5X00106G01	SPARE				AI - HART	1.1.5.8
DROP13	76PCM03		Spare Module Address					1.1.6
DROP13	76PCM03		Spare Module Address					1.1.7
DROP13	76PCM03	5X00119G01	MDPU13T1	DPU 13 CABINET TEMPERATURE	32	154 DEG F	RTD	1.1.8.1
DROP13	76PCM03	5X00119G01	SPARE				RTD	1.1.8.2
DROP13	76PCM03	5X00119G01	SPARE				RTD	1.1.8.3
DROP13	76PCM03	5X00119G01	SPARE				RTD	1.1.8.4
DROP13	76PCM03	5X00119G01	SPARE				RTD	1.1.8.5
DROP13	76PCM03	5X00119G01	SPARE				RTD	1.1.8.6
DROP13	76PCM03	5X00119G01	SPARE				RTD	1.1.8.7
DROP13	76PCM03	5X00119G01	SPARE				RTD	1.1.8.8
DROP13	76PCM03		Spare Module Address					1.2.1

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP13	76PCM03	5X00167G01	<b>M76SC0525</b>	TC POLY FEED PUMP NO.5 SPD CMD	0	100 PCT	AO	1.2.2.1	
DROP13	76PCM03	5X00167G01	SPARE				AO	1.2.2.2	
DROP13	76PCM03	5X00167G01	SPARE				AO	1.2.2.3	
DROP13	76PCM03	5X00167G01	SPARE				AO	1.2.2.4	
DROP13	76PCM03	5X00167G01	SPARE				AO	1.2.2.5	
DROP13	76PCM03	5X00167G01	SPARE				AO	1.2.2.6	
DROP13	76PCM03	5X00167G01	SPARE				AO	1.2.2.7	
DROP13	76PCM03	5X00167G01	SPARE				AO	1.2.2.8	
DROP13	76PCM03	Spare Module Address							1.2.3
DROP13	76PCM03	5X00106G01	M76FT2141	TC FEED HDR RECYCLE FLOW	0	900 GPM	AI - HART	1.2.4.1	
DROP13	76PCM03	5X00106G01	M76DT2140	TC INLT SLUDGE DENSITY	0	5 PCT	AI - HART	1.2.4.2	
DROP13	76PCM03	5X00106G01	M76PT2142	TC FEED HDR RECYCLE PRESS	0	50 PSI	AI - HART	1.2.4.3	
DROP13	76PCM03	5X00106G01	SPARE				AI - HART	1.2.4.4	
DROP13	76PCM03	5X00106G01	SPARE				AI - HART	1.2.4.5	
DROP13	76PCM03	5X00106G01	SPARE				AI - HART	1.2.4.6	
DROP13	76PCM03	5X00106G01	SPARE				AI - HART	1.2.4.7	
DROP13	76PCM03	5X00106G01	SPARE				AI - HART	1.2.4.8	
DROP13	76PCM03	Spare Module Address							1.2.5
DROP13	76PCM03	Spare Module Address							1.2.6
DROP13	76PCM03	1C31166G02		CENTRIFUGE BUILDING - POWER MONITORING			SERIAL	1.2.7	
DROP13	76PCM03	5X00419G01		76VDL03 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8	
DROP13	76PCM03	1C31232G01	M76EAL9201	76USSA - LINE A TRANSFORMER	NORMAL	U/VOLT	DI	1.3.1.1	
DROP13	76PCM03	1C31232G01	M76ZD9214	76USSA - 76MCC76A02 FD BREAKER	OPENED	NORMAL	DI	1.3.1.2	
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.1.3	
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.1.4	
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.1.5	
DROP13	76PCM03	1C31232G01	M76UA9201	76USSA - LINE A TRANSFORMER	TRBL	NORMAL	DI	1.3.1.6	
DROP13	76PCM03	1C31232G01	M76ZA9203	76USSA - FEED A BREAKER	TRIPPD	NORMAL	DI	1.3.1.7	
DROP13	76PCM03	1C31232G01	M76ZA9206	76USSA - 76MCC76A01 FD BREAKER	NORMAL	TRIPPD	DI	1.3.1.8	
DROP13	76PCM03	1C31232G01	M76ZA9207	76USSA - SPARE MCC FD BREAKER	NORMAL	TRIPPD	DI	1.3.1.9	
DROP13	76PCM03	1C31232G01	M76ZA9209	76USSA - 76-TC-01 FEED BREAKER	NORMAL	TRIPPD	DI	1.3.1.10	
DROP13	76PCM03	1C31232G01	M76ZA9212	76USSA - SPARE MCC FD BREAKER	NORMAL	TRIPPD	DI	1.3.1.11	
DROP13	76PCM03	1C31232G01	M76ZB9203	76USSA - FEED A BREAKER	CLOSED	NORMAL	DI	1.3.1.12	
DROP13	76PCM03	1C31232G01	M76ZB9206	76USSA - 76MCC76A01 FD BREAKER	CLOSED	NORMAL	DI	1.3.1.13	
DROP13	76PCM03	1C31232G01	M76ZB9207	76USSA - SPARE MCC FD BREAKER	CLOSED	NORMAL	DI	1.3.1.14	
DROP13	76PCM03	1C31232G01	M76ZB9209	76USSA - 76-TC-01 FEED BREAKER	CLOSED	NORMAL	DI	1.3.1.15	
DROP13	76PCM03	1C31232G01	<b>M13QC3S01</b>	<b>DPUI3 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16	

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.1
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.2
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.3
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.4
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.5
DROP13	76PCM03	1C31232G01	M76ZD9204	76USSA - FEED B BREAKER	OPENED	NORMAL	DI	1.3.2.6
DROP13	76PCM03	1C31232G01	M76ZD9206	76USSA - 76MCC76A01 FD BREAKER	OPENED	NORMAL	DI	1.3.2.7
DROP13	76PCM03	1C31232G01	M76ZD9208	76USSA - 76-TC-02 FEED BREAKER	OPENED	NORMAL	DI	1.3.2.8
DROP13	76PCM03	1C31232G01	M76ZD9210	76USSA - 76-TC-04 FEED BREAKER	OPENED	NORMAL	DI	1.3.2.9
DROP13	76PCM03	1C31232G01	M76ZD9212	76USSA - SPARE MCC FD BREAKER	OPENED	NORMAL	DI	1.3.2.10
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.11
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.12
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.13
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.14
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.2.15
DROP13	76PCM03	1C31232G01	<b>M13QC3S02</b>	<b>DPU13 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16
DROP13	76PCM03	1C31232G01	M76ZB9212	76USSA - SPARE MCC FD BREAKER	CLOSED	NORMAL	DI	1.3.3.1
DROP13	76PCM03	1C31232G01	M76ZB9213	76USSA - SPARE MCC FD BREAKER	CLOSED	NORMAL	DI	1.3.3.2
DROP13	76PCM03	1C31232G01	M76ZB9214	76USSA - 76MCC76A02 FD BREAKER	CLOSED	NORMAL	DI	1.3.3.3
DROP13	76PCM03	1C31232G01	M76ZD9203	76USSA - FEED A BREAKER	OPENED	NORMAL	DI	1.3.3.4
DROP13	76PCM03	1C31232G01	M76ZD9205	76USSA - TIE BREAKER	OPENED	NORMAL	DI	1.3.3.5
DROP13	76PCM03	1C31232G01	M76ZD9207	76USSA - SPARE MCC FD BREAKER	OPENED	NORMAL	DI	1.3.3.6
DROP13	76PCM03	1C31232G01	M76ZD9209	76USSA - 76-TC-01 FEED BREAKER	OPENED	NORMAL	DI	1.3.3.7
DROP13	76PCM03	1C31232G01	M76ZD9211	76USSA - SPARE MCC FD BREAKER	OPENED	NORMAL	DI	1.3.3.8
DROP13	76PCM03	1C31232G01	M76ZD9213	76USSA - SPARE MCC FD BREAKER	OPENED	NORMAL	DI	1.3.3.9
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.3.10
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.3.11
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.3.12
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.3.13
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.3.14
DROP13	76PCM03	1C31232G01	SPARE				DI	1.3.3.15
DROP13	76PCM03	1C31232G01	<b>M13QC3S03</b>	<b>DPU13 QC DROP 3 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.3.16
DROP13	76PCM03			Spare Module Address				1.3.4
DROP13	76PCM03			Spare Module Address				1.3.5
DROP13	76PCM03			Spare Module Address				1.3.6
DROP13	76PCM03			Spare Module Address				1.3.7
DROP13	76PCM03			Spare Module Address				1.3.8

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP13	76PCM03	1C31232G01	M76MI0525	TC POLY FEED PUMP NO. 5	RUNNNG	OFF	DI	1.4.1.1
DROP13	76PCM03	1C31232G01	<b>M76QS0525</b>	<b>TC POLY FEED PUMP NO. 5</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.4.1.2
DROP13	76PCM03	1C31232G01	M76RI0525	TC POLY FEED PUMP NO. 5	WAIT	READY	DI	1.4.1.3
DROP13	76PCM03	1C31232G01	M76UA0525	TC POLY FEED PUMP NO. 5	NORMAL	FAIL	DI	1.4.1.4
DROP13	76PCM03	1C31232G01	M76PAH2757	TC POLY FD PUMP 5 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.1.5
DROP13	76PCM03	1C31232G01	M76PAL2757A	TC POLY FD PUMP 5 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.6
DROP13	76PCM03	1C31232G01	M76PAL2757B	TC POLY FD PUMP 5 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.7
DROP13	76PCM03	1C31232G01	M76ZB1230	THICK CFUGE 5 POLY INJECT VLV1	CLOSED	NORMAL	DI	1.4.1.8
DROP13	76PCM03	1C31232G01	M76ZD1230	THICK CFUGE 5 POLY INJECT VLV1	OPENED	NORMAL	DI	1.4.1.9
DROP13	76PCM03	1C31232G01	M76ZB1231	THICK CFUGE 5 POLY INJECT VLV2	CLOSED	NORMAL	DI	1.4.1.10
DROP13	76PCM03	1C31232G01	M76ZD1231	THICK CFUGE 5 POLY INJECT VLV2	OPENED	NORMAL	DI	1.4.1.11
DROP13	76PCM03	1C31232G01	M76PAH2170	TC FEED PUMP 5 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.1.12
DROP13	76PCM03	1C31232G01	M76PAL2170A	TC FEED PUMP 5 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.13
DROP13	76PCM03	1C31232G01	M76PAL2170B	TC FEED PUMP 5 PRESS CUTOUT	NORMAL	LOW	DI	1.4.1.14
DROP13	76PCM03	1C31232G01	SPARE				DI	1.4.1.15
DROP13	76PCM03	1C31232G01	<b>M13QC4S01</b>	<b>DPU13 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16
DROP13	76PCM03	1C31232G01	M76EAL9202	76USSA - LINE B TRANSFORMER	NORMAL	U/VOLT	DI	1.4.2.1
DROP13	76PCM03	1C31232G01	SPARE				DI	1.4.2.2
DROP13	76PCM03	1C31232G01	M76UA9202	76USSA - LINE B TRANSFORMER	TRBL	NORMAL	DI	1.4.2.3
DROP13	76PCM03	1C31232G01	M76ZA9204	76USSA - FEED B BREAKER	TRIPPD	NORMAL	DI	1.4.2.4
DROP13	76PCM03	1C31232G01	M76ZA9205	76USSA - TIE BREAKER	TRIPPD	NORMAL	DI	1.4.2.5
DROP13	76PCM03	1C31232G01	M76ZA9208	76USSA - 76-TC-02 FEED BREAKER	NORMAL	TRIPPD	DI	1.4.2.6
DROP13	76PCM03	1C31232G01	M76ZA9210	76USSA - 76-TC-04 FEED BREAKER	NORMAL	TRIPPD	DI	1.4.2.7
DROP13	76PCM03	1C31232G01	M76ZA9211	76USSA - SPARE MCC FD BREAKER	NORMAL	TRIPPD	DI	1.4.2.8
DROP13	76PCM03	1C31232G01	M76ZA9213	76USSA - SPARE MCC FD BREAKER	NORMAL	TRIPPD	DI	1.4.2.9
DROP13	76PCM03	1C31232G01	M76ZA9214	76USSA - 76MCC76A02 FD BREAKER	NORMAL	TRIPPD	DI	1.4.2.10
DROP13	76PCM03	1C31232G01	M76ZB9204	76USSA - FEED B BREAKER	CLOSED	NORMAL	DI	1.4.2.11
DROP13	76PCM03	1C31232G01	M76ZB9205	76USSA - TIE BREAKER	CLOSED	NORMAL	DI	1.4.2.12
DROP13	76PCM03	1C31232G01	M76ZB9208	76USSA - 76-TC-02 FEED BREAKER	CLOSED	NORMAL	DI	1.4.2.13
DROP13	76PCM03	1C31232G01	M76ZB9210	76USSA - 76-TC-04 FEED BREAKER	CLOSED	NORMAL	DI	1.4.2.14
DROP13	76PCM03	1C31232G01	M76ZB9211	76USSA - SPARE MCC FD BREAKER	CLOSED	NORMAL	DI	1.4.2.15
DROP13	76PCM03	1C31232G01	<b>M13QC4S02</b>	<b>DPU13 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16
DROP13	76PCM03			Spare Module Address				1.4.3
DROP13	76PCM03			Spare Module Address				1.4.4
DROP13	76PCM03			Spare Module Address				1.4.5
DROP13	76PCM03			Spare Module Address				1.4.6
DROP13	76PCM03			Spare Module Address				1.4.7
DROP13	76PCM03			Spare Module Address				1.4.8

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DROP13	76PCM03	5A26458G04	<b>M76HS0525</b>	<b>TC POLY FEED PUMP NO.5 START/STOP</b>	<b>OFF</b>	<b>RUN</b>	DO	1.5.1.1
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.2
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.3
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.4
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.5
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.6
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.7
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.8
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.9
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.10
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.11
DROP13	76PCM03	5A26458G04	SPARE				DO	1.5.1.12

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP16	76PCM06	5X00106G01/5X00109G01A	M76FT2506	DEWTRG CFUGE 1 SLUDGE FLOW	0	350 GPM	AI	1.1.1.1
DROP16	76PCM06	5X00106G01/5X00109G01A	M76PT2507	DC FEED PUMP 1 DISCH PRESS	0	50 PSI	AI	1.1.1.2
DROP16	76PCM06	5X00106G01/5X00109G01A	M76PT2555	DC 1 INLT SLUDGE PRESS	0	50 PSI	AI	1.1.1.3
DROP16	76PCM06	5X00106G01/5X00109G01A	M76TT2556	DEWAT CFUGE 1 INLT SLUDGE TEMP	70	150 DEG F	AI	1.1.1.4
DROP16	76PCM06	5X00106G01/5X00109G01A	M76LT2720	POLY DAY TANK 3 LEVEL	0	12 FT	AI	1.1.1.5
DROP16	76PCM06	5X00106G01/5X00109G01A	M76PT2770	DC POLY FD PUMP 1 DISCH PRESS	0	100 PSI	AI	1.1.1.6
DROP16	76PCM06	5X00106G01/5X00109G01A	M76LT2821	FERRIC CHLORIDE DAY TANK 1 LVL	0	10 FT	AI	1.1.1.7
DROP16	76PCM06	5X00106G01/5X00109G01A	SPARE				AI	1.1.1.8
DROP16	76PCM06			Spare Module Address				1.1.2
DROP16	76PCM06			Spare Module Address				1.2.1
DROP16	76PCM06	5X00419G01	<b>M76DC01</b>	<b>DC NO. 1</b>			ET	1.2.2
DROP16	76PCM06	QBO/G01	M76HS0281	CAKE PMP1 S/S TO 76-LCP-03	OFF	RUN	DO	3.1.1.1
DROP16	76PCM06	QBO/G01	M76QS0281A	CAKE PMP1 STATUS TO 76-LCP-03	DSELECT	SELECT	DO	3.1.1.2
DROP16	76PCM06	QBO/G01	M76QS0281B	CAKE PMP3 STATUS TO 76-LCP-03	DSELECT	SELECT	DO	3.1.1.3
DROP16	76PCM06	QBO/G01	M76HS0283	CAKE PMP3 S/S TO 76-LCP-03	OFF	RUN	DO	3.1.1.4
DROP16	76PCM06	QBO/G01	SPARE				DO	3.1.1.5
DROP16	76PCM06	QBO/G01	SPARE				DO	3.1.1.6
DROP16	76PCM06	QBO/G01	<b>M76HS0251B</b>	<b>DC FD PMP1 S/S TO 76DC01.LCP</b>	<b>OFF</b>	<b>RUN</b>	DO	3.1.1.7
DROP16	76PCM06	QBO/G01	SPARE				DO	3.1.1.8
DROP16	76PCM06	QBO/G01	<b>M76HS0561B</b>	<b>DC POLY FEED PUMP NO. 1</b>	<b>OFF</b>	<b>RUN</b>	DO	3.1.1.9
DROP16	76PCM06	QBO/G01	SPARE				DO	3.1.1.10
DROP16	76PCM06	QBO/G01	SPARE				DO	3.1.1.11
DROP16	76PCM06	QBO/G01	SPARE				DO	3.1.1.12
DROP16	76PCM06	QBO/G01	SPARE				DO	3.1.1.13
DROP16	76PCM06	QBO/G01	SPARE				DO	3.1.1.14
DROP16	76PCM06	QBO/G01	M76HS1116A	GRIT CONVEYOR 1 DISCH GATE 1	OFF	OPEN	DO	3.1.1.15
DROP16	76PCM06	QBO/G01	M76HS1116B	GRIT CONVEYOR 1 DISCH GATE 1	OFF	CLOSE	DO	3.1.1.16
DROP16	76PCM06	QBO/G01	M76HS0285	CAKE PMP5 S/S TO 76-LCP-03	OFF	RUN	DO	3.1.5.1
DROP16	76PCM06	QBO/G01	M76QS0285A	CAKE PMP5 STATUS TO 76-LCP-03	DSELECT	SELECT	DO	3.1.5.2
DROP16	76PCM06	QBO/G01	M76QS0285B	CAKE PMP7 STATUS TO 76-LCP-03	DSELECT	SELECT	DO	3.1.5.3
DROP16	76PCM06	QBO/G01	M76HS0287	CAKE PMP7 S/S TO 76-LCP-03	OFF	RUN	DO	3.1.5.4
DROP16	76PCM06	QBO/G01	SPARE				DO	3.1.5.5
DROP16	76PCM06	QBO/G01	SPARE				DO	3.1.5.6
DROP16	76PCM06	QBO/G01	M76HS2504A	DC FD HEADER PRESS	OFF	123	DO	3.1.5.7
DROP16	76PCM06	QBO/G01	M76HS2504B	DC FD HEADER PRESS	OFF	231	DO	3.1.5.8
DROP16	76PCM06	QBO/G01	M76HS2504C	DC FD HEADER PRESS	OFF	312	DO	3.1.5.9
DROP16	76PCM06	QBO/G01	M76QS2504	DC FD HEADER PRESS	OFF	CMPRDY	DO	3.1.5.10
DROP16	76PCM06	QBO/G01	M76HS1117A	GRIT CONVEYOR 1 DISCH GATE 2	OFF	OPEN	DO	3.1.5.11
DROP16	76PCM06	QBO/G01	M76HS1117B	GRIT CONVEYOR 1 DISCH GATE 2	OFF	CLOSE	DO	3.1.5.12
DROP16	76PCM06	QBO/G01	M76HS0511	POLY DAY TANK 3 MIXER	OFF	RUN	DO	3.1.5.13
DROP16	76PCM06	QBO/G01	M76HS1318A	SCREEN2 SCREENING DIVERTR GATE	OFF	OPEN	DO	3.1.5.14
DROP16	76PCM06	QBO/G01	M76HS1318B	SCREEN2 SCREENING DIVERTR GATE	OFF	CLOSE	DO	3.1.5.15
DROP16	76PCM06	QBO/G01	M76HS1319A	SCREEN 2 SOLIDS DISCH VALVE	OFF	OPEN	DO	3.1.5.16





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DROP16	76PCM06	QBO/G01	M76HS1319B	SCREEN 2 SOLIDS DISCH VALVE	OFF	CLOSE	DO	3.1.9.1
DROP16	76PCM06	QBO/G01	M76HS1328A	SCREEN3 SCREENING DIVERTR GATE	OFF	OPEN	DO	3.1.9.2
DROP16	76PCM06	QBO/G01	M76HS1328B	SCREEN3 SCREENING DIVERTR GATE	OFF	CLOSE	DO	3.1.9.3
DROP16	76PCM06	QBO/G01	M76HS1329A	SCREEN 3 SOLIDS DISCH VALVE	OFF	OPEN	DO	3.1.9.4
DROP16	76PCM06	QBO/G01	M76HS1329B	SCREEN 3 SOLIDS DISCH VALVE	OFF	CLOSE	DO	3.1.9.5
DROP16	76PCM06	QBO/G01	M76HS0402	SCREEN NO. 2	OFF	RUN	DO	3.1.9.6
DROP16	76PCM06	QBO/G01	M76HS0403	SCREEN NO. 3	OFF	RUN	DO	3.1.9.7
DROP16	76PCM06	QBO/G01	SPARE				DO	3.1.9.8
DROP16	76PCM06	QBO/G01	SPARE				DO	3.1.9.9
DROP16	76PCM06	QBO/G01	SPARE				DO	3.1.9.10
DROP16	76PCM06	QBO/G01	SPARE				DO	3.1.9.11
DROP16	76PCM06	QBO/G01	M76MU0287	DC CAKE PMP 7 BYPASS/LOAD	LOAD	BYPASS	DO	3.1.9.12
DROP16	76PCM06	QBO/G01	M76MU0285	DC CAKE PMP 5 BYPASS/LOAD	LOAD	BYPASS	DO	3.1.9.13
DROP16	76PCM06	QBO/G01	M76MU0283	DC CAKE PMP 3 BYPASS/LOAD	LOAD	BYPASS	DO	3.1.9.14
DROP16	76PCM06	QBO/G01	M76MU0281	DC CAKE PMP 1 BYPASS/LOAD	LOAD	BYPASS	DO	3.1.9.15
DROP16	76PCM06	QBO/G01	M76HS0251C	DC SLUDGE FEED PUMP 1 DISABLE	ENABLE	DISABL	DO	3.1.9.16
DROP16	76PCM06	QAX/G05	M76PT9042A	SCREEN NO. 2 PRESS	0	20 PSI	AI	3.2.1.1
DROP16	76PCM06	QAX/G05	M76PT9042B	SCREEN NO. 2 PRESS	0	20 PSI	AI	3.2.1.2
DROP16	76PCM06	QAX/G05	M76LT2655A	CFUGE BIN 3 LEVEL	0	4 FT	AI	3.2.1.3
DROP16	76PCM06	QAX/G05	M76LT2655B	CFUGE BIN 3 LEVEL	0	4 FT	AI	3.2.1.4
DROP16	76PCM06	QAX/G05	M76ST0240	CFUGE BIN 3 SCREW FEEDER 1	0	100 PCT	AI	3.2.1.5
DROP16	76PCM06	QAX/G05	M76ST0241	CFUGE BIN 3 SCREW FEEDER 2	0	100 PCT	AI	3.2.1.6
DROP16	76PCM06	QAX/G05	M76FT0283	CFUGE CAKE PUMP 3	0	150 GPM	AI	3.2.1.7
DROP16	76PCM06	QAX/G05	M76LT2670	SURGE BIN 3 LEVEL	0	100 PCT	AI	3.2.1.8
DROP16	76PCM06	QAX/G05	M76PT2671	PIPE LUBE RING 3 PRESSURE	0	1500 PSI	AI	3.2.1.9
DROP16	76PCM06	QAX/G05	M76PT2673	CAKE PUMP 3 DISCH PRESSURE	0	1500 PSI	AI	3.2.1.10
DROP16	76PCM06	QAX/G05	M76FT2771	DEWTRG CFUGE 1 POLYMER FLOW	0	40 GPM	AI	3.2.1.11
DROP16	76PCM06	QAX/G05	M76FT2773	DC POLY FEED PUMP 1 ROTAMETER	0	40 GPM	AI	3.2.1.12
DROP16	76PCM06	QAX/G05	M76ST0251	DC FEED PUMP NO. 1	0	100 PCT	AI	3.2.2.1
DROP16	76PCM06	QAX/G05	M76ZT1559	HEAT EXCHANGR1 HOT WTR SUPPLY	0	100 PCT	AI	3.2.2.2
DROP16	76PCM06	QAX/G05	SPARE				AI	3.2.2.3
DROP16	76PCM06	QAX/G05	SPARE				AI	3.2.2.4
DROP16	76PCM06	QAX/G05	SPARE				AI	3.2.2.5
DROP16	76PCM06	QAX/G05	SPARE				AI	3.2.2.6
DROP16	76PCM06	QAX/G05	SPARE				AI	3.2.2.7
DROP16	76PCM06	QAX/G05	M76LT2650A	CFUGE BIN 1 LEVEL	0	4 FT	AI	3.2.2.8
DROP16	76PCM06	QAX/G05	M76LT2650B	CFUGE BIN 1 LEVEL	0	4 FT	AI	3.2.2.9
DROP16	76PCM06	QAX/G05	M76ST0230	CFUGE BIN 1 SCREW FEEDER 1	0	100 PCT	AI	3.2.2.10
DROP16	76PCM06	QAX/G05	M76ST0231	CFUGE BIN 1 SCREW FEEDER 2	0	100 PCT	AI	3.2.2.11
DROP16	76PCM06	QAX/G05	SPARE				AI	3.2.2.12

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DROP16	76PCM06	QID/G03	M76QI0281	CAKE PUMP NO. 1 DCS STATUS	LOCAL	INCOMP	DI	3.2.6.1
DROP16	76PCM06	QID/G03	M76QI0281B	CAKE PUMP NO. 1	DSELECT	SELECT	DI	3.2.6.2
DROP16	76PCM06	QID/G03	M76QI0281C	CAKE PUMP NO. 3	DSELECT	SELECT	DI	3.2.6.3
DROP16	76PCM06	QID/G03	M76QI0281D	CAKE PUMP NO. 1 & 3	DSELECT	SELECT	DI	3.2.6.4
DROP16	76PCM06	QID/G03	M76QI0281E	CAKE PUMP SELECTOR SWITCH 1/3	LOCAL	INCOMP	DI	3.2.6.5
DROP16	76PCM06	QID/G03	M76QI0283	CAKE PUMP NO. 3 DCS STATUS	LOCAL	INCOMP	DI	3.2.6.6
DROP16	76PCM06	QID/G03	SPARE				DI	3.2.6.7
DROP16	76PCM06	QID/G03	SPARE				DI	3.2.6.8
DROP16	76PCM06	QID/G03	M76MI0231A	CFUGE BIN 1 SCREW FEEDER 2	OFF	RUNFWD	DI	3.2.6.9
DROP16	76PCM06	QID/G03	M76MI0231B	CFUGE BIN 1 SCREW FEEDER 2	OFF	RUNRVS	DI	3.2.6.10
DROP16	76PCM06	QID/G03	M76QI0231	CFUGE BIN 1 SCREW FEEDER 2	LOCAL	INCOMP	DI	3.2.6.11
DROP16	76PCM06	QID/G03	M76RI0231	DC BIN 1 SCREW FDR 2 AC POWER	WAIT	READY	DI	3.2.6.12
DROP16	76PCM06	QID/G03	M76UA0231A	CFUGE BIN1 SCREW FDR2 TORQUE	NORMAL	HIGH	DI	3.2.6.13
DROP16	76PCM06	QID/G03	M76UA0231B	CFUGE BIN1 SCREW FDR2 COMMON	NORMAL	FAIL	DI	3.2.6.14
DROP16	76PCM06	QID/G03	SPARE				DI	3.2.6.15
DROP16	76PCM06	QID/G03	M16QD3S6	DPU16 QC SL6 HSD3 QID PS MON	ALARM	NORMAL	DI	3.2.6.16
DROP16	76PCM06	QID/G03	M76MI0281	CFUGE CAKE PUMP 1	OFF	RUNNNG	DI	3.2.8.1
DROP16	76PCM06	QID/G03	M76RI0281	CFUGE CAKE PUMP 1 AC POWER	WAIT	READY	DI	3.2.8.2
DROP16	76PCM06	QID/G03	M76ZD0281	CFUGE CAKE PUMP 1	NORMAL	ALARM	DI	3.2.8.3
DROP16	76PCM06	QID/G03	M76PAH2505	DC FEED PUMP 1 PRESS CUTOUT	NORMAL	HIGH	DI	3.2.8.4
DROP16	76PCM06	QID/G03	M76PAL2505A	DC FEED PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	3.2.8.5
DROP16	76PCM06	QID/G03	M76PAL2505B	DC FEED PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	3.2.8.6
DROP16	76PCM06	QID/G03	M76MI0251	DC FEED PUMP NO. 1	OFF	RUNNNG	DI	3.2.8.7
DROP16	76PCM06	QID/G03	<b>M76QI0251B</b>	<b>DC FEED PUMP NO. 1</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	3.2.8.8
DROP16	76PCM06	QID/G03	M76RI0251	DC FEED PUMP NO. 1	WAIT	READY	DI	3.2.8.9
DROP16	76PCM06	QID/G03	M76UA0251	DC FEED PUMP NO. 1	NORMAL	FAIL	DI	3.2.8.10
DROP16	76PCM06	QID/G03	SPARE				DI	3.2.8.11
DROP16	76PCM06	QID/G03	SPARE				DI	3.2.8.12
DROP16	76PCM06	QID/G03	SPARE				DI	3.2.8.13
DROP16	76PCM06	QID/G03	SPARE				DI	3.2.8.14
DROP16	76PCM06	QID/G03	M76PAH2772	DC POLY FD PUMP 1 PRESS CUTOUT	NORMAL	HIGH	DI	3.2.8.15
DROP16	76PCM06	QID/G03	M16QD4S8	DPU16 QC SL8 HSD4 QID PS MON	ALARM	NORMAL	DI	3.2.8.16
DROP16	76PCM06	QID/G03	M76MI0287	CFUGE CAKE PUMP 7	OFF	RUNNNG	DI	3.2.9.1
DROP16	76PCM06	QID/G03	M76RI0287	CFUGE CAKE PUMP 7 AC POWER	WAIT	READY	DI	3.2.9.2
DROP16	76PCM06	QID/G03	M76ZD0287	CFUGE CAKE PUMP 7	NORMAL	ALARM	DI	3.2.9.3
DROP16	76PCM06	QID/G03	M76RI0561	DC POLY FD PUMP NO. 1 AC POWER	WAIT	READY	DI	3.2.9.4
DROP16	76PCM06	QID/G03	M76UA0561	DC POLY FEED PUMP NO. 1	NORMAL	FAIL	DI	3.2.9.5
DROP16	76PCM06	QID/G03	M76JA2504	DC XFR PUMP PANEL DC POWER	NORMAL	FAIL/O	DI	3.2.9.6
DROP16	76PCM06	QID/G03	M76QI2504A	DC XFR PUMP 1/2/3 SELECTOR SW	LOCAL	INCOMP	DI	3.2.9.7
DROP16	76PCM06	QID/G03	M76QI2504B	DC FD HEADER PRESS	LOCAL	INCOMP	DI	3.2.9.8
DROP16	76PCM06	QID/G03	M76QI2503	DC FD HEADER RECYCLE FLO	LOCAL	INCOMP	DI	3.2.9.9
DROP16	76PCM06	QID/G03	SPARE				DI	3.2.9.10
DROP16	76PCM06	QID/G03	SPARE				DI	3.2.9.11
DROP16	76PCM06	QID/G03	SPARE				DI	3.2.9.12
DROP16	76PCM06	QID/G03	SPARE				DI	3.2.9.13
DROP16	76PCM06	QID/G03	SPARE				DI	3.2.9.14
DROP16	76PCM06	QID/G03	SPARE				DI	3.2.9.15
DROP16	76PCM06	QID/G03	M16QC5S9	DPU16 QC SL9 HSC5 QID PS MON	ALARM	NORMAL	DI	3.2.9.16



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DROP16	76PCM06	QID/G03	M76QI1116	GRIT CONVEYOR 1 DISCH GATE 1	LOCAL	INCOMP	DI	3.2.10.1
DROP16	76PCM06	QID/G03	M76RI1116	GRIT CONVEYOR 1 DISCH GATE 1	WAIT	READY	DI	3.2.10.2
DROP16	76PCM06	QID/G03	M76ZB1116	GRIT CONVEYOR 1 DISCH GATE 1	NORMAL	CLOSED	DI	3.2.10.3
DROP16	76PCM06	QID/G03	M76ZD1116	GRIT CONVEYOR 1 DISCH GATE 1	NORMAL	OPENED	DI	3.2.10.4
DROP16	76PCM06	QID/G03	M76QI1117	GRIT CONVEYOR 1 DISCH GATE 2	LOCAL	INCOMP	DI	3.2.10.5
DROP16	76PCM06	QID/G03	M76RI1117	GRIT CONVEYOR 1 DISCH GATE 2	WAIT	READY	DI	3.2.10.6
DROP16	76PCM06	QID/G03	M76ZB1117	GRIT CONVEYOR 1 DISCH GATE 2	NORMAL	CLOSED	DI	3.2.10.7
DROP16	76PCM06	QID/G03	M76ZD1117	GRIT CONVEYOR 1 DISCH GATE 2	NORMAL	OPENED	DI	3.2.10.8
DROP16	76PCM06	QID/G03	M76PAL2772A	DC POLY FD PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	3.2.10.9
DROP16	76PCM06	QID/G03	M76ZD1318	SCREEN2 SCREENING DIVERTR GATE	NORMAL	OPENED	DI	3.2.10.10
DROP16	76PCM06	QID/G03	M76ZD1556	DEWAT CFUGE 1 POLY INJECT VLV3	NORMAL	OPENED	DI	3.2.10.11
DROP16	76PCM06	QID/G03	M76QI1329	SCREEN 3 SOLIDS DISCH VALVE	LOCAL	INCOMP	DI	3.2.10.12
DROP16	76PCM06	QID/G03	M76MI0805	PIPELINE LUBE PUMP NO. 5	OFF	RUNNNG	DI	3.2.10.13
DROP16	76PCM06	QID/G03	M76NAH0411	SCREENINGS CONVEYOR NO. 1	NORMAL	HIGH	DI	3.2.10.14
DROP16	76PCM06	QID/G03	SPARE				DI	3.2.10.15
DROP16	76PCM06	QID/G03	M16QD5S10	DPU16 QC SL10 HSD5 QID PS MON	ALARM	NORMAL	DI	3.2.10.16
DROP16	76PCM06	QAO/G01A	M76FC2503	DC FD HDR RECYCLE VALVE POS	0	100 PST	AO	3.2.11.1
DROP16	76PCM06	QAO/G01A	M76PC2504	DC FD HDR PRS/76LCP02 PC STPNT	0	50 PSI	AO	3.2.11.2
DROP16	76PCM06	QAO/G01A	SPARE				AO	3.2.11.3
DROP16	76PCM06	QAO/G01A	SPARE				AO	3.2.11.4
DROP16	76PCM06	QID/G03	M76UA0805	PIPELINE LUBE PUMP NO. 5	NORMAL	FAIL	DI	3.2.12.1
DROP16	76PCM06	QID/G03	M76MI0807	PIPELINE LUBE PUMP NO. 7	OFF	RUNNNG	DI	3.2.12.2
DROP16	76PCM06	QID/G03	M76UA0807	PIPELINE LUBE PUMP NO. 7	NORMAL	FAIL	DI	3.2.12.3
DROP16	76PCM06	QID/G03	M76LAH2721	POLY DAY TANK 3 LEVEL ALARMS	NORMAL	HIGH	DI	3.2.12.4
DROP16	76PCM06	QID/G03	M76LAL2721	POLY DAY TANK 3 LEVEL ALARMS	NORMAL	LOW	DI	3.2.12.5
DROP16	76PCM06	QID/G03	M76LM2721	POLY DAY TANK 3 LEVEL ALARMS	NORMAL	MIDPNT	DI	3.2.12.6
DROP16	76PCM06	QID/G03	M76MI0511	POLY DAY TANK 3 MIXER	OFF	RUNNNG	DI	3.2.12.7
DROP16	76PCM06	QID/G03	M76QI0511	POLY DAY TANK 3 MIXER	LOCAL	INCOMP	DI	3.2.12.8
DROP16	76PCM06	QID/G03	M76RI0511	POLY DAY TANK 3 MIXER	WAIT	READY	DI	3.2.12.9
DROP16	76PCM06	QID/G03	M76LAH2722	POLY DAY TNKS 3 & 4 FLOOD ALRM	HIGH	NORMAL	DI	3.2.12.10
DROP16	76PCM06	QID/G03	M76ZB1315	SCREEN 2 ISOLATION VALVE	NORMAL	CLOSED	DI	3.2.12.11
DROP16	76PCM06	QID/G03	M76ZD1315	SCREEN 2 ISOLATION VALVE	NORMAL	OPENED	DI	3.2.12.12
DROP16	76PCM06	QID/G03	M76QI1318	SCREEN2 SCREENING DIVERTR GATE	LOCAL	INCOMP	DI	3.2.12.13
DROP16	76PCM06	QID/G03	M76RI1318	SCREEN2 SCREENING DIVERTR GATE	WAIT	READY	DI	3.2.12.14
DROP16	76PCM06	QID/G03	M76ZB1318	SCREEN2 SCREENING DIVERTR GATE	NORMAL	CLOSED	DI	3.2.12.15
DROP16	76PCM06	QID/G03	M16QC6S12	DPU16 QC SL12 HSC6 QID PS MON	ALARM	NORMAL	DI	3.2.12.16
DROP16	76PCM06	QAX/G05	M76PT9043A	SCREEN NO. 3 PRESS	0	20 PSI	AI	3.3.1.1
DROP16	76PCM06	QAX/G05	M76PT9043B	SCREEN NO. 3 PRESS	0	20 PSI	AI	3.3.1.2
DROP16	76PCM06	QAX/G05	M76FT0281	CFUGE CAKE PUMP 1	0	150 GPM	AI	3.3.1.3
DROP16	76PCM06	QAX/G05	M76LT2660	SURGE BIN 1 LEVEL	0	100 PCT	AI	3.3.1.4
DROP16	76PCM06	QAX/G05	M76PT2661	PIPE LUBE RING 2 PRESSURE	0	1500 PSI	AI	3.3.1.5
DROP16	76PCM06	QAX/G05	M76PT2663	CAKE PUMP 1 DISCH PRESSURE	0	1500 PSI	AI	3.3.1.6
DROP16	76PCM06	QAX/G05	M76FT0287	CFUGE CAKE PUMP 7	0	150 GPM	AI	3.3.1.7
DROP16	76PCM06	QAX/G05	M76LT2690	SURGE BIN 7 LEVEL	0	100 PCT	AI	3.3.1.8
DROP16	76PCM06	QAX/G05	M76PT2691	PIPE LUBE RING 7 PRESSURE	0	1500 PSI	AI	3.3.1.9
DROP16	76PCM06	QAX/G05	M76PT2693	CAKE PUMP 7 DISCH PRESSURE	0	1500 PSI	AI	3.3.1.10
DROP16	76PCM06	QAX/G05	M76ST0561	DC POLY FEED PUMP NO. 1	0	100 PCT	AI	3.3.1.11
DROP16	76PCM06	QAX/G05	SPARE				AI	3.3.1.12

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP16	76PCM06	QAO/G01A	M76FC0251	DC FEED PUMP 1 SPEED DEMAND	0	100 PCT	AO	3.3.4.1
DROP16	76PCM06	QAO/G01A	M76FC0561	DC POLY FD PMP 1 SPEED DEMAND	0	100 PCT	AO	3.3.4.2
DROP16	76PCM06	QAO/G01A	SPARE				AO	3.3.4.3
DROP16	76PCM06	QAO/G01A	SPARE				AO	3.3.4.4
DROP16	76PCM06	QRT/G02	MDPU16T1	DPU 16 CABINET TEMP	32	154 DEG F	RTD	3.3.5.1
DROP16	76PCM06	QRT/G02	SPARE				RTD	3.3.5.2
DROP16	76PCM06	QRT/G02	SPARE				RTD	3.3.5.3
DROP16	76PCM06	QRT/G02	SPARE				RTD	3.3.5.4
DROP16	76PCM06	QID/G03	M76QI0285	CAKE PUMP NO. 5 DCS STATUS	LOCAL	INCOMP	DI	3.3.6.1
DROP16	76PCM06	QID/G03	M76QI0285B	CAKE PUMP NO. 5	DSELECT	SELECT	DI	3.3.6.2
DROP16	76PCM06	QID/G03	M76QI0285C	CAKE PUMP NO. 7	DSELECT	SELECT	DI	3.3.6.3
DROP16	76PCM06	QID/G03	M76QI0285D	CAKE PUMP NO. 5 & 7	DSELECT	SELECT	DI	3.3.6.4
DROP16	76PCM06	QID/G03	M76QI0285E	CAKE PUMP SELECTOR SWITCH 5/7	LOCAL	INCOMP	DI	3.3.6.5
DROP16	76PCM06	QID/G03	M76QI0287	CAKE PUMP NO. 7 DCS STATUS	LOCAL	INCOMP	DI	3.3.6.6
DROP16	76PCM06	QID/G03	SPARE				DI	3.3.6.7
DROP16	76PCM06	QID/G03	SPARE				DI	3.3.6.8
DROP16	76PCM06	QID/G03	SPARE				DI	3.3.6.9
DROP16	76PCM06	QID/G03	M76MI0240A	CFUGE BIN 3 SCREW FEEDER 1	OFF	RUNFWD	DI	3.3.6.10
DROP16	76PCM06	QID/G03	M76MI0240B	CFUGE BIN 3 SCREW FEEDER 1	OFF	RUNRVS	DI	3.3.6.11
DROP16	76PCM06	QID/G03	M76QI0240	CFUGE BIN 3 SCREW FEEDER 1	LOCAL	INCOMP	DI	3.3.6.12
DROP16	76PCM06	QID/G03	M76RI0240	DC BIN 3 SCREW FDR 1 AC POWER	WAIT	READY	DI	3.3.6.13
DROP16	76PCM06	QID/G03	M76UA0240A	CFUGE BIN3 SCREW FDR1 TORQUE	NORMAL	HIGH	DI	3.3.6.14
DROP16	76PCM06	QID/G03	M76UA0240B	CFUGE BIN3 SCREW FDR1 COMMON	NORMAL	FAIL	DI	3.3.6.15
DROP16	76PCM06	QID/G03	M16QF3S6	DPU16 QC SL6 HSF3 QID PS MON	ALARM	NORMAL	DI	3.3.6.16
DROP16	76PCM06	QID/G03	M76AAH2350A	CFUGE BLDG GAS MONITOR G/F H2S	HIGH	NORMAL	DI	3.3.7.1
DROP16	76PCM06	QID/G03	M76AAH2350C	DC BLDG GAS MONITOR G/F NaH3	HIGH	NORMAL	DI	3.3.7.2
DROP16	76PCM06	QID/G03	M76AAHH2350A	CFUGE BLDG GAS MONITOR G/F H2S	HI-HI	NORMAL	DI	3.3.7.3
DROP16	76PCM06	QID/G03	M76AAHH2350C	DC BLDG GAS MONITOR G/F NaH3	HI-HI	NORMAL	DI	3.3.7.4
DROP16	76PCM06	QID/G03	M76XA2350A	CFUGE BLDG GAS MONITOR G/F H2S	FAIL	NORMAL	DI	3.3.7.5
DROP16	76PCM06	QID/G03	M76XA2350C	DC BLDG GAS MONITOR G/F NaH3	FAIL	NORMAL	DI	3.3.7.6
DROP16	76PCM06	QID/G03	M76ZB1401	PIPELINE LUBE PUMP 1 DISCH VLV	NORMAL	CLOSED	DI	3.3.7.7
DROP16	76PCM06	QID/G03	M76ZD1401	PIPELINE LUBE PUMP 1 DISCH VLV	NORMAL	OPENED	DI	3.3.7.8
DROP16	76PCM06	QID/G03	M76ZB1400	PIPELINE LUBE PUMP 1 INLET VLV	NORMAL	CLOSED	DI	3.3.7.9
DROP16	76PCM06	QID/G03	M76ZD1400	PIPELINE LUBE PUMP 1 INLET VLV	NORMAL	OPENED	DI	3.3.7.10
DROP16	76PCM06	QID/G03	M76ZB1405	PIPELINE LUBE PUMP 3 DISCH VLV	NORMAL	CLOSED	DI	3.3.7.11
DROP16	76PCM06	QID/G03	SPARE				DI	3.3.7.12
DROP16	76PCM06	QID/G03	SPARE				DI	3.3.7.13
DROP16	76PCM06	QID/G03	SPARE				DI	3.3.7.14
DROP16	76PCM06	QID/G03	SPARE				DI	3.3.7.15
DROP16	76PCM06	QID/G03	M16QE4S7	DPU16 QC SL7 HSE4 QID PS MON	ALARM	NORMAL	DI	3.3.7.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP16	76PCM06	QID/G03	M76MI0283	CFUGE CAKE PUMP 3	OFF	RUNNNG	DI	3.3.8.1
DROP16	76PCM06	QID/G03	M76RI0283	CFUGE CAKE PUMP 3 AC POWER	WAIT	READY	DI	3.3.8.2
DROP16	76PCM06	QID/G03	M76ZD0283	CFUGE CAKE PUMP 3	NORMAL	ALARM	DI	3.3.8.3
DROP16	76PCM06	QID/G03	M76AI9082	SCREEN 2 SLUDGE PROBE	NORMAL	BRKTHR	DI	3.3.8.4
DROP16	76PCM06	QID/G03	M76QI1319	SCREEN 2 SOLIDS DISCH VALVE	LOCAL	INCOMP	DI	3.3.8.5
DROP16	76PCM06	QID/G03	M76RI1319	SCREEN 2 SOLIDS DISCH VALVE	WAIT	READY	DI	3.3.8.6
DROP16	76PCM06	QID/G03	M76ZB1319	SCREEN 2 SOLIDS DISCH VALVE	NORMAL	CLOSED	DI	3.3.8.7
DROP16	76PCM06	QID/G03	M76ZD1319	SCREEN 2 SOLIDS DISCH VALVE	NORMAL	OPENED	DI	3.3.8.8
DROP16	76PCM06	QID/G03	M76ZB1325	SCREEN 3 ISOLATION VALVE	NORMAL	CLOSED	DI	3.3.8.9
DROP16	76PCM06	QID/G03	M76ZD1325	SCREEN 3 ISOLATION VALVE	NORMAL	OPENED	DI	3.3.8.10
DROP16	76PCM06	QID/G03	M76QI1328	SCREEN3 SCREENING DIVERTR GATE	LOCAL	INCOMP	DI	3.3.8.11
DROP16	76PCM06	QID/G03	M76RI1328	SCREEN3 SCREENING DIVERTR GATE	WAIT	READY	DI	3.3.8.12
DROP16	76PCM06	QID/G03	M76ZB1328	SCREEN3 SCREENING DIVERTR GATE	NORMAL	CLOSED	DI	3.3.8.13
DROP16	76PCM06	QID/G03	M76ZD1328	SCREEN3 SCREENING DIVERTR GATE	NORMAL	OPENED	DI	3.3.8.14
DROP16	76PCM06	QID/G03	M76AI9083	SCREEN 3 SLUDGE PROBE	NORMAL	BRKTHR	DI	3.3.8.15
DROP16	76PCM06	QID/G03	M16QF4S8	DPU16 QC SL8 HSF4 QID PS MON	ALARM	NORMAL	DI	3.3.8.16
DROP16	76PCM06	QID/G03	M76ZB1551	DEWAT CFUGE1 FeCl3 INJECT VLV	NORMAL	CLOSED	DI	3.3.9.1
DROP16	76PCM06	QID/G03	M76ZD1551	DEWAT CFUGE1 FeCl3 INJECT VLV	NORMAL	OPENED	DI	3.3.9.2
DROP16	76PCM06	QID/G03	M76ZB1553	DC 1 HEAT XCHNGR BPASS VALVE	NORMAL	CLOSED	DI	3.3.9.3
DROP16	76PCM06	QID/G03	M76ZD1553	DC 1 HEAT XCHNGR BPASS VALVE	NTOPEN	OPENED	DI	3.3.9.4
DROP16	76PCM06	QID/G03	M76ZB1554	DC 1 HEAT XCHNGR DISCH VALVE	NORMAL	CLOSED	DI	3.3.9.5
DROP16	76PCM06	QID/G03	M76ZD1554	DC 1 HEAT XCHNGR DISCH VALVE	NORMAL	OPENED	DI	3.3.9.6
DROP16	76PCM06	QID/G03	M76ZB1552	DC 1 HEAT XCHNGR INLET VALVE	NORMAL	CLOSED	DI	3.3.9.7
DROP16	76PCM06	QID/G03	M76ZD1552	DC 1 HEAT XCHNGR INLET VALVE	NORMAL	OPENED	DI	3.3.9.8
DROP16	76PCM06	QID/G03	SPARE				DI	3.3.9.9
DROP16	76PCM06	QID/G03	SPARE				DI	3.3.9.10
DROP16	76PCM06	QID/G03	M76ZB1550	DEWAT CFUGE 1 POLY INJECT VLV1	NORMAL	CLOSED	DI	3.3.9.11
DROP16	76PCM06	QID/G03	M76ZD1550	DEWAT CFUGE 1 POLY INJECT VLV1	NORMAL	OPENED	DI	3.3.9.12
DROP16	76PCM06	QID/G03	M76ZB1555	DEWAT CFUGE 1 POLY INJECT VLV2	NORMAL	CLOSED	DI	3.3.9.13
DROP16	76PCM06	QID/G03	M76ZD1555	DEWAT CFUGE 1 POLY INJECT VLV2	NORMAL	OPENED	DI	3.3.9.14
DROP16	76PCM06	QID/G03	M76ZB1556	DEWAT CFUGE 1 POLY INJECT VLV3	NORMAL	CLOSED	DI	3.3.9.15
DROP16	76PCM06	QID/G03	M16QE5S9	DPU16 QC SL9 HSE5 QID PS MON	ALARM	NORMAL	DI	3.3.9.16
DROP16	76PCM06	QID/G03	M76MI0441	GRIT CONVEYOR NO. 1	OFF	RUNNNG	DI	3.3.10.1
DROP16	76PCM06	QID/G03	M76NAH0441	GRIT CONVEYOR NO. 1	NORMAL	HIGH	DI	3.3.10.2
DROP16	76PCM06	QID/G03	M76RI0441	GRIT CONVEYOR NO. 1	WAIT	READY	DI	3.3.10.3
DROP16	76PCM06	QID/G03	M76XA0441	GRIT CONVEYOR NO. 1	NORMAL	ZERO/S	DI	3.3.10.4
DROP16	76PCM06	QID/G03	M76MI0461	GRIT DEWATERING NO. 1	OFF	RUNNNG	DI	3.3.10.5
DROP16	76PCM06	QID/G03	M76NAH0461	GRIT DEWATERING NO. 1	NORMAL	HIGH	DI	3.3.10.6
DROP16	76PCM06	QID/G03	M76QI0461	GRIT DEWATERING NO. 1	LOCAL	INCOMP	DI	3.3.10.7
DROP16	76PCM06	QID/G03	M76RI0461	GRIT DEWATERING NO. 1	WAIT	READY	DI	3.3.10.8
DROP16	76PCM06	QID/G03	M76XA0461	GRIT DEWATERING NO. 1	NORMAL	ZERO/S	DI	3.3.10.9
DROP16	76PCM06	QID/G03	M76QI1559	HEAT EXCHANGR 1 HOT WTR SUPPLY	LOCAL	INCOMP	DI	3.3.10.10
DROP16	76PCM06	QID/G03	M76RI1559	HEAT EXCHANGR 1 HOT WTR SUPPLY	WAIT	READY	DI	3.3.10.11
DROP16	76PCM06	QID/G03	M16ESL13B	DPU16 SEC 13VDC PS MON	NORMAL	ALARM	DI	3.3.10.12
DROP16	76PCM06	QID/G03	M16ESL13A	DPU16 PRI 13VDC PS MON	NORMAL	ALARM	DI	3.3.10.13
DROP16	76PCM06	QID/G03	M16ESL24B	DPU16 SEC 24VDC PS MON	NORMAL	ALARM	DI	3.3.10.14
DROP16	76PCM06	QID/G03	M16ESL24A	DPU16 PRI 24VDC PS MON	NORMAL	ALARM	DI	3.3.10.15
DROP16	76PCM06	QID/G03	M16QF5S10	DPU16 QC SL10 HSF5 QID PS MON	ALARM	NORMAL	DI	3.3.10.16



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP16	76PCM06	QAX/G05	M76FT0285	CFUGE CAKE PUMP 5	0	150 GPM	AI	3.4.1.1
DROP16	76PCM06	QAX/G05	M76LT2680	SURGE BIN 5 LEVEL	0	100 PCT	AI	3.4.1.2
DROP16	76PCM06	QAX/G05	M76PT2681	PIPE LUBE RING 5 PRESSURE	0	1500 PSI	AI	3.4.1.3
DROP16	76PCM06	QAX/G05	M76PT2683	CAKE PUMP 5 DISCH PRESSURE	0	1500 PSI	AI	3.4.1.4
DROP16	76PCM06	QAX/G05	SPARE				AI	3.4.1.5
DROP16	76PCM06	QAX/G05	SPARE				AI	3.4.1.6
DROP16	76PCM06	QAX/G05	M76UY0281	DC CAKE PMP 1 EFFICIENCY	0	100 PCT	AI	3.4.1.7
DROP16	76PCM06	QAX/G05	M76UY0283	DC CAKE PMP 3 EFFICIENCY	0	100 PCT	AI	3.4.1.8
DROP16	76PCM06	QAX/G05	M76UY0285	DC CAKE PMP 5 EFFICIENCY	0	100 PCT	AI	3.4.1.9
DROP16	76PCM06	QAX/G05	M76UY0287	DC CAKE PMP 7 EFFICIENCY	0	100 PCT	AI	3.4.1.10
DROP16	76PCM06	QAX/G05	SPARE				AI	3.4.1.11
DROP16	76PCM06	QAX/G05	SPARE				AI	3.4.1.12
DROP16	76PCM06	QID/G03	M76ZD1405	PIPELINE LUBE PUMP 3 DISCH VLV	NORMAL	OPENED	DI	3.4.5.1
DROP16	76PCM06	QID/G03	M76ZB1404	PIPELINE LUBE PUMP 3 INLET VLV	NORMAL	CLOSED	DI	3.4.5.2
DROP16	76PCM06	QID/G03	M76ZD1404	PIPELINE LUBE PUMP 3 INLET VLV	NORMAL	OPENED	DI	3.4.5.3
DROP16	76PCM06	QID/G03	M76ZB1409	PIPELINE LUBE PUMP 5 DISCH VLV	NORMAL	CLOSED	DI	3.4.5.4
DROP16	76PCM06	QID/G03	M76ZD1409	PIPELINE LUBE PUMP 5 DISCH VLV	NORMAL	OPENED	DI	3.4.5.5
DROP16	76PCM06	QID/G03	M76ZB1408	PIPELINE LUBE PUMP 5 INLET VLV	NORMAL	CLOSED	DI	3.4.5.6
DROP16	76PCM06	QID/G03	M76ZD1408	PIPELINE LUBE PUMP 5 INLET VLV	NORMAL	OPENED	DI	3.4.5.7
DROP16	76PCM06	QID/G03	M76ZB1413	PIPELINE LUBE PUMP 7 DISCH VLV	NORMAL	CLOSED	DI	3.4.5.8
DROP16	76PCM06	QID/G03	M76ZD1413	PIPELINE LUBE PUMP 7 DISCH VLV	NORMAL	OPENED	DI	3.4.5.9
DROP16	76PCM06	QID/G03	M76ZB1412	PIPELINE LUBE PUMP 7 INLET VLV	NORMAL	CLOSED	DI	3.4.5.10
DROP16	76PCM06	QID/G03	M76ZD1412	PIPELINE LUBE PUMP 7 INLET VLV	NORMAL	OPENED	DI	3.4.5.11
DROP16	76PCM06	QID/G03	M76MI0801	PIPELINE LUBE PUMP NO. 1	OFF	RUNNING	DI	3.4.5.12
DROP16	76PCM06	QID/G03	M76UA0801	PIPELINE LUBE PUMP NO. 1	NORMAL	FAIL	DI	3.4.5.13
DROP16	76PCM06	QID/G03	M76MI0803	PIPELINE LUBE PUMP NO. 3	OFF	RUNNING	DI	3.4.5.14
DROP16	76PCM06	QID/G03	M76UA0803	PIPELINE LUBE PUMP NO. 3	NORMAL	FAIL	DI	3.4.5.15
DROP16	76PCM06	QID/G03	M16QG3S5	DPU16 QC SL5 HSG3 QID PS MON	ALARM	NORMAL	DI	3.4.5.16
DROP16	76PCM06	QID/G03	M76JA2650	CFUGE BIN 1 LEVEL DC POWER	NORMAL	FAIL/O	DI	3.4.6.1
DROP16	76PCM06	QID/G03	SPARE				DI	3.4.6.2
DROP16	76PCM06	QID/G03	SPARE				DI	3.4.6.3
DROP16	76PCM06	QID/G03	M76MI0230A	CFUGE BIN 1 SCREW FEEDER 1	NORMAL	RUNFWD	DI	3.4.6.4
DROP16	76PCM06	QID/G03	M76MI0230B	CFUGE BIN 1 SCREW FEEDER 1	NORMAL	RUNRVS	DI	3.4.6.5
DROP16	76PCM06	QID/G03	M76QI0230	CFUGE BIN 1 SCREW FEEDER 1	LOCAL	INCOMP	DI	3.4.6.6
DROP16	76PCM06	QID/G03	M76RI0230	DC BIN 1 SCREW FDR 1 AC POWER	WAIT	READY	DI	3.4.6.7
DROP16	76PCM06	QID/G03	M76UA0230A	CFUGE BIN1 SCREW FDR1 TORQUE	NORMAL	HIGH	DI	3.4.6.8
DROP16	76PCM06	QID/G03	SPARE				DI	3.4.6.9
DROP16	76PCM06	QID/G03	M76MI0241A	CFUGE BIN 3 SCREW FEEDER 2	OFF	RUNFWD	DI	3.4.6.10
DROP16	76PCM06	QID/G03	M76MI0241B	CFUGE BIN 3 SCREW FEEDER 2	OFF	RUNRVS	DI	3.4.6.11
DROP16	76PCM06	QID/G03	M76QI0241	CFUGE BIN 3 SCREW FEEDER 2	LOCAL	INCOMP	DI	3.4.6.12
DROP16	76PCM06	QID/G03	M76RI0241	DC BIN 3 SCREW FDR 2 AC POWER	WAIT	READY	DI	3.4.6.13
DROP16	76PCM06	QID/G03	M76UA0241A	CFUGE BIN3 SCREW FDR2 TORQUE	NORMAL	HIGH	DI	3.4.6.14
DROP16	76PCM06	QID/G03	M76UA0241B	CFUGE BIN3 SCREW FDR2 COMMON	NORMAL	FAIL	DI	3.4.6.15
DROP16	76PCM06	QID/G03	M16QH3S6	DPU16 QC SL6 HSH3 QID PS MON	ALARM	NORMAL	DI	3.4.6.16



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP16	76PCM06	QID/G03	M76AAH2350B	DC BLDG GAS MONITOR 2ND/F H2S	HIGH	NORMAL	DI	3.4.7.1
DROP16	76PCM06	QID/G03	M76AAH2350D	DC BLDG GAS MONITOR 2ND/F NaH3	HIGH	NORMAL	DI	3.4.7.2
DROP16	76PCM06	QID/G03	M76AAHH2350B	DC BLDG GAS MONITOR 2ND/F H2S	HI-HI	NORMAL	DI	3.4.7.3
DROP16	76PCM06	QID/G03	M76AAHH2350D	DC BLDG GAS MONITOR 2ND/F NaH3	HI-HI	NORMAL	DI	3.4.7.4
DROP16	76PCM06	QID/G03	M76XA2350B	DC BLDG GAS MONITOR 2ND/F H2S	FAIL	NORMAL	DI	3.4.7.5
DROP16	76PCM06	QID/G03	M76XA2350D	DC BLDG GAS MONITOR 2ND/F NaH3	FAIL	NORMAL	DI	3.4.7.6
DROP16	76PCM06	QID/G03	M76UA0230B	CFUGE BIN1 SCREW FDR1 COMMON	NORMAL	FAIL	DI	3.4.7.7
DROP16	76PCM06	QID/G03	M76XA0230	DC BIN1 SCREW FDR1 0 SPD ALARM	NORMAL	FAIL	DI	3.4.7.8
DROP16	76PCM06	QID/G03	M76XA0231	DC BIN1 SCREW FDR2 0 SPD ALARM	NORMAL	FAIL	DI	3.4.7.9
DROP16	76PCM06	QID/G03	M76XA0240	DC BIN3 SCREW FDR1 0 SPD ALARM	NORMAL	FAIL	DI	3.4.7.10
DROP16	76PCM06	QID/G03	M76XA0241	DC BIN3 SCREW FDR2 0 SPD ALARM	NORMAL	FAIL	DI	3.4.7.11
DROP16	76PCM06	QID/G03	M76AUPSNORMALMOD	DEWATERING UPS FD OK NRML MODE	ALARM	NORMAL	DI	3.4.7.12
DROP16	76PCM06	QID/G03	M76AUPSBYPASSMOD	DEWATERING UPS IN USE	BYPASS	NORMAL	DI	3.4.7.13
DROP16	76PCM06	QID/G03	M76AUPSLOBATTERY	DEWATERING UPS LO BATTERY ALRM	LOWBAT	NORMAL	DI	3.4.7.14
DROP16	76PCM06	QID/G03	M76AUPSALARM	DEWATERING UPS NO TRBL/ALARM	ALARM	NORMAL	DI	3.4.7.15
DROP16	76PCM06	QID/G03	M16QG4S7	DPU16 QC SL5 HSG3 QID PS MON	ALARM	NORMAL	DI	3.4.7.16
DROP16	76PCM06	QID/G03	M76MI0285	CFUGE CAKE PUMP 5	OFF	RUNNNG	DI	3.4.8.1
DROP16	76PCM06	QID/G03	M76RI0285	CFUGE CAKE PUMP 5 AC POWER	WAIT	READY	DI	3.4.8.2
DROP16	76PCM06	QID/G03	M76ZD0285	CFUGE CAKE PUMP 5	NORMAL	ALARM	DI	3.4.8.3
DROP16	76PCM06	QID/G03	M76RI1329	SCREEN 3 SOLIDS DISCH VALVE	WAIT	READY	DI	3.4.8.4
DROP16	76PCM06	QID/G03	M76ZB1329	SCREEN 3 SOLIDS DISCH VALVE	NORMAL	CLOSED	DI	3.4.8.5
DROP16	76PCM06	QID/G03	M76ZD1329	SCREEN 3 SOLIDS DISCH VALVE	NORMAL	OPENED	DI	3.4.8.6
DROP16	76PCM06	QID/G03	M76MI0402	SCREEN NO. 2	OFF	RUNNNG	DI	3.4.8.7
DROP16	76PCM06	QID/G03	M76NAH0402	SCREEN NO. 2	NORMAL	HIGH	DI	3.4.8.8
DROP16	76PCM06	QID/G03	M76QI0402	SCREEN NO. 2	LOCAL	INCOMP	DI	3.4.8.9
DROP16	76PCM06	QID/G03	M76RI0402	SCREEN NO. 2	WAIT	READY	DI	3.4.8.10
DROP16	76PCM06	QID/G03	M76MI0403	SCREEN NO. 3	OFF	RUNNNG	DI	3.4.8.11
DROP16	76PCM06	QID/G03	M76NAH0403	SCREEN NO. 3	NORMAL	HIGH	DI	3.4.8.12
DROP16	76PCM06	QID/G03	M76QI0403	SCREEN NO. 3	LOCAL	INCOMP	DI	3.4.8.13
DROP16	76PCM06	QID/G03	M76RI0403	SCREEN NO. 3	WAIT	READY	DI	3.4.8.14
DROP16	76PCM06	QID/G03	M76MI0411	SCREENINGS CONVEYOR NO. 1	OFF	RUNNNG	DI	3.4.8.15
DROP16	76PCM06	QID/G03	M16QH4S8	DPU16 QC SL8 HSH4 QID PS MON	ALARM	NORMAL	DI	3.4.8.16
DROP16	76PCM06	QID/G03	M76ZB1541	DEWAT CFUGE 1 POLY INJECT VLV4	NORMAL	CLOSED	DI	3.4.9.1
DROP16	76PCM06	QID/G03	M76ZD1541	DEWAT CFUGE 1 POLY INJECT VLV4	NORMAL	OPENED	DI	3.4.9.2
DROP16	76PCM06	QID/G03	SPARE				DI	3.4.9.3
DROP16	76PCM06	QID/G03	SPARE				DI	3.4.9.4
DROP16	76PCM06	QID/G03	M76LAH2820	FeCl3 DAY TNK 1 LVL ALRMS	HIGH	NORMAL	DI	3.4.9.5
DROP16	76PCM06	QID/G03	M76LAL2820	FeCl3 DAY TNK 1 LVL ALRMS	NORMAL	LOW	DI	3.4.9.6
DROP16	76PCM06	QID/G03	M76LAH2827	FeCl3 DAY TNKS FLOOD ALRM	HIGH	NORMAL	DI	3.4.9.7
DROP16	76PCM06	QID/G03	M76RI0411	SCREENINGS CONVEYOR NO. 1	WAIT	READY	DI	3.4.9.8
DROP16	76PCM06	QID/G03	M76PAL2772B	DC POLY FD PUMP 1 PRESS CUTOUT	NORMAL	LOW	DI	3.4.9.9
DROP16	76PCM06	QID/G03	M76MI0561	DC POLY FEED PUMP NO. 1	OFF	RUNNNG	DI	3.4.9.10
DROP16	76PCM06	QID/G03	<b>M76QI0561B</b>	<b>DC POLY FEED PUMP NO. 1</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	3.4.9.11
DROP16	76PCM06	QID/G03	SPARE				DI	3.4.9.12
DROP16	76PCM06	QID/G03	SPARE				DI	3.4.9.13
DROP16	76PCM06	QID/G03	SPARE				DI	3.4.9.14
DROP16	76PCM06	QID/G03	SPARE				DI	3.4.9.15
DROP16	76PCM06	QID/G03	M16QG5S9	DPU16 QC SL9 HSG5 QID PS MON	ALARM	NORMAL	DI	3.4.9.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP17	76PCM07	5X00419G01		76VDL07 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1
			76MV1535	DEWATERING CENTRIFUGE FEED PUMP 8 INLET VALVE				
			76MV1536	DEWATERING CENTRIFUGE FEED PUMP 8 DISCHARGE VALVE				
			76MV1537	DEWATERING CENTRIFUGE FEED PUMP 8 BYPASS VALVE				
			76MV1666	CENTRIFUGE CAKE PUMP 2 DISCHARGE VALVE				
			76MV1676	CENTRIFUGE CAKE PUMP 4 DISCHARGE VALVE				
			76MV1686	CENTRIFUGE CAKE PUMP 6 DISCHARGE VALVE				
			76MV1696	CENTRIFUGE CAKE PUMP 8 DISCHARGE VALVE				
			76MV1725	POLYMER DAY TANK 4 INLET VALVE				
			76MV1726	POLYMER DAY TANK 4 DISCHARGE VALVE 1				
			76MV1727	POLYMER DAY TANK 4 DISCHARGE VALVE 2				
			76MV1805	DEWATERING CENTRIFUGE POLYMER FEED PUMP 8 INLET VALVE				
			76MV1806	DEWATERING CENTRIFUGE POLYMER FEED PUMP 8 BYPASS VALVE				
			76MV1807	DEWATERING CENTRIFUGE POLYMER FEED PUMP 8 DISCHARGE VALVE				
			76MV1825	FERRIC CHLORIDE DAY TANK 2 DISCHARGE VALVE 1				
			76MV1826	FERRIC CHLORIDE DAY TANK 2 DISCHARGE VALVE 2				
			76MV1827	FERRIC CHLORIDE DAY TANK 2 INLET VALVE				
			DROP17	76PCM07	5X00419G01	M76DC02		
M76DC04	DC NO. 4							
DROP17	76PCM07	5X00106G01	M76ST0258	DC FEED PUMP NO. 8	0	100 PCT	AI - HART	1.1.3.1
DROP17	76PCM07	5X00106G01	M76PT2542	DC FEED PUMP 8 DISCH PRESS	0	50 PSI	AI - HART	1.1.3.2
DROP17	76PCM07	5X00106G01	M76FT2541	DC 8 SLUDGE FLOW	0	350 GPM	AI - HART	1.1.3.3
DROP17	76PCM07	5X00106G01	M76PT2625	DC 8 INLT SLUDGE PRESS	0	50 PSI	AI - HART	1.1.3.4
DROP17	76PCM07	5X00106G01	M76TT2626	DEWAT CFUGE 8 INLT SLUDGE TEMP	70	150 DEG F	AI - HART	1.1.3.5
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.1.3.6
DROP17	76PCM07	5X00106G01	M76LT2695	SURGE BIN 8 LEVEL	0	100 PCT	AI - HART	1.1.3.7
DROP17	76PCM07	5X00106G01	M76PT2696	PIPE LUBE RING 8 PRESSURE	0	1500 PSI	AI - HART	1.1.3.8
DROP17	76PCM07	5X00106G01	M76ST0568	DC POLY FEED PUMP NO. 8	0	100 PCT	AI - HART	1.1.4.1
DROP17	76PCM07	5X00106G01	M76PT2805	DC POLY FEED PUMP 8 DISCH PRESS	0	100 PSI	AI - HART	1.1.4.2
DROP17	76PCM07	5X00106G01	M76FT2806	DC 8 POLYMER FLOW	0	40 GPM	AI - HART	1.1.4.3
DROP17	76PCM07	5X00106G01	M76FT2808	DC POLY FEED PUMP 8 ROTAMETER	0	40 GPM	AI - HART	1.1.4.4
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.1.4.5
DROP17	76PCM07	5X00106G01	M76FT0288	DC CAKE PUMP 8	0	150 GPM	AI - HART	1.1.4.6
DROP17	76PCM07	5X00106G01	M76UY0288	DC CAKE PMP 8 EFFICIENCY	0	100 PCT	AI - HART	1.1.4.7
DROP17	76PCM07	5X00106G01	M76PT2698	CAKE PUMP 8 DISCH PRESSURE	0	1500 PSI	AI - HART	1.1.4.8
DROP17	76PCM07	5X00106G01	M76LT2120	GRIT CONTAINER 1 LEVEL	0	5 FEET	AI - HART	1.1.5.1
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.1.5.2
DROP17	76PCM07	5X00106G01	M76LT2651A	CFUGE BIN 2 LEVEL	0	4 FEET	AI - HART	1.1.5.3
DROP17	76PCM07	5X00106G01	M76LT2656A	CFUGE BIN 4 LEVEL	0	4 FEET	AI - HART	1.1.5.4
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.1.5.5
DROP17	76PCM07	5X00106G01	M76ST0245	CFUGE BIN 4 SCREW FEEDER 1	0	100 PCT	AI - HART	1.1.5.6
DROP17	76PCM07	5X00106G01	M76ST0235	CFUGE BIN 2 SCREW FEEDER 1	0	100 PCT	AI - HART	1.1.5.7
DROP17	76PCM07	5X00106G01	M76ZT1629	HEAT EXCHANGR 8 HOT WTR SUPPLY	0	100 PCT	AI - HART	1.1.5.8





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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP17	76PCM07	5X00106G01	M76FT0286	CFUGE CAKE PUMP 6	0	150 GPM	AI - HART	1.1.6.1	
DROP17	76PCM07	5X00106G01	M76UY0286	DC CAKE PMP 6 EFFICIENCY	0	100 PCT	AI - HART	1.1.6.2	
DROP17	76PCM07	5X00106G01	M76PT2688	CAKE PUMP 6 DISCH PRESSURE	0	1500 PSI	AI - HART	1.1.6.3	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.1.6.4	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.1.6.5	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.1.6.6	
DROP17	76PCM07	5X00106G01	M76LT2685	SURGE BIN 6 LEVEL	0	100 PCT	AI - HART	1.1.6.7	
DROP17	76PCM07	5X00106G01	M76PT2686	PIPE LUBE RING 6 PRESSURE	0	1500 PSI	AI - HART	1.1.6.8	
DROP17	76PCM07	Spare Module Address							1.1.7
DROP17	76PCM07	5X00119G01	MDPU17T1	DPU17 76PCM07 CABINET TEMP	0	40	RTD	1.1.8.1	
DROP17	76PCM07	5X00119G01	SPARE				RTD	1.1.8.2	
DROP17	76PCM07	5X00119G01	SPARE				RTD	1.1.8.3	
DROP17	76PCM07	5X00119G01	SPARE				RTD	1.1.8.4	
DROP17	76PCM07	5X00119G01	SPARE				RTD	1.1.8.5	
DROP17	76PCM07	5X00119G01	SPARE				RTD	1.1.8.6	
DROP17	76PCM07	5X00119G01	SPARE				RTD	1.1.8.7	
DROP17	76PCM07	5X00119G01	SPARE				RTD	1.1.8.8	
DROP17	76PCM07	Spare Module Address							1.2.1
DROP17	76PCM07	5X00167G01	M76FC2541	DC FEED PUMP 8 SPEED DEMAND	0	100 PCT	AO	1.2.2.1	
DROP17	76PCM07	5X00167G01	M76FC2806	DC POLY FD PMP 8 SPEED DEMAND	0	100 PCT	AO	1.2.2.2	
DROP17	76PCM07	5X00167G01	SPARE				AO	1.2.2.3	
DROP17	76PCM07	5X00167G01	M76TC2626	DC HEAT EXCHANGER 8 VLV POS	0	100 PCT	AO	1.2.2.4	
DROP17	76PCM07	5X00167G01	SPARE				AO	1.2.2.5	
DROP17	76PCM07	5X00167G01	SPARE				AO	1.2.2.6	
DROP17	76PCM07	5X00167G01	SPARE				AO	1.2.2.7	
DROP17	76PCM07	5X00167G01	SPARE				AO	1.2.2.8	
DROP17	76PCM07	Spare Module Address							1.2.3
DROP17	76PCM07	5X00106G01	M76FT0282	CFUGE CAKE PUMP 2	0	150 GPM	AI - HART	1.2.4.1	
DROP17	76PCM07	5X00106G01	M76UY0282	DC CAKE PMP 2 EFFICIENCY	0	100 PCT	AI - HART	1.2.4.2	
DROP17	76PCM07	5X00106G01	M76PT2668	CAKE PUMP 2 DISCH PRESSURE	0	1500 PSI	AI - HART	1.2.4.3	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.2.4.4	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.2.4.5	
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.2.4.6	
DROP17	76PCM07	5X00106G01	M76LT2665	SURGE BIN 2 LEVEL	0	100 PCT	AI - HART	1.2.4.7	
DROP17	76PCM07	5X00106G01	M76PT2666	PIPE LUBE RING 2 PRESSURE	0	1500 PSI	AI - HART	1.2.4.8	

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DROP17	76PCM07	5X00106G01	M76LT2121	GRIT CONTAINER 2 LEVEL	0	5 FEET	AI - HART	1.2.5.1
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.2.5.2
DROP17	76PCM07	5X00106G01	M76FT0284	CFUGE CAKE PUMP 4	0	150 GPM	AI - HART	1.2.5.3
DROP17	76PCM07	5X00106G01	M76UY0284	DC CAKE PMP 4 EFFICIENCY	0	100 PCT	AI - HART	1.2.5.4
DROP17	76PCM07	5X00106G01	M76PT2678	CAKE PUMP 4 DISCH PRESSURE	0	1500 PSI	AI - HART	1.2.5.5
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.2.5.6
DROP17	76PCM07	5X00106G01	M76LT2675	SURGE BIN 4 LEVEL	0	100 PCT	AI - HART	1.2.5.7
DROP17	76PCM07	5X00106G01	M76PT2676	PIPE LUBE RING 4 PRESSURE	0	1500 PSI	AI - HART	1.2.5.8
DROP17	76PCM07	5X00106G01	M76LT2651B	CFUGE BIN 2 LEVEL	0	4 FEET	AI - HART	1.2.6.1
DROP17	76PCM07	5X00106G01	M76LT2656B	CFUGE BIN 4 LEVEL	0	4 FEET	AI - HART	1.2.6.2
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.2.6.3
DROP17	76PCM07	5X00106G01	M76ST0236	CFUGE BIN 2 SCREW FEEDER 2	0	100 PCT	AI - HART	1.2.6.4
DROP17	76PCM07	5X00106G01	M76ST0246	CFUGE BIN 4 SCREW FEEDER 2	0	100 PCT	AI - HART	1.2.6.5
DROP17	76PCM07	5X00106G01	SPARE				AI - HART	1.2.6.6
DROP17	76PCM07	5X00106G01	M76LT2826	FERRIC CHLORIDE DAY TNK 2 LVL	0	10 FEET	AI - HART	1.2.6.7
DROP17	76PCM07	5X00106G01	M76LT2725	POLY DAY TANK 4 LEVEL	0	12 FEET	AI - HART	1.2.6.8
DROP17	76PCM07	5X00419G01	<b>M76DC08</b>	<b>DC NO. 8</b>			ET	1.2.7
DROP17	76PCM07	5X00419G01		76VDL07 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8
DROP17	76PCM07	1C31232G01	M76MI0442	GRIT CONVEYOR NO. 2	OFF	RUNNNG	DI	1.3.1.1
DROP17	76PCM07	1C31232G01	M76RI0442	GRIT CONVEYOR NO. 2	WAIT	READY	DI	1.3.1.2
DROP17	76PCM07	1C31232G01	M76XA0442	GRIT CONVEYOR NO. 2	NORMAL	ZERO/S	DI	1.3.1.3
DROP17	76PCM07	1C31232G01	M76NAH0442	GRIT CONVEYOR NO. 2	NORMAL	HIGH	DI	1.3.1.4
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.1.5
DROP17	76PCM07	1C31232G01	M76ZB1122	GRIT CONVEYOR 2 DISCH GATE 2	NORMAL	CLOSED	DI	1.3.1.6
DROP17	76PCM07	1C31232G01	M76ZD1122	GRIT CONVEYOR 2 DISCH GATE 2	NORMAL	OPENED	DI	1.3.1.7
DROP17	76PCM07	1C31232G01	M76QI1122	GRIT CONVEYOR 2 DISCH GATE 2	LOCAL	INCOMP	DI	1.3.1.8
DROP17	76PCM07	1C31232G01	M76RI1122	GRIT CONVEYOR 2 DISCH GATE 2	WAIT	READY	DI	1.3.1.9
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.1.10
DROP17	76PCM07	1C31232G01	M76MI0462	GRIT DEWAT NO. 2	OFF	RUNNNG	DI	1.3.1.11
DROP17	76PCM07	1C31232G01	M76QI0462	GRIT DEWAT NO. 2	LOCAL	INCOMP	DI	1.3.1.12
DROP17	76PCM07	1C31232G01	M76RI0462	GRIT DEWAT NO. 2	WAIT	READY	DI	1.3.1.13
DROP17	76PCM07	1C31232G01	M76XA0462	GRIT DEWAT NO. 2	NORMAL	ZERO/S	DI	1.3.1.14
DROP17	76PCM07	1C31232G01	M76NAH0462	GRIT DEWAT NO. 2	NORMAL	HIGH	DI	1.3.1.15
DROP17	76PCM07	1C31232G01	<b>M17QC3S01</b>	<b>DPU17 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP17	76PCM07	1C31232G01	M76MI0236A	CFUGE BIN 2 SCREW FEEDER 2	OFF	RUNFWD	DI	1.3.2.1
DROP17	76PCM07	1C31232G01	M76MI0236B	CFUGE BIN 2 SCREW FEEDER 2	OFF	RUNRVS	DI	1.3.2.2
DROP17	76PCM07	1C31232G01	M76QI0236	CFUGE BIN 2 SCREW FEEDER 2	LOCAL	INCOMP	DI	1.3.2.3
DROP17	76PCM07	1C31232G01	M76RI0236	CFUGE BIN 2 SCREW FEEDER 2	WAIT	READY	DI	1.3.2.4
DROP17	76PCM07	1C31232G01	M76UA0236B	CFUGE BIN2 SCREW FDR2 COMMON	NORMAL	FAIL	DI	1.3.2.5
DROP17	76PCM07	1C31232G01	M76UA0236A	CFUGE BIN2 SCREW FDR2 TORQUE	NORMAL	HIGH	DI	1.3.2.6
DROP17	76PCM07	1C31232G01	M76XA0236	CFUGE BIN 2 SCREW FEEDER 2	NORMAL	FAIL	DI	1.3.2.7
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.2.8
DROP17	76PCM07	1C31232G01	M76MI0246A	CFUGE BIN 4 SCREW FEEDER 2	OFF	RUNFWD	DI	1.3.2.9
DROP17	76PCM07	1C31232G01	M76MI0246B	CFUGE BIN 4 SCREW FEEDER 2	OFF	RUNRVS	DI	1.3.2.10
DROP17	76PCM07	1C31232G01	M76QI0246	CFUGE BIN 4 SCREW FEEDER 2	LOCAL	INCOMP	DI	1.3.2.11
DROP17	76PCM07	1C31232G01	M76RI0246	CFUGE BIN 4 SCREW FEEDER 2	WAIT	READY	DI	1.3.2.12
DROP17	76PCM07	1C31232G01	M76UA0246A	CFUGE BIN4 SCREW FDR2 TORQUE	NORMAL	HIGH	DI	1.3.2.13
DROP17	76PCM07	1C31232G01	M76UA0246B	CFUGE BIN4 SCREW FDR2 COMMON	NORMAL	FAIL	DI	1.3.2.14
DROP17	76PCM07	1C31232G01	M76XA0246	CFUGE BIN 4 SCREW FEEDER 2	NORMAL	FAIL	DI	1.3.2.15
DROP17	76PCM07	1C31232G01	<b>M17QC3S02</b>	<b>DPUI7 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16
DROP17	76PCM07	1C31232G01	M76QI1105	GRIT SEPARATOR 2 INLET VALVE	LOCAL	INCOMP	DI	1.3.3.1
DROP17	76PCM07	1C31232G01	M76RI1105	GRIT SEPARATOR 2 INLET VALVE	WAIT	READY	DI	1.3.3.2
DROP17	76PCM07	1C31232G01	M76ZB1105	GRIT SEPARATOR 2 INLET VALVE	NORMAL	CLOSED	DI	1.3.3.3
DROP17	76PCM07	1C31232G01	M76ZD1105	GRIT SEPARATOR 2 INLET VALVE	NORMAL	OPENED	DI	1.3.3.4
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.3.5
DROP17	76PCM07	1C31232G01	M76QI1108	GRIT SEPARATOR 2 DISCH VALVE	LOCAL	INCOMP	DI	1.3.3.6
DROP17	76PCM07	1C31232G01	M76RI1108	GRIT SEPARATOR 2 DISCH VALVE	WAIT	READY	DI	1.3.3.7
DROP17	76PCM07	1C31232G01	M76ZB1108	GRIT SEPARATOR 2 DISCH VALVE	NORMAL	CLOSED	DI	1.3.3.8
DROP17	76PCM07	1C31232G01	M76ZD1108	GRIT SEPARATOR 2 DISCH VALVE	NORMAL	OPENED	DI	1.3.3.9
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.3.10
DROP17	76PCM07	1C31232G01	<b>M76QI1106</b>	<b>GRIT SEPARATOR 2 GRIT VALVE 1</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.3.3.11
DROP17	76PCM07	1C31232G01	M76RI1106	GRIT SEPARATOR 2 GRIT VALVE 1	WAIT	READY	DI	1.3.3.12
DROP17	76PCM07	1C31232G01	M76ZD1106	GRIT SEPARATOR 2 GRIT VALVE 1	NORMAL	OPENED	DI	1.3.3.13
DROP17	76PCM07	1C31232G01	M76ZB1106	GRIT SEPARATOR 2 GRIT VALVE 1	NORMAL	CLOSED	DI	1.3.3.14
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.3.15
DROP17	76PCM07	1C31232G01	<b>M17QC3S03</b>	<b>DPUI7 QC DROP 3 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.3.16
DROP17	76PCM07	1C31232G01	M76QI1107	GRIT DEWATERING UNIT NO.2 INLET VALVE	LOCAL	INCOMP	DI	1.3.4.1
DROP17	76PCM07	1C31232G01	M76RI1107	GRIT DEWATERING UNIT NO.2 INLET VALVE	WAIT	READY	DI	1.3.4.2
DROP17	76PCM07	1C31232G01	M76ZB1107	GRIT DEWATERING UNIT NO.2 INLET VALVE	NORMAL	CLOSED	DI	1.3.4.3
DROP17	76PCM07	1C31232G01	M76ZD1107	GRIT DEWATERING UNIT NO.2 INLET VALVE	NORMAL	OPENED	DI	1.3.4.4
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.4.5
DROP17	76PCM07	1C31232G01	M76FAL2101	GRIT SEPARATORS WATER FLOW	NORMAL	FAIL	DI	1.3.4.6
DROP17	76PCM07	1C31232G01	M76QI1121	GRIT CONVEYOR 2 DISCH GATE 1	LOCAL	INCOMP	DI	1.3.4.7
DROP17	76PCM07	1C31232G01	M76RI1121	GRIT CONVEYOR 2 DISCH GATE 1	WAIT	READY	DI	1.3.4.8
DROP17	76PCM07	1C31232G01	M76ZB1121	GRIT CONVEYOR 2 DISCH GATE 1	NORMAL	CLOSED	DI	1.3.4.9
DROP17	76PCM07	1C31232G01	M76ZD1121	GRIT CONVEYOR 2 DISCH GATE 1	NORMAL	OPENED	DI	1.3.4.10
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.4.11
DROP17	76PCM07	1C31232G01	M76ZB1621	DC 8 FERRIC INJECT VALVE	NORMAL	CLOSED	DI	1.3.4.12
DROP17	76PCM07	1C31232G01	M76ZD1621	DC 8 FERRIC INJECT VALVE	NORMAL	OPENED	DI	1.3.4.13
DROP17	76PCM07	1C31232G01	M76LAH2825	FeC13 DAY TNK 2 LEVEL ALARMS	HIGH	NORMAL	DI	1.3.4.14
DROP17	76PCM07	1C31232G01	M76LAL2825	FeC13 DAY TNK 2 LEVEL ALARMS	NORMAL	LOW	DI	1.3.4.15
DROP17	76PCM07	1C31232G01	<b>M17QC3S04</b>	<b>DPUI7 QC DROP 3 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.4.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP17	76PCM07	1C31232G01	M76MI0235A	CFUGE BIN 2 SCREW FEEDER 1	OFF	RUNFWD	DI	1.3.5.1
DROP17	76PCM07	1C31232G01	M76MI0235B	CFUGE BIN 2 SCREW FEEDER 1	OFF	RUNRVS	DI	1.3.5.2
DROP17	76PCM07	1C31232G01	M76QI0235	CFUGE BIN 2 SCREW FEEDER 1	LOCAL	INCOMP	DI	1.3.5.3
DROP17	76PCM07	1C31232G01	M76RI0235	CFUGE BIN 2 SCREW FEEDER 1	WAIT	READY	DI	1.3.5.4
DROP17	76PCM07	1C31232G01	M76UA0235B	CFUGE BIN2 SCREW FDR1 COMMON	NORMAL	FAIL	DI	1.3.5.5
DROP17	76PCM07	1C31232G01	M76UA0235A	CFUGE BIN2 SCREW FDR1 TORQUE	NORMAL	HIGH	DI	1.3.5.6
DROP17	76PCM07	1C31232G01	M76XA0235	CFUGE BIN 2 SCREW FEEDER 1	NORMAL	FAIL	DI	1.3.5.7
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.5.8
DROP17	76PCM07	1C31232G01	M76MI0245A	CFUGE BIN 4 SCREW FEEDER 1	OFF	RUNFWD	DI	1.3.5.9
DROP17	76PCM07	1C31232G01	M76MI0245B	CFUGE BIN 4 SCREW FEEDER 1	OFF	RUNRVS	DI	1.3.5.10
DROP17	76PCM07	1C31232G01	M76QI0245	CFUGE BIN 4 SCREW FEEDER 1	LOCAL	INCOMP	DI	1.3.5.11
DROP17	76PCM07	1C31232G01	M76RI0245	CFUGE BIN 4 SCREW FEEDER 1	WAIT	READY	DI	1.3.5.12
DROP17	76PCM07	1C31232G01	M76UA0245A	CFUGE BIN4 SCREW FDR1 TORQUE	NORMAL	HIGH	DI	1.3.5.13
DROP17	76PCM07	1C31232G01	M76UA0245B	CFUGE BIN4 SCREW FDR1 COMMON	NORMAL	FAIL	DI	1.3.5.14
DROP17	76PCM07	1C31232G01	M76XA0245	CFUGE BIN 4 SCREW FEEDER 1	NORMAL	FAIL	DI	1.3.5.15
DROP17	76PCM07	1C31232G01	<b>M17QC3S05</b>	<b>DPU17 QC DROP 3 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.5.16
DROP17	76PCM07	1C31232G01	M76QI0282B	CAKE PUMP NO. 2	DSELECT	SELECT	DI	1.3.6.1
DROP17	76PCM07	1C31232G01	M76QI0282C	CAKE PUMP NO. 4	DSELECT	SELECT	DI	1.3.6.2
DROP17	76PCM07	1C31232G01	M76QI0282D	CAKE PUMP NO. 2 & 4	DSELECT	SELECT	DI	1.3.6.3
DROP17	76PCM07	1C31232G01	M76QI0282E	CAKE PUMP 2 & 4 SELECTR SWITCH	LOCAL	INCOMP	DI	1.3.6.4
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.6.5
DROP17	76PCM07	1C31232G01	M76MI0284	CFUGE CAKE PUMP 4	OFF	RUNNNG	DI	1.3.6.6
DROP17	76PCM07	1C31232G01	M76QI0284	CAKE PUMP NO. 4 DCS STATUS	LOCAL	INCOMP	DI	1.3.6.7
DROP17	76PCM07	1C31232G01	M76RI0284	CFUGE CAKE PUMP 4	WAIT	READY	DI	1.3.6.8
DROP17	76PCM07	1C31232G01	M76ZD0284	CFUGE CAKE PUMP 4	NORMAL	ALARM	DI	1.3.6.9
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.6.10
DROP17	76PCM07	1C31232G01	M76MI0282	CFUGE CAKE PUMP 2	OFF	RUNNNG	DI	1.3.6.11
DROP17	76PCM07	1C31232G01	M76QI0282	CAKE PUMP NO. 2 DCS STATUS	LOCAL	INCOMP	DI	1.3.6.12
DROP17	76PCM07	1C31232G01	M76RI0282	CFUGE CAKE PUMP 2	WAIT	READY	DI	1.3.6.13
DROP17	76PCM07	1C31232G01	M76ZD0282	CFUGE CAKE PUMP 2	NORMAL	ALARM	DI	1.3.6.14
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.6.15
DROP17	76PCM07	1C31232G01	<b>M17QC3S06</b>	<b>DPU17 QC DROP 3 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.6.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP17	76PCM07	1C31232G01	M76ZB1403	PIPELINE LUBE PUMP 2 DISCH VLV	NORMAL	CLOSED	DI	1.3.7.1	
DROP17	76PCM07	1C31232G01	M76ZD1403	PIPELINE LUBE PUMP 2 DISCH VLV	NORMAL	OPENED	DI	1.3.7.2	
DROP17	76PCM07	1C31232G01	M76ZB1402	PIPELINE LUBE PUMP 2 INLET VLV	NORMAL	CLOSED	DI	1.3.7.3	
DROP17	76PCM07	1C31232G01	M76ZD1402	PIPELINE LUBE PUMP 2 INLET VLV	NORMAL	OPENED	DI	1.3.7.4	
DROP17	76PCM07	1C31232G01	M76MI0802	PIPELINE LUBE PUMP NO. 2	OFF	RUNNNG	DI	1.3.7.5	
DROP17	76PCM07	1C31232G01	M76UA0802	PIPELINE LUBE PUMP NO. 2	NORMAL	FAIL	DI	1.3.7.6	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.7.7	
DROP17	76PCM07	1C31232G01	M76ZB1407	PIPELINE LUBE PUMP 4 DISCH VLV	NORMAL	CLOSED	DI	1.3.7.8	
DROP17	76PCM07	1C31232G01	M76ZD1407	PIPELINE LUBE PUMP 4 DISCH VLV	NORMAL	OPENED	DI	1.3.7.9	
DROP17	76PCM07	1C31232G01	M76ZB1406	PIPELINE LUBE PUMP 4 INLET VLV	NORMAL	CLOSED	DI	1.3.7.10	
DROP17	76PCM07	1C31232G01	M76ZD1406	PIPELINE LUBE PUMP 4 INLET VLV	NORMAL	OPENED	DI	1.3.7.11	
DROP17	76PCM07	1C31232G01	M76MI0804	PIPELINE LUBE PUMP NO. 4	OFF	RUNNNG	DI	1.3.7.12	
DROP17	76PCM07	1C31232G01	M76UA0804	PIPELINE LUBE PUMP NO. 4	NORMAL	FAIL	DI	1.3.7.13	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.7.14	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.3.7.15	
DROP17	76PCM07	1C31232G01	<b>M17QC3S07</b>	<b>DPU17 QC DROP 3 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.7.16	
DROP17	76PCM07		Spare Module Address						1.3.8
DROP17	76PCM07	1C31232G01	M76QI0286B	CAKE PUMP NO. 6	DSELECT	SELECT	DI	1.4.1.1	
DROP17	76PCM07	1C31232G01	M76QI0286C	CAKE PUMP NO. 8	DSELECT	SELECT	DI	1.4.1.2	
DROP17	76PCM07	1C31232G01	M76QI0286D	CAKE PUMP NO. 6 & 8	DSELECT	SELECT	DI	1.4.1.3	
DROP17	76PCM07	1C31232G01	M76QI0286E	CAKE PUMP 6 & 8 SELECTR SWITCH	LOCAL	INCOMP	DI	1.4.1.4	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.1.5	
DROP17	76PCM07	1C31232G01	M76MI0286	CFUGE CAKE PUMP 6	OFF	RUNNNG	DI	1.4.1.6	
DROP17	76PCM07	1C31232G01	M76QI0286	CAKE PUMP NO. 6 DCS STATUS	LOCAL	INCOMP	DI	1.4.1.7	
DROP17	76PCM07	1C31232G01	M76RI0286	CFUGE CAKE PUMP 6	WAIT	READY	DI	1.4.1.8	
DROP17	76PCM07	1C31232G01	M76ZD0286	CFUGE CAKE PUMP 6	NORMAL	ALARM	DI	1.4.1.9	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.1.10	
DROP17	76PCM07	1C31232G01	M76MI0288	CFUGE CAKE PUMP 8	OFF	RUNNNG	DI	1.4.1.11	
DROP17	76PCM07	1C31232G01	M76QI0288	CAKE PUMP NO. 8 DCS STATUS	LOCAL	INCOMP	DI	1.4.1.12	
DROP17	76PCM07	1C31232G01	M76RI0288	CFUGE CAKE PUMP 8	WAIT	READY	DI	1.4.1.13	
DROP17	76PCM07	1C31232G01	M76ZD0288	CFUGE CAKE PUMP 8	NORMAL	ALARM	DI	1.4.1.14	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.1.15	
DROP17	76PCM07	1C31232G01	<b>M17QC4S01</b>	<b>DPU17 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16	
DROP17	76PCM07	1C31232G01	M76MI0258	DC FEED PUMP NO. 8	OFF	RUNNNG	DI	1.4.2.1	
DROP17	76PCM07	1C31232G01	M76QI0258B	DC FEED PUMP NO. 8	LOCAL	INCOMP	DI	1.4.2.2	
DROP17	76PCM07	1C31232G01	M76RI0258	DC FEED PUMP NO. 8	WAIT	READY	DI	1.4.2.3	
DROP17	76PCM07	1C31232G01	M76UA0258	DC FEED PUMP NO. 8	NORMAL	FAIL	DI	1.4.2.4	
DROP17	76PCM07	1C31232G01	M76PAH2540	DC FEED PUMP 8 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.2.5	
DROP17	76PCM07	1C31232G01	M76PAL2540A	DC FEED PUMP 8 PRESS CUTOUT	NORMAL	LOW	DI	1.4.2.6	
DROP17	76PCM07	1C31232G01	M76PAL2540B	DC FEED PUMP 8 PRESS CUTOUT	NORMAL	LOW	DI	1.4.2.7	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.2.8	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.2.9	
DROP17	76PCM07	1C31232G01	M76ZB1628	DC 8 CAKE TO CENT VALVE	NORMAL	CLOSED	DI	1.4.2.10	
DROP17	76PCM07	1C31232G01	M76ZD1628	DC 8 CAKE TO CENT VALVE	NORMAL	OPENED	DI	1.4.2.11	
DROP17	76PCM07	1C31232G01	M76ZB1627	DC 8 DISCH CAKE GATE	CLOSED	NORMAL	DI	1.4.2.12	
DROP17	76PCM07	1C31232G01	M76ZD1627	DC 8 DISCH CAKE GATE	OPENED	NORMAL	DI	1.4.2.13	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.2.14	
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.2.15	
DROP17	76PCM07	1C31232G01	<b>M17QC4S02</b>	<b>DPU17 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16	

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.3.1
DROP17	76PCM07	1C31232G01	M76ZB1620	DC 8 POLY INJECT VALVE 1	NORMAL	CLOSED	DI	1.4.3.2
DROP17	76PCM07	1C31232G01	M76ZD1620	DC 8 POLY INJECT VALVE 1	NORMAL	OPENED	DI	1.4.3.3
DROP17	76PCM07	1C31232G01	M76ZB1625	DC 8 POLY INJECT VALVE 2	NORMAL	CLOSED	DI	1.4.3.4
DROP17	76PCM07	1C31232G01	M76ZD1625	DC 8 POLY INJECT VALVE 2	NORMAL	OPENED	DI	1.4.3.5
DROP17	76PCM07	1C31232G01	M76ZB1626	DC 8 POLY INJECT VALVE 3	NORMAL	CLOSED	DI	1.4.3.6
DROP17	76PCM07	1C31232G01	M76ZD1626	DC 8 POLY INJECT VALVE 3	NORMAL	OPENED	DI	1.4.3.7
DROP17	76PCM07	1C31232G01	M76ZB1548	DC 8 POLY INJECT VALVE 4	NORMAL	CLOSED	DI	1.4.3.8
DROP17	76PCM07	1C31232G01	M76ZD1548	DC 8 POLY INJECT VALVE 4	NORMAL	OPENED	DI	1.4.3.9
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.3.10
DROP17	76PCM07	1C31232G01	M76MI0512	POLY DAY TANK 4 MIXER	OFF	RUNNNG	DI	1.4.3.11
DROP17	76PCM07	1C31232G01	M76QI0512	POLY DAY TANK 4 MIXER	LOCAL	INCOMP	DI	1.4.3.12
DROP17	76PCM07	1C31232G01	M76RI0512	POLY DAY TANK 4 MIXER	WAIT	READY	DI	1.4.3.13
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.3.14
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.3.15
DROP17	76PCM07	1C31232G01	<b>M17QC4S03</b>	<b>DPU17 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP17	76PCM07	1C31232G01	M76QI1110	GRIT SEPARATOR 3 INLET VALVE	LOCAL	INCOMP	DI	1.4.4.1
DROP17	76PCM07	1C31232G01	M76RI1110	GRIT SEPARATOR 3 INLET VALVE	WAIT	READY	DI	1.4.4.2
DROP17	76PCM07	1C31232G01	M76ZB1110	GRIT SEPARATOR 3 INLET VALVE	NORMAL	CLOSED	DI	1.4.4.3
DROP17	76PCM07	1C31232G01	M76ZD1110	GRIT SEPARATOR 3 INLET VALVE	NORMAL	OPENED	DI	1.4.4.4
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.4.5
DROP17	76PCM07	1C31232G01	M76QI1113	GRIT SEPARATOR 3 DISCH VALVE	LOCAL	INCOMP	DI	1.4.4.6
DROP17	76PCM07	1C31232G01	M76RI1113	GRIT SEPARATOR 3 DISCH VALVE	WAIT	READY	DI	1.4.4.7
DROP17	76PCM07	1C31232G01	M76ZB1113	GRIT SEPARATOR 3 DISCH VALVE	NORMAL	CLOSED	DI	1.4.4.8
DROP17	76PCM07	1C31232G01	M76ZD1113	GRIT SEPARATOR 3 DISCH VALVE	NORMAL	OPENED	DI	1.4.4.9
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.4.10
DROP17	76PCM07	1C31232G01	<b>M76QI1111</b>	<b>GRIT SEPARATOR 3 GRIT VALVE 1</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.4.4.11
DROP17	76PCM07	1C31232G01	M76RI1111	GRIT SEPARATOR 3 GRIT VALVE 1	WAIT	READY	DI	1.4.4.12
DROP17	76PCM07	1C31232G01	M76ZB1111	GRIT SEPARATOR 3 GRIT VALVE 1	NORMAL	CLOSED	DI	1.4.4.13
DROP17	76PCM07	1C31232G01	M76ZD1111	GRIT SEPARATOR 3 GRIT VALVE 1	NORMAL	OPENED	DI	1.4.4.14
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.4.15
DROP17	76PCM07	1C31232G01	<b>M17QC4S04</b>	<b>DPU17 QC DROP 4 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16
DROP17	76PCM07	1C31232G01	M76MI0568	DC POLY FEED PUMP NO. 8	OFF	RUNNNG	DI	1.4.5.1
DROP17	76PCM07	1C31232G01	M76QI0568B	DC POLY FEED PUMP NO. 8	LOCAL	INCOMP	DI	1.4.5.2
DROP17	76PCM07	1C31232G01	M76RI0568	DC POLY FEED PUMP NO. 8	WAIT	READY	DI	1.4.5.3
DROP17	76PCM07	1C31232G01	M76UA0568	DC POLY FEED PUMP NO. 8	NORMAL	FAIL	DI	1.4.5.4
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.5.5
DROP17	76PCM07	1C31232G01	M76PAH2807	DC POLY FD PUMP 8 PRESS CUTOUT	NORMAL	HIGH	DI	1.4.5.6
DROP17	76PCM07	1C31232G01	M76PAL2807A	DC POLY FD PUMP 8 PRESS CUTOUT	NORMAL	LOW	DI	1.4.5.7
DROP17	76PCM07	1C31232G01	M76PAL2807B	DC POLY FD PUMP 8 PRESS CUTOUT	NORMAL	LOW	DI	1.4.5.8
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.5.9
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.5.10
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.5.11
DROP17	76PCM07	1C31232G01	M76LAH2726	POLY DAY TANK 4 LEVEL ALARMS	NORMAL	HIGH	DI	1.4.5.12
DROP17	76PCM07	1C31232G01	M76LM2726	POLY DAY TANK 4 LEVEL ALARMS	NORMAL	MIDPNT	DI	1.4.5.13
DROP17	76PCM07	1C31232G01	M76LAL2726	POLY DAY TANK 4 LEVEL ALARMS	NORMAL	LOW	DI	1.4.5.14
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.5.15
DROP17	76PCM07	1C31232G01	<b>M17QC4S05</b>	<b>DPU17 QC DROP 4 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.5.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP17	76PCM07	1C31232G01	M76ZB1411	PIPELINE LUBE PUMP 6 DISCH VLV	NORMAL	CLOSED	DI	1.4.6.1
DROP17	76PCM07	1C31232G01	M76ZD1411	PIPELINE LUBE PUMP 6 DISCH VLV	NORMAL	OPENED	DI	1.4.6.2
DROP17	76PCM07	1C31232G01	M76ZB1410	PIPELINE LUBE PUMP 6 INLET VLV	NORMAL	CLOSED	DI	1.4.6.3
DROP17	76PCM07	1C31232G01	M76ZD1410	PIPELINE LUBE PUMP 6 INLET VLV	NORMAL	OPENED	DI	1.4.6.4
DROP17	76PCM07	1C31232G01	M76MI0806	PIPELINE LUBE PUMP NO. 6	OFF	RUNNNG	DI	1.4.6.5
DROP17	76PCM07	1C31232G01	M76UA0806	PIPELINE LUBE PUMP NO. 6	NORMAL	FAIL	DI	1.4.6.6
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.6.7
DROP17	76PCM07	1C31232G01	M76ZB1415	PIPELINE LUBE PUMP 8 DISCH VLV	NORMAL	CLOSED	DI	1.4.6.8
DROP17	76PCM07	1C31232G01	M76ZD1415	PIPELINE LUBE PUMP 8 DISCH VLV	NORMAL	OPENED	DI	1.4.6.9
DROP17	76PCM07	1C31232G01	M76ZB1414	PIPELINE LUBE PUMP 8 INLET VLV	NORMAL	CLOSED	DI	1.4.6.10
DROP17	76PCM07	1C31232G01	M76ZD1414	PIPELINE LUBE PUMP 8 INLET VLV	NORMAL	OPENED	DI	1.4.6.11
DROP17	76PCM07	1C31232G01	M76MI0808	PIPELINE LUBE PUMP NO. 8	OFF	RUNNNG	DI	1.4.6.12
DROP17	76PCM07	1C31232G01	M76UA0808	PIPELINE LUBE PUMP NO. 8	NORMAL	FAIL	DI	1.4.6.13
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.6.14
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.6.15
DROP17	76PCM07	1C31232G01	<b>M17QC4S06</b>	<b>DPU17 QC DROP 4 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.6.16
DROP17	76PCM07	1C31232G01	M76ZB1622	DC 8 HT XCHNGR INLET VALVE	NORMAL	CLOSED	DI	1.4.7.1
DROP17	76PCM07	1C31232G01	M76ZD1622	DC 8 HT XCHNGR INLET VALVE	NORMAL	OPENED	DI	1.4.7.2
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.7.3
DROP17	76PCM07	1C31232G01	M76ZB1623	DC 8 HT XCHNGR BPASS VALVE	NORMAL	CLOSED	DI	1.4.7.4
DROP17	76PCM07	1C31232G01	M76ZD1623	DC 8 HT XCHNGR BPASS VALVE	NTOPEN	OPENED	DI	1.4.7.5
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.7.6
DROP17	76PCM07	1C31232G01	M76ZB1624	DC 8 HT XCHNGR DISCH VALVE	NORMAL	CLOSED	DI	1.4.7.7
DROP17	76PCM07	1C31232G01	M76ZD1624	DC 8 HT XCHNGR DISCH VALVE	NORMAL	OPENED	DI	1.4.7.8
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.7.9
DROP17	76PCM07	1C31232G01	M76QI1629	HEAT EXCHANGR8 HOT WTR SUPPLY	LOCAL	INCOMP	DI	1.4.7.10
DROP17	76PCM07	1C31232G01	M76RI1629	HEAT EXCHANGR8 HOT WTR SUPPLY	WAIT	READY	DI	1.4.7.11
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.7.12
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.7.13
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.7.14
DROP17	76PCM07	1C31232G01	SPARE				DI	1.4.7.15
DROP17	76PCM07	1C31232G01	<b>M17QC4S07</b>	<b>DPU17 QC DROP 4 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.7.16
DROP17	76PCM07			Spare Module Address				1.4.8



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP17	76PCM07	5A26458G04	M76QS0282A	CAKE PMP 2 STATUS TO 76-LCP-03	DSELECT	SELECT	DO	1.5.1.1
DROP17	76PCM07	5A26458G04	M76HS0282	CAKE PMP 2 S/S TO 76-LCP-03	OFF	RUN	DO	1.5.1.2
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.1.3
DROP17	76PCM07	5A26458G04	M76QS0282B	CAKE PMP 4 STATUS TO 76-LCP-03	DSELECT	SELECT	DO	1.5.1.4
DROP17	76PCM07	5A26458G04	M76HS0284	CAKE PMP 4 S/S TO 76-LCP-03	OFF	RUN	DO	1.5.1.5
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.1.6
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.1.7
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.1.8
DROP17	76PCM07	5A26458G04	M76MU0284	DC CAKE PMP 4 BYPASS/LOAD	OFF	BYPASS	DO	1.5.1.9
DROP17	76PCM07	5A26458G04	M76MU0282	DC CAKE PMP 2 BYPASS/LOAD	LOAD	BYPASS	DO	1.5.1.10
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.1.11
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.1.12
DROP17	76PCM07	5A26458G04	M76HS1105A	GRIT SEPARATOR 2 INLET VALVE	OFF	OPEN	DO	1.5.2.1
DROP17	76PCM07	5A26458G04	M76HS1105B	GRIT SEPARATOR 2 INLET VALVE	OFF	CLOSE	DO	1.5.2.2
DROP17	76PCM07	5A26458G04	M76HS1108A	GRIT SEPARATOR 2 DISCH VALVE	OFF	OPEN	DO	1.5.2.3
DROP17	76PCM07	5A26458G04	M76HS1108B	GRIT SEPARATOR 2 DISCH VALVE	OFF	CLOSE	DO	1.5.2.4
DROP17	76PCM07	5A26458G04	M76HS1106A	GRIT SEPARATOR 2 GRIT VALVE	OFF	OPEN	DO	1.5.2.5
DROP17	76PCM07	5A26458G04	M76HS1106B	GRIT SEPARATOR 2 GRIT VALVE	OFF	CLOSE	DO	1.5.2.6
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.2.7
DROP17	76PCM07	5A26458G04	M76HS1107A	GRIT DEWATERING UNIT NO.2 INLET VALVE	OFF	OPEN	DO	1.5.2.8
DROP17	76PCM07	5A26458G04	M76HS1107B	GRIT DEWATERING UNIT NO.2 INLET VALVE	OFF	CLOSE	DO	1.5.2.9
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.2.10
DROP17	76PCM07	5A26458G04	M76HS1121A	GRIT CONVEYOR 2 DISCH GATE 1	OFF	OPEN	DO	1.5.2.11
DROP17	76PCM07	5A26458G04	M76HS1121B	GRIT CONVEYOR 2 DISCH GATE 1	OFF	CLOSE	DO	1.5.2.12
DROP17	76PCM07	5A26458G04	M76HS1122A	GRIT CONVEYOR 2 DISCH GATE 2	OFF	OPEN	DO	1.5.3.1
DROP17	76PCM07	5A26458G04	M76HS1122B	GRIT CONVEYOR 2 DISCH GATE 2	OFF	CLOSE	DO	1.5.3.2
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.3.3
DROP17	76PCM07	5A26458G04	M76HS1110A	GRIT SEPARATOR 3 INLET VALVE	OFF	OPEN	DO	1.5.3.4
DROP17	76PCM07	5A26458G04	M76HS1110B	GRIT SEPARATOR 3 INLET VALVE	OFF	CLOSE	DO	1.5.3.5
DROP17	76PCM07	5A26458G04	M76HS1113A	GRIT SEPARATOR 3 DISCH VALVE	OFF	OPEN	DO	1.5.3.6
DROP17	76PCM07	5A26458G04	M76HS1113B	GRIT SEPARATOR 3 DISCH VALVE	OFF	CLOSE	DO	1.5.3.7
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.3.8
DROP17	76PCM07	5A26458G04	M76HS1111A	GRIT SEPARATOR 3 GRIT VALVE 2	OFF	OPEN	DO	1.5.3.9
DROP17	76PCM07	5A26458G04	M76HS1111B	GRIT SEPARATOR 3 GRIT VALVE 2	OFF	CLOSE	DO	1.5.3.10
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.3.11
DROP17	76PCM07	5A26458G04	SPARE				DO	1.5.3.12



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP17	76PCM07	5A26458G04	M76HS0258B	DC FEED PUMP NO. 8	OFF	RUN	DO	1.6.1.1
DROP17	76PCM07	5A26458G04	M76HS0258C	DC SLUDGE FEED PUMP 8 DISABLE	ENABLE	DISABLE	DO	1.6.1.2
DROP17	76PCM07	5A26458G04	M76HS0568B	DC POLY FEED PUMP NO. 8	OFF	RUN	DO	1.6.1.3
DROP17	76PCM07	5A26458G04	M76HS0208	DEWAT CFUGE NO. 8	OFF	RUN	DO	1.6.1.4
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.1.5
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.1.6
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.1.7
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.1.8
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.1.9
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.1.10
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.1.11
DROP17	76PCM07	5A26458G04	M76HS0512	POLY DAY TANK 4 MIXER	OFF	RUN	DO	1.6.1.12
DROP17	76PCM07	5A26458G04	M76QS0286A	CAKE PMP 6 STATUS TO 76-LCP-03	DSELECT	SELECT	DO	1.6.2.1
DROP17	76PCM07	5A26458G04	M76HS0286	CAKE PMP 6 S/S TO 76-LCP-03	OFF	RUN	DO	1.6.2.2
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.2.3
DROP17	76PCM07	5A26458G04	M76QS0286B	CAKE PMP 8 STATUS TO 76-LCP-03	DSELECT	SELECT	DO	1.6.2.4
DROP17	76PCM07	5A26458G04	M76HS0288	CAKE PMP 8 S/S TO 76-LCP-03	OFF	RUN	DO	1.6.2.5
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.2.6
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.2.7
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.2.8
DROP17	76PCM07	5A26458G04	M76MU0286	DC CAKE PMP 6 BYPASS/LOAD	OFF	BYPASS	DO	1.6.2.9
DROP17	76PCM07	5A26458G04	M76MU0288	DC CAKE PMP 8 BYPASS/LOAD	OFF	BYPASS	DO	1.6.2.10
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.2.11
DROP17	76PCM07	5A26458G04	SPARE				DO	1.6.2.12

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 FEBRUARY 2021

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	5X00419G01		76VDL08 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1
			76MV1090	GRIT SEPARATORS INLET VALVE				
			76MV1091	GRIT SEPARATORS OUTLET VALVE				
			76MV1092	GRIT SEPARATORS BYPASS VALVE				
			76MV1300	SCREENS INLET VALVE				
			76MV1301	SCREENS DISCHARGE VALVE				
			76MV1302	SCREENS BYPASS VALVE				
DROP18	76PCM08	5X00106G01	M76PT2090	GRIT SEPARATORS INLET PRESS	0	100 PSIG	AI - HART	1.1.2.1
DROP18	76PCM08	5X00106G01	M76PT2091	GRIT SEPARATORS DISCH PRESS	0	100 PSIG	AI - HART	1.1.2.2
DROP18	76PCM08	5X00106G01	SPARE	SPARE			AI - HART	1.1.2.3
DROP18	76PCM08	5X00106G01	SPARE	SPARE			AI - HART	1.1.2.4
DROP18	76PCM08	5X00106G01	SPARE	SPARE			AI - HART	1.1.2.5
DROP18	76PCM08	5X00106G01	SPARE	SPARE			AI - HART	1.1.2.6
DROP18	76PCM08	5X00106G01	SPARE	SPARE			AI - HART	1.1.2.7
DROP18	76PCM08	5X00106G01	SPARE	SPARE			AI - HART	1.1.2.8
DROP18	76PCM08			Spare Module Address				1.2.3
DROP18	76PCM08			Spare Module Address				1.2.4
DROP18	76PCM08			Spare Module Address				1.2.5
DROP18	76PCM08			Spare Module Address				1.2.6
DROP18	76PCM08			Spare Module Address				1.2.7
DROP18	76PCM08	5X00119G01	M76PT9041	DPU16 76PCM08 CABINET TEMP	32	154 DEG F	RTD	1.1.8.1
DROP18	76PCM08	5X00119G01	SPARE				RTD	1.1.8.2
DROP18	76PCM08	5X00119G01	SPARE				RTD	1.1.8.3
DROP18	76PCM08	5X00119G01	SPARE				RTD	1.1.8.4
DROP18	76PCM08	5X00119G01	SPARE				RTD	1.1.8.5
DROP18	76PCM08	5X00119G01	SPARE				RTD	1.1.8.6
DROP18	76PCM08	5X00119G01	SPARE				RTD	1.1.8.7
DROP18	76PCM08	5X00119G01	SPARE				RTD	1.1.8.8
DROP18	76PCM08	1C31232G01	M76AAHH2355B	CF BLDG G/FLR CH4 GRIT AREA N	HI-HI	NORMAL	DI	1.2.1.1
DROP18	76PCM08	1C31232G01	M76AAHH2355C	CF BLDG G/FLR CH4 DW AREA SW	HI-HI	NORMAL	DI	1.2.1.2
DROP18	76PCM08	1C31232G01	M76AAHH2355D	CF BLDG G/FLR CH4 DW AREA SE	HI-HI	NORMAL	DI	1.2.1.3
DROP18	76PCM08	1C31232G01	M76AAHH2355E	CF BLDG G/FLR CH4 DW AREA NW	HI-HI	NORMAL	DI	1.2.1.4
DROP18	76PCM08	1C31232G01	M76AAHH2355F	CF BLDG G/FLR CH4 DW AREA NE	HI-HI	NORMAL	DI	1.2.1.5
DROP18	76PCM08	1C31232G01	M76AAHH2355G	CF BLDG G/FLR CH4 THKNG AREA W	HI-HI	NORMAL	DI	1.2.1.6
DROP18	76PCM08	1C31232G01	M76AAHH2355H	CF BLDG G/FLR CH4 THKNG AREA E	HI-HI	NORMAL	DI	1.2.1.7
DROP18	76PCM08	1C31232G01	M76AAHH2355J	CF BLDG G/FLR CH4 CHEM AREA 1	HI-HI	NORMAL	DI	1.2.1.8
DROP18	76PCM08	1C31232G01	M76AAHH2355K	CF BLDG G/FLR CH4 CHEM AREA 2	HI-HI	NORMAL	DI	1.2.1.9
DROP18	76PCM08	1C31232G01	M76AAHH2355L	CF BLDG G/FLR CH4 MCC ROOM 1	HI-HI	NORMAL	DI	1.2.1.10
DROP18	76PCM08	1C31232G01	M76AAHH2355M	CF BLDG G/FLR CH4 MCC ROOM 2	HI-HI	NORMAL	DI	1.2.1.11
DROP18	76PCM08	1C31232G01	M76AAHH2355N	CF BLDG G/FLR CH4 ST AREA 1	HI-HI	NORMAL	DI	1.2.1.12
DROP18	76PCM08	1C31232G01	M76AAHH2355P	CF BLDG G/FLR CH4 ST AREA 2	HI-HI	NORMAL	DI	1.2.1.13
DROP18	76PCM08	1C31232G01	M76AAHH2355Q	CF BLDG G/FLR CH4 ELEVTR LOBBY	HI-HI	NORMAL	DI	1.2.1.14
DROP18	76PCM08	1C31232G01	M76XA2355A	CF BLDG G/FLR CH4 GRIT AREA S	FAIL	NORMAL	DI	1.2.1.15
DROP18	76PCM08	1C31232G01	<b>M18QC2S01</b>	<b>DPU18 QC DROP 2 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.2.1.16

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FEBRUARY 2021

DCS INPUTS OUTPUTS (IO)  
40 94 24 SUPPLEMENT 1 - 55

CITY OF SAN DIEGO  
METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	1C31232G01	M76XA2357H	CF BLDG FLR 3 CH4 T & C RM 1	FAIL	NORMAL	DI	1.2.2.1
DROP18	76PCM08	1C31232G01	M76XA2357J	CF BLDG FLR 3 CH4 CORRIDOR	FAIL	NORMAL	DI	1.2.2.2
DROP18	76PCM08	1C31232G01	M76XA2357K	CF BLDG FLR 3 CH4 ST AREA1	FAIL	NORMAL	DI	1.2.2.3
DROP18	76PCM08	1C31232G01	M76XA2357L	CF BLDG FLR 3 CH4 ST AREA2	FAIL	NORMAL	DI	1.2.2.4
DROP18	76PCM08	1C31232G01	M76XA2357M	CF BLDG FLR 3 CH4 ELVTR LOBBY	FAIL	NORMAL	DI	1.2.2.5
DROP18	76PCM08	1C31232G01	M76XA2357N	CF BLDG FLR 3 CH4 HVAC RM 2	FAIL	NORMAL	DI	1.2.2.6
DROP18	76PCM08	1C31232G01	M76XA2357P	CF BLDG FLR 3 CH4 T & C RM 2	FAIL	NORMAL	DI	1.2.2.7
DROP18	76PCM08	1C31232G01	M76AAH2357Q	CF BLDG FLR 3 CH4 P ELVTR SHFT	HIGH	NORMAL	DI	1.2.2.8
DROP18	76PCM08	1C31232G01	M76AAH2357R	CF BLDG FLR 3 CH4 F ELVTR SHFT	HIGH	NORMAL	DI	1.2.2.9
DROP18	76PCM08	1C31232G01	M76AAH2358A	CF BLDG GLRY LVL CH4 M/C RM	HIGH	NORMAL	DI	1.2.2.10
DROP18	76PCM08	1C31232G01	M76AAH2358B	CF BLDG GLRY LVL CH4 ELVTR LBY	HIGH	NORMAL	DI	1.2.2.11
DROP18	76PCM08	1C31232G01	M76AAH2358C	CF BLDG GLRY LVL CH4 STAIRCASE	HIGH	NORMAL	DI	1.2.2.12
DROP18	76PCM08	1C31232G01	M76AAH2357Q	CF BLDG FLR 3 CH4 P ELVTR SHFT	HI-HI	NORMAL	DI	1.2.2.13
DROP18	76PCM08	1C31232G01	M76AAH2357R	CF BLDG FLR 3 CH4 F ELVTR SHFT	HI-HI	NORMAL	DI	1.2.2.14
DROP18	76PCM08	1C31232G01	M76AAH2358A	CF BLDG GLRY LVL CH4 M/C RM	HI-HI	NORMAL	DI	1.2.2.15
DROP18	76PCM08	1C31232G01	<b>M18QC2S02</b>	<b>DPU18 QC DROP 2 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.2.2.16
DROP18	76PCM08	1C31232G01	M76ZB9230	76USSB - 76-DC-08 FEED BREAKER	NORMAL	CLOSED	DI	1.2.3.1
DROP18	76PCM08	1C31232G01	M76ZB9232	76USSB - 76MCC76B02 FD BREAKER	NORMAL	CLOSED	DI	1.2.3.2
DROP18	76PCM08	1C31232G01	M76ZD9230	76USSB - 76-DC-08 FEED BREAKER	NORMAL	OPENED	DI	1.2.3.3
DROP18	76PCM08	1C31232G01	M76ZD9232	76USSB - 76MCC76B02 FD BREAKER	NORMAL	OPENED	DI	1.2.3.4
DROP18	76PCM08	1C31232G01	M76EAL9241	76USSC - LINE A TRANSFORMER	U/VOLT	NORMAL	DI	1.2.3.5
DROP18	76PCM08	1C31232G01	M76UA9241	76USSC - LINE A TRANSFORMER	NORMAL	TRBL	DI	1.2.3.6
DROP18	76PCM08	1C31232G01	M76ZA9243	76USSC - FEED A BREAKER	NORMAL	TRIPPD	DI	1.2.3.7
DROP18	76PCM08	1C31232G01	M76ZA9245	76USSC - TIE BREAKER	NORMAL	TRIPPD	DI	1.2.3.8
DROP18	76PCM08	1C31232G01	M76ZA9247	76USSC - 76MCC76C01 FD BREAKER	TRIPPD	NORMAL	DI	1.2.3.9
DROP18	76PCM08	1C31232G01	M76ZB9243	76USSC - FEED A BREAKER	NORMAL	CLOSED	DI	1.2.3.10
DROP18	76PCM08	1C31232G01	M76ZB9245	76USSC - TIE BREAKER	NORMAL	CLOSED	DI	1.2.3.11
DROP18	76PCM08	1C31232G01	M76ZD9243	76USSC - FEED A BREAKER	NORMAL	OPENED	DI	1.2.3.12
DROP18	76PCM08	1C31232G01	M76ZD9245	76USSC - TIE BREAKER	NORMAL	OPENED	DI	1.2.3.13
DROP18	76PCM08	1C31232G01	M76ZD9246	76USSC - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.2.3.14
DROP18	76PCM08	1C31232G01	M76ZA9251	76USSC - 76-DC-02 FEED BREAKER	TRIPPD	NORMAL	DI	1.2.3.15
DROP18	76PCM08	1C31232G01	<b>M18QC2S03</b>	<b>DPU18 QC DROP 2 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.2.3.16
DROP18	76PCM08	1C31232G01	M76QI1102	GRIT DEWATERING UNIT NO.1 INLET VALVE	NORMAL	INCOMP	DI	1.2.4.1
DROP18	76PCM08	1C31232G01	M76RI1102	GRIT DEWATERING UNIT NO.1 INLET VALVE	WAIT	READY	DI	1.2.4.2
DROP18	76PCM08	1C31232G01	M76ZB1102	GRIT DEWATERING UNIT NO.1 INLET VALVE	NORMAL	CLOSED	DI	1.2.4.3
DROP18	76PCM08	1C31232G01	M76ZD1102	GRIT DEWATERING UNIT NO.1 INLET VALVE	NORMAL	OPENED	DI	1.2.4.4
DROP18	76PCM08	1C31232G01	SPARE				DI	1.2.4.5
DROP18	76PCM08	1C31232G01	M76AAHH2358C	CF BLDG GLRY LVL CH4 STAIRCASE	HI-HI	NORMAL	DI	1.2.4.6
DROP18	76PCM08	1C31232G01	M76XA2357Q	CF BLDG FLR 3 CH4 P ELVTR SHFT	FAIL	NORMAL	DI	1.2.4.7
DROP18	76PCM08	1C31232G01	M76XA2357R	CF BLDG FLR 3 CH4 F ELVTR SHFT	FAIL	NORMAL	DI	1.2.4.8
DROP18	76PCM08	1C31232G01	M76XA2358A	CF BLDG GLRY LVL CH4 M/C RM	FAIL	NORMAL	DI	1.2.4.9
DROP18	76PCM08	1C31232G01	M76XA2358B	CF BLDG GLRY LVL CH4 ELVTR LBY	FAIL	NORMAL	DI	1.2.4.10
DROP18	76PCM08	1C31232G01	M76XA2358C	CF BLDG GLRY LVL CH4 STAIRCASE	FAIL	NORMAL	DI	1.2.4.11
DROP18	76PCM08	1C31232G01	SPARE				DI	1.2.4.12
DROP18	76PCM08	1C31232G01	SPARE				DI	1.2.4.13
DROP18	76PCM08	1C31232G01	SPARE				DI	1.2.4.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.2.4.15
DROP18	76PCM08	1C31232G01	<b>M18QC2S04</b>	<b>DPU18 QC DROP 2 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.2.4.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	1C31232G01	M76XA2355C	CF BLDG G/FLR CH4 DW AREA SW	FAIL	NORMAL	DI	1.2.5.1
DROP18	76PCM08	1C31232G01	M76XA2355D	CF BLDG G/FLR CH4 DW AREA SE	FAIL	NORMAL	DI	1.2.5.2
DROP18	76PCM08	1C31232G01	M76XA2355E	CF BLDG G/FLR CH4 DW AREA NW	FAIL	NORMAL	DI	1.2.5.3
DROP18	76PCM08	1C31232G01	M76XA2355F	CF BLDG G/FLR CH4 DW AREA NE	FAIL	NORMAL	DI	1.2.5.4
DROP18	76PCM08	1C31232G01	M76XA2355G	CF BLDG G/FLR CH4 THKNG AREA W	FAIL	NORMAL	DI	1.2.5.5
DROP18	76PCM08	1C31232G01	M76XA2355H	CF BLDG G/FLR CH4 THKNG AREA E	FAIL	NORMAL	DI	1.2.5.6
DROP18	76PCM08	1C31232G01	M76XA2355J	CF BLDG G/FLR CH4 CHEM AREA 1	FAIL	NORMAL	DI	1.2.5.7
DROP18	76PCM08	1C31232G01	M76XA2355K	CF BLDG G/FLR CH4 CHEM AREA 2	FAIL	NORMAL	DI	1.2.5.8
DROP18	76PCM08	1C31232G01	M76XA2355L	CF BLDG G/FLR CH4 MCC ROOM 1	FAIL	NORMAL	DI	1.2.5.9
DROP18	76PCM08	1C31232G01	M76XA2355M	CF BLDG G/FLR CH4 MCC ROOM 2	FAIL	NORMAL	DI	1.2.5.10
DROP18	76PCM08	1C31232G01	M76XA2355N	CF BLDG G/FLR CH4 ST AREA 1	FAIL	NORMAL	DI	1.2.5.11
DROP18	76PCM08	1C31232G01	M76XA2355P	CF BLDG G/FLR CH4 ST AREA 2	FAIL	NORMAL	DI	1.2.5.12
DROP18	76PCM08	1C31232G01	M76XA2355Q	CF BLDG G/FLR CH4 ELEVTR LOBBY	FAIL	NORMAL	DI	1.2.5.13
DROP18	76PCM08	1C31232G01	M76AAH2356A	CF BLDG FLR 2 CH4 GRIT AREA W	HIGH	NORMAL	DI	1.2.5.14
DROP18	76PCM08	1C31232G01	M76AAH2356B	CF BLDG FLR 2 CH4 GRIT AREA S	HIGH	NORMAL	DI	1.2.5.15
DROP18	76PCM08	1C31232G01	<b>M18QC2S05</b>	<b>DPU18 QC DROP 2 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.2.5.16
DROP18	76PCM08	1C31232G01	M76XA2356D	CF BLDG FLR 2 CH4 HVAC ROOM	FAIL	NORMAL	DI	1.2.6.1
DROP18	76PCM08	1C31232G01	M76XA2356E	CF BLDG FLR 2 CH4 STARTR RM 1	FAIL	NORMAL	DI	1.2.6.2
DROP18	76PCM08	1C31232G01	M76XA2356F	CF BLDG FLR 2 CH4 CORRIDOR	FAIL	NORMAL	DI	1.2.6.3
DROP18	76PCM08	1C31232G01	M76XA2356G	CF BLDG FLR 2 CH4 ST AREA 1	FAIL	NORMAL	DI	1.2.6.4
DROP18	76PCM08	1C31232G01	M76XA2356H	CF BLDG FLR 2 CH4 ST AREA 2	FAIL	NORMAL	DI	1.2.6.5
DROP18	76PCM08	1C31232G01	M76XA2356J	CF BLDG FLR 2 CH4 ELVTR LOBBY	FAIL	NORMAL	DI	1.2.6.6
DROP18	76PCM08	1C31232G01	M76XA2356K	CF BLDG FLR 2 CH4 WOMENS RR	FAIL	NORMAL	DI	1.2.6.7
DROP18	76PCM08	1C31232G01	M76XA2356L	CF BLDG FLR 2 CH4 MENS RR	FAIL	NORMAL	DI	1.2.6.8
DROP18	76PCM08	1C31232G01	M76XA2356M	CF BLDG FLR 2 CH4 JANITOR CLST	FAIL	NORMAL	DI	1.2.6.9
DROP18	76PCM08	1C31232G01	M76XA2356N	CF BLDG FLR 2 CH4 LABORATORY	FAIL	NORMAL	DI	1.2.6.10
DROP18	76PCM08	1C31232G01	M76XA2356P	CF BLDG FLR 2 CH4 O&C ROOM	FAIL	NORMAL	DI	1.2.6.11
DROP18	76PCM08	1C31232G01	M76XA2356Q	CF BLDG FLR 2 CH4 STARTER RM 2	FAIL	NORMAL	DI	1.2.6.12
DROP18	76PCM08	1C31232G01	M76XA2356R	CF BLDG FLR 2 CH4 STARTER RM 3	FAIL	NORMAL	DI	1.2.6.13
DROP18	76PCM08	1C31232G01	M76AAH2357A	CF BLDG FLR 3 CH4 CF AREA SW	HIGH	NORMAL	DI	1.2.6.14
DROP18	76PCM08	1C31232G01	M76AAH2357B	CF BLDG FLR 3 CH4 CF AREA W	HIGH	NORMAL	DI	1.2.6.15
DROP18	76PCM08	1C31232G01	<b>M18QC2S06</b>	<b>DPU18 QC DROP 2 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.2.6.16
DROP18	76PCM08			Spare Module Address				1.2.7
DROP18	76PMC08	5X00419G01		76VDL08 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	1C31232G01	M76EAL9221	76USSB - LINE A TRANSFORMER	U/VOLT	NORMAL	DI	1.3.1.1
DROP18	76PCM08	1C31232G01	M76UA9221	76USSB - LINE A TRANSFORMER	NORMAL	FAIL	DI	1.3.1.2
DROP18	76PCM08	1C31232G01	M76ZA9223	76USSB - FEED A BREAKER	NORMAL	TRIPPD	DI	1.3.1.3
DROP18	76PCM08	1C31232G01	M76ZA9225	76USSB - TIE BREAKER	NORMAL	TRIPPD	DI	1.3.1.4
DROP18	76PCM08	1C31232G01	M76ZA9226	76USSB - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.3.1.5
DROP18	76PCM08	1C31232G01	M76ZB9223	76USSB - FEED A BREAKER	NORMAL	CLOSED	DI	1.3.1.6
DROP18	76PCM08	1C31232G01	M76ZB9225	76USSB - TIE BREAKER	NORMAL	CLOSED	DI	1.3.1.7
DROP18	76PCM08	1C31232G01	M76ZB9226	76USSB - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.3.1.8
DROP18	76PCM08	1C31232G01	M76ZB9229	76USSB - 76-DC-05 FEED BREAKER	NORMAL	CLOSED	DI	1.3.1.9
DROP18	76PCM08	1C31232G01	M76ZD9223	76USSB - FEED A BREAKER	NORMAL	OPENED	DI	1.3.1.10
DROP18	76PCM08	1C31232G01	M76ZD9225	76USSB - TIE BREAKER	NORMAL	OPENED	DI	1.3.1.11
DROP18	76PCM08	1C31232G01	M76ZD9226	76USSB - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.3.1.12
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.1.13
DROP18	76PCM08	1C31232G01	M76ZD9229	76USSB - 76-DC-05 FEED BREAKER	NORMAL	OPENED	DI	1.3.1.14
DROP18	76PCM08	1C31232G01	M76ZA9230	76USSB - 76-DC-08 FEED BREAKER	TRIPPD	NORMAL	DI	1.3.1.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S01</b>	<b>DPU18 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16
DROP18	76PCM08	1C31232G01	M76ZD9247	76USSC - 76MCC76C01 FD BREAKER	NORMAL	OPENED	DI	1.3.2.1
DROP18	76PCM08	1C31232G01	M76ZD9249	76USSC - 76-DC-01 FEED BREAKER	NORMAL	OPENED	DI	1.3.2.2
DROP18	76PCM08	1C31232G01	M76ZA9253	76USSC - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.3.2.3
DROP18	76PCM08	1C31232G01	M76ZB9251	76USSC - 76-DC-02 FEED BREAKER	NORMAL	CLOSED	DI	1.3.2.4
DROP18	76PCM08	1C31232G01	M76ZB9253	76USSC - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.3.2.5
DROP18	76PCM08	1C31232G01	M76ZD9251	76USSC - 76-DC-02 FEED BREAKER	NORMAL	OPENED	DI	1.3.2.6
DROP18	76PCM08	1C31232G01	M76ZD9253	76USSC - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.3.2.7
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.2.8
DROP18	76PCM08	1C31232G01	M76ZA9232	76USSB - 76MCC76B02 FD BREAKER	TRIPPD	NORMAL	DI	1.3.2.9
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.2.10
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.2.11
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.2.12
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.2.13
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.2.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.2.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S02</b>	<b>DPU18 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16
DROP18	76PCM08	1C31232G01	M76AAHH2356A	CF BLDG FLR 2 CH4 GRIT AREA W	HI-HI	NORMAL	DI	1.3.3.1
DROP18	76PCM08	1C31232G01	M76AAHH2356B	CF BLDG FLR 2 CH4 GRIT AREA S	HI-HI	NORMAL	DI	1.3.3.2
DROP18	76PCM08	1C31232G01	M76AAHH2356C	CF BLDG FLR 2 CH4 GRIT AREA N	HIGH	NORMAL	DI	1.3.3.3
DROP18	76PCM08	1C31232G01	M76XA2356C	CF BLDG FLR 2 CH4 GRIT AREA N	FAIL	NORMAL	DI	1.3.3.4
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.5
DROP18	76PCM08	1C31232G01	M76AAHH2356C	CF BLDG FLR 2 CH4 GRIT AREA N	HI-HI	NORMAL	DI	1.3.3.6
DROP18	76PCM08	1C31232G01	M76AAHH2357E	CF BLDG FLR 3 CH4 CF AREA E	HI-HI	NORMAL	DI	1.3.3.7
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.8
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.9
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.10
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.11
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.12
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.13
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.3.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S03</b>	<b>DPU18 QC DROP 3 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.3.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.1
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.2
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.3
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.4
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.5
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.6
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.7
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.8
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.9
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.10
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.11
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.12
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.13
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.4.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S04</b>	<b>DPU18 QC DROP 3 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.4.16
DROP18	76PCM08	1C31232G01	M76AAH2356D	CF BLDG FLR 2 CH4 HVAC ROOM	HIGH	NORMAL	DI	1.3.5.1
DROP18	76PCM08	1C31232G01	M76AAH2356E	CF BLDG FLR 2 CH4 STARTR RM 1	HIGH	NORMAL	DI	1.3.5.2
DROP18	76PCM08	1C31232G01	M76AAH2356F	CF BLDG FLR 2 CH4 CORRIDOR	HIGH	NORMAL	DI	1.3.5.3
DROP18	76PCM08	1C31232G01	M76AAH2356G	CF BLDG FLR 2 CH4 ST AREA 1	HIGH	NORMAL	DI	1.3.5.4
DROP18	76PCM08	1C31232G01	M76AAH2356H	CF BLDG FLR 2 CH4 ST AREA 2	HIGH	NORMAL	DI	1.3.5.5
DROP18	76PCM08	1C31232G01	M76AAH2356J	CF BLDG FLR 2 CH4 ELVTR LOBBY	HIGH	NORMAL	DI	1.3.5.6
DROP18	76PCM08	1C31232G01	M76AAH2356K	CF BLDG FLR 2 CH4 WOMENS RR	HIGH	NORMAL	DI	1.3.5.7
DROP18	76PCM08	1C31232G01	M76AAH2356L	CF BLDG FLR 2 CH4 MENS RR	1.3.5.1	NORMAL	DI	1.3.5.8
DROP18	76PCM08	1C31232G01	M76AAH2356M	CF BLDG FLR 2 CH4 JANITOR CLST	HIGH	NORMAL	DI	1.3.5.9
DROP18	76PCM08	1C31232G01	M76AAH2356N	CF BLDG FLR 2 CH4 LABORATORY	HIGH	NORMAL	DI	1.3.5.10
DROP18	76PCM08	1C31232G01	M76AAH2356P	CF BLDG FLR 2 CH4 O&C ROOM	HIGH	NORMAL	DI	1.3.5.11
DROP18	76PCM08	1C31232G01	M76AAH2356Q	CF BLDG FLR 2 CH4 STARTER RM 2	HIGH	NORMAL	DI	1.3.5.12
DROP18	76PCM08	1C31232G01	M76AAH2356R	CF BLDG FLR 2 CH4 STARTER RM 3	HIGH	NORMAL	DI	1.3.5.13
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.5.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.5.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S05</b>	<b>DPU18 QC DROP 3 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.5.16
DROP18	76PCM08	1C31232G01	M76AAH2357D	CF BLDG FLR 3 CH4 CF AREA SE	HIGH	NORMAL	DI	1.3.6.1
DROP18	76PCM08	1C31232G01	M76AAH2357E	CF BLDG FLR 3 CH4 CF AREA E	HIGH	NORMAL	DI	1.3.6.2
DROP18	76PCM08	1C31232G01	M76AAH2357F	CF BLDG FLR 3 CH4 CF AREA NE	HIGH	NORMAL	DI	1.3.6.3
DROP18	76PCM08	1C31232G01	M76AAH2357G	CF BLDG FLR 3 CH4 HVAC RM 1	HIGH	NORMAL	DI	1.3.6.4
DROP18	76PCM08	1C31232G01	M76AAH2357H	CF BLDG FLR 3 CH4 T & C RM 1	HIGH	NORMAL	DI	1.3.6.5
DROP18	76PCM08	1C31232G01	M76AAH2357J	CF BLDG FLR 3 CH4 CORRIDOR	HIGH	NORMAL	DI	1.3.6.6
DROP18	76PCM08	1C31232G01	M76AAH2357K	CF BLDG FLR 3 CH4 ST AREA1	HIGH	NORMAL	DI	1.3.6.7
DROP18	76PCM08	1C31232G01	M76AAH2357L	CF BLDG FLR 3 CH4 ST AREA2	HIGH	NORMAL	DI	1.3.6.8
DROP18	76PCM08	1C31232G01	M76AAH2357M	CF BLDG FLR 3 CH4 ELVTR LOBBY	HIGH	NORMAL	DI	1.3.6.9
DROP18	76PCM08	1C31232G01	M76AAH2357N	CF BLDG FLR 3 CH4 HVAC RM 2	HIGH	NORMAL	DI	1.3.6.10
DROP18	76PCM08	1C31232G01	M76AAH2357P	CF BLDG FLR 3 CH4 T & C RM 2	HIGH	NORMAL	DI	1.3.6.11
DROP18	76PCM08	1C31232G01	M76AAH2357A	CF BLDG FLR 3 CH4 CF AREA SW	HI-HI	NORMAL	DI	1.3.6.12
DROP18	76PCM08	1C31232G01	M76AAH2357B	CF BLDG FLR 3 CH4 CF AREA W	HI-HI	NORMAL	DI	1.3.6.13
DROP18	76PCM08	1C31232G01	M76AAH2357C	CF BLDG FLR 3 CH4 CF AREA NW	HI-HI	NORMAL	DI	1.3.6.14
DROP18	76PCM08	1C31232G01	M76AAH2357D	CF BLDG FLR 3 CH4 CF AREA SE	HI-HI	NORMAL	DI	1.3.6.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S06</b>	<b>DPU18 QC DROP 3 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.6.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	1C31232G01	M76EAL9222	76USSB - LINE B TRANSFORMER	U/VOLT	NORMAL	DI	1.3.7.1
DROP18	76PCM08	1C31232G01	M76UA9222	76USSB - LINE B TRANSFORMER	NORMAL	FAIL	DI	1.3.7.2
DROP18	76PCM08	1C31232G01	M76ZA9224	76USSB - FEED B BREAKER	NORMAL	TRIPPD	DI	1.3.7.3
DROP18	76PCM08	1C31232G01	M76ZA9227	76USSB - 76MCC76B01 FD BREAKER	TRIPPD	NORMAL	DI	1.3.7.4
DROP18	76PCM08	1C31232G01	M76ZA9228	76USSB - 76-DC-06 FEED BREAKER	TRIPPD	NORMAL	DI	1.3.7.5
DROP18	76PCM08	1C31232G01	M76ZA9229	76USSB - 76-DC-05 FEED BREAKER	TRIPPD	NORMAL	DI	1.3.7.6
DROP18	76PCM08	1C31232G01	M76ZB9224	76USSB - FEED B BREAKER	NORMAL	CLOSED	DI	1.3.7.7
DROP18	76PCM08	1C31232G01	M76ZB9227	76USSB - 76MCC76B01 FD BREAKER	NORMAL	CLOSED	DI	1.3.7.8
DROP18	76PCM08	1C31232G01	M76ZB9228	76USSB - 76-DC-06 FEED BREAKER	NORMAL	CLOSED	DI	1.3.7.9
DROP18	76PCM08	1C31232G01	M76ZD9224	76USSB - FEED B BREAKER	NORMAL	OPENED	DI	1.3.7.10
DROP18	76PCM08	1C31232G01	M76ZD9227	76USSB - 76MCC76B01 FD BREAKER	NORMAL	OPENED	DI	1.3.7.11
DROP18	76PCM08	1C31232G01	M76ZD9228	76USSB - 76-DC-06 FEED BREAKER	NORMAL	OPENED	DI	1.3.7.12
DROP18	76PCM08	1C31232G01	M76ZA9231	76USSB - 76-DC-07 FEED BREAKER	TRIPPD	NORMAL	DI	1.3.7.13
DROP18	76PCM08	1C31232G01	M76ZA9233	76USSB - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.3.7.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.7.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S07</b>	<b>DPU18 QC DROP 3 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.7.16
DROP18	76PCM08	1C31232G01	M76ZD9248	76USSC - 76-DC-03 FEED BREAKER	NORMAL	OPENED	DI	1.3.8.1
DROP18	76PCM08	1C31232G01	M76ZA9250	76USSC - 76-DC-04 FEED BREAKER	TRIPPD	NORMAL	DI	1.3.8.2
DROP18	76PCM08	1C31232G01	M76ZB9250	76USSC - 76-DC-04 FEED BREAKER	NORMAL	CLOSED	DI	1.3.8.3
DROP18	76PCM08	1C31232G01	M76ZB9252	76USSC - 76MCC76C02 FD BREAKER	NORMAL	CLOSED	DI	1.3.8.4
DROP18	76PCM08	1C31232G01	M76ZD9250	76USSC - 76-DC-04 FEED BREAKER	NORMAL	OPENED	DI	1.3.8.5
DROP18	76PCM08	1C31232G01	M76ZD9252	76USSC - 76MCC76C02 FD BREAKER	NORMAL	OPENED	DI	1.3.8.6
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.8.7
DROP18	76PCM08	1C31232G01	SPARE				DI	1.3.8.8
DROP18	76PCM08	1C31232G01	M76ZD9244	76USSC - FEED B BREAKER	NORMAL	OPENED	DI	1.3.8.9
DROP18	76PCM08	1C31232G01	M76AAHH2355A	CF BLDG G/FLR CH4 GRIT AREA S	HI-HI	NORMAL	DI	1.3.8.10
DROP18	76PCM08	1C31232G01	M76XA2357G	CF BLDG FLR 3 CH4 HVAC RM 1	FAIL	NORMAL	DI	1.3.8.11
DROP18	76PCM08	1C31232G01	M76ZA9252	76USSC - 76MCC76C02 FD BREAKER	TRIPPD	NORMAL	DI	1.3.8.12
DROP18	76PCM08	1C31232G01	M76XA2355B	CF BLDG G/FLR CH4 GRIT AREA N	FAIL	NORMAL	DI	1.3.8.13
DROP18	76PCM08	1C31232G01	M76AAHH2358B	CF BLDG GLRY LVL CH4 ELVTR LBY	HI-HI	NORMAL	DI	1.3.8.14
DROP18	76PCM08	1C31232G01	M76AAH2357C	CF BLDG FLR 3 CH4 CF AREA NW	HIGH	NORMAL	DI	1.3.8.15
DROP18	76PCM08	1C31232G01	<b>M18QC3S08</b>	<b>DPU18 QC DROP 3 SL08 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.8.16



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	1C31232G01	M76QI1100	GRIT SEPARATOR 1 INLET VALVE	NORMAL	INCOMP	DI	1.4.1.1
DROP18	76PCM08	1C31232G01	M76RI1100	GRIT SEPARATOR 1 INLET VALVE	WAIT	READY	DI	1.4.1.2
DROP18	76PCM08	1C31232G01	M76ZB1100	GRIT SEPARATOR 1 INLET VALVE	NORMAL	CLOSED	DI	1.4.1.3
DROP18	76PCM08	1C31232G01	M76ZD1100	GRIT SEPARATOR 1 INLET VALVE	NORMAL	OPENED	DI	1.4.1.4
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.1.5
DROP18	76PCM08	1C31232G01	M76QI1103	GRIT SEPARATOR 1 DISCH VALVE	NORMAL	INCOMP	DI	1.4.1.6
DROP18	76PCM08	1C31232G01	M76RI1103	GRIT SEPARATOR 1 DISCH VALVE	WAIT	READY	DI	1.4.1.7
DROP18	76PCM08	1C31232G01	M76ZB1103	GRIT SEPARATOR 1 DISCH VALVE	NORMAL	CLOSED	DI	1.4.1.8
DROP18	76PCM08	1C31232G01	M76ZD1103	GRIT SEPARATOR 1 DISCH VALVE	NORMAL	OPENED	DI	1.4.1.9
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.1.10
DROP18	76PCM08	1C31232G01	<b>M76QI1101</b>	<b>GRIT SEPARATOR 1 GRIT VALVE 1</b>	<b>NORMAL</b>	<b>INCOMP</b>	DI	1.4.1.11
DROP18	76PCM08	1C31232G01	M76RI1101	GRIT SEPARATOR 1 GRIT VALVE 1	WAIT	READY	DI	1.4.1.12
DROP18	76PCM08	1C31232G01	M76ZB1101	GRIT SEPARATOR 1 GRIT VALVE 1	NORMAL	CLOSED	DI	1.4.1.13
DROP18	76PCM08	1C31232G01	M76ZD1101	GRIT SEPARATOR 1 GRIT VALVE 1	NORMAL	OPENED	DI	1.4.1.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.1.15
DROP18	76PCM08	1C31232G01	<b>M18QC4S01</b>	<b>DPU18 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16
DROP18	76PCM08	1C31232G01	M76AAH2355A	CF BLDG G/FLR CH4 GRIT AREA S	HIGH	NORMAL	DI	1.4.2.1
DROP18	76PCM08	1C31232G01	M76AAH2355B	CF BLDG G/FLR CH4 GRIT AREA N	HIGH	NORMAL	DI	1.4.2.2
DROP18	76PCM08	1C31232G01	M76AAH2355C	CF BLDG G/FLR CH4 DW AREA SW	HIGH	NORMAL	DI	1.4.2.3
DROP18	76PCM08	1C31232G01	M76AAH2355D	CF BLDG G/FLR CH4 DW AREA SE	HIGH	NORMAL	DI	1.4.2.4
DROP18	76PCM08	1C31232G01	M76AAH2355E	CF BLDG G/FLR CH4 DW AREA NW	HIGH	NORMAL	DI	1.4.2.5
DROP18	76PCM08	1C31232G01	M76AAH2355F	CF BLDG G/FLR CH4 DW AREA NE	HIGH	NORMAL	DI	1.4.2.6
DROP18	76PCM08	1C31232G01	M76AAH2355G	CF BLDG G/FLR CH4 THKNG AREA W	HIGH	NORMAL	DI	1.4.2.7
DROP18	76PCM08	1C31232G01	M76AAH2355H	CF BLDG G/FLR CH4 THKNG AREA E	HIGH	NORMAL	DI	1.4.2.8
DROP18	76PCM08	1C31232G01	M76AAH2355J	CF BLDG G/FLR CH4 CHEM AREA 1	HIGH	NORMAL	DI	1.4.2.9
DROP18	76PCM08	1C31232G01	M76AAH2355K	CF BLDG G/FLR CH4 CHEM AREA 2	HIGH	NORMAL	DI	1.4.2.10
DROP18	76PCM08	1C31232G01	M76AAH2355L	CF BLDG G/FLR CH4 MCC ROOM 1	HIGH	NORMAL	DI	1.4.2.11
DROP18	76PCM08	1C31232G01	M76AAH2355M	CF BLDG G/FLR CH4 MCC ROOM 2	HIGH	NORMAL	DI	1.4.2.12
DROP18	76PCM08	1C31232G01	M76AAH2355N	CF BLDG G/FLR CH4 ST AREA 1	HIGH	NORMAL	DI	1.4.2.13
DROP18	76PCM08	1C31232G01	M76AAH2355P	CF BLDG G/FLR CH4 ST AREA 2	HIGH	NORMAL	DI	1.4.2.14
DROP18	76PCM08	1C31232G01	M76AAH2355Q	CF BLDG G/FLR CH4 ELEVTR LOBBY	HIGH	NORMAL	DI	1.4.2.15
DROP18	76PCM08	1C31232G01	<b>M18QC4S02</b>	<b>DPU18 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16
DROP18	76PCM08	1C31232G01	<b>M76QI1118</b>	<b>GRIT SEPARATOR 4 INLET VALVE</b>	<b>NORMAL</b>	<b>INCOMP</b>	DI	1.4.3.1
DROP18	76PCM08	1C31232G01	<b>M76RI1118</b>	<b>GRIT SEPARATOR 4 INLET VALVE</b>	<b>WAIT</b>	<b>READY</b>	DI	1.4.3.2
DROP18	76PCM08	1C31232G01	<b>M76ZB1118</b>	<b>GRIT SEPARATOR 4 INLET VALVE</b>	<b>NORMAL</b>	<b>CLOSED</b>	DI	1.4.3.3
DROP18	76PCM08	1C31232G01	<b>M76ZD1118</b>	<b>GRIT SEPARATOR 4 INLET VALVE</b>	<b>NORMAL</b>	<b>OPENED</b>	DI	1.4.3.4
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.3.5
DROP18	76PCM08	1C31232G01	<b>M76QI1119</b>	<b>GRIT SEPARATOR 4 DISCH VALVE</b>	<b>NORMAL</b>	<b>INCOMP</b>	DI	1.4.3.6
DROP18	76PCM08	1C31232G01	<b>M76RI1119</b>	<b>GRIT SEPARATOR 4 DISCH VALVE</b>	<b>WAIT</b>	<b>READY</b>	DI	1.4.3.7
DROP18	76PCM08	1C31232G01	<b>M76ZB1119</b>	<b>GRIT SEPARATOR 4 DISCH VALVE</b>	<b>NORMAL</b>	<b>CLOSED</b>	DI	1.4.3.8
DROP18	76PCM08	1C31232G01	<b>M76ZD1119</b>	<b>GRIT SEPARATOR 4 DISCH VALVE</b>	<b>NORMAL</b>	<b>OPENED</b>	DI	1.4.3.9
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.3.10
DROP18	76PCM08	1C31232G01	<b>M76QI1124</b>	<b>GRIT SEPARATOR 4 GRIT VALVE</b>	<b>NORMAL</b>	<b>INCOMP</b>	DI	1.4.3.11
DROP18	76PCM08	1C31232G01	<b>M76RI1124</b>	<b>GRIT SEPARATOR 4 GRIT VALVE</b>	<b>WAIT</b>	<b>READY</b>	DI	1.4.3.12
DROP18	76PCM08	1C31232G01	<b>M76ZB1124</b>	<b>GRIT SEPARATOR 4 GRIT VALVE</b>	<b>NORMAL</b>	<b>CLOSED</b>	DI	1.4.3.13
DROP18	76PCM08	1C31232G01	<b>M76ZD1124</b>	<b>GRIT SEPARATOR 4 GRIT VALVE</b>	<b>NORMAL</b>	<b>OPENED</b>	DI	1.4.3.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.3.15
DROP18	76PCM08	1C31232G01	<b>M18QC4S03</b>	<b>DPU18 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.1
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.2
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.3
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.4
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.5
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.6
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.7
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.8
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.9
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.10
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.11
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.12
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.13
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.14
DROP18	76PCM08	1C31232G01	SPARE				DI	1.4.4.15
DROP18	76PCM08	1C31232G01	<b>M18QC4S04</b>	<b>DPU18 QC DROP 4 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16
DROP18	76PCM08	1C31232G01	M76AAHH2356D	CF BLDG FLR 2 CH4 HVAC ROOM	HI-HI	NORMAL	DI	1.4.5.1
DROP18	76PCM08	1C31232G01	M76AAHH2356E	CF BLDG FLR 2 CH4 STARTR RM 1	HI-HI	NORMAL	DI	1.4.5.2
DROP18	76PCM08	1C31232G01	M76AAHH2356F	CF BLDG FLR 2 CH4 CORRIDOR	HI-HI	NORMAL	DI	1.4.5.3
DROP18	76PCM08	1C31232G01	M76AAHH2356G	CF BLDG FLR 2 CH4 ST AREA 1	HI-HI	NORMAL	DI	1.4.5.4
DROP18	76PCM08	1C31232G01	M76AAHH2356H	CF BLDG FLR 2 CH4 ST AREA 2	HI-HI	NORMAL	DI	1.4.5.5
DROP18	76PCM08	1C31232G01	M76AAHH2356J	CF BLDG FLR 2 CH4 ELVTR LOBBY	HI-HI	NORMAL	DI	1.4.5.6
DROP18	76PCM08	1C31232G01	M76AAHH2356K	CF BLDG FLR 2 CH4 WOMENS RR	HI-HI	NORMAL	DI	1.4.5.7
DROP18	76PCM08	1C31232G01	M76AAHH2356L	CF BLDG FLR 2 CH4 MENS RR	HI-HI	NORMAL	DI	1.4.5.8
DROP18	76PCM08	1C31232G01	M76AAHH2356M	CF BLDG FLR 2 CH4 JANITOR CLST	HI-HI	NORMAL	DI	1.4.5.9
DROP18	76PCM08	1C31232G01	M76AAHH2356N	CF BLDG FLR 2 CH4 LABORATORY	HI-HI	NORMAL	DI	1.4.5.10
DROP18	76PCM08	1C31232G01	M76AAHH2356P	CF BLDG FLR 2 CH4 O&C ROOM	HI-HI	NORMAL	DI	1.4.5.11
DROP18	76PCM08	1C31232G01	M76AAHH2356Q	CF BLDG FLR 2 CH4 STARTER RM 2	HI-HI	NORMAL	DI	1.4.5.12
DROP18	76PCM08	1C31232G01	M76AAHH2356R	CF BLDG FLR 2 CH4 STARTER RM 3	HI-HI	NORMAL	DI	1.4.5.13
DROP18	76PCM08	1C31232G01	M76XA2356A	CF BLDG FLR 2 CH4 GRIT AREA W	FAIL	NORMAL	DI	1.4.5.14
DROP18	76PCM08	1C31232G01	M76XA2356B	CF BLDG FLR 2 CH4 GRIT AREA S	FAIL	NORMAL	DI	1.4.5.15
DROP18	76PCM08	1C31232G01	<b>M18QC4S05</b>	<b>DPU18 QC DROP 4 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.5.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	1C31232G01	M76AAHH2357F	CF BLDG FLR 3 CH4 CF AREA NE	HI-HI	NORMAL	DI	1.4.6.1
DROP18	76PCM08	1C31232G01	M76AAHH2357G	CF BLDG FLR 3 CH4 HVAC RM 1	HI-HI	NORMAL	DI	1.4.6.2
DROP18	76PCM08	1C31232G01	M76AAHH2357H	CF BLDG FLR 3 CH4 T & C RM 1	HI-HI	NORMAL	DI	1.4.6.3
DROP18	76PCM08	1C31232G01	M76AAHH2357J	CF BLDG FLR 3 CH4 CORRIDOR	HI-HI	NORMAL	DI	1.4.6.4
DROP18	76PCM08	1C31232G01	M76AAHH2357K	CF BLDG FLR 3 CH4 ST AREA1	HI-HI	NORMAL	DI	1.4.6.5
DROP18	76PCM08	1C31232G01	M76AAHH2357L	CF BLDG FLR 3 CH4 ST AREA2	HI-HI	NORMAL	DI	1.4.6.6
DROP18	76PCM08	1C31232G01	M76AAHH2357M	CF BLDG FLR 3 CH4 ELVTR LOBBY	HI-HI	NORMAL	DI	1.4.6.7
DROP18	76PCM08	1C31232G01	M76AAHH2357N	CF BLDG FLR 3 CH4 HVAC RM 2	HI-HI	NORMAL	DI	1.4.6.8
DROP18	76PCM08	1C31232G01	M76AAHH2357P	CF BLDG FLR 3 CH4 T & C RM 2	HI-HI	NORMAL	DI	1.4.6.9
DROP18	76PCM08	1C31232G01	M76XA2357A	CF BLDG FLR 3 CH4 CF AREA SW	FAIL	NORMAL	DI	1.4.6.10
DROP18	76PCM08	1C31232G01	M76XA2357B	CF BLDG FLR 3 CH4 CF AREA W	FAIL	NORMAL	DI	1.4.6.11
DROP18	76PCM08	1C31232G01	M76XA2357C	CF BLDG FLR 3 CH4 CF AREA NW	FAIL	NORMAL	DI	1.4.6.12
DROP18	76PCM08	1C31232G01	M76XA2357D	CF BLDG FLR 3 CH4 CF AREA SE	FAIL	NORMAL	DI	1.4.6.13
DROP18	76PCM08	1C31232G01	M76XA2357E	CF BLDG FLR 3 CH4 CF AREA E	FAIL	NORMAL	DI	1.4.6.14
DROP18	76PCM08	1C31232G01	M76XA2357F	CF BLDG FLR 3 CH4 CF AREA NE	FAIL	NORMAL	DI	1.4.6.15
DROP18	76PCM08	1C31232G01	<b>M18QC4S06</b>	<b>DPU18 QC DROP 4 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.6.16
DROP18	76PCM08	1C31232G01	M76ZB9231	76USSB - 76-DC-07 FEED BREAKER	NORMAL	CLOSED	DI	1.4.7.1
DROP18	76PCM08	1C31232G01	M76ZB9233	76USSB - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.4.7.2
DROP18	76PCM08	1C31232G01	M76ZD9231	76USSB - 76-DC-07 FEED BREAKER	NORMAL	OPENED	DI	1.4.7.3
DROP18	76PCM08	1C31232G01	M76ZD9233	76USSB - SPARE MCC FD BREAKER	NORMAL	OPENED	DI	1.4.7.4
DROP18	76PCM08	1C31232G01	M76EAL9242	76USSC - LINE B TRANSFORMER	U/VOLT	NORMAL	DI	1.4.7.5
DROP18	76PCM08	1C31232G01	M76UA9242	76USSC - LINE B TRANSFORMER	NORMAL	TRBL	DI	1.4.7.6
DROP18	76PCM08	1C31232G01	M76ZA9244	76USSC - FEED B BREAKER	NORMAL	TRIPPD	DI	1.4.7.7
DROP18	76PCM08	1C31232G01	M76ZA9246	76USSC - SPARE MCC FD BREAKER	TRIPPD	NORMAL	DI	1.4.7.8
DROP18	76PCM08	1C31232G01	M76ZA9248	76USSC - 76-DC-03 FEED BREAKER	TRIPPD	NORMAL	DI	1.4.7.9
DROP18	76PCM08	1C31232G01	M76ZA9249	76USSC - 76-DC-01 FEED BREAKER	TRIPPD	NORMAL	DI	1.4.7.10
DROP18	76PCM08	1C31232G01	M76ZB9244	76USSC - FEED B BREAKER	NORMAL	CLOSED	DI	1.4.7.11
DROP18	76PCM08	1C31232G01	M76ZB9246	76USSC - SPARE MCC FD BREAKER	NORMAL	CLOSED	DI	1.4.7.12
DROP18	76PCM08	1C31232G01	M76ZB9247	76USSC - 76MCC76C01 FD BREAKER	NORMAL	CLOSED	DI	1.4.7.13
DROP18	76PCM08	1C31232G01	M76ZB9248	76USSC - 76-DC-03 FEED BREAKER	NORMAL	CLOSED	DI	1.4.7.14
DROP18	76PCM08	1C31232G01	M76ZB9249	76USSC - 76-DC-01 FEED BREAKER	NORMAL	CLOSED	DI	1.4.7.15
DROP18	76PCM08	1C31232G01	<b>M18QC4S07</b>	<b>DPU18 QC DROP 4 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.7.16
DROP18	76PCM08			Spare Module Address				1.4.8

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP18	76PCM08	5A26458G04	M76HS1100A	GRIT SEPARATOR 1 INLET VALVE	OFF	OPEN	DO	1.5.1.1
DROP18	76PCM08	5A26458G04	M76HS1100B	GRIT SEPARATOR 1 INLET VALVE	OFF	CLOSE	DO	1.5.1.2
DROP18	76PCM08	5A26458G04	SPARE				DO	1.5.1.3
DROP18	76PCM08	5A26458G04	M76HS1101A	GRIT SEPARATOR 1 GRIT VALVE 2	OFF	OPEN	DO	1.5.1.4
DROP18	76PCM08	5A26458G04	M76HS1101B	GRIT SEPARATOR 1 GRIT VALVE 2	OFF	CLOSE	DO	1.5.1.5
DROP18	76PCM08	5A26458G04	SPARE				DO	1.5.1.6
DROP18	76PCM08	5A26458G04	M76HS1103A	GRIT SEPARATOR 1 DISCH VALVE	OFF	OPEN	DO	1.5.1.7
DROP18	76PCM08	5A26458G04	M76HS1103B	GRIT SEPARATOR 1 DISCH VALVE	OFF	CLOSE	DO	1.5.1.8
DROP18	76PCM08	5A26458G04	SPARE				DO	1.5.1.9
DROP18	76PCM08	5A26458G04	SPARE				DO	1.5.1.10
DROP18	76PCM08	5A26458G04	M76HS1102A	GRIT DEWATERING UNIT NO.1 INLET VALVE	OFF	OPEN	DO	1.5.1.11
DROP18	76PCM08	5A26458G04	M76HS1102B	GRIT DEWATERING UNIT NO.1 INLET VALVE	OFF	CLOSE	DO	1.5.1.12
DROP18	76PCM08	5A26458G04	M76HS1118A	GRIT SEPARATOR 4 INLET VALVE	OFF	OPEN	DO	1.6.2.1
DROP18	76PCM08	5A26458G04	M76HS1118B	GRIT SEPARATOR 4 INLET VALVE	OFF	CLOSE	DO	1.6.2.2
DROP18	76PCM08	5A26458G04	SPARE				DO	1.6.2.3
DROP18	76PCM08	5A26458G04	M76HS1119A	GRIT SEPARATOR 4 DISCH VALVE	OFF	OPEN	DO	1.6.2.4
DROP18	76PCM08	5A26458G04	M76HS1119B	GRIT SEPARATOR 4 DISCH VALVE	OFF	CLOSE	DO	1.6.2.5
DROP18	76PCM08	5A26458G04	SPARE				DO	1.6.2.6
DROP18	76PCM08	5A26458G04	M76HS1124A	GRIT SEPARATOR 4 GRIT VALVE 2	OFF	OPEN	DO	1.6.2.7
DROP18	76PCM08	5A26458G04	M76HS1124B	GRIT SEPARATOR 4 GRIT VALVE 2	OFF	CLOSE	DO	1.6.2.8
DROP18	76PCM08	5A26458G04	SPARE				DO	1.6.2.9
DROP18	76PCM08	5A26458G04	SPARE				DO	1.6.2.10
DROP18	76PCM08	5A26458G04	SPARE				DO	1.6.2.11
DROP18	76PCM08	5A26458G04	SPARE				DO	1.6.2.12

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP29	94PCM01	5X00419G01		94VDL01 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1
			94MV1125	CENTRATE PUMP 1 INLET VALVE				
			94MV1126	CENTRATE PUMP 1 DISCHARGE VALVE				
			94MV1135	CENTRATE PUMP 3 INLET VALVE				
			94MV1136	CENTRATE PUMP 3 DISCHARGE VALVE				
			94MV1160	SCRUBBER 1 ACID INLET VALVE				
			94MV1165	ODER CONTROL RECIRCULATING PUMP 1 INLET VALVE				
			94MV1166	ODER CONTROL RECIRCULATING PUMP 1 DISCHARGE VALVE				
			94MV1180	SCRUBBER 2 CAUSTIC AND SHT INLET VALVE				
			94MV1185	ODER CONTROL RECIRCULATING PUMP 2 INLET VALVE				
			94MV1186	ODER CONTROL RECIRCULATING PUMP 2 DISCHARGE VALVE				
			94MV1320	SHT FEED PUMP 2 INLET VALVE				
			94MV1321	SHT FEED PUMP 2 DISCHARGE VALVE				
			94MV1350	CAUSTIC FEED PUMP 2 INLET VALVE				
			94MV1351	CAUSTIC FEED PUMP 2 DISCHARGE VALVE				
			94MV1380	ACID FEED PUMP 2 INLET VALVE				
94MV1381	ACID FEED PUMP 2 DISCHARGE VALVE							
DROP29	94PCM01	5X00419G01	<b>M94P0111</b>	<b>CENTRATE PUMP NO. 1</b>			ET	1.1.2
DROP29	94PCM01	5X00106G01	M94FT2123	CENTRATE PUMPS DISCHARGE FLOW	0	5000 GPM	AI - HART	1.1.3.1
DROP29	94PCM01	5X00106G01	M94PT2119	CENTRATE PUMPS DISCHARGE PRESS	0	100 PSIG	AI - HART	1.1.3.2
DROP29	94PCM01	5X00106G01	M94AT2129	CENTRATE PUMPS ANALYZER	0	14 PCT	AI - HART	1.1.3.3
DROP29	94PCM01	5X00106G01	M94LT2250	WASTEWATER WET WELL 1 LEVEL	0	15 FT	AI - HART	1.1.3.4
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.1.3.5
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.1.3.6
DROP29	94PCM01	5X00106G01	M94ST0111	CENTRATE PUMP NO. 1 SPEED	0	100 PCT	AI - HART	1.1.3.7
DROP29	94PCM01	5X00106G01	M94LT2120	CENTRATE WET WELL LEVEL 1	0	15 FT	AI - HART	1.1.3.8
DROP29	94PCM01	5X00106G01	M94PDT2190A	OC CRBN ADS 1 PRESS DROP	0	12 IN H2O	AI - HART	1.1.4.1
DROP29	94PCM01	5X00106G01	M94PDT2190B	OC CRBN ADS 1 PRESS DROP	0	12 IN H2O	AI - HART	1.1.4.2
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.1.4.3
DROP29	94PCM01	5X00106G01	M94PT2194	OC EXHST FAN 1 INLET PRESS	-20	0 INWC	AI - HART	1.1.4.4
DROP29	94PCM01	5X00106G01	M94TT2170	OC HEAT COIL 5 INLET AIR TEMP	30	120 DEG F	AI - HART	1.1.4.5
DROP29	94PCM01	5X00106G01	M94TT2171	OC HEAT COIL 5 DISCH TEMP	30	120 DEG F	AI - HART	1.1.4.6
DROP29	94PCM01	5X00106G01	M94FT2165B	OC SCRUBBER 1 RECIRC FLOW	0	150 GPM	AI - HART	1.1.4.7
DROP29	94PCM01	5X00106G01	M94FT2185B	OC SCRUBBER 2 RECIRC FLOW	0	150 GPM	AI - HART	1.1.4.8
DROP29	94PCM01	5X00106G01	M94AT2160	OC SCRUBBER 1 PH	0	14 PH	AI - HART	1.1.5.1
DROP29	94PCM01	5X00106G01	M94AT2180	OC SCRUBBER 2 PH	0	14 PH	AI - HART	1.1.5.2
DROP29	94PCM01	5X00106G01	M94AT2181	OC SCRUBBER 2 ORP	0	1000 PH	AI - HART	1.1.5.3
DROP29	94PCM01	5X00106G01	M94AT2198	OC STACK NO. 1 H2S	0	5 mVOLTS	AI - HART	1.1.5.4
DROP29	94PCM01	5X00106G01	M94AT2199	OC STACK NO. 1 AMMONIA	0	20 PPM	AI - HART	1.1.5.5
DROP29	94PCM01	5X00106G01	M94PDT2162A	OC SCRBR 1 PRESS DROP	0	3 IN H2O	AI - HART	1.1.5.6
DROP29	94PCM01	5X00106G01	M94PDT2162B	OC SCRBR 1 PRESS DROP	0	6 IN H2O	AI - HART	1.1.5.7
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.1.5.8

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP29	94PCM01	Spare Module Address							1.1.6
DROP29	94PCM01	5X00167G01	M94AC2180	OC SCRUBBER 2 pH SETPOINT	0	14 PH	AO	1.1.7.1	
DROP29	94PCM01	5X00167G01	M94SC0171	OC EXHST FAN1 OUT DMD	0	100 PCT	AO	1.1.7.2	
DROP29	94PCM01	5X00167G01	M94SC0142	ACID FEED PUMP NO. 2 SPD DMND	0	100 PCT	AO	1.1.7.3	
DROP29	94PCM01	5X00167G01					AO	1.1.7.4	
DROP29	94PCM01	5X00167G01	M94LC2250	WSTWTR WW 1 LVL STPNT/SPD DMND	0	100 PCT	AO	1.1.7.5	
DROP29	94PCM01	5X00167G01	M94SC0111	CENTRATE PUMP NO. 1 SPD DMND	0	100 PCT	AO	1.1.7.6	
DROP29	94PCM01	5X00167G01	M94SC0122	SHT FEED PUMP NO. 2 SPD DMND	0	100 PCT	AO	1.1.7.7	
DROP29	94PCM01	5X00167G01					AO	1.1.7.8	
DROP29	94PCM01	5X00119G01	MDPU29T1	DPU29 94PCM01 CABINET TEMP	32	154	RTD	1.1.8.1	
DROP29	94PCM01	5X00119G01	SPARE				RTD	1.1.8.2	
DROP29	94PCM01	5X00119G01	SPARE				RTD	1.1.8.3	
DROP29	94PCM01	5X00119G01	SPARE				RTD	1.1.8.4	
DROP29	94PCM01	5X00119G01	SPARE				RTD	1.1.8.5	
DROP29	94PCM01	5X00119G01	SPARE				RTD	1.1.8.6	
DROP29	94PCM01	5X00119G01	SPARE				RTD	1.1.8.7	
DROP29	94PCM01	5X00119G01	SPARE				RTD	1.1.8.8	
DROP29	94PCM01	Spare Module Address							1.2.1
DROP29	94PCM01	5X00167G01	M94AC2160	OC SCRUBBER 1 pH SETPOINT	0	14 PH	AO	1.2.2.1	
DROP29	94PCM01	5X00167G01	M94PC2194	OC EXHST FAN1 INLET POSITION	0	100 PCT	AO	1.2.2.2	
DROP29	94PCM01	5X00167G01	M94SC0132	CAUSTIC FEED PMP 2 SPD DMND	0	100 PCT	AO	1.2.2.3	
DROP29	94PCM01	5X00167G01	SPARE				AO	1.2.2.4	
DROP29	94PCM01	5X00167G01	M94LC2120	CNTRTE WW LVL 1 STPNT/SPD DMND	0	100 PCT	AO	1.2.2.5	
DROP29	94PCM01	5X00167G01	M94SC0113	CENTRATE PUMP NO. 3 SPD DMND	0	100 PCT	AO	1.2.2.6	
DROP29	94PCM01	5X00167G01	M94TC2171	OC HEAT COIL 5 DISCH POSITION	0	100 PCT	AO	1.2.2.7	
DROP29	94PCM01	5X00167G01	SPARE				AO	1.2.2.8	
DROP29	94PCM01	Spare Module Address							1.2.3
DROP29	94PCM01	5X00106G01	M94PDT2182A	OC SCRBR 2 PRESS DROP	0	3 IN H2O	AI - HART	1.2.4.1	
DROP29	94PCM01	5X00106G01	M94PDT2182B	OC SCRBR 2 PRESS DROP	0	6 IN H2O	AI - HART	1.2.4.2	
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.2.4.3	
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.2.4.4	
DROP29	94PCM01	5X00106G01	M94ST0122	SHT FEED PUMP NO. 2 SPEED	0	100 PCT	AI - HART	1.2.4.5	
DROP29	94PCM01	5X00106G01	M94ST0132	CAUSTIC FEED PUMP NO. 2 SPEED	0	100 PCT	AI - HART	1.2.4.6	
DROP29	94PCM01	5X00106G01	M94ST0142	ACID FEED PUMP NO. 2 SPEED	0	100 PCT	AI - HART	1.2.4.7	
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.2.4.8	

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP29	94PCM01	5X00106G01	M94ST0171	OC EXHST FAN1 SPEED	0	100 PCT	AI - HART	1.2.5.1	
DROP29	94PCM01	5X00106G01	M94ZT1174	OC HEAT COIL 5 H/W VALVE	0	100 PCT	AI - HART	1.2.5.2	
DROP29	94PCM01	5X00106G01	M94ZT1196	OC EXHST FAN1 INLET VANE POS	0	100 PCT	AI - HART	1.2.5.3	
DROP29	94PCM01	5X00106G01	M94FT2165A	OC SCRUBBER 1 MAKE-UP FLOW	0	20 GPM	AI - HART	1.2.5.4	
DROP29	94PCM01	5X00106G01	M94FT2185A	OC SCRUBBER 2 MAKE-UP FLOW	0	20 GPM	AI - HART	1.2.5.5	
DROP29	94PCM01	5X00106G01	SPARE				AI - HART	1.2.5.6	
DROP29	94PCM01	5X00106G01	M94ST0113	CENTRATE PUMP NO. 3 SPEED	0	100 PCT	AI - HART	1.2.5.7	
DROP29	94PCM01	5X00106G01	M94LT2121	CENTRATE WET WELL LEVEL 2	0	15 FT	AI - HART	1.2.5.8	
DROP29	94PCM01	Spare Module Address							1.2.6
DROP29	94PCM01	5X00419G01	<b>M94P0113</b>	<b>CENTRATE PUMP NO. 3</b>			ET	1.2.7	
DROP29	94PCM01	5X00419G01		94VDL01 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8	
DROP29	94PCM01	1C31232G01	M94MI0113	CENTRATE PMP NO. 3	OFF	RUNNNG	DI	1.3.1.1	
DROP29	94PCM01	1C31232G01	M94QI0113	CENTRATE PMP NO. 3	LOCAL	INCOMP	DI	1.3.1.2	
DROP29	94PCM01	1C31232G01	M94RI0113	CENTRATE PMP NO. 3	WAIT	READY	DI	1.3.1.3	
DROP29	94PCM01	1C31232G01	M94UA0113	CENTRATE PMP NO. 3	NORMAL	FAIL	DI	1.3.1.4	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.1.5	
DROP29	94PCM01	1C31232G01	M94QH1120	CENTRATE WW INLET SLUICE GATE	LOCAL	INCOMP	DI	1.3.1.6	
DROP29	94PCM01	1C31232G01	M94RI1120	CENTRATE WW INLET SLUICE GATE	WAIT	READY	DI	1.3.1.7	
DROP29	94PCM01	1C31232G01	M94ZB1120	CENTRATE WW INLET SLUICE GATE	NORMAL	CLOSED	DI	1.3.1.8	
DROP29	94PCM01	1C31232G01	M94ZD1120	CENTRATE WW INLET SLUICE GATE	NORMAL	OPENED	DI	1.3.1.9	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.1.10	
DROP29	94PCM01	1C31232G01	M94MI0151	OC SCRBR 1 R/C PMP NO. 1	OFF	RUNNNG	DI	1.3.1.11	
DROP29	94PCM01	1C31232G01	M94QI0151	OC SCRBR 1 R/C PMP NO. 1	LOCAL	INCOMP	DI	1.3.1.12	
DROP29	94PCM01	1C31232G01	M94RI0151	OC SCRBR 1 R/C PMP NO. 1	WAIT	READY	DI	1.3.1.13	
DROP29	94PCM01	1C31232G01	M94PAL2163	OC SCRBR 1 R/C PMP DISCH PRESS	NORMAL	LOW	DI	1.3.1.14	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.1.15	
DROP29	94PCM01	1C31232G01	<b>M29QC3S01</b>	<b>DPU29 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16	
DROP29	94PCM01	1C31232G01	M94QI1156	OC SCRBR 1 FA DISCH DMPR	LOCAL	INCOMP	DI	1.3.2.1	
DROP29	94PCM01	1C31232G01	M94RI1156	OC SCRBR 1 FA DISCH DMPR	WAIT	READY	DI	1.3.2.2	
DROP29	94PCM01	1C31232G01	M94ZB1156	OC SCRBR 1 FA DISCH DMPR	NORMAL	CLOSED	DI	1.3.2.3	
DROP29	94PCM01	1C31232G01	M94ZD1156	OC SCRBR 1 FA DISCH DMPR	NORMAL	OPENED	DI	1.3.2.4	
DROP29	94PCM01	1C31232G01	M94QH1155	OC SCRBR 1 FA INLET DMPR	LOCAL	INCOMP	DI	1.3.2.5	
DROP29	94PCM01	1C31232G01	M94RI1155	OC SCRBR 1 FA INLET DMPR	WAIT	READY	DI	1.3.2.6	
DROP29	94PCM01	1C31232G01	M94ZB1155	OC SCRBR 1 FA INLET DMPR	NORMAL	CLOSED	DI	1.3.2.7	
DROP29	94PCM01	1C31232G01	M94ZD1155	OC SCRBR 1 FA INLET DMPR	NORMAL	OPENED	DI	1.3.2.8	
DROP29	94PCM01	1C31232G01	M94QI1157	OC SCRBR 1 FA BYPASS DMPR	LOCAL	INCOMP	DI	1.3.2.9	
DROP29	94PCM01	1C31232G01	M94RI1157	OC SCRBR 1 FA BYPASS DMPR	WAIT	READY	DI	1.3.2.10	
DROP29	94PCM01	1C31232G01	M94ZB1157	OC SCRBR 1 FA BYPASS DMPR	NORMAL	CLOSED	DI	1.3.2.11	
DROP29	94PCM01	1C31232G01	M94ZD1157	OC SCRBR 1 FA BYPASS DMPR	NORMAL	OPENED	DI	1.3.2.12	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.2.13	
DROP29	94PCM01	1C31232G01	M94ZB1261	WW SUBMERSIBLE PMP 2 DIS VLV	NORMAL	CLOSED	DI	1.3.2.14	
DROP29	94PCM01	1C31232G01	M94ZD1261	WW SUBMERSIBLE PMP 2 DIS VLV	NORMAL	OPENED	DI	1.3.2.15	
DROP29	94PCM01	1C31232G01	<b>M29QC3S02</b>	<b>DPU29 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16	

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP29	94PCM01	1C31232G01	M94QI2250	WASTE H20 WET WELL 1 LEVEL	LOCAL	INCOMP	DI	1.3.3.1
DROP29	94PCM01	1C31232G01	M94QI2250A	WASTE H20 WET WELL 1 LEVEL	LOCAL	INCOMP	DI	1.3.3.2
DROP29	94PCM01	1C31232G01	M94LAH2251	WASTE H20 WET WELL 1 LEVEL	NORMAL	HIGH	DI	1.3.3.3
DROP29	94PCM01	1C31232G01	M94LAL2251	WASTE H20 WET WELL 1 LEVEL	NORMAL	LOW	DI	1.3.3.4
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.3.5
DROP29	94PCM01	1C31232G01	M94MI0171	OC EXHST FAN 1 ON	OFF	RUNNG	DI	1.3.3.6
DROP29	94PCM01	1C31232G01	M94QI0171	OC EXHST FAN 1 REMOTE	LOCAL	INCOMP	DI	1.3.3.7
DROP29	94PCM01	1C31232G01	M94QH1196	OC EXHST FAN 1 CTRL PWR	-	READY	DI	1.3.3.8
DROP29	94PCM01	1C31232G01	M94RI0171	OC EXHST FAN 1	NORMAL	LOW	DI	1.3.3.9
DROP29	94PCM01	1C31232G01	M94UA0171A	OC EXHST FAN 1 FAIL	NORMAL	FAIL	DI	1.3.3.10
DROP29	94PCM01	1C31232G01	M94UA0171B	OC EXHST FAN 1 ALARM	NORMAL	ALARM	DI	1.3.3.11
DROP29	94PCM01	1C31232G01	M94QI2194	OC EXHST FAN 1 INLET PRESS	LOCAL	INCOMP	DI	1.3.3.12
DROP29	94PCM01	1C31232G01	M94RI1196	OC EXHST FAN 1 INLET VANE PWR	NRDY	READY	DI	1.3.3.13
DROP29	94PCM01	1C31232G01	M94FAL2197	OC EXHST FAN 1 INLET VANE REM	LOCAL	INCOMP	DI	1.3.3.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.3.15
DROP29	94PCM01	1C31232G01	<b>M29QC3S03</b>	<b>DPU29 QC DROP 3 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.3.16
DROP29	94PCM01	1C31232G01	M94MI0111	CENTRATE PMP NO. 1	OFF	RUNNG	DI	1.3.4.1
DROP29	94PCM01	1C31232G01	M94QI0111	CENTRATE PMP NO. 1	LOCAL	INCOMP	DI	1.3.4.2
DROP29	94PCM01	1C31232G01	M94RI0111	CENTRATE PMP NO. 1	WAIT	READY	DI	1.3.4.3
DROP29	94PCM01	1C31232G01	M94UA0111	CENTRATE PMP NO. 1	NORMAL	FAIL	DI	1.3.4.4
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.4.5
DROP29	94PCM01	1C31232G01	M94MI0161	WASTE H20 PMP NO. 1	OFF	RUNNG	DI	1.3.4.6
DROP29	94PCM01	1C31232G01	M94QI0161	WASTE H20 PMP NO. 1	LOCAL	INCOMP	DI	1.3.4.7
DROP29	94PCM01	1C31232G01	M94RI0161	WASTE H20 PMP NO. 1	WAIT	READY	DI	1.3.4.8
DROP29	94PCM01	1C31232G01	M94XA0161	WASTE H20 PMP NO. 1	NORMAL	FAIL	DI	1.3.4.9
DROP29	94PCM01	1C31232G01	M94TAH0161	WASTE H20 PMP NO. 1	NORMAL	HIGH	DI	1.3.4.10
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.4.11
DROP29	94PCM01	1C31232G01	M94ZB1260	WW SUBMERSIBLE PMP 1 DIS VLV	NORMAL	CLOSED	DI	1.3.4.12
DROP29	94PCM01	1C31232G01	M94ZD1260	WW SUBMERSIBLE PMP 1 DIS VLV	NORMAL	OPENED	DI	1.3.4.13
DROP29	94PCM01	1C31232G01	M94LAH2122	CENTRATE DRY WELL FLOOD	HIGH	NORMAL	DI	1.3.4.14
DROP29	94PCM01	1C31232G01	M94QI2120B	CENTRATE WET WELL LCP	LOCAL	INCOMP	DI	1.3.4.15
DROP29	94PCM01	1C31232G01	<b>M29QC3S04</b>	<b>DPU29 QC DROP 3 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.4.16
DROP29	94PCM01	1C31232G01	M94ZB9106	94USS - 94-P-1 FEED BREAKER	NORMAL	CLOSED	DI	1.3.5.1
DROP29	94PCM01	1C31232G01	M94ZD9106	94USS - 94-P-1 FEED BREAKER	NORMAL	OPENED	DI	1.3.5.2
DROP29	94PCM01	1C31232G01	M94ZA9106	94USS - 94-P-1 FEED BREAKER	TRIPPED	NORMAL	DI	1.3.5.3
DROP29	94PCM01	1C31232G01	M94ZB9110	94USS - 94MCC9401 FEED BREAKER	NORMAL	CLOSED	DI	1.3.5.4
DROP29	94PCM01	1C31232G01	M94ZD9110	94USS - 94MCC9401 FEED BREAKER	NORMAL	OPENED	DI	1.3.5.5
DROP29	94PCM01	1C31232G01	M94ZA9110	94USS - 94MCC9401 FEED BREAKER	TRIPPED	NORMAL	DI	1.3.5.6
DROP29	94PCM01	1C31232G01	M94ZB9107	94USS - 94-P-3 FEED BREAKER	NORMAL	CLOSED	DI	1.3.5.7
DROP29	94PCM01	1C31232G01	M94ZD9107	94USS - 94-P-3 FEED BREAKER	NORMAL	OPENED	DI	1.3.5.8
DROP29	94PCM01	1C31232G01	M94ZA9107	94USS - 94-P-3 FEED BREAKER	TRIPPED	NORMAL	DI	1.3.5.9
DROP29	94PCM01	1C31232G01	M94ZB9108	94USS - 94MCC9403 FEED BREAKER	NORMAL	CLOSED	DI	1.3.5.10
DROP29	94PCM01	1C31232G01	M94ZD9108	94USS - 94MCC9403 FEED BREAKER	NORMAL	OPENED	DI	1.3.5.11
DROP29	94PCM01	1C31232G01	M94ZA9108	94USS - 94MCC9403 FEED BREAKER	TRIPPED	NORMAL	DI	1.3.5.12
DROP29	94PCM01	1C31232G01	M94ZB9101	94USS - FEED A BREAKER	NORMAL	CLOSED	DI	1.3.5.13
DROP29	94PCM01	1C31232G01	M94ZD9101	94USS - FEED A BREAKER	NORMAL	OPENED	DI	1.3.5.14
DROP29	94PCM01	1C31232G01	M94ZA9101	94USS - FEED A BREAKER	NORMAL	TRIPPED	DI	1.3.5.15
DROP29	94PCM01	1C31232G01	<b>M29QC3S05</b>	<b>DPU29 QC DROP 3 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.5.16



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP29	94PCM01	1C31232G01	M94QI1190	OC CRBN ADS 1 OUTLET VLV 1	LOCAL	INCOMP	DI	1.3.6.1	
DROP29	94PCM01	1C31232G01	M94RI1190	OC CRBN ADS 1 OUTLET VLV 1	WAIT	READY	DI	1.3.6.2	
DROP29	94PCM01	1C31232G01	M94ZB1190	OC CARB ADS 1 OUTLET VLV 1	NORMAL	CLOSED	DI	1.3.6.3	
DROP29	94PCM01	1C31232G01	M94ZD1190	OC CRBN ADS 1 OUTLET VLV 1	NORMAL	OPENED	DI	1.3.6.4	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.6.5	
DROP29	94PCM01	1C31232G01	M94QI1192	OC CRBN ADS 1 BYPASS VLV	LOCAL	INCOMP	DI	1.3.6.6	
DROP29	94PCM01	1C31232G01	M94RI1192	OC CRBN ADS 1 BYPASS VLV	WAIT	READY	DI	1.3.6.7	
DROP29	94PCM01	1C31232G01	M94ZB1192	OC CARB ADS 1 BYPASS VLV	NORMAL	CLOSED	DI	1.3.6.8	
DROP29	94PCM01	1C31232G01	M94ZD1192	OC CRBN ADS 1 BYPASS VLV	NORMAL	OPENED	DI	1.3.6.9	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.6.10	
DROP29	94PCM01	1C31232G01	M94QI1191	OC CRBN ADS 1 OUTLET VLV 2	LOCAL	INCOMP	DI	1.3.6.11	
DROP29	94PCM01	1C31232G01	M94RI1191	OC CRBN ADS 1 OUTLET VLV 2	WAIT	READY	DI	1.3.6.12	
DROP29	94PCM01	1C31232G01	M94ZB1191	OC CARB ADS 1 OUTLET VLV 2	NORMAL	CLOSED	DI	1.3.6.13	
DROP29	94PCM01	1C31232G01	M94ZD1191	OC CRBN ADS 1 OUTLET VLV 2	NORMAL	OPENED	DI	1.3.6.14	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.6.15	
DROP29	94PCM01	1C31232G01	<b>M29QC3S06</b>	<b>DPU29 QC DROP 3 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.6.16	
DROP29	94PCM01	1C31232G01	M94HS2160A	ODOR CNTRL SCRBR 1 PH	LOCAL	INCOMP	DI	1.3.7.1	
DROP29	94PCM01	1C31232G01	M94QI2160A	ODOR CNTRL SCRBR 1 PH	NORMAL	PMP 1	DI	1.3.7.2	
DROP29	94PCM01	1C31232G01	M94QI2160B	ODOR CNTRL SCRBR 1 PH	NORMAL	PMP 2	DI	1.3.7.3	
DROP29	94PCM01	1C31232G01	M94LAHH9011	ODOR CNTRL SCRBR 1 LVL SW/ALM	NORMAL	HI-HI	DI	1.3.7.4	
DROP29	94PCM01	1C31232G01	M94LAH9011	ODOR CNTRL SCRBR 1 LVL SW/ALM	NORMAL	HIGH	DI	1.3.7.5	
DROP29	94PCM01	1C31232G01	M94LAL9011	ODOR CNTRL SCRBR 1 LVL SW/ALM	NORMAL	LOW	DI	1.3.7.6	
DROP29	94PCM01	1C31232G01	M94LALL9011	ODOR CNTRL SCRBR 1 LVL SW/ALM	NORMAL	LO-LO	DI	1.3.7.7	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.7.8	
DROP29	94PCM01	1C31232G01	M94QI1250	WASTE H2O WET WELL INLET VALVE	LOCAL	INCOMP	DI	1.3.7.9	
DROP29	94PCM01	1C31232G01	M94ZB1250	WASTE H2O WET WELL 1 INLET VLV	NORMAL	CLOSED	DI	1.3.7.10	
DROP29	94PCM01	1C31232G01	M94ZD1250	WASTE H2O WET WELL 1 INLET VLV	NORMAL	OPENED	DI	1.3.7.11	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.7.12	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.7.13	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.7.14	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.3.7.15	
DROP29	94PCM01	1C31232G01	<b>M29QC3S07</b>	<b>DPU29 QC DROP 3 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.7.16	
DROP29	94PCM01		Spare Module Address						1.3.8
DROP29	94PCM01	1C31232G01	M94MI0142	ACID FEED PMP NO. 2	OFF	RUNNNG	DI	1.4.1.1	
DROP29	94PCM01	1C31232G01	M94QI0142	ACID FEED PMP NO. 2	LOCAL	INCOMP	DI	1.4.1.2	
DROP29	94PCM01	1C31232G01	M94RI0142	ACID FEED PMP NO. 2	WAIT	READY	DI	1.4.1.3	
DROP29	94PCM01	1C31232G01	M94UA0142	ACID FEED PMP NO. 2	NORMAL	FAIL	DI	1.4.1.4	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.1.5	
DROP29	94PCM01	1C31232G01	M94MI0122	SHT FEED PMP NO. 2	OFF	RUNNNG	DI	1.4.1.6	
DROP29	94PCM01	1C31232G01	M94QI0122	SHT FEED PMP NO. 2	LOCAL	INCOMP	DI	1.4.1.7	
DROP29	94PCM01	1C31232G01	M94RI0122	SHT FEED PMP NO. 2	WAIT	READY	DI	1.4.1.8	
DROP29	94PCM01	1C31232G01	M94UA0122	SHT FEED PMP NO. 2	NORMAL	FAIL	DI	1.4.1.9	
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.1.10	
DROP29	94PCM01	1C31232G01	M94MI0162	WASTE H2O PMP NO. 2	OFF	RUNNNG	DI	1.4.1.11	
DROP29	94PCM01	1C31232G01	M94QI0162	WASTE H2O PMP NO. 2	LOCAL	INCOMP	DI	1.4.1.12	
DROP29	94PCM01	1C31232G01	M94RI0162	WASTE H2O PMP NO. 2	WAIT	READY	DI	1.4.1.13	
DROP29	94PCM01	1C31232G01	M94XA0162	WASTE H2O PMP NO. 2	NORMAL	FAIL	DI	1.4.1.14	
DROP29	94PCM01	1C31232G01	M94TAH0162	WASTE H2O PMP NO. 2	NORMAL	HIGH	DI	1.4.1.15	
DROP29	94PCM01	1C31232G01	<b>M29QC4S01</b>	<b>DPU29 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16	



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DROP29	94PCM01	1C31232G01	M94QI1170	OC SCRBR 2 INLET DMPR	LOCAL	INCOMP	DI	1.4.2.1
DROP29	94PCM01	1C31232G01	M94RI1170	OC SCRBR 2 INLET DMPR	WAIT	READY	DI	1.4.2.2
DROP29	94PCM01	1C31232G01	M94ZB1170	OC SCRBR 2 INLET DMPR	NORMAL	CLOSED	DI	1.4.2.3
DROP29	94PCM01	1C31232G01	M94ZD1170	OC SCRBR 2 INLET DMPR	NORMAL	OPENED	DI	1.4.2.4
DROP29	94PCM01	1C31232G01	M94QI1171	OC SCRBR 2 DISCH DMPR	LOCAL	INCOMP	DI	1.4.2.5
DROP29	94PCM01	1C31232G01	M94RI1171	OC SCRBR 2 DISCH DMPR	WAIT	READY	DI	1.4.2.6
DROP29	94PCM01	1C31232G01	M94ZB1171	OC SCRBR 2 DISCH DMPR	NORMAL	CLOSED	DI	1.4.2.7
DROP29	94PCM01	1C31232G01	M94ZD1171	OC SCRBR 2 DISCH DMPR	NORMAL	OPENED	DI	1.4.2.8
DROP29	94PCM01	1C31232G01	M94QI1172	OC SCRBR 2 BYPASS DMPR	LOCAL	INCOMP	DI	1.4.2.9
DROP29	94PCM01	1C31232G01	M94RI1172	OC SCRBR 2 BYPASS DMPR	WAIT	READY	DI	1.4.2.10
DROP29	94PCM01	1C31232G01	M94ZB1172	OC SCRBR 2 BYPASS DMPR	NORMAL	CLOSED	DI	1.4.2.11
DROP29	94PCM01	1C31232G01	M94ZD1172	OC SCRBR 2 BYPASS DMPR	NORMAL	OPENED	DI	1.4.2.12
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.2.13
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.2.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.2.15
DROP29	94PCM01	1C31232G01	<b>M29QC4S02</b>	<b>DPU29 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16
DROP29	94PCM01	1C31232G01	M94MI0132	CAUSTIC FEED PMP NO. 2	OFF	RUNNNG	DI	1.4.3.1
DROP29	94PCM01	1C31232G01	M94QI0132	CAUSTIC FEED PMP NO. 2	LOCAL	INCOMP	DI	1.4.3.2
DROP29	94PCM01	1C31232G01	M94RI0132	CAUSTIC FEED PMP NO. 2	WAIT	READY	DI	1.4.3.3
DROP29	94PCM01	1C31232G01	M94UA0132	CAUSTIC FEED PMP NO. 2	NORMAL	FAIL	DI	1.4.3.4
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.3.5
DROP29	94PCM01	1C31232G01	M94QI2171	OC HEAT COIL 5 DISCH TMP	LOCAL	INCOMP	DI	1.4.3.6
DROP29	94PCM01	1C31232G01	M94PDAH2172	OC HEAT COIL 5 PRESS DROP	NORMAL	HIGH	DI	1.4.3.7
DROP29	94PCM01	1C31232G01	M94QI1173	OC HEAT COIL 5 INLET AIR DMPR	LOCAL	INCOMP	DI	1.4.3.8
DROP29	94PCM01	1C31232G01	M94RI1173	OC HEAT COIL 5 INLET AIR DMPR	WAIT	READY	DI	1.4.3.9
DROP29	94PCM01	1C31232G01	M94ZB1173	OC HEAT COIL 5 INLET AIR DMPR	NORMAL	CLOSED	DI	1.4.3.10
DROP29	94PCM01	1C31232G01	M94ZD1173	OC HEAT COIL 5 INLET AIR DMPR	NORMAL	OPENED	DI	1.4.3.11
DROP29	94PCM01	1C31232G01	M94QI1174	OC HEAT COIL 5 HOT H2O VLV	LOCAL	INCOMP	DI	1.4.3.12
DROP29	94PCM01	1C31232G01	M94RI1174	OC HEAT COIL 5 HOT H2O VLV	WAIT	READY	DI	1.4.3.13
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.3.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.3.15
DROP29	94PCM01	1C31232G01	<b>M29QC4S03</b>	<b>DPU29 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP29	94PCM01	1C31232G01	M94ZB9114	94USS - 94-P-2 FEED BREAKER	NORMAL	CLOSED	DI	1.4.4.1
DROP29	94PCM01	1C31232G01	M94ZD9114	94USS - 94-P-2 FEED BREAKER	NORMAL	OPENED	DI	1.4.4.2
DROP29	94PCM01	1C31232G01	M94ZA9114	94USS - 94-P-2 FEED BREAKER	TRIPPED	NORMAL	DI	1.4.4.3
DROP29	94PCM01	1C31232G01	M94ZB9111	94USS - 94MCC9402 FEED BREAKER	NORMAL	CLOSED	DI	1.4.4.4
DROP29	94PCM01	1C31232G01	M94ZD9111	94USS - 94MCC9402 FEED BREAKER	NORMAL	OPENED	DI	1.4.4.5
DROP29	94PCM01	1C31232G01	M94ZA9111	94USS - 94MCC9402 FEED BREAKER	TRIPPED	NORMAL	DI	1.4.4.6
DROP29	94PCM01	1C31232G01	M94ZB9115	94USS - 94-P-4 FEED BREAKER	NORMAL	CLOSED	DI	1.4.4.7
DROP29	94PCM01	1C31232G01	M94ZD9115	94USS - 94-P-4 FEED BREAKER	NORMAL	OPENED	DI	1.4.4.8
DROP29	94PCM01	1C31232G01	M94ZA9115	94USS - 94-P-4 FEED BREAKER	TRIPPED	NORMAL	DI	1.4.4.9
DROP29	94PCM01	1C31232G01	M94ZB9113	94USS - 94MCC9404 FEED BREAKER	NORMAL	CLOSED	DI	1.4.4.10
DROP29	94PCM01	1C31232G01	M94ZD9113	94USS - 94MCC9404 FEED BREAKER	NORMAL	OPENED	DI	1.4.4.11
DROP29	94PCM01	1C31232G01	M94ZA9113	94USS - 94MCC9404 FEED BREAKER	TRIPPED	NORMAL	DI	1.4.4.12
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.4.13
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.4.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.4.15
DROP29	94PCM01	1C31232G01	<b>M29QC4S04</b>	<b>DPU29 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16

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DROP29	94PCM01	1C31232G01	M94UA9105	94USS - LINE B TRANSFORMER	NORMAL	TRBL	DI	1.4.5.1
DROP29	94PCM01	1C31232G01	M94EAL9105	94USS - LINE B TRANSFORMER	U/VOLT	NORMAL	DI	1.4.5.2
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.5.3
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.5.4
DROP29	94PCM01	1C31232G01	M94ZB9102	94USS - FEED B BREAKER	NORMAL	CLOSED	DI	1.4.5.5
DROP29	94PCM01	1C31232G01	M94ZD9102	94USS - FEED B BREAKER	NORMAL	OPENED	DI	1.4.5.6
DROP29	94PCM01	1C31232G01	M94ZA9102	94USS - FEED B BREAKER	NORMAL	TRIPPED	DI	1.4.5.7
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.5.8
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.5.9
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.5.10
DROP29	94PCM01	1C31232G01	M94MI0152	OC SCRBR 2 R/C PMP NO. 2	OFF	RUNNNG	DI	1.4.5.11
DROP29	94PCM01	1C31232G01	M94QI0152	OC SCRBR 2 R/C PMP NO. 2	LOCAL	INCOMP	DI	1.4.5.12
DROP29	94PCM01	1C31232G01	M94RI0152	OC SCRBR 2 R/C PMP NO. 2	WAIT	READY	DI	1.4.5.13
DROP29	94PCM01	1C31232G01	M94PAL2183	OC SCRBR 2 R/C PMP DISCH PRESS	NORMAL	LOW	DI	1.4.5.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.5.15
DROP29	94PCM01	1C31232G01	<b>M29QC4S05</b>	<b>DPU29 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.5.16
DROP29	94PCM01	1C31232G01	M94HS2180C	ODOR CNTRL SCRBR 2 PH	LOCAL	IINCOMP	DI	1.4.6.1
DROP29	94PCM01	1C31232G01	M94QI2180B	ODOR CNTRL SCRBR 2 PH PMP1	NORMAL	PMP 1	DI	1.4.6.2
DROP29	94PCM01	1C31232G01	M94QI2180D	ODOR CNTRL SCRBR 2 PH PMP1	NORMAL	PMP 1	DI	1.4.6.3
DROP29	94PCM01	1C31232G01	M94QI2180C	ODOR CNTRL SCRBR 2 PH PMP2	NORMAL	PMP 2	DI	1.4.6.4
DROP29	94PCM01	1C31232G01	M94QI2180A	ODOR CNTRL SCRBR 2 PH PMP2	NORMAL	PMP 2	DI	1.4.6.5
DROP29	94PCM01	1C31232G01	M94LALL9012	ODOR CNTRL SCRBR 2 LVL SW/ALM	NORMAL	LO-LO	DI	1.4.6.6
DROP29	94PCM01	1C31232G01	M94LAL9012	ODOR CNTRL SCRBR 2 LVL SW/ALM	NORMAL	LOW	DI	1.4.6.7
DROP29	94PCM01	1C31232G01	M94LAH9012	ODOR CNTRL SCRBR 2 LVL SW/ALM	NORMAL	HIGH	DI	1.4.6.8
DROP29	94PCM01	1C31232G01	M94LAHH9012	ODOR CNTRL SCRBR 2 LVL SW/ALM	NORMAL	HI-HI	DI	1.4.6.9
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.6.10
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.6.11
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.6.12
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.6.13
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.6.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.6.15
DROP29	94PCM01	1C31232G01	<b>M29QC4S06</b>	<b>DPU29 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.6.16
DROP29	94PCM01	1C31232G01	M94EAL9104	94USS - LINE A TRANSFORMER	U/VOLT	NORMAL	DI	1.4.7.1
DROP29	94PCM01	1C31232G01	M94UA9104	94USS - LINE A TRANSFORMER	NORMAL	TRBL	DI	1.4.7.2
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.7.3
DROP29	94PCM01	1C31232G01	M94ZB9103	94USS - TIE BREAKER	NORMAL	CLOSED	DI	1.4.7.4
DROP29	94PCM01	1C31232G01	M94ZD9103	94USS - TIE BREAKER	NORMAL	OPENED	DI	1.4.7.5
DROP29	94PCM01	1C31232G01	M94ZA9103	94USS - TIE BREAKER	NORMAL	TRIPPED	DI	1.4.7.6
DROP29	94PCM01	1C31232G01	M94ZB9109	94USS - SPARE FEED BREAKER	NORMAL	CLOSED	DI	1.4.7.7
DROP29	94PCM01	1C31232G01	M94ZD9109	94USS - SPARE FEED BREAKER	NORMAL	OPENED	DI	1.4.7.8
DROP29	94PCM01	1C31232G01	M94ZA9109	94USS - SPARE FEED BREAKER	TRIPPED	NORMAL	DI	1.4.7.9
DROP29	94PCM01	1C31232G01	M94ZB9112	94USS - SPARE MCC FEED BREAKER	NORMAL	CLOSED	DI	1.4.7.10
DROP29	94PCM01	1C31232G01	M94ZD9112	94USS - SPARE MCC FEED BREAKER	NORMAL	OPENED	DI	1.4.7.11
DROP29	94PCM01	1C31232G01	M94ZA9112	94USS - SPARE MCC FEED BREAKER	TRIPPED	NORMAL	DI	1.4.7.12
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.7.13
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.7.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.7.15
DROP29	94PCM01	1C31232G01	<b>M29QC4S07</b>	<b>DPU29 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.7.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP29	94PCM01	1C31232G01	M94QI2120A	CENTRATE WET WELL LEVEL 1	LOCAL	INCOMP	DI	1.4.8.1
DROP29	94PCM01	1C31232G01	M94JA2120	CENTRATE WET WELL LEVEL 1	NORMAL	F/OVER	DI	1.4.8.2
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.8.3
DROP29	94PCM01	1C31232G01	M94LAL1100	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	LOW	DI	1.4.8.4
DROP29	94PCM01	1C31232G01	M94LALL1100	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	LO-LO	DI	1.4.8.5
DROP29	94PCM01	1C31232G01	M94PAL1100A	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	LOW	DI	1.4.8.6
DROP29	94PCM01	1C31232G01	M94PAL1100B	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	LOW	DI	1.4.8.7
DROP29	94PCM01	1C31232G01	M94TAH1100	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	HIGH	DI	1.4.8.8
DROP29	94PCM01	1C31232G01	M94UA1100A	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	FAIL	DI	1.4.8.9
DROP29	94PCM01	1C31232G01	M94UA1100B	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	FAIL	DI	1.4.8.10
DROP29	94PCM01	1C31232G01	M94UA1100C	HYDRAULIC PWR PACK STATUS ALRM	NORMAL	FAIL	DI	1.4.8.11
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.8.12
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.8.13
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.8.14
DROP29	94PCM01	1C31232G01	SPARE				DI	1.4.8.15
DROP29	94PCM01	1C31232G01	M29QC4S08	DPU29 QC DROP 4 SL03 DI PWR MON	ALARM	NORMAL	DI	1.4.8.16
DROP29	94PCM01	5A26458G04	M94HS1155A	OC SCRBR 1 FA INLET DMPR	OPEN	CLOSE	DO	1.5.1.1
DROP29	94PCM01	5A26458G04	M94HS1156A	OC SCRBR 1 FA DIS DMPR	OPEN	CLOSE	DO	1.5.1.2
DROP29	94PCM01	5A26458G04	M94HS1157A	OC SCRBR 1 FA BYPASS DMPR	OPEN	CLOSE	DO	1.5.1.3
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.1.4
DROP29	94PCM01	5A26458G04	M94HS0151	ODOR CNTRL R/C PMP NO. 1	OFF	RUN	DO	1.5.1.5
DROP29	94PCM01	5A26458G04	M94QS2160	ODOR CNTRL SCRBR 1 PH	OFF	CMPRDY	DO	1.5.1.6
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.1.7
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.1.8
DROP29	94PCM01	5A26458G04	M94QS2171	ODOR CNTRL HEAT COIL 5 DIS TMP	OFF	CMPRDY	DO	1.5.1.9
DROP29	94PCM01	5A26458G04	M94HS1173A	OC HEAT COIL 5 INLET AIR DMPR	OPEN	CLOSE	DO	1.5.1.10
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.1.11
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.1.12
DROP29	94PCM01	5A26458G04	M94HS0111	CENTRATE PMP NO. 1	OFF	RUN	DO	1.5.2.1
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.2.2
DROP29	94PCM01	5A26458G04	M94HS0121A	SHT FD PMP NO. 1 - TRAIN 1	OFF	RUN	DO	1.5.2.3
DROP29	94PCM01	5A26458G04	M94HS0131A	CSTC FD PMP NO. 1 - TRAIN 1	OFF	RUN	DO	1.5.2.4
DROP29	94PCM01	5A26458G04	M94HS0141A	ACID FD PMP NO. 1 - TRAIN 1	OFF	RUN	DO	1.5.2.5
DROP29	94PCM01	5A26458G04	M94HS0161	WASTE H2O PMP NO. 1	OFF	RUN	DO	1.5.2.6
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.2.7
DROP29	94PCM01	5A26458G04	M94HS1190A	OC CRBN ADS 1 OUTLET VLV 1	OPEN	CLOSE	DO	1.5.2.8
DROP29	94PCM01	5A26458G04	M94HS1191A	OC CRBN ADS 1 OUTLET VLV 2	OPEN	CLOSE	DO	1.5.2.9
DROP29	94PCM01	5A26458G04	M94HS1192A	OC CRBN ADS 1 BYPASS VLV	OPEN	CLOSE	DO	1.5.2.10
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.2.11
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.2.12

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DROP29	94PCM01	5A26458G04	M94QS0161	WASTE H2O WET WELL 1 LEVEL	LOCAL	DCS	DO	1.5.3.1
DROP29	94PCM01	5A26458G04	M94QS0162	WASTE H2O WET WELL 1 LEVEL	LOCAL	DCS	DO	1.5.3.2
DROP29	94PCM01	5A26458G04	M94HS1250A	WASTE H2O WET WELL 1 INLET VLV	OFF	OPEN	DO	1.5.3.3
DROP29	94PCM01	5A26458G04	M94HS1250B	WASTE H2O WET WELL 1 INLET VLV	OFF	CLOSE	DO	1.5.3.4
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.3.5
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.3.6
DROP29	94PCM01	5A26458G04	M94QS2120	CENTRATE WET WELL LEVEL 1	OFF	CMPRDY	DO	1.5.3.7
DROP29	94PCM01	5A26458G04	M94HS2120A	CENTRATE WET WELL LEVEL 1 1234	OFF	SELECT	DO	1.5.3.8
DROP29	94PCM01	5A26458G04	M94HS2120B	CENTRATE WET WELL LEVEL 1 2341	OFF	SELECT	DO	1.5.3.9
DROP29	94PCM01	5A26458G04	M94HS2120C	CENTRATE WET WELL LEVEL 1 3412	OFF	SELECT	DO	1.5.3.10
DROP29	94PCM01	5A26458G04	M94HS2120D	CENTRATE WET WELL LEVEL 1 4123	OFF	SELECT	DO	1.5.3.11
DROP29	94PCM01	5A26458G04	SPARE				DO	1.5.3.12
DROP29	94PCM01	5A26458G04	M94HS1120A	CENTRATE WW INLET SLUICE GATE	OFF	OPEN	DO	1.6.1.1
DROP29	94PCM01	5A26458G04	M94HS1120B	CENTRATE WW INLET SLUICE GATE	OFF	CLOSE	DO	1.6.1.2
DROP29	94PCM01	5A26458G04	M94HS1120C	CENTRATE WW INLET SLUICE GATE	OFF	STOP	DO	1.6.1.3
DROP29	94PCM01	5A26458G04	M94QS2250	WASTE H2O WET WELL 1 LEVEL	OFF	CMPRDY	DO	1.6.1.4
DROP29	94PCM01	5A26458G04	M94HS2250A	WASTE H2O WET WELL 1 LEVEL 12	OFF	SELECT	DO	1.6.1.5
DROP29	94PCM01	5A26458G04	M94HS2250B	WASTE H2O WET WELL 1 LEVEL 21	OFF	SELECT	DO	1.6.1.6
DROP29	94PCM01	5A26458G04	SPARE				DO	1.6.1.7
DROP29	94PCM01	5A26458G04	SPARE				DO	1.6.1.8
DROP29	94PCM01	5A26458G04	M94QS2194	OC EXHST FAN1 INLT PRESS	OFF	CMPRDY	DO	1.6.1.9
DROP29	94PCM01	5A26458G04	M94HS0171	OC EXHST FAN1 RUN CMD	OFF	RUN	DO	1.6.1.10
DROP29	94PCM01	5A26458G04	SPARE				DO	1.6.1.11
DROP29	94PCM01	5A26458G04	SPARE				DO	1.6.1.12
DROP29	94PCM01	5A26458G04	M94HS0113	CENTRATE PMP NO. 3	OFF	RUN	DO	1.6.2.1
DROP29	94PCM01	5A26458G04	SPARE				DO	1.6.2.2
DROP29	94PCM01	5A26458G04	M94HS0122A	SHT FD PMP NO. 2 - TRAIN 1	OFF	RUN	DO	1.6.2.3
DROP29	94PCM01	5A26458G04	M94HS0132A	CSTC FD PMP NO. 2 - TRAIN 1	OFF	RUN	DO	1.6.2.4
DROP29	94PCM01	5A26458G04	M94HS0142A	ACID FD PMP NO. 2 - TRAIN 1	OFF	RUN	DO	1.6.2.5
DROP29	94PCM01	5A26458G04	M94HS0162	WASTE H2O PMP NO. 2	OFF	RUN	DO	1.6.2.6
DROP29	94PCM01	5A26458G04	M94QS2180	OCL SCRBR 2 PH	OFF	CMPRDY	DO	1.6.2.7
DROP29	94PCM01	5A26458G04	M94HS1170A	OC SCRBR 2 INLET DMPR	OPEN	CLOSE	DO	1.6.2.8
DROP29	94PCM01	5A26458G04	M94HS1171A	OC SCRBR 2 DIS DMPR	OPEN	CLOSE	DO	1.6.2.9
DROP29	94PCM01	5A26458G04	M94HS1172A	OC SCRBR 2 BYPASS DMPR	OPEN	CLOSE	DO	1.6.2.10
DROP29	94PCM01	5A26458G04	SPARE				DO	1.6.2.11
DROP29	94PCM01	5A26458G04	M94HS0152	ODOR CNTRL R/C PMP NO. 2	OFF	RUN	DO	1.6.2.12

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DROP30	94PCM02	5X00419G01		94VDL02 - PRIMARY CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.1.1				
			94MV1130	CENTRATE PUMP 2 INLET VALVE								
			94MV1131	CENTRATE PUMP 2 DISCHARGE VALVE								
			94MV1140	CENTRATE PUMP 4 INLET VALVE (FUTURE)								
			94MV1141	CENTRATE PUMP 4 DISCHARGE VALVE (FUTURE)								
			94MV1210	SCRUBBER 3 ACID INLET VALVE								
			94MV1215	ODER CONTROL RECIRCULATING PUMP 3 INLET VALVE								
			94MV1216	ODER CONTROL RECIRCULATING PUMP 3 DISCHARGE VALVE								
			94MV1230	SCRUBBER 4 CAUSTIC AND SHT INLET VALVE								
			94MV1235	ODER CONTROL RECIRCULATING PUMP 4 INLET VALVE								
			94MV1236	ODER CONTROL RECIRCULATING PUMP 4 DISCHARGE VALVE								
			94MV1300	SHT DAY TANK 1 INLET VALVE								
			94MV1301	SHT DAY TANK 1 DISCHARGE VALVE 1								
			94MV1302	SHT DAY TANK 1 DISCHARGE VALVE 2								
			94MV1305	SHT DAY TANK 2 INLET VALVE								
			94MV1306	SHT DAY TANK 2 DISCHARGE VALVE 1								
			94MV1307	SHT DAY TANK 2 DISCHARGE VALVE 2								
			94MV1310	SHT FEED PUMP 1 INLET VALVE								
			94MV1311	SHT FEED PUMP 1 DISCHARGE VALVE								
			94MV1330	CAUSTIC DAY TANK 1 INLET VALVE								
			94MV1331	CAUSTIC DAY TANK 1 DISCHARGE VALVE 1								
			94MV1332	CAUSTIC DAY TANK 1 DISCHARGE VALVE 2								
			94MV1335	CAUSTIC DAY TANK 2 INLET VALVE								
			94MV1336	CAUSTIC DAY TANK 2 DISCHARGE VALVE 1								
			94MV1337	CAUSTIC DAY TANK 2 DISCHARGE VALVE 2								
			94MV1340	CAUSTIC FEED PUMP 1 INLET VALVE								
			94MV1341	CAUSTIC FEED PUMP 1 DISCHARGE VALVE								
			94MV1360	ACID DAY TANK 1 INLET VALVE								
			94MV1361	ACID DAY TANK 1 DISCHARGE VALVE 1								
			94MV1362	ACID DAY TANK 1 DISCHARGE VALVE 2								
			94MV1365	ACID DAY TANK 2 INLET VALVE								
			94MV1366	ACID DAY TANK 2 DISCHARGE VALVE 1								
			94MV1367	ACID DAY TANK 2 DISCHARGE VALVE 2								
			94MV1370	ACID FEED PUMP 1 INLET VALVE								
			94MV1371	ACID FEED PUMP 1 DISCHARGE VALVE								
			94MV1360A	ACID DAY TANK 1 OVERFLOW VALVE								
			94MV1365A	ACID DAY TANK 2 OVERFLOW VALVE								
			DROP30	94PCM02	5X00419G01	<b>M94P0112</b>	<b>CENTRATE PUMP NO. 2</b>				ET	1.1.2

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP30	94PCM02	5X00106G01	M94LT2360	ACID DAY TANK 1 LEVEL	0	4 FEET	AI - HART	1.1.3.1	
DROP30	94PCM02	5X00106G01	M94LT2330	CAUSTIC DAY TANK 1 LEVEL	0	4 FEET	AI - HART	1.1.3.2	
DROP30	94PCM02	5X00106G01	M94LT2300	SHT DAY TANK 1 LEVEL	0	4 FEET	AI - HART	1.1.3.3	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.1.3.4	
DROP30	94PCM02	5X00106G01	M94ST0141	ACID FEED PUMP NO. 1	0	100 PCT	AI - HART	1.1.3.5	
DROP30	94PCM02	5X00106G01	M94ST0131	CAUSTIC FEED PUMP NO. 1	0	100 PCT	AI - HART	1.1.3.6	
DROP30	94PCM02	5X00106G01	M94ST0121	SHT FEED PUMP NO. 1	0	100 PCT	AI - HART	1.1.3.7	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.1.3.8	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.1.4.1	
DROP30	94PCM02	5X00106G01	M94AT2210	ODOR CNTRL SCRBR 3 PH	0	14 PH	AI - HART	1.1.4.2	
DROP30	94PCM02	5X00106G01	M94FT2215B	OC SCRUBBER 3 RECIRC FLOW	0	150 GPM	AI - HART	1.1.4.3	
DROP30	94PCM02	5X00106G01	M94FT2215A	OC SCRUBBER 3 MAKE-UP FLOW	0	20 GPM	AI - HART	1.1.4.4	
DROP30	94PCM02	5X00106G01	M94PDT2212A	ODOR CNTRL SCRBR 3 PRESS DROP	0	3 IN H2O	AI - HART	1.1.4.5	
DROP30	94PCM02	5X00106G01	M94PDT2212B	ODOR CNTRL SCRBR 3 PRESS DROP	0	6 IN H2O	AI - HART	1.1.4.6	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.1.4.7	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.1.4.8	
DROP30	94PCM02	5X00106G01	M94FT2150	SCRBR3 FOUL AIR INLET FLOW	0	9000 SCFM	AI - HART	1.1.5.1	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.1.5.2	
DROP30	94PCM02	5X00106G01	M94TT2220	OC HT COIL 6 INLET AIR TEMP	30	120 DEG F	AI - HART	1.1.5.3	
DROP30	94PCM02	5X00106G01	M94TT2221	OC HT COIL 6 DISCH TEMP	30	120 DEG F	AI - HART	1.1.5.4	
DROP30	94PCM02	5X00106G01	M94ZT1224	OC HEAT COIL 6 HOT H2O VLV	0	100 PCT	AI - HART	1.1.5.5	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.1.5.6	
DROP30	94PCM02	5X00106G01	M94FT2260	WW SUBMERSIBLE PUMPS DISCH FLW	0	750 GPM	AI - HART	1.1.5.7	
DROP30	94PCM02	5X00106G01	M94PT2261	WW SUBMERSIBL PMPS DISCH PRESS	0	50 PSI	AI - HART	1.1.5.8	
DROP30	94PCM02		Spare Module Address						1.1.6
DROP30	94PCM02	5X00167G01	M94SC0141	ACID FEED PUMP NO. 1 SPD DMND	0	100 PCT	AO	1.1.7.1	
DROP30	94PCM02	5X00167G01	M94SC0131	CAUSTIC FD PUMP NO. 1 SPD DMND	0	100 PCT	AO	1.1.7.2	
DROP30	94PCM02	5X00167G01	M94SC0121	SHT FEED PUMP NO. 1 SPD DMND	0	100 PCT	AO	1.1.7.3	
DROP30	94PCM02	5X00167G01	SPARE				AO	1.1.7.4	
DROP30	94PCM02	5X00167G01	M94AC2210	ODOR CNTRL SCRBR 3 PH SETPOINT	0	14 PH	AO	1.1.7.5	
DROP30	94PCM02	5X00167G01	M94SC0114	CENTRATE PUMP NO. 3 (FUTURE)	0	100 PCT	AO	1.1.7.6	
DROP30	94PCM02	5X00167G01	SPARE				AO	1.1.7.7	
DROP30	94PCM02	5X00167G01	SPARE				AO	1.1.7.8	
DROP30	94PCM02	5X00119G01	MDPU30T1	DPU30 94PCM02 CABINET TEMP	32	154 DEG F	RTD	1.1.8.1	
DROP30	94PCM02	5X00119G01	SPARE				RTD	1.1.8.2	
DROP30	94PCM02	5X00119G01	SPARE				RTD	1.1.8.3	
DROP30	94PCM02	5X00119G01	SPARE				RTD	1.1.8.4	
DROP30	94PCM02	5X00119G01	SPARE				RTD	1.1.8.5	
DROP30	94PCM02	5X00119G01	SPARE				RTD	1.1.8.6	
DROP30	94PCM02	5X00119G01	SPARE				RTD	1.1.8.7	
DROP30	94PCM02	5X00119G01	SPARE				RTD	1.1.8.8	

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DROP30	94PCM02	Spare Module Address							1.2.1
DROP30	94PCM02	5X00167G01	M94SC0172	OC EXHST FAN 2 OUT DMD	0	100 PCT	AO	1.2.2.1	
DROP30	94PCM02	5X00167G01	M94PC2244	OC EXHST FAN 2 INLET VANE POS	0	100 PSI	AO	1.2.2.2	
DROP30	94PCM02	5X00167G01	SPARE				AO	1.2.2.3	
DROP30	94PCM02	5X00167G01	M94TC2221	ODOR CNTRL HT COIL 6 VLV POS	0	100 PCT	AO	1.2.2.4	
DROP30	94PCM02	5X00167G01	SPARE				AO	1.2.2.5	
DROP30	94PCM02	5X00167G01	SPARE				AO	1.2.2.6	
DROP30	94PCM02	5X00167G01	M94AC2230	ODOR CNTRL SCRBR 4 PH SETPOINT	0	14 PH	AO	1.2.2.7	
DROP30	94PCM02	5X00167G01	M94SC0112	CENTRATE PUMP NO. 2 SPD DMND	0	100 PCT	AO	1.2.2.8	
DROP30	94PCM02	Spare Module Address							1.2.3
DROP30	94PCM02	5X00106G01	M94AT2231	ODOR CNTRL SCRBR 4 ORP	0	1000 mVOLTS	AI - HART	1.2.4.1	
DROP30	94PCM02	5X00106G01	M94AT2230	ODOR CNTRL SCRBR 4 PH	0	14 PH	AI - HART	1.2.4.2	
DROP30	94PCM02	5X00106G01	M94FT2235B	OC SCRUBBER 4 RECIRC FLOW	0	150 GPM	AI - HART	1.2.4.3	
DROP30	94PCM02	5X00106G01	M94FT2235A	OC SCRUBBER 4 MAKE-UP FLOW	0	20 GPM	AI - HART	1.2.4.4	
DROP30	94PCM02	5X00106G01	M94PDT2232A	ODOR CNTRL SCRBR 4 PRESS DROP	0	3 IN H2O	AI - HART	1.2.4.5	
DROP30	94PCM02	5X00106G01	M94PDT2232B	ODOR CNTRL SCRBR 4 PRESS DROP	0	6 IN H2O	AI - HART	1.2.4.6	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.2.4.7	
DROP30	94PCM02	5X00106G01	M94ST0114	CENTRATE PUMP NO. 4 (FUTR)	0	100 PCT	AI - HART	1.2.4.8	
DROP30	94PCM02	5X00106G01	M94AT2249	ODOR CNTRL STACK NO. 2 AMMONIA	0	20 PPM	AI - HART	1.2.5.1	
DROP30	94PCM02	5X00106G01	M94AT2248	ODOR CNTRL STACK NO. 2 H2S	0	5 PPM	AI - HART	1.2.5.2	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.2.5.3	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.2.5.4	
DROP30	94PCM02	5X00106G01	M94ST0172	OC EXHST FAN 2 SPEED	0	100 PCT	AI - HART	1.2.5.5	
DROP30	94PCM02	5X00106G01	M94ZT1246	OC EXHST FAN 2 INLET VANE	0	100 PCT	AI - HART	1.2.5.6	
DROP30	94PCM02	5X00106G01	M94PT2244	OC EXHST FAN 2 INLET PRESS	-20	0 INWC	AI - HART	1.2.5.7	
DROP30	94PCM02	5X00106G01	M94ST0112	CENTRATE PUMP NO. 2	0	100 PCT	AI - HART	1.2.5.8	
DROP30	94PCM02	5X00106G01	M94LT2365	ACID DAY TANK 2 LEVEL	0	4 FEET	AI - HART	1.2.6.1	
DROP30	94PCM02	5X00106G01	M94LT2335	CAUSTIC DAY TANK 2 LEVEL	0	4 FEET	AI - HART	1.2.6.2	
DROP30	94PCM02	5X00106G01	M94LT2305	SHT DAY TANK 2 LEVEL	0	4 FEET	AI - HART	1.2.6.3	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.2.6.4	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.2.6.5	
DROP30	94PCM02	5X00106G01	M94PDT2240A	OC CRBN ADS 2 PRESS DROP	0	12 IN H2O	AI - HART	1.2.6.6	
DROP30	94PCM02	5X00106G01	M94PDT2240B	OC CRBN ADS 2 PRESS DROP	0	12 IN H2O	AI - HART	1.2.6.7	
DROP30	94PCM02	5X00106G01	SPARE				AI - HART	1.2.6.8	
DROP30	94PCM02	Spare Module Address							1.2.7
DROP30	94PCM02	5X00419G01		94VDL02 - BACKUP CONTROLLER (PAKSCAN VALVE NETWORK)			SERIAL	1.2.8	



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location	
DROP30	94PCM02	1C31232G01	M94QI1206	OC SCRBR 3 FA DISCH DAMP	LOCAL	INCOMP	DI	1.3.1.1	
DROP30	94PCM02	1C31232G01	M94RI1206	OC SCRBR 3 FA DISCH DMPR	WAIT	READY	DI	1.3.1.2	
DROP30	94PCM02	1C31232G01	M94ZD1206	OC SCRBR 3 FA DISCH DMPR	NORMAL	OPENED	DI	1.3.1.3	
DROP30	94PCM02	1C31232G01	M94ZB1206	OC SCRBR 3 FA DISCH DMPR	NORMAL	CLOSED	DI	1.3.1.4	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.1.5	
DROP30	94PCM02	1C31232G01	M94QI1207	OC SCRBR 3 FA B/PASS DAMP	LOCAL	INCOMP	DI	1.3.1.6	
DROP30	94PCM02	1C31232G01	M94RI1207	OC SCRBR 3 FA BYPASS DMPR	WAIT	READY	DI	1.3.1.7	
DROP30	94PCM02	1C31232G01	M94ZD1207	OC SCRBR 3 FA B/PASS DMPR	NORMAL	OPENED	DI	1.3.1.8	
DROP30	94PCM02	1C31232G01	M94ZB1207	OC SCRBR 3 FA B/PASS DMPR	NORMAL	CLOSED	DI	1.3.1.9	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.1.10	
DROP30	94PCM02	1C31232G01	M94HS2210A	ODOR CNTRL SCRBR 3 PH	LOCAL	INCOMP	DI	1.3.1.11	
DROP30	94PCM02	1C31232G01	M94QI2210A	ODOR CNTRL SCRBR 3 PH	OFF	PUMP 2	DI	1.3.1.12	
DROP30	94PCM02	1C31232G01	M94QI2210B	ODOR CNTRL SCRBR 3 PH	OFF	PUMP 1	DI	1.3.1.13	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.1.14	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.1.15	
DROP30	94PCM02	1C31232G01	<b>M30QC3S01</b>	<b>DPU30 QC DROP 3 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.1.16	
DROP30	94PCM02	1C31232G01	M94QI1220	OC SCRBR 4 INLET DAMPER	LOCAL	INCOMP	DI	1.3.2.1	
DROP30	94PCM02	1C31232G01	M94RI1220	OC SCRBR 4 INLET DAMPER	WAIT	READY	DI	1.3.2.2	
DROP30	94PCM02	1C31232G01	M94ZD1220	OC SCRBR 4 INLET DAMPER	NORMAL	OPENED	DI	1.3.2.3	
DROP30	94PCM02	1C31232G01	M94ZB1220	OC SCRBR 4 INLET DAMPER	NORMAL	CLOSED	DI	1.3.2.4	
DROP30	94PCM02	1C31232G01	M94QI1240	OC CARB ADSBR 2 OUT VLV 1	LOCAL	INCOMP	DI	1.3.2.5	
DROP30	94PCM02	1C31232G01	M94RI1240	OC CARB ADSBR 2 OUT VLV 1	WAIT	READY	DI	1.3.2.6	
DROP30	94PCM02	1C31232G01	M94ZD1240	OC CARB ADSBR 2 OUT VLV 1	NORMAL	OPENED	DI	1.3.2.7	
DROP30	94PCM02	1C31232G01	M94ZB1240	OC CRBN ADSBR 2 OUT VLV 1	NORMAL	CLOSED	DI	1.3.2.8	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.2.9	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.2.10	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.2.11	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.2.12	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.2.13	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.2.14	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.2.15	
DROP30	94PCM02	1C31232G01	<b>M30QC3S02</b>	<b>DPU30 QC DROP 3 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.2.16	
DROP30	94PCM02		Spare Module Address						1.3.3
DROP30	94PCM02	1C31232G01	M94AAHH2124B	PUMP STN WET WELL GAS MNTRG	HI-HI	NORMAL	DI	1.3.4.1	
DROP30	94PCM02	1C31232G01	M94AAH2124B	PUMP STN WET WELL GAS MNTRG	HIGH	NORMAL	DI	1.3.4.2	
DROP30	94PCM02	1C31232G01	M94XA2124B	PUMP STN WET WELL GAS MNTRG	FAIL	NORMAL	DI	1.3.4.3	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.4.4	
DROP30	94PCM02	1C31232G01	M94AAHH2124D	PUMP STN WET WELL GAS MNTRG	HI-HI	NORMAL	DI	1.3.4.5	
DROP30	94PCM02	1C31232G01	M94AAH2124D	PUMP STN WET WELL GAS MNTRG	HIGH	NORMAL	DI	1.3.4.6	
DROP30	94PCM02	1C31232G01	M94XA2124D	PUMP STN WET WELL GAS MNTRG	FAIL	NORMAL	DI	1.3.4.7	
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.4.8	
DROP30	94PCM02	1C31232G01	M94MI0131	CAUSTIC FEED PUMP NO. 1	OFF	RUNNING	DI	1.3.4.9	
DROP30	94PCM02	1C31232G01	M94QI0131	CAUSTIC FEED PUMP NO. 1	LOCAL	INCOMP	DI	1.3.4.10	
DROP30	94PCM02	1C31232G01	M94RI0131	CAUSTIC FEED PUMP NO. 1	WAIT	READY	DI	1.3.4.11	
DROP30	94PCM02	1C31232G01	M94UA0131	CAUSTIC FEED PUMP NO. 1	NORMAL	FAIL	DI	1.3.4.12	
DROP30	94PCM02	1C31232G01	M94LAL2331	CAUSTIC DAY TANK 1 LVL ALRM	NORMAL	LOW	DI	1.3.4.13	
DROP30	94PCM02	1C31232G01	M94LAH2331	CAUSTIC DAY TANK 1 LVL ALRM	HIGH	NORMAL	DI	1.3.4.14	
DROP30	94PCM02	1C31232G01	M94LAH2334	CAUSTIC DAY TANKS FLOOD ALARM	HIGH	NORMAL	DI	1.3.4.15	
DROP30	94PCM02	1C31232G01	<b>M30QC3S04</b>	<b>DPU30 QC DROP 3 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.4.16	



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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP30	94PCM02	1C31232G01	M94LAH2361	ACID DAY TANK 1 LVL ALRM	HIGH	NORMAL	DI	1.3.5.1
DROP30	94PCM02	1C31232G01	M94LAL2361	ACID DAY TANK 1 LVL ALRM	NORMAL	LOW	DI	1.3.5.2
DROP30	94PCM02	1C31232G01	M94LAH2364	ACID DAY TANKS FLOOD ALARM	HIGH	NORMAL	DI	1.3.5.3
DROP30	94PCM02	1C31232G01	M94MI0141	ACID FEED PUMP NO. 1	OFF	RUNNING	DI	1.3.5.4
DROP30	94PCM02	1C31232G01	M94QI0141	ACID FEED PUMP NO. 1	LOCAL	INCOMP	DI	1.3.5.5
DROP30	94PCM02	1C31232G01	M94RI0141	ACID FEED PUMP NO. 1	WAIT	READY	DI	1.3.5.6
DROP30	94PCM02	1C31232G01	M94UA0141	ACID FEED PUMP NO. 1	NORMAL	FAIL	DI	1.3.5.7
DROP30	94PCM02	1C31232G01					DI	1.3.5.8
DROP30	94PCM02	1C31232G01	M94JA2250	WASTE H2O WET WELL 1 LEVEL	NORMAL	F/OVER	DI	1.3.5.9
DROP30	94PCM02	1C31232G01					DI	1.3.5.10
DROP30	94PCM02	1C31232G01					DI	1.3.5.11
DROP30	94PCM02	1C31232G01					DI	1.3.5.12
DROP30	94PCM02	1C31232G01					DI	1.3.5.13
DROP30	94PCM02	1C31232G01					DI	1.3.5.14
DROP30	94PCM02	1C31232G01					DI	1.3.5.15
DROP30	94PCM02	1C31232G01	<b>M30QC3S05</b>	<b>DPU30 QC DROP 3 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.5.16
DROP30	94PCM02	1C31232G01	M94LAH2301	SHT DAY TANK 1 LVL ALRM	HIGH	NORMAL	DI	1.3.6.1
DROP30	94PCM02	1C31232G01	M94LAH2304	SHT DAY TANKS FLOOD ALARM	HIGH	NORMAL	DI	1.3.6.2
DROP30	94PCM02	1C31232G01	M94LAL2301	SHT DAY TANK 1 LVL ALRM	NORMAL	LOW	DI	1.3.6.3
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.6.4
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.6.5
DROP30	94PCM02	1C31232G01	M94MI0121	SHT FEED PUMP NO. 1	OFF	RUNNING	DI	1.3.6.6
DROP30	94PCM02	1C31232G01	M94QI0121	SHT FEED PUMP NO. 1	LOCAL	INCOMP	DI	1.3.6.7
DROP30	94PCM02	1C31232G01	M94RI0121	SHT FEED PUMP NO. 1	WAIT	READY	DI	1.3.6.8
DROP30	94PCM02	1C31232G01	M94UA0121	SHT FEED PUMP NO. 1	NORMAL	FAIL	DI	1.3.6.9
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.6.10
DROP30	94PCM02	1C31232G01	M94MI0114	CENTRATE PUMP NO. 3 (FUTURE)	OFF	RUNNING	DI	1.3.6.11
DROP30	94PCM02	1C31232G01	M94QI0114	CENTRATE PUMP NO. 3 (FUTURE)	LOCAL	INCOMP	DI	1.3.6.12
DROP30	94PCM02	1C31232G01	M94RI0114	CENTRATE PUMP NO. 3 (FUTURE)	WAIT	READY	DI	1.3.6.13
DROP30	94PCM02	1C31232G01	M94UA0114	CENTRATE PUMP NO. 3 (FUTURE)	NORMAL	FAIL	DI	1.3.6.14
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.6.15
DROP30	94PCM02	1C31232G01	<b>M30QC3S06</b>	<b>DPU30 QC DROP 3 SL06 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.6.16
DROP30	94PCM02	1C31232G01	M94MI0153	ODOR CNTRL R/C PUMP NO. 3	OFF	RUNNING	DI	1.3.7.1
DROP30	94PCM02	1C31232G01	M94QI0153	ODOR CNTRL R/C PUMP NO. 3	LOCAL	INCOMP	DI	1.3.7.2
DROP30	94PCM02	1C31232G01	M94RI0153	ODOR CNTRL R/C PUMP NO. 3	WAIT	READY	DI	1.3.7.3
DROP30	94PCM02	1C31232G01	M94PAL2213	OC SCRBR 3 R/C PMP DISCH PRESS	NORMAL	LOW	DI	1.3.7.4
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.7.5
DROP30	94PCM02	1C31232G01	M94LAH9013	ODOR CNTRL SCRBR 3 LVL ALRM	NORMAL	HIGH	DI	1.3.7.6
DROP30	94PCM02	1C31232G01	M94LAHH9013	ODOR CNTRL SCRBR 3 LVL SW ALRM	NORMAL	HI-HI	DI	1.3.7.7
DROP30	94PCM02	1C31232G01	M94LAL9013	ODOR CNTRL SCRBR 3 LVL SW ALRM	NORMAL	LOW	DI	1.3.7.8
DROP30	94PCM02	1C31232G01	M94LALL9013	ODOR CNTRL SCRBR 3 LVL SW ALRM	NORMAL	LO-LO	DI	1.3.7.9
DROP30	94PCM02	1C31232G01	M94QI1205	OC SCRBR 3 FA INLET DAMP	LOCAL	INCOMP	DI	1.3.7.10
DROP30	94PCM02	1C31232G01	M94RI1205	OC SCRBR 3 FA INLET DMPR	WAIT	READY	DI	1.3.7.11
DROP30	94PCM02	1C31232G01	M94ZD1205	OC SCRBR 3 FA INLET DMPR	NORMAL	OPENED	DI	1.3.7.12
DROP30	94PCM02	1C31232G01	M94ZB1205	OC SCRBR 3 FA INLET DMPR	NORMAL	CLOSED	DI	1.3.7.13
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.7.14
DROP30	94PCM02	1C31232G01	SPARE				DI	1.3.7.15
DROP30	94PCM02	1C31232G01	<b>M30QC3S07</b>	<b>DPU30 QC DROP 3 SL07 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.7.16
DROP30	94PCM02			Spare Module Address				1.3.8

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP30	94PCM02	1C31232G01	M94MI0172	OC EXHST FAN 2 ON	OFF	RUNNNG	DI	1.4.1.1
DROP30	94PCM02	1C31232G01	M94QI0172	OC EXHST FAN 2 REMOTE	LOCAL	INCOMP	DI	1.4.1.2
DROP30	94PCM02	1C31232G01	M94RI0172	OC EXHST FAN 2 CTRL PWR	WAIT	READY	DI	1.4.1.3
DROP30	94PCM02	1C31232G01	M94UA0172A	OC EXHST FAN 2 FAIL	NORMAL	FAIL	DI	1.4.1.4
DROP30	94PCM02	1C31232G01	M94UA0172B	OC EXHST FAN 2 ALARM	NORMAL	ALARM	DI	1.4.1.5
DROP30	94PCM02	1C31232G01	M94QI2244	OC EXHST FAN 2 IN PRESS	LOCAL	INCOMP	DI	1.4.1.6
DROP30	94PCM02	1C31232G01	M94QI1246	OC EXHST FAN 2 INLET VANE REM	LOCAL	INCOMP	DI	1.4.1.7
DROP30	94PCM02	1C31232G01	M94RI1246	OC EXHST FAN 2 INLET VANE PWR	NRDY	READY	DI	1.4.1.8
DROP30	94PCM02	1C31232G01	M94FAL2247	OC EXHST FAN 2	NORMAL	LOW	DI	1.4.1.9
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.1.10
DROP30	94PCM02	1C31232G01	M94MI0112	CENTRATE PUMP NO. 2	OFF	RUNNNG	DI	1.4.1.11
DROP30	94PCM02	1C31232G01	M94QI0112	CENTRATE PUMP NO. 2	LOCAL	INCOMP	DI	1.4.1.12
DROP30	94PCM02	1C31232G01	M94RI0112	CENTRATE PUMP NO. 2	WAIT	READY	DI	1.4.1.13
DROP30	94PCM02	1C31232G01	M94UA0112	CENTRATE PUMP NO. 2	NORMAL	FAIL	DI	1.4.1.14
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.1.15
DROP30	94PCM02	1C31232G01	<b>M30QC4S01</b>	<b>DPU30 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16
DROP30	94PCM02	1C31232G01	M94LAL2366	ACID DAY TANK 2 LVL ALRM	NORMAL	LOW	DI	1.4.2.1
DROP30	94PCM02	1C31232G01	M94LAH2366	ACID DAY TANK 2 LVL ALRM	HIGH	NORMAL	DI	1.4.2.2
DROP30	94PCM02	1C31232G01	M94LAH2336	CAUSTIC DAY TANK 2 LVL ALRM	HIGH	NORMAL	DI	1.4.2.3
DROP30	94PCM02	1C31232G01	M94LAL2336	CAUSTIC DAY TANK 2 LVL ALRM	NORMAL	LOW	DI	1.4.2.4
DROP30	94PCM02	1C31232G01	M94LAH2306	SHT DAY TANK 2 LVL ALRM	HIGH	NORMAL	DI	1.4.2.5
DROP30	94PCM02	1C31232G01	M94LAL2306	SHT DAY TANK 2 LVL ALRM	NORMAL	LOW	DI	1.4.2.6
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.2.7
DROP30	94PCM02	1C31232G01	M94MI0154	ODOR CNTRL R/C PUMP NO. 4	OFF	RUNNNG	DI	1.4.2.8
DROP30	94PCM02	1C31232G01	M94QI0154	ODOR CNTRL R/C PUMP NO. 4	LOCAL	INCOMP	DI	1.4.2.9
DROP30	94PCM02	1C31232G01	M94RI0154	ODOR CNTRL R/C PUMP NO. 4	WAIT	READY	DI	1.4.2.10
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.2.11
DROP30	94PCM02	1C31232G01	M94PAL2233	OC SCRBR 4 R/C PMP DISCH PRESS	NORMAL	LOW	DI	1.4.2.12
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.2.13
DROP30	94PCM02	1C31232G01	M94ZD1267	WSTWTR PS DISARGE RELIEF VLV 2	NORMAL	OPENED	DI	1.4.2.14
DROP30	94PCM02	1C31232G01	M94ZB1267	WSTWTR PS DISARGE RELIEF VLV 2	NORMAL	CLOSED	DI	1.4.2.15
DROP30	94PCM02	1C31232G01	<b>M30QC4S02</b>	<b>DPU30 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP30	94PCM02	1C31232G01	M94ZD1262	WSTWTR PS DISARGE RELIEF VLV 1	NORMAL	OPENED	DI	1.4.3.1
DROP30	94PCM02	1C31232G01	M94ZB1262	WSTWTR PS DISARGE RELIEF VLV 1	NORMAL	CLOSED	DI	1.4.3.2
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.3.3
DROP30	94PCM02	1C31232G01	M94QI1242	OC CARB ADSBR 2 B/PASS VLV	LOCAL	INCOMP	DI	1.4.3.4
DROP30	94PCM02	1C31232G01	M94RI1242	OC CARB ADSBR 2 B/PASS VLV	WAIT	READY	DI	1.4.3.5
DROP30	94PCM02	1C31232G01	M94ZB1242	OC CRBN ADSBR 2 B/PASS VLV	NORMAL	CLOSED	DI	1.4.3.6
DROP30	94PCM02	1C31232G01	M94ZD1242	OC CARB ADSBR 2 B/PASS VLV	NORMAL	OPENED	DI	1.4.3.7
DROP30	94PCM02	1C31232G01	M94QI1222	OC SCRBR 4 B/PASS DAMPER	LOCAL	INCOMP	DI	1.4.3.8
DROP30	94PCM02	1C31232G01	M94RI1222	OC SCRBR 4 B/PASS DAMPER	WAIT	READY	DI	1.4.3.9
DROP30	94PCM02	1C31232G01	M94ZD1222	OC SCRBR 4 B/PASS DAMPER	NORMAL	OPENED	DI	1.4.3.10
DROP30	94PCM02	1C31232G01	M94ZB1222	OC SCRBR 4 B/PASS DAMPER	NORMAL	CLOSED	DI	1.4.3.11
DROP30	94PCM02	1C31232G01	M94QI1221	OC SCRBR 4 DISCH DAMPER	LOCAL	INCOMP	DI	1.4.3.12
DROP30	94PCM02	1C31232G01	M94RI1221	OC SCRBR 4 DISCH DAMPER	WAIT	READY	DI	1.4.3.13
DROP30	94PCM02	1C31232G01	M94ZD1221	OC SCRBR 4 DISCH DAMPER	NORMAL	OPENED	DI	1.4.3.14
DROP30	94PCM02	1C31232G01	M94ZB1221	OC SCRBR 4 DISCH DAMPER	NORMAL	CLOSED	DI	1.4.3.15
DROP30	94PCM02	1C31232G01	<b>M30QC4S03</b>	<b>DPU30 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP30	94PCM02	1C31232G01	M94QI1223	OC HEAT COIL 6 INLET AIR DMPR	LOCAL	INCOMP	DI	1.4.4.1
DROP30	94PCM02	1C31232G01	M94RI1223	OC HEAT COIL 6 INLET AIR DMPR	WAIT	READY	DI	1.4.4.2
DROP30	94PCM02	1C31232G01	M94ZD1223	OC HEAT COIL 6 INLET AIR DMPR	NORMAL	OPENED	DI	1.4.4.3
DROP30	94PCM02	1C31232G01	M94ZB1223	OC HEAT COIL 6 INLET AIR DMPR	NORMAL	CLOSED	DI	1.4.4.4
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.4.5
DROP30	94PCM02	1C31232G01	M94QI1224	OC HEAT COIL 6 HOT H2O VLV	LOCAL	INCOMP	DI	1.4.4.6
DROP30	94PCM02	1C31232G01	M94RI1224	OC HEAT COIL 6 HOT H2O VLV	WAIT	READY	DI	1.4.4.7
DROP30	94PCM02	1C31232G01	M94QI2221	ODOR CNTRL HT COIL 6 DISCH TMP	LOCAL	INCOMP	DI	1.4.4.8
DROP30	94PCM02	1C31232G01	M94PDAH2222	OC HEAT COIL 6 PRESS DROP	NORMAL	HIGH	DI	1.4.4.9
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.4.10
DROP30	94PCM02	1C31232G01	M94HS2230C	ODOR CNTRL SCRBR 4 PH	LOCAL	INCOMP	DI	1.4.4.11
DROP30	94PCM02	1C31232G01	M94QI2230A	ODOR CNTRL SCRBR 4 PH	OFF	PUMP 2	DI	1.4.4.12
DROP30	94PCM02	1C31232G01	M94QI2230B	ODOR CNTRL SCRBR 4 PH	OFF	PUMP 1	DI	1.4.4.13
DROP30	94PCM02	1C31232G01	M94QI2230C	ODOR CNTRL SCRBR 4 PH	OFF	PUMP 2	DI	1.4.4.14
DROP30	94PCM02	1C31232G01	M94QI2230D	ODOR CNTRL SCRBR 4 PH	OFF	PUMP 1	DI	1.4.4.15
DROP30	94PCM02	1C31232G01	<b>M30QC4S04</b>	<b>DPU30 QC DROP 4 SL04 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.4.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP30	94PCM02	1C31232G01	M94AAHH2124A	PUMP STN WET WELL GAS MNTRG	HI-HI	NORMAL	DI	1.4.5.1
DROP30	94PCM02	1C31232G01	M94AAH2124A	PUMP STN WET WELL GAS MNTRG	HIGH	NORMAL	DI	1.4.5.2
DROP30	94PCM02	1C31232G01	M94XA2124A	PUMP STN WET WELL GAS MNTRG	FAIL	NORMAL	DI	1.4.5.3
DROP30	94PCM02	1C31232G01	M94AAH2124C	PUMP STN WET WELL GAS MNTRG	HIGH	NORMAL	DI	1.4.5.4
DROP30	94PCM02	1C31232G01	M94AAHH2124C	PUMP STN WET WELL GAS MNTRG	HI-HI	NORMAL	DI	1.4.5.5
DROP30	94PCM02	1C31232G01	M94XA2124C	PUMP STN WET WELL GAS MNTRG	FAIL	NORMAL	DI	1.4.5.6
DROP30	94PCM02	1C31232G01	M94QI1241	OC CARB ADSBR 2 OUT VLV 2	LOCAL	INCOMP	DI	1.4.5.7
DROP30	94PCM02	1C31232G01	M94RI1241	OC CARB ADSBR 2 OUT VLV 2	WAIT	READY	DI	1.4.5.8
DROP30	94PCM02	1C31232G01	M94ZD1241	OC CARB ADSBR 2 OUT VLV 2	NORMAL	OPENED	DI	1.4.5.9
DROP30	94PCM02	1C31232G01	M94ZB1241	OC CRBN ADSBR 2 OUT VLV 2	NORMAL	CLOSED	DI	1.4.5.10
DROP30	94PCM02	1C31232G01	M94LAHH9014	ODOR CNTRL SCRBR 4 LVL SW ALRM	NORMAL	HI-HI	DI	1.4.5.11
DROP30	94PCM02	1C31232G01	M94LAH9014	ODOR CNTRL SCRBR 4 LVL SW ALRM	NORMAL	HIGH	DI	1.4.5.12
DROP30	94PCM02	1C31232G01	M94LAL9014	ODOR CNTRL SCRBR 4 LVL SW ALRM	NORMAL	LOW	DI	1.4.5.13
DROP30	94PCM02	1C31232G01	M94LALL9014	ODOR CNTRL SCRBR 4 LVL SW ALRM	NORMAL	LO-LO	DI	1.4.5.14
DROP30	94PCM02	1C31232G01	SPARE				DI	1.4.5.15
DROP30	94PCM02	1C31232G01	M30QC4S05	DPU30 QC DROP 4 SL05 DI PWR MON	ALARM	NORMAL	DI	1.4.5.16
DROP30	94PCM02			Spare Module Address				1.4.6
DROP30	94PCM02			Spare Module Address				1.4.7
DROP30	94PCM02			Spare Module Address				1.4.8
DROP30	94PCM02	5A26458G04	M94HS0153	ODOR CNTRL R/C PUMP NO. 3	OFF	RUN	DO	1.5.1.1
DROP30	94PCM02	5A26458G04	M94HS1205A	OC SCRBR 3 FA INLET DMPR	OPEN	CLOSE	DO	1.5.1.2
DROP30	94PCM02	5A26458G04	M94HS1206A	OC SCRBR 3 FA DISCH DMPR	OPEN	CLOSE	DO	1.5.1.3
DROP30	94PCM02	5A26458G04	M94HS1207A	OC SCRBR 3 FA B/PASS DMPR	OPEN	CLOSE	DO	1.5.1.4
DROP30	94PCM02	5A26458G04	SPARE				DO	1.5.1.5
DROP30	94PCM02	5A26458G04	M94QS2210	ODOR CNTRL SCRBR 3 PH	OFF	CMRPDY	DO	1.5.1.6
DROP30	94PCM02	5A26458G04	SPARE				DO	1.5.1.7
DROP30	94PCM02	5A26458G04	M94HS0141B	ACID FD PUMP NO. 1 - TRAIN 2	OFF	RUN	DO	1.5.1.8
DROP30	94PCM02	5A26458G04	M94HS0131B	CSTC FD PUMP NO. 1 - TRAIN 2	OFF	RUN	DO	1.5.1.9
DROP30	94PCM02	5A26458G04	M94HS0121B	SHT FD PUMP NO. 1 - TRAIN 2	OFF	RUN	DO	1.5.1.10
DROP30	94PCM02	5A26458G04	M94HS0172	OC EXHST FAN1 RUN CMD	OFF	RUN	DO	1.5.1.11
DROP30	94PCM02	5A26458G04	M94HS0114	CENTRATE PUMP NO. 3 (FUTURE)	OFF	RUN	DO	1.5.1.12

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DROP30	94PCM02	5A26458G04	M94HS0112	CENTRATE PUMP NO. 2	OFF	RUN	DO	1.6.1.1
DROP30	94PCM02	5A26458G04	M94HS0142B	ACID FD PUMP NO. 2 - TRAIN 2	OFF	RUN	DO	1.6.1.2
DROP30	94PCM02	5A26458G04	M94HS0132B	CSTC FD PUMP NO. 2 - TRAIN 2	OFF	RUN	DO	1.6.1.3
DROP30	94PCM02	5A26458G04	M94HS0122B	SHT FD PUMP NO. 2 - TRAIN 2	OFF	RUN	DO	1.6.1.4
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.1.5
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.1.6
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.1.7
DROP30	94PCM02	5A26458G04	M94HS1242A	OC CARB ADSBR 2 B/PASS VLV	OPEN	CLOSE	DO	1.6.1.8
DROP30	94PCM02	5A26458G04	M94HS1241A	OC CARB ADSBR 2 OUT VLV 2	OPEN	CLOSE	DO	1.6.1.9
DROP30	94PCM02	5A26458G04	M94HS1240A	OC CARB ADSBR 2 OUT VLV 1	OPEN	CLOSE	DO	1.6.1.10
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.1.11
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.1.12
DROP30	94PCM02	5A26458G04	M94HS0154	ODOR CNTRL R/C PUMP NO. 4	OFF	RUN	DO	1.6.2.1
DROP30	94PCM02	5A26458G04	M94QS2230	ODOR CNTRL SCRBR 4 PH	OFF	CMPRDY	DO	1.6.2.2
DROP30	94PCM02	5A26458G04	M94HS1222A	OC SCRBR 4 B/PASS DAMPER	OPEN	CLOSE	DO	1.6.2.3
DROP30	94PCM02	5A26458G04	M94HS1221A	OC SCRBR 4 DISCH DAMPER	OPEN	CLOSE	DO	1.6.2.4
DROP30	94PCM02	5A26458G04	M94HS1220A	OC SCRBR 4 INLET DAMPER	OPEN	CLOSE	DO	1.6.2.5
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.2.6
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.2.7
DROP30	94PCM02	5A26458G04	M94HS1223A	OC HEAT COIL 6 IN AIR DAMPER	OPEN	CLOSE	DO	1.6.2.8
DROP30	94PCM02	5A26458G04	M94QS2221	OC HEAT COIL 6 DISCH TEMP	OFF	CMPRDY	DO	1.6.2.9
DROP30	94PCM02	5A26458G04	M94QS2244	OC EXHAUST FAN 2 INLET PRESS	OFF	CMPRDY	DO	1.6.2.10
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.2.11
DROP30	94PCM02	5A26458G04	SPARE				DO	1.6.2.12

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DROP38	80PCM05	5X00419G01		80VDL07 - PRIMARY CONTROLLER (FLOWSERVE VALVE NETWORK)			SERIAL	1.1.1						
			80MV1452	STORAGE MIX PUMP DISCHARGE HDR VALVE 1										
			80MV1453	STORAGE MIX PUMP DISCHARGE HDR VALVE 2										
			80MV1472	EM BIO-STORAGE TANK MIX NOZZLE #4										
			80MV1473	EM BIO-STORAGE TANK MIX NOZZLE #3										
			80MV1673	BIO-GAS COMP. #2 OUTLET VALVE										
			<b>80MV1678</b>	<b>BIO-GAS COMP. #3 OUTLET VALVE</b>										
			80MV1671	BIOGAS COMPRESSOR #1 DISCHARGE VALVE										
			80MV1466	RSL INLET EM STORAGE TANK VALVE										
			80MV1465	DSL INLET EM STORAGE TANK VALVE										
			80MV1116	EM BIO-STORAGE SAMPLER VALVE										
			80MV1470	EM BIO-STORAGE TANK MIX NOZZLE #2										
			80MV1471	EM BIO-STORAGE TANK MIX NOZZLE #1										
			80MV1460	EM BIO-STORAGE TANK BIOGAS VALVE										
			80MV1451	STORAGE MIX PUMP INLET HEADER VALVE 2										
			80MV1445	STORAGE MIX PUMP DISCHARGE VALVE										
			80MV1444	STORAGE MIX PUMP SUCTION VALVE										
			80MV1450	STORAGE MIX PUMP INLET HEADER VALVE 1										
			80MV1442	STORAGE MIX PUMP #2 SUCTION VALVE										
			80MV1443	STORAGE MIX PUMP #2 DISCHARGE VALVE										
			80MV1440	STORAGE MIX PUMP #1 SUCTION VALVE										
			80MV1117	BIO-STORAGE TANK SAMPLER										
			80MV1441	STORAGE MIX PUMP #1 DISCHARGE VALVE										
			80MV1762	DIGESTER #3 CAUSTIC SODA ISOLATION VALVE										
			80MV1761	DIGESTER #2 CAUSTIC SODA ISOLATION VALVE										
			80MV1760	DIGESTER #1 CAUSTIC SODA ISOLATION VALVE										
			80MV1766	CAUSTIC FEED PUMP #1 DISCHARGE VALVE										
			80MV1765	CAUSTIC FEED PUMP #1 SUCTION VALVE										
			80MV1751	CAUSTIC SODA DAY TANK #1 OUTLET VALVE										
			80MV1752	CAUSTIC DAY TANK #1 STRAINER VALVE										
			80MV1750	CAUSTIC SODA DAY TANK #1 INLET VALVE										
			80MV1755	CAUSTIC SODA DAY TANK #2 INLET VALVE										
			80MV1757	CAUSTIC DAY TANK #2 STRAINER VALVE										
			80MV1756	CAUSTIC SODA DAY TANK #2 OUTLET VALVE										
			80MV1754	CAUSTIC SODA DAY TANK BYPASS VALVE										
			80MV1715	FERRIC DAY #2 TANK INLET VALVE										
			80MV1716	FERRIC DAY #2 TANK OUTLET VALVE										
			80MV1717	FC3 DAY TANK #2 STRAINER VALVE										
			80MV1714	FERRIC DAY TANK 1&2 BYPASS VALVE										
			80MV1712	FC3 DAY TANK #1 STRAINER VALVE										
			80MV1711	FERRIC DAY TANK 1 OUTLET VALVE										
			80MV1710	FERRIC DAY TANK 1 INLET VALVE										
			80MV1726	FERRIC FEED PUMP #1 DISCHARGE VALVE										
			80MV1725	FERRIC FEED PUMP #1 SUCTION VALVE										
			DROP38	80PCM05		Spare Module Address						1.1.2		

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP38	80PCM05	5X00106G01	M80FT2640	EM BS STORAGE TANK BIOGAS FLOW	0	170 SCFM	AI - HART	1.1.3.1
DROP38	80PCM05	5X00106G01	M80FT2673	BIOGAS COMPRESSORS DISCH FLOW	0	3000 SCFM	AI - HART	1.1.3.2
DROP38	80PCM05	5X00106G01	M80ST0180	FERROUS FEED PUMP 1 SPEED	0	100 PCT	AI - HART	1.1.3.3
DROP38	80PCM05	5X00106G01	M80ST0186	CAUSTIC FEED PUMP 1 SPEED	0	100 PCT	AI - HART	1.1.3.4
DROP38	80PCM05	5X00106G01	M80FI3005	AREA 80 PROCESS WATER FLOW	0	800 GPM	AI - HART	1.1.3.5
DROP38	80PCM05	5X00106G01	M80FI3009	AREA 80 UTILITY WATER FLOW	0	1300 GPM	AI - HART	1.1.3.6
DROP38	80PCM05	5X00106G01	SPARE				AI - HART	1.1.3.7
DROP38	80PCM05	5X00106G01	SPARE				AI - HART	1.1.3.8
DROP38	80PCM05	5X00106G01	<b>M80Z11670</b>	<b>BIOGAS COMPRESSOR NO.1 INLET VALVE POSITION</b>	<b>0</b>	<b>100 PCT</b>	AI - HART	1.1.4.1
DROP38	80PCM05	5X00106G01	<b>M80Z11677</b>	<b>BIOGAS COMPRESSOR NO.3 INLET VALVE POSITION</b>	<b>0</b>	<b>100 PCT</b>	AI - HART	1.1.4.2
DROP38	80PCM05	5X00106G01	M80LT2460	EM BS STORAGE TANK LEVEL 1	0	65 FEET	AI - HART	1.1.4.3
DROP38	80PCM05	5X00106G01	M80FT2725	FERROUS FEED PUMP 1 DISCH FLOW	0	0.7 GPM	AI - HART	1.1.4.4
DROP38	80PCM05	5X00106G01	M80LT2710	FERROUS DAY TANK 1 LEVEL	0	8 FEET	AI - HART	1.1.4.5
DROP38	80PCM05	5X00106G01	SPARE				AI - HART	1.1.4.6
DROP38	80PCM05	5X00106G01	M80FT2765	CAUSTIC FEED PUMP 1 DISCH FLOW	2	19 PGM	AI - HART	1.1.4.7
DROP38	80PCM05	5X00106G01	M80LT2750	CAUSTIC DAY TANK 1 LEVEL	0	9 FEET	AI - HART	1.1.4.8
DROP38	80PCM05			Spare Module Address				1.1.5
DROP38	80PCM05			Spare Module Address				1.1.6
DROP38	80PCM05	5X00167G01	M80SC0180	FERROUS FEED PUMP 1 SPD DMND	0	100 PCT	AO	1.1.7.1
DROP38	80PCM05	5X00167G01	M80SC0186	CAUSTIC FEED PUMP 1 SPD DMND	0	100 PCT	AO	1.1.7.2
DROP38	80PCM05	5X00167G01	SPARE				AO	1.1.7.3
DROP38	80PCM05	5X00167G01	<b>M80ZC1670</b>	<b>BIOGAS COMPRESSOR NO.1 INLET VALVE POSITION CMD</b>	<b>0</b>	<b>100 PCT</b>	AO	1.1.7.4
DROP38	80PCM05	5X00167G01	<b>M80ZC1677</b>	<b>BIOGAS COMPRESSOR NO.3 INLET VALVE POSITION CMD</b>	<b>0</b>	<b>100 PCT</b>	AO	1.1.7.5
DROP38	80PCM05	5X00167G01	SPARE				AO	1.1.7.6
DROP38	80PCM05	5X00167G01	SPARE				AO	1.1.7.7
DROP38	80PCM05	5X00167G01	SPARE				AO	1.1.7.8
DROP38	80PCM05	5X00119G01	MDPU38T1	80PCM05 DPU38 CABINET TEMP	32	154 DEG F	RTD	1.1.8.1
DROP38	80PCM05	5X00119G01	SPARE				RTD	1.1.8.2
DROP38	80PCM05	5X00119G01	SPARE				RTD	1.1.8.3
DROP38	80PCM05	5X00119G01	SPARE				RTD	1.1.8.4
DROP38	80PCM05	5X00119G01	SPARE				RTD	1.1.8.5
DROP38	80PCM05	5X00119G01	SPARE				RTD	1.1.8.6
DROP38	80PCM05	5X00119G01	SPARE				RTD	1.1.8.7
DROP38	80PCM05	5X00119G01	SPARE				RTD	1.1.8.8

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DROP38	80PCM05			Spare Module Address				1.2.1
DROP38	80PCM05	5X00167G01	M80ZC1672	BIOGAS COMPRESSOR NO.2 INLET VALVE POSITION CMD	0	100 PCT	AO	1.2.2.1
DROP38	80PCM05	5X00167G01	M80ZC1674	BIOGAS COMP. RECIRCULATION VALVE POSITION CMD	0	100 PCT	AO	1.2.2.2
DROP38	80PCM05	5X00167G01	SPARE				AO	1.2.2.3
DROP38	80PCM05	5X00167G01	SPARE				AO	1.2.2.4
DROP38	80PCM05	5X00167G01	SPARE				AO	1.2.2.5
DROP38	80PCM05	5X00167G01	SPARE				AO	1.2.2.6
DROP38	80PCM05	5X00167G01	SPARE				AO	1.2.2.7
DROP38	80PCM05	5X00167G01	SPARE				AO	1.2.2.8
DROP38	80PCM05			Spare Module Address				1.2.3
DROP38	80PCM05			Spare Module Address				1.2.4
DROP38	80PCM05	5X00106G01	M80ZC1672	BIOGAS COMPRESSOR NO.2 INLET VALVE POSITION	0	100 PCT	AI - HART	1.2.5.1
DROP38	80PCM05	5X00106G01	M80ZC1674	BIOGAS COMPRESSOR RECIRCULATION VALVE POSITION	0	100 PCT	AI - HART	1.2.5.2
DROP38	80PCM05	5X00106G01	M80LT2461	EM BS STORAGE TANK LEVEL 2	0	65 FEET	AI - HART	1.2.5.3
DROP38	80PCM05	5X00106G01	M80PT2641	EM BS ST TANK BIOGAS PRS	0	12 INH2O	AI - HART	1.2.5.4
DROP38	80PCM05	5X00106G01	SPARE				AI - HART	1.2.5.5
DROP38	80PCM05	5X00106G01	M80LT2715	FERROUS DAY TANK 2 LEVEL	0	8 FEET	AI - HART	1.2.5.6
DROP38	80PCM05	5X00106G01	SPARE				AI - HART	1.2.5.7
DROP38	80PCM05	5X00106G01	M80LT2755	CAUSTIC DAY TANK 2 LEVEL	0	9 FEET	AI - HART	1.2.5.8
DROP38	80PCM05	5X00106G01	SPARE				AI - HART	1.2.6.1
DROP38	80PCM05	5X00106G01	M80PT2670	BIOGAS COMPRESSORS INLET PRS	0	12 INH2O	AI - HART	1.2.6.2
DROP38	80PCM05	5X00106G01	M80PT2671	BIOGAS COMPRESSORS DISCH PRS	0	40 PSIG	AI - HART	1.2.6.3
DROP38	80PCM05	5X00106G01	M80TT2669	BIOGAS COMPRESSORS INLET TEMP	30	210 DEG F	AI - HART	1.2.6.4
DROP38	80PCM05	5X00106G01	M80TT2672	BIOGAS COMPRESSORS DISCH TEMP	60	120 DEG F	AI - HART	1.2.6.5
DROP38	80PCM05	5X00106G01	M80LI3001	AIR GAP TANK-01 LEVEL	0	20 FEET	AI - HART	1.2.6.6
DROP38	80PCM05	5X00106G01	M80LI3002	HYDRO-PNEUMATIC TANK LEVEL	0	180 INWC	AI - HART	1.2.6.7
DROP38	80PCM05	5X00106G01	M80PI3003	AREA 80 PRW OUTPUT PRESSURE	0	150 PSI	AI - HART	1.2.6.8
DROP38	80PCM05	1C31166G02		AREA 80 HVAC			SERIAL	1.2.7
DROP38	80PCM05	5X00419G01		80VDL07 - BACKUP CONTROLLER (FLOWSERVE VALVE NETWORK)			SERIAL	1.2.8
DROP38	80PCM05	1C31232G01	M80MI0201	BIOGAS COMPRESSOR NO. 1	OFF	RUNNING	DI	1.3.1.1
DROP38	80PCM05	1C31232G01	M80QI0201	BIOGAS COMPRESSOR NO. 1	LOCAL	INCOMP	DI	1.3.1.2
DROP38	80PCM05	1C31232G01	M80RI0201	BIOGAS COMPRESSOR NO. 1	WAIT	READY	DI	1.3.1.3
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.1.4
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.1.5
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.1.6
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.1.7
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.1.8
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.1.9
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.1.10
DROP38	80PCM05	1C31232G01	M80LAH2714	FC2 DAY TANKS FLOOD ALARM	HIGH	NORMAL	DI	1.3.1.11
DROP38	80PCM05	1C31232G01	M80PDH2760	ODOR CONTROL FAN 1 NRML PRS DROP	NORMAL	HIDIFF	DI	1.3.1.12
DROP38	80PCM05	1C31232G01	M80MI0191	ODOR CONTROL FAN NO. 1	OFF	RUNNING	DI	1.3.1.13
DROP38	80PCM05	1C31232G01	M80QI0191	ODOR CONTROL FAN NO. 1	LOCAL	INCOMP	DI	1.3.1.14
DROP38	80PCM05	1C31232G01	M80RI0191	ODOR CONTROL FAN NO. 1	WAIT	READY	DI	1.3.1.15
DROP38	80PCM05	1C31232G01	M38QC3S01	DPUS8 QC DROP 3 SL01 DI PWR MON	ALARM	NORMAL	DI	1.3.1.16

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DROP38	80PCM05	1C31232G01	M80HS1670	BIOGAS COMPRESSOR NO.1 INLET VALVE	LOCAL	INCOMP	DI	1.3.2.1
DROP38	80PCM05	1C31232G01	M80HS1677	BIOGAS COMPRESSOR NO.3 INLET VALVE	LOCAL	INCOMP	DI	1.3.2.2
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.2.3
DROP38	80PCM05	1C31232G01	M80LAHH2625	CONDENSATE SUMP 1 LEVEL ALARMS	NORMAL	HI-HI	DI	1.3.2.4
DROP38	80PCM05	1C31232G01	M80LALL2625	CONDENSATE SUMP 1 LEVEL ALARMS	NORMAL	LO-LO	DI	1.3.2.5
DROP38	80PCM05	1C31232G01	M80ZB1461	EM BS ST TNK PRS REL 1 ISO VLV	NORMAL	CLOSED	DI	1.3.2.6
DROP38	80PCM05	1C31232G01	M80ZD1461	EM BS ST TNK PRS REL 1 ISO VLV	NORMAL	OPENED	DI	1.3.2.7
DROP38	80PCM05	1C31232G01	M80MI0180	FERROUS FEED PUMP NO. 1	OFF	RUNNING	DI	1.3.2.8
DROP38	80PCM05	1C31232G01	M80QI0180	FC3 FEED PUMP NO. 1	LOCAL	INCOMP	DI	1.3.2.9
DROP38	80PCM05	1C31232G01	M80RI0180	FC3 FEED PUMP NO. 1	WAIT	READY	DI	1.3.2.10
DROP38	80PCM05	1C31232G01	M80UA0180	FERROUS FEED PMP 1 INLET VLV	NORMAL	FAIL	DI	1.3.2.11
DROP38	80PCM05	1C31232G01	M80LAHH2622	SEDIMENT TRAP 11 LEVEL	NORMAL	HI-HI	DI	1.3.2.12
DROP38	80PCM05	1C31232G01	M80LALL2622	SEDIMENT TRAP 11 LEVEL	NORMAL	LO-LO	DI	1.3.2.13
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.2.14
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.2.15
DROP38	80PCM05	1C31232G01	M38QC3S02	DPU38 QC DROP 3 SL02 DI PWR MON	ALARM	NORMAL	DI	1.3.2.16
DROP38	80PCM05	1C31232G01	M80MI0203	BIOGAS COMPRESSOR NO. 3	OFF	RUNNING	DI	1.3.3.1
DROP38	80PCM05	1C31232G01	M80QI0203	BIOGAS COMPRESSOR NO. 3	LOCAL	INCOMP	DI	1.3.3.2
DROP38	80PCM05	1C31232G01	M80RI0203	BIOGAS COMPRESSOR NO. 3	WAIT	READY	DI	1.3.3.3
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.3.4
DROP38	80PCM05	1C31232G01	M80FAL0131	STORAGE MIX PUMP NO. 1	NORMAL	LOW	DI	1.3.3.5
DROP38	80PCM05	1C31232G01	M80MI0131A	STORAGE MIX PUMP NO. 1	OFF	ONFAST	DI	1.3.3.6
DROP38	80PCM05	1C31232G01	M80MI0131B	STORAGE MIX PUMP NO. 1	OFF	ONSLOW	DI	1.3.3.7
DROP38	80PCM05	1C31232G01	M80QI0131	STORAGE MIX PUMP NO. 1	LOCAL	INCOMP	DI	1.3.3.8
DROP38	80PCM05	1C31232G01	M80RI0131	STORAGE MIX PUMP NO. 1	WAIT	READY	DI	1.3.3.9
DROP38	80PCM05	1C31232G01	M80FAL0133	STORAGE MIX PUMP NO. 3	NORMAL	LOW	DI	1.3.3.10
DROP38	80PCM05	1C31232G01	M80MI0133A	STORAGE MIX PUMP NO. 3	OFF	ONFAST	DI	1.3.3.11
DROP38	80PCM05	1C31232G01	M80MI0133B	STORAGE MIX PUMP NO. 3	OFF	ONSLOW	DI	1.3.3.12
DROP38	80PCM05	1C31232G01	M80QI0133	STORAGE MIX PUMP NO. 3	LOCAL	INCOMP	DI	1.3.3.13
DROP38	80PCM05	1C31232G01	M80RI0133	STORAGE MIX PUMP NO. 3	WAIT	READY	DI	1.3.3.14
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.3.15
DROP38	80PCM05	1C31232G01	M38QC3S03	DPU38 QC DROP 3 SL03 DI PWR MON	ALARM	NORMAL	DI	1.3.3.16
DROP38	80PCM05	1C31232G01	M80LAH2751	CAUSTIC ST DAY TNK1 LVL ALARMS	HIGH	NORMAL	DI	1.3.4.1
DROP38	80PCM05	1C31232G01	M80LAL2751	CAUSTIC ST DAY TNK1 LVL ALARMS	NORMAL	LOW	DI	1.3.4.2
DROP38	80PCM05	1C31232G01	M80LAHH2635	CONDENSATE SUMP 3 LEVEL ALARMS	NORMAL	HI-HI	DI	1.3.4.3
DROP38	80PCM05	1C31232G01	M80LALL2635	CONDENSATE SUMP 3 LEVEL ALARMS	NORMAL	LO-LO	DI	1.3.4.4
DROP38	80PCM05	1C31232G01	M80LAH2711	FC2 DAY TANK 1 LEVEL ALARMS	HIGH	NORMAL	DI	1.3.4.5
DROP38	80PCM05	1C31232G01	M80LAL2711	FC2 DAY TANK 1 LEVEL ALARMS	NORMAL	LOW	DI	1.3.4.6
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.4.7
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.4.8
DROP38	80PCM05	1C31232G01	M80ZB1531	J-TUBE DISCH VLV 3	NORMAL	CLOSED	DI	1.3.4.9
DROP38	80PCM05	1C31232G01	M80ZD1531	J-TUBE DISCH VLV 3	NORMAL	OPENED	DI	1.3.4.10
DROP38	80PCM05	1C31232G01	M80LAHH2632	SEDIMENT TRAP 4 LEVEL	NORMAL	HI-HI	DI	1.3.4.11
DROP38	80PCM05	1C31232G01	M80LALL2632	SEDIMENT TRAP 4 LEVEL	NORMAL	LO-LO	DI	1.3.4.12
DROP38	80PCM05	1C31232G01	M80LAHH3001	AIR GAP TANK 001 LEVEL ALARM	NORMAL	HI-HI	DI	1.3.4.13
DROP38	80PCM05	1C31232G01	M80LALL3001	AIR GAP TANK 001 LEVEL ALARM	NORMAL	LO-LO	DI	1.3.4.14
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.4.15
DROP38	80PCM05	1C31232G01	M38QC3S04	DPU38 QC DROP 3 SL04 DI PWR MON	ALARM	NORMAL	DI	1.3.4.16

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP38	80PCM05	1C31232G01	M80YL096A	PROCESS WATER PUMP P-096	OFF	ON	DI	1.3.5.1
DROP38	80PCM05	1C31232G01	M80ZL096	PW PUMP P-096 STATUS	LOCAL	INCOMP	DI	1.3.5.2
DROP38	80PCM05	1C31232G01	M80YL096	PUMP P-096 POWER AVAILABLE	WAIT	READY	DI	1.3.5.3
DROP38	80PCM05	1C31232G01	M80YA096B	PROCESS WATER PUMP P-096	NORMAL	FAIL	DI	1.3.5.4
DROP38	80PCM05	1C31232G01	M80PAL3096	PUMP P-096 DISCHARGE PRESSURE	LOW	NORMAL	DI	1.3.5.5
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.5.6
DROP38	80PCM05	1C31232G01	M80YL097A	PROCESS WATER PUMP P-097	OFF	ON	DI	1.3.5.7
DROP38	80PCM05	1C31232G01	M80ZL097	PROCESS WATER PUMP P-097	LOCAL	INCOMP	DI	1.3.5.8
DROP38	80PCM05	1C31232G01	M80YL097	PUMP P-097 POWER AVAILABLE	WAIT	READY	DI	1.3.5.9
DROP38	80PCM05	1C31232G01	M80YA097B	PROCESS WATER PUMP P-097	NORMAL	FAIL	DI	1.3.5.10
DROP38	80PCM05	1C31232G01	M80PAL3097	PUMP P-097 DISCHARGE PRESSURE	LOW	NORMAL	DI	1.3.5.11
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.5.12
DROP38	80PCM05	1C31232G01	SPARE				DI	1.3.5.13
DROP38	80PCM05	1C31232G01	M80ZLO3001	AIR GAP TK PW FILLVALVE	CLOSED	OPENED	DI	1.3.5.14
DROP38	80PCM05	1C31232G01	M80ZLC3001	AIR GAP TANK PW FILL VALVE	NORMAL	CLOSED	DI	1.3.5.15
DROP38	80PCM05	1C31232G01	<b>M38QC3S05</b>	<b>DPU38 QC DROP 3 SL05 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.3.5.16
DROP38	80PCM05			Spare Module Address				1.3.6
DROP38	80PCM05			Spare Module Address				1.3.7
DROP38	80PCM05			Spare Module Address				1.3.8
DROP38	80PCM05	1C31232G01	M80MI0202	BIOGAS COMPRESSOR NO. 2	OFF	RUNNING	DI	1.4.1.1
DROP38	80PCM05	1C31232G01	M80QI0202	BIOGAS COMPRESSOR NO. 2	LOCAL	INCOMP	DI	1.4.1.2
DROP38	80PCM05	1C31232G01	M80RI0202	BIOGAS COMPRESSOR NO. 2	WAIT	READY	DI	1.4.1.3
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.1.4
DROP38	80PCM05	1C31232G01	<b>M80HS1672</b>	<b>BIOGAS COMPRESSOR NO.2 INLET VALVE</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.4.1.5
DROP38	80PCM05	1C31232G01	<b>M80HS1674</b>	<b>BIOGAS COMP. RECIRCULATION VALVE</b>	<b>LOCAL</b>	<b>INCOMP</b>	DI	1.4.1.6
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.1.7
DROP38	80PCM05	1C31232G01	M80FAL0132	STORAGE MIX PUMP NO. 2	NORMAL	LOW	DI	1.4.1.8
DROP38	80PCM05	1C31232G01	M80MI0132A	STORAGE MIX PUMP NO. 2	OFF	ONFAST	DI	1.4.1.9
DROP38	80PCM05	1C31232G01	M80MI0132B	STORAGE MIX PUMP NO. 2	OFF	ONSLOW	DI	1.4.1.10
DROP38	80PCM05	1C31232G01	M80QI0132	STORAGE MIX PUMP NO. 2	LOCAL	INCOMP	DI	1.4.1.11
DROP38	80PCM05	1C31232G01	M80RI0132	STORAGE MIX PUMP NO. 2	WAIT	READY	DI	1.4.1.12
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.1.13
DROP38	80PCM05	1C31232G01	M80ZB1462	EM BS ST TNK PRS REL 2 ISO VLV	NORMAL	CLOSED	DI	1.4.1.14
DROP38	80PCM05	1C31232G01	M80ZD1462	EM BS ST TNK PRS REL 2 ISO VLV	NORMAL	OPENED	DI	1.4.1.15
DROP38	80PCM05	1C31232G01	<b>M38QC4S01</b>	<b>DPU38 QC DROP 4 SL01 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.1.16

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DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.2.1
DROP38	80PCM05	1C31232G01	M80LAL2756	CAUSTIC DAY TNK 2 LEVEL ALARMS	NORMAL	LOW	DI	1.4.2.2
DROP38	80PCM05	1C31232G01	M80ZB1464	EM BS STORAGE MIX PUMP VLV	NORMAL	CLOSED	DI	1.4.2.3
DROP38	80PCM05	1C31232G01	M80ZD1464	EM BS STORAGE MIX PUMP VLV	NORMAL	OPENED	DI	1.4.2.4
DROP38	80PCM05	1C31232G01	M80ZB1463	EM BS STORAGE TANK DISCH VLV	NORMAL	CLOSED	DI	1.4.2.5
DROP38	80PCM05	1C31232G01	M80ZD1463	EM BS STORAGE TANK DISCH VLV	NORMAL	OPENED	DI	1.4.2.6
DROP38	80PCM05	1C31232G01	M80LAH2716	FC2 DAY TANK 2 LEVEL ALARMS	HIGH	NORMAL	DI	1.4.2.7
DROP38	80PCM05	1C31232G01	M80LAL2716	FC2 DAY TANK 2 LEVEL ALARMS	NORMAL	LOW	DI	1.4.2.8
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.2.9
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.2.10
DROP38	80PCM05	1C31232G01	M80ZB1532	J-TUBE DISCH VLV 4	NORMAL	CLOSED	DI	1.4.2.11
DROP38	80PCM05	1C31232G01	M80ZD1532	J-TUBE DISCH VLV 4	NORMAL	OPENED	DI	1.4.2.12
DROP38	80PCM05	1C31232G01	M80LAHH2612	SEDIMENT TRAP 6 LEVEL	NORMAL	HI-HI	DI	1.4.2.13
DROP38	80PCM05	1C31232G01	M80LALL2612	SEDIMENT TRAP 6 LEVEL	NORMAL	LO-LO	DI	1.4.2.14
DROP38	80PCM05	1C31232G01	M80ZL3001	AIR GAP TANK -01 PW FILL VALVE	LOCAL	INCOMP	DI	1.4.2.15
DROP38	80PCM05	1C31232G01	<b>M38QC4S02</b>	<b>DPU38 QC DROP 4 SL02 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.2.16
DROP38	80PCM05	1C31232G01	M80LAH2754	CAUSTIC DAY TNKS FLOOD ALARM	HIGH	NORMAL	DI	1.4.3.1
DROP38	80PCM05	1C31232G01	M80MI0186	CAUSTIC FEED PUMP NO. 1	OFF	RUNNING	DI	1.4.3.2
DROP38	80PCM05	1C31232G01	M80QI0186	CAUSTIC FEED PUMP NO. 1	LOCAL	INCOMP	DI	1.4.3.3
DROP38	80PCM05	1C31232G01	M80RI0186	CAUSTIC FEED PUMP NO. 1	WAIT	READY	DI	1.4.3.4
DROP38	80PCM05	1C31232G01	M80UA0186	CAUSTIC FEED PUMP NO. 1	NORMAL	FAIL	DI	1.4.3.5
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.6
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.7
DROP38	80PCM05	1C31232G01	M80LAHH2602	SEDIMENT TRAP 9 LEVEL	NORMAL	HI-HI	DI	1.4.3.8
DROP38	80PCM05	1C31232G01	M80LALL2602	SEDIMENT TRAP 9 LEVEL	NORMAL	LO-LO	DI	1.4.3.9
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.10
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.11
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.12
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.13
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.14
DROP38	80PCM05	1C31232G01	SPARE				DI	1.4.3.15
DROP38	80PCM05	1C31232G01	<b>M38QC4S03</b>	<b>DPU38 QC DROP 4 SL03 DI PWR MON</b>	<b>ALARM</b>	<b>NORMAL</b>	DI	1.4.3.16
DROP38	80PCM05			Spare Module Address				1.4.4
DROP38	80PCM05			Spare Module Address				1.4.5
DROP38	80PCM05			Spare Module Address				1.4.6
DROP38	80PCM05			Spare Module Address				1.4.7
DROP38	80PCM05			Spare Module Address				1.4.8

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DCU	Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Location
DROP38	80PCM05	5A26458G04	M80HS0201	BIOGAS COMPRESSOR NO. 1	OFF	RUN	DO	1.5.1.1
DROP38	80PCM05	5A26458G04	<b>M80HS0203</b>	<b>BIOGAS COMPRESSOR NO. 3</b>	<b>OFF</b>	<b>RUN</b>	DO	1.5.1.2
DROP38	80PCM05	5A26458G04	M80HS0186	CAUSTIC FEED PUMP NO. 1	OFF	RUN	DO	1.5.1.3
DROP38	80PCM05	5A26458G04	M80HS0180	FC3 FEED PUMP NO. 1	OFF	RUN	DO	1.5.1.4
DROP38	80PCM05	5A26458G04	SPARE				DO	1.5.1.5
DROP38	80PCM05	5A26458G04	M80HS0131A	STORAGE MIX PUMP NO. 1	OFF	RUNFST	DO	1.5.1.6
DROP38	80PCM05	5A26458G04	M80HS0131B	STORAGE MIX PUMP NO. 1	OFF	RUNSLW	DO	1.5.1.7
DROP38	80PCM05	5A26458G04	M80HS0191	ODOR CNTRL FAN NO. 1	OFF	RUN	DO	1.5.1.8
DROP38	80PCM05	5A26458G04	M80HS3010A	AIR INLET TO H/P TK VALVE 1	CLOSE	OPEN	DO	1.5.1.9
DROP38	80PCM05	5A26458G04	M80HS0133A	STORAGE MIX PUMP NO. 3	OFF	RUNFST	DO	1.5.1.10
DROP38	80PCM05	5A26458G04	M80HS0133B	STORAGE MIX PUMP NO. 3	OFF	RUNSLW	DO	1.5.1.11
DROP38	80PCM05	5A26458G04	SPARE				DO	1.5.1.12
DROP38	80PCM05	5A26458G04	M80HS0202	BIOGAS COMPRESSOR NO. 2	OFF	RUN	DO	1.6.1.1
DROP38	80PCM05	5A26458G04	SPARE				DO	1.6.1.2
DROP38	80PCM05	5A26458G04	M80HS3001A	AIR GAP TK FILL VALVE	NORMAL	OPEN	DO	1.6.1.3
DROP38	80PCM05	5A26458G04	M80HS096	PROCESS WATER PUMP P-096	STOP	START	DO	1.6.1.4
DROP38	80PCM05	5A26458G04	M80HS097	PROCESS WATER PUMP P-097	STOP	START	DO	1.6.1.5
DROP38	80PCM05	5A26458G04	SPARE				DO	1.6.1.6
DROP38	80PCM05	5A26458G04	M80HS3001B	AIR GAP TK PW FILL VALVE	NORMAL	CLOSE	DO	1.6.1.7
DROP38	80PCM05	5A26458G04	M80HS3010B	AIR OUTLET FROM H/P TK VALVE 2	CLOSE	OPEN	DO	1.6.1.8
DROP38	80PCM05	5A26458G04	SPARE				DO	1.6.1.9
DROP38	80PCM05	5A26458G04	SPARE				DO	1.6.1.10
DROP38	80PCM05	5A26458G04	M80HS0132A	STORAGE MIX PUMP NO. 2	OFF	RUNFST	DO	1.6.1.11
DROP38	80PCM05	5A26458G04	M80HS0132B	STORAGE MIX PUMP NO. 2	OFF	RUNSLW	DO	1.6.1.12

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP7	60PCM05	QID	M7QB6S12	DPU07 QC SL12 HSB6 QID PS MON	ALARM	NORMAL	DI	3.1.12.16
DROP7	60PCM05	QID	M7QC6S11	DPU07 QC SL11 HSC6 QID PS MON	ALARM	NORMAL	DI	3.2.11.16
DROP7	60PCM05	QID	M7QD6S12	DPU07 QC SL12 HSD6 QID PS MON	ALARM	NORMAL	DI	3.2.12.16
DROP7	60PCM05	QID	M7ESL13B	DPU07 SEC 13VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.12
DROP7	60PCM05	QID	M7ESL13A	DPU07 PRI 13VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.13
DROP7	60PCM05	QID	M7ESL24B	DPU07 SEC 24VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.14
DROP7	60PCM05	QID	M7ESL24A	DPU07 PRI 24VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.15
DROP7	60PCM05	QID	M7QE6S11	DPU07 QC SL11 HSE6 QID PS MON	ALARM	NORMAL	DI	3.3.11.16
DROP7	60PCM05	QID	M7QF6S12	DPU07 QC SL12 HSF6 QID PS MON	ALARM	NORMAL	DI	3.3.12.16
DROP7	60PCM05	QID	M7QH3S6	DPU07 QC SL06 HSH3 QID PS MON	ALARM	NORMAL	DI	3.4.6.16

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DELETED DCS INPUT / OUTPUT LIST

DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP8	60PCM06	QID	M73PAH2109	DELETED, NO LONGER NEEDED	NORMAL	NORMAL	DI	1.2.3.1
DROP8	60PCM06	QID	M8QA6S11	DPU08 QC SL11 HSA6 QID PS MON	ALARM	NORMAL	DI	3.1.11.16
DROP8	60PCM06	QID	M8QB6S12	DPU08 QC SL12 HSB6 QID PS MON	ALARM	NORMAL	DI	3.1.12.16
DROP8	60PCM06	QID	M8QD5S10	DPU08 QC SL10 HSD5 QID PS MON	ALARM	NORMAL	DI	3.2.10.16
DROP8	60PCM06	QID	M8QC6S11	DPU08 QC SL11 HSC6 QID PS MON	ALARM	NORMAL	DI	3.2.11.16
DROP8	60PCM06	QID	M8QD6S12	DPU08 QC SL12 HSD6 QID PS MON	ALARM	NORMAL	DI	3.2.12.16
DROP8	60PCM06	QID	M8ESL13B	DPU08 SEC 13VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.12
DROP8	60PCM06	QID	M8ESL13A	DPU08 PRI 13VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.13
DROP8	60PCM06	QID	M8ESL24B	DPU08 SEC 24VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.14
DROP8	60PCM06	QID	M8ESL24A	DPU08 PRI 24VDC PS MONITOR	NORMAL	ALARM	DI	3.3.11.15
DROP8	60PCM06	QID	M8QE6S11	DPU08 QC SL11 HSE6 QID PS MON	ALARM	NORMAL	DI	3.3.11.16
DROP8	60PCM06	QID	M8QF6S12	DPU08 QC SL12 HSF6 QID PS MON	ALARM	NORMAL	DI	3.3.12.16
DROP8	60PCM06	QID	M8QH3S6	DPU08 QC SL06 HSH3 QID PS MON	ALARM	NORMAL	DI	3.4.6.16
DROP8	60PCM06	QID	M8QG3S5	DPU08 QC SL05 HSG3 QID PS MON	ALARM	NORMAL	DI	3.4.7.16

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METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

DELETED DCS INPUT / OUTPUT LIST

DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP10	76PCM01	QBO	M76HS0111C	TC SLUDGE FEED PUMP 1 DISABLE	DISABL	ENABLE	DO	3.1.1.7
DROP10	76PCM01	QBO	M76HS0102	THICK CFUGE NO. 2	RUN	OFF	DO	3.1.1.12
DROP10	76PCM01	QBO	M76HS0112C	TC SLUDGE FEED PUMP 2 DISABLE	DISABL	ENABLE	DO	3.1.1.16
DROP10	76PCM01	QBO	M76HS0521B	TC POLY FEED PUMP NO. 1	RUN	OFF	DO	3.1.3.9
DROP10	76PCM01	QBO	M76QS2152	THICK CFUGE 1 SLUDGE FLOW	CMPRDY	OFF	DO	3.1.3.10
DROP10	76PCM01	QLC		TC 1 MOTOR TEMPERATURES			SERIAL	3.1.4
DROP10	76PCM01	QBO	M76HS0111B	TC FEED PUMP NO. 1	RUN	OFF	DO	3.1.5.9
DROP10	76PCM01	QBO	M76QS2156	THICK CFUGE 2 SLUDGE FLOW	CMPRDY	OFF	DO	3.1.5.14
DROP10	76PCM01	QLC		TC 2 MOTOR TEMPERATURES			SERIAL	3.1.8
DROP10	76PCM01	QID	M10QC1S1	DPU10 QC SL1 HSC1 QID PS MON	ALARM	NORMAL	DI	3.2.1.16
DROP10	76PCM01	QID	M10QD1S2	DPU10 QC SL2 HSD1 QID PS MON	ALARM	NORMAL	DI	3.2.2.16
DROP10	76PCM01	QID	M10QC2S3	DPU10 QC SL3 HSC2 QID PS MON	ALARM	NORMAL	DI	3.2.3.16
DROP10	76PCM01	QID	M10QD2S4	DPU10 QC SL4 HSD2 QID PS MON	ALARM	NORMAL	DI	3.2.4.16
DROP10	76PCM01	QID	M76MI0111	TC FEED PUMP NO. 1	RUNNNG	OFF	DI	3.2.5.10
DROP10	76PCM01	QID	M76QI0111B	TC FEED PUMP NO. 1	INCOMP	LOCAL	DI	3.2.5.11
DROP10	76PCM01	QID	M76RI0111	TC FEED PUMP NO. 1	READY	WAIT	DI	3.2.5.12
DROP10	76PCM01	QID	M76UA0111	TC FEED PUMP NO. 1	FAIL	NORMAL	DI	3.2.5.13
DROP10	76PCM01	QID	M76QI0522B	TC POLY FEED PUMP NO. 2	INCOMP	LOCAL	DI	3.2.5.14
DROP10	76PCM01	QID	M10QC3S5	DPU10 QC SL5 HSC3 QID PS MON	ALARM	NORMAL	DI	3.2.5.16
DROP10	76PCM01	QID	M76TAH2193	TC 1 MTR WINDING TMP	HIGH	NORMAL	DI	3.2.6.3
DROP10	76PCM01	QID	M76QI2736	THICK CFUGE 1 POLYMER INLT FLW	INCOMP	LOCAL	DI	3.2.6.8
DROP10	76PCM01	QID	M10QD3S6	DPU10 QC SL6 HSD3 QID PS MON	ALARM	NORMAL	DI	3.2.6.16
DROP10	76PCM01	QID	M76HS0112B	TC FEED PUMP NO. 2	RUNREQ	OFF	DI	3.2.7.15
DROP10	76PCM01	QID	M10QC4S7	DPU10 QC SL7 HSC4 QID PS MON	ALARM	NORMAL	DI	3.2.7.16
DROP10	76PCM01	QID	M10QE1S1	DPU10 QC SL1 HSE1 QID PS MON	ALARM	NORMAL	DI	3.3.1.16
DROP10	76PCM01	QID	M10QF1S2	DPU10 QC SL2 HSF1 QID PS MON	ALARM	NORMAL	DI	3.3.2.16
DROP10	76PCM01	QID	M10QE2S3	DPU10 QC SL3 HSE2 QID PS MON	ALARM	NORMAL	DI	3.3.3.16
DROP10	76PCM01	QID	M76MI0112	TC FEED PUMP NO. 2	RUNNNG	OFF	DI	3.3.4.11
DROP10	76PCM01	QID	M76QI0112B	TC FEED PUMP NO. 2	INCOMP	LOCAL	DI	3.3.4.12
DROP10	76PCM01	QID	M76RI0112	TC FEED PUMP NO. 2	READY	WAIT	DI	3.3.4.13
DROP10	76PCM01	QID	M76UA0112	TC FEED PUMP NO. 2	FAIL	NORMAL	DI	3.3.4.14
DROP10	76PCM01	QID	M76QI2152	THICK CFUGE 1 SLUDGE FLOW	INCOMP	LOCAL	DI	3.3.4.15
DROP10	76PCM01	QID	M10QF2S4	DPU10 QC SL4 HSF2 QID PS MON	ALARM	NORMAL	DI	3.3.4.16
DROP10	76PCM01	QID	M76QI0521B	TC POLY FEED PUMP NO. 1	INCOMP	LOCAL	DI	3.3.5.6
DROP10	76PCM01	QID	M76QI2156	THICK CFUGE 2 SLUDGE FLOW	INCOMP	LOCAL	DI	3.3.5.9
DROP10	76PCM01	QID	M76QI0102	THICK CFUGE NO. 2	INCOMP	LOCAL	DI	3.3.5.14
DROP10	76PCM01	QID	M10QE3S5	DPU10 QC SL5 HSE3 QID PS MON	ALARM	NORMAL	DI	3.3.5.16

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DELETED DCS INPUT / OUTPUT LIST

DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP10	76PCM01	QID	M76TAH2203	TC 2 MTR WINDING TMP	HIGH	NORMAL	DI	3.3.6.3
DROP10	76PCM01	QID	M76QI2741	THICK CFUGE 2 POLYMER INLT FLW	INCOMP	LOCAL	DI	3.3.6.8
DROP10	76PCM01	QID	M10QF3S6	DPU10 QC SL6 HSF3 QID PS MON	ALARM	NORMAL	DI	3.3.6.16
DROP10	76PCM01	QID	M10ESL13B	DPU10 SEC 13VDC PS MON	NORMAL	ALARM	DI	3.3.7.12
DROP10	76PCM01	QID	M10ESL13A	DPU10 PRI 13VDC PS MON	NORMAL	ALARM	DI	3.3.7.13
DROP10	76PCM01	QID	M10ESL24B	DPU10 SEC 24VDC PS MON	NORMAL	ALARM	DI	3.3.7.14
DROP10	76PCM01	QID	M10ESL24A	DPU10 PRI 24VDC PS MON	NORMAL	ALARM	DI	3.3.7.15
DROP10	76PCM01	QID	M10QE4S7	DPU10 QC SL7 HSE4 QID PS MON	ALARM	NORMAL	DI	3.3.7.16
DROP10	76PCM01	QAX	M76AT2191	TC NO.1 SUSPENDE SOLIDS	0	2 gr/L	AI	3.3.9.1
DROP10	76PCM01	QAX	M76ST0111	TC FEED PUMP NO. 1 SPEED	0	100 PCT	AI	3.3.9.5
DROP10	76PCM01	QAX	M76VT2190X	TC 1 BEARING 1 VIBRTN X-AXIS	0	3 IN/SEC	AI	3.3.9.7
DROP10	76PCM01	QAX	M76VT2190Y	TC 1 BEARING 1 VIBRTN Y-AXIS	0	4 IN/SEC	AI	3.3.9.8
DROP10	76PCM01	QAX	M76VT2192X	TC 1 BEARING 2 VIBRTN X-AXIS	0	5 IN/SEC	AI	3.3.9.9
DROP10	76PCM01	QAX	M76VT2192Y	TC 1 BEARING 2 VIBRTN Y-AXIS	0	6 IN/SEC	AI	3.3.9.10
DROP10	76PCM01	QAX	M76VT2190Z	TC 1 BEARING 1 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.3.10.1
DROP10	76PCM01	QAX	M76VT2192Z	TC 1 BEARING 2 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.3.10.2
DROP10	76PCM01	QAX	M76VT2200Z	TC 2 BEARING 1 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.3.10.3
DROP10	76PCM01	QAX	M76VT2202Z	TC 2 BEARING 2 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.3.10.4
DROP10	76PCM01	QBO	M76QS2736	THICK CFUGE 1 POLYMER INLT FLW	CMPRDY	OFF	DO	3.4.1.9
DROP10	76PCM01	QID	M76QI0101	THICK CFUGE NO. 1	INCOMP	LOCAL	DI	3.4.2.2
DROP10	76PCM01	QID	M76HS0522B	TC POLY FEED PUMP NO. 2	RUNREQ	OFF	DI	3.4.2.15
DROP10	76PCM01	QID	M10QH1S2	DPU10 QC SL2 HSH1 QID PS MON	ALARM	NORMAL	DI	3.4.2.16
DROP10	76PCM01	QBO	M76QS2741	THICK CFUGE 2 POLYMER INLT FLW	CMPRDY	OFF	DO	3.4.5.9
DROP10	76PCM01	QBO	M76HS0101	THICK CFUGE NO. 1	RUN	OFF	DO	3.4.5.14
DROP10	76PCM01	QAO	M76FC2152	THICK CFUGE FD PMP1 SPD DMND	0	100 PCT	AO	3.4.8.2
DROP10	76PCM01	QAO	M76FC2736	TC POLYMER FD P1 SPD DMND	0	100 PCT	AO	3.4.8.3
DROP10	76PCM01	QAX	M76AT2201	TC NO.2 SUSPENDE SOLIDS	0	2 gr/L	AI	3.4.9.1
DROP10	76PCM01	QAX	M76VT2200X	TC 2 BEARING 1 VIBRTN X-AXIS	0	3 IN/SEC	AI	3.4.9.4
DROP10	76PCM01	QAX	M76VT2200Y	TC 2 BEARING 1 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.4.9.5
DROP10	76PCM01	QAX	M76VT2202X	TC 2 BEARING 2 VIBRTN X-AXIS	0	3 IN/SEC	AI	3.4.9.6
DROP10	76PCM01	QAX	M76VT2202Y	TC 2 BEARING 2 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.4.9.7
DROP10	76PCM01	QAX	M76ST0112	TC FEED PUMP NO. 2 SPEED	0	100 PCT	AI	3.4.9.8
DROP10	76PCM01	QAO	M76FC2156	THICK CFUGE FD PMP2 SPD DMND	0	100 PCT	AO	3.4.12.1
DROP10	76PCM01	QAO	M76FC2741	TC POLYMER FD P2 SPD DMND	0	100 PCT	AO	3.4.12.3

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP11	76PCM02	QBO	M76HS0103	THICKENING CENTRIFUGE NO. 3	OFF	RUN	DO	3.1.1.1
DROP11	76PCM02	QBO	M76HS0104	THICKENING CENTRIFUGE NO. 4	OFF	RUN	DO	3.1.1.2
DROP11	76PCM02	QBO	M76QS2161	THICK CENTRIFUGE 3 SLUDGE FLOW	OFF	CMPRDY	DO	3.1.1.10
DROP11	76PCM02	QBO	M76QS2166	THICK CENTRIFUGE 4 SLUDGE FLOW	OFF	CMPRDY	DO	3.1.1.11
DROP11	76PCM02	QBO	M76QS2746	THICK CFUGE3 POLYMER INLT FLW	OFF	CMPRDY	DO	3.1.1.12
DROP11	76PCM02	QBO	M76QS2751	THICK CFUGE4 POLYMER INLT FLW	OFF	CMPRDY	DO	3.1.1.13
DROP11	76PCM02	QBO	M76HS0113C	TC SLUDGE FEED PUMP 3 DISABLE	ENABLE	DISABL	DO	3.1.1.14
DROP11	76PCM02	QBO	M76HS0114C	TC SLUDGE FEED PUMP 4 DISABLE	ENABLE	DISABL	DO	3.1.1.15
DROP11	76PCM02	QLC		TC 3 MOTOR TEMPERATURES			SERIAL	3.1.3
DROP11	76PCM02	QLC		TC 3 DATA			SERIAL	3.1.5
DROP11	76PCM02	QLC		TC 4 MOTOR TEMPERATURES			SERIAL	3.1.7
DROP11	76PCM02	QLC		TC 4 DATA			SERIAL	3.1.9
DROP11	76PCM02	QID	M76HS0113B	TC FEED PUMP NO. 3	OFF	RUNREQ	DI	3.2.1.2
DROP11	76PCM02	QID	M76HS0523B	TC POLY FEED PUMP NO. 3	OFF	RUNREQ	DI	3.2.1.3
DROP11	76PCM02	QID	M76TAH2223	THICK CFUGE 4 MTR WINDING TMP	HIGH	NORMAL	DI	3.2.1.14
DROP11	76PCM02	QID	M76UA0114	TC FEED PUMP NO. 4	NORMAL	FAIL	DI	3.2.1.15
DROP11	76PCM02	QID	M11QC1S1	DPU11 QC SL1 HSC1 QID PS MON	ALARM	NORMAL	DI	3.2.1.16
DROP11	76PCM02	QID	M76HS0114B	TC FEED PUMP NO. 4	OFF	RUNREQ	DI	3.2.2.2
DROP11	76PCM02	QID	M76HS0524B	TC POLY FEED PUMP NO. 4	OFF	RUNREQ	DI	3.2.2.3
DROP11	76PCM02	QID	M76QI0103	THICKENING CENTRIFUGE NO. 3	LOCAL	INCOMP	DI	3.2.2.4
DROP11	76PCM02	QID	M76QI0113B	TC FEED PUMP NO. 3	LOCAL	INCOMP	DI	3.2.2.5
DROP11	76PCM02	QID	M76QI0523B	TC POLY FEED PUMP NO. 3	LOCAL	INCOMP	DI	3.2.2.7
DROP11	76PCM02	QID	M76QI2161	THICK CENTRIFUGE 3 SLUDGE FLOW	LOCAL	INCOMP	DI	3.2.2.8
DROP11	76PCM02	QID	M76QI2746	THICK CFUGE 3 POLYMER INLT FLW	LOCAL	INCOMP	DI	3.2.2.9
DROP11	76PCM02	QID	M76RI0113	TC FEED PUMP NO. 3	NORMAL	READY	DI	3.2.2.10
DROP11	76PCM02	QID	M76TAH2213	THICK CFUGE 3 MTR WINDING TMP	HIGH	NORMAL	DI	3.2.2.13
DROP11	76PCM02	QID	M76UA0113	TC FEED PUMP NO. 3	NORMAL	FAIL	DI	3.2.2.14
DROP11	76PCM02	QID	M11QD1S2	DPU11 QC SL2 HSD1 QID PS MON	ALARM	NORMAL	DI	3.2.2.16
DROP11	76PCM02	QID	M11QC2S3	DPU11 QC SL3 HSC2 QID PS MON	ALARM	NORMAL	DI	3.2.3.16
DROP11	76PCM02	QID	M11QD2S4	DPU11 QC SL4 HSD2 QID PS MON	ALARM	NORMAL	DI	3.2.4.16
DROP11	76PCM02	QID	M76MI0113	TC FEED PUMP NO. 3	OFF	RUNNNG	DI	3.3.1.2
DROP11	76PCM02	QID	M11QD1S1	DPU11 QC SL1 HSE1 QID PS MON	ALARM	NORMAL	DI	3.3.1.16
DROP11	76PCM02	QID	M11ESL13B	DPU11 13VDC SEC PS MON	NORMAL	ALARM	DI	3.3.2.12
DROP11	76PCM02	QID	M11ESL13A	DPU11 13VDC PRI PS MON	NORMAL	ALARM	DI	3.3.2.13
DROP11	76PCM02	QID	M11ESL24B	DPU11 24VDC SEC PS MON	NORMAL	ALARM	DI	3.3.2.14
DROP11	76PCM02	QID	M11ESL24A	DPU11 24VDC PRI PS MON	NORMAL	ALARM	DI	3.3.2.15
DROP11	76PCM02	QID	M11QF1S2	DPU11 QC SL2 HSF1 QID PS MON	ALARM	NORMAL	DI	3.3.2.16

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DELETED DCS INPUT / OUTPUT LIST

DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP11	76PCM02	QID	M76QI0114B	TC FEED PUMP NO. 4	LOCAL	INCOMP	DI	3.3.3.11

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DELETED DCS INPUT / OUTPUT LIST

DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP11	76PCM02	QID	M11QE2S3	DPU11 QC SL3 HSE2 QID PS MON	ALARM	NORMAL	DI	3.3.3.16
DROP11	76PCM02	QAO	M76FC2161	THICK CFUGE FD PMP3 SPD DMND	0	100 PCT	AO	3.3.4.1
DROP11	76PCM02	QAO	M76FC2746	TC POLYMER FD P3 SPD DMND	0	100 PCT	AO	3.3.4.2
DROP11	76PCM02	QAX	M76AT2211	THICK CFUGE 3 SUSPENDED SOLIDS	0	2 gr/L	AI	3.3.6.1
DROP11	76PCM02	QAX	M76ST0113	TC FEED PUMP NO. 3 SPEED	0	100 PCT	AI	3.3.6.4
DROP11	76PCM02	QAX	M76VT2210X	TC 3 BEARING 1 VIBRTN X-AXIS	0	3 IN/SEC	AI	3.3.6.6
DROP11	76PCM02	QAX	M76VT2212X	TC 3 BEARING 2 VIBRTN X-AXIS	0	4 IN/SEC	AI	3.3.6.7
DROP11	76PCM02	QAX	M76VT2220X	TC 4 BEARING 1 VIBRTN X-AXIS	0	5 IN/SEC	AI	3.3.6.8
DROP11	76PCM02	QAX	M76VT2222X	TC 4 BEARING 2 VIBRTN X-AXIS	0	6 IN/SEC	AI	3.3.6.9
DROP11	76PCM02	QAX	M76VT2210Z	TC 3 BEARING 1 VIBRTN Z-AXIS	0	7 IN/SEC	AI	3.3.6.10
DROP11	76PCM02	QAX	M76VT2212Z	TC 3 BEARING 2 VIBRTN Z-AXIS	0	8 IN/SEC	AI	3.3.6.11
DROP11	76PCM02	QID	M76MI0114	TC FEED PUMP NO. 4	OFF	RUNNNG	DI	3.4.1.2
DROP11	76PCM02	QID	M76QI0104	THICKENING CENTRIFUGE NO. 4	LOCAL	INCOMP	DI	3.4.1.10
DROP11	76PCM02	QID	M76QI0524B	TC POLY FEED PUMP NO. 4	LOCAL	INCOMP	DI	3.4.1.11
DROP11	76PCM02	QID	M76QI2166	THICK CENTRIFUGE 4 SLUDGE FLOW	LOCAL	INCOMP	DI	3.4.1.12
DROP11	76PCM02	QID	M76QI2751	THICK CFUGE 4 POLYMER INLT FLW	LOCAL	INCOMP	DI	3.4.1.13
DROP11	76PCM02	QID	M76RI0114	TC FEED PUMP NO. 4	NORMAL	READY	DI	3.4.1.14
DROP11	76PCM02	QID	M11QG1S1	DPU11 QC SL1 HSG1 QID PS MON	ALARM	NORMAL	DI	3.4.1.16
DROP11	76PCM02	QID	M11QH1S2	DPU11 QC SL2 HSH1 QID PS MON	ALARM	NORMAL	DI	3.4.2.16
DROP11	76PCM02	QID	M11QG2S3	DPU11 QC SL3 HSG2 QID PS MON	ALARM	NORMAL	DI	3.4.3.16
DROP11	76PCM02	QAO	M76FC2166	THICK CFUGE FD PMP4 SPD DMND	0	100 PCT	AO	3.4.4.1
DROP11	76PCM02	QAO	M76FC2751	TC POLYMER FD P4 SPD DMND	0	100 PCT	AO	3.4.4.2
DROP11	76PCM02	QAX	M76AT2221	THICK CFUGE 4 SUSPENDED SOLIDS	0	2 gr/L	AI	3.4.6.1
DROP11	76PCM02	QAX	M76ST0114	TC FEED PUMP NO. 4 SPEED	0	100 PCT	AI	3.4.6.4
DROP11	76PCM02	QAX	M76VT2210Y	TC 3 BEARING 1 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.4.6.6
DROP11	76PCM02	QAX	M76VT2212Y	TC 3 BEARING 2 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.4.6.7
DROP11	76PCM02	QAX	M76VT2220Y	TC 4 BEARING 1 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.4.6.8
DROP11	76PCM02	QAX	M76VT2222Y	TC 4 BEARING 2 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.4.6.9
DROP11	76PCM02	QAX	M76VT2220Z	TC 4 BEARING 1 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.4.6.10
DROP11	76PCM02	QAX	M76VT2222Z	TC 4 BEARING 2 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.4.6.11

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP12	76PCM02A	QLC		TC 1 DATA			SERIAL	3.3.11
DROP12	76PCM02A	QLC		TC 2 DATA			SERIAL	3.3.12

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DELETED DCS INPUT / OUTPUT LIST

DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP13	76PCM03	QBO	M76QS2171	THICK CENTRIFUGE 5 SLUDGE FLOW	CMPRDY	OFF	DO	3.1.1.1
DROP13	76PCM03	QBO	M76QS2756	THICK CFUGE 5 POLYMER INLT FLW	CMPRDY	OFF	DO	3.1.1.2
DROP13	76PCM03	QBO	M76HS0105	THICKENING CENTRIFUGE NO. 5	RUN	OFF	DO	3.1.1.3
DROP13	76PCM03	QBO	M76HS0115C	TC SLUDGE FEED PUMP 5 DISABLE	DIABL	ENABLE	DO	3.1.1.16
DROP13	76PCM03	QLC		TC 5 DATA			SERIAL	3.1.2
DROP13	76PCM03	QLC		TC 5 MOTOR TEMPERATURES			SERIAL	3.1.4
DROP13	76PCM03	QID	M76QI0105	THICKENING CENTRIFUGE NO. 5	INCOMP	LOCAL	DI	3.2.1.2
DROP13	76PCM03	QID	M76QI2171	THICK CENTRIFUGE 5 SLUDGE FLOW	INCOMP	LOCAL	DI	3.2.1.3
DROP13	76PCM03	QID	M76QI2756	THICK CFUGE 5 POLYMER INLT FLW	INCOMP	LOCAL	DI	3.2.1.4
DROP13	76PCM03	QID	M76TAH2233	THICK CFUGE 5 MTR WINDING TMP	NORMAL	HIGH	DI	3.2.1.5
DROP13	76PCM03	1C31232G01	M13QC1S1	DPU13 QC HSC1 SL1 QID PS MON	NORMAL	ALARM	DI	3.2.1.16
DROP13	76PCM03	QID	M76HS0525B	TC POLY FEED PUMP NO. 5	RUNREQ	NORMAL	DI	3.2.2.1
DROP13	76PCM03	QID	M76QI0525B	TC POLY FEED PUMP NO. 5	INCOMP	LOCAL	DI	3.2.2.6
DROP13	76PCM03	1C31232G01	M13QD1S2	DPU13 QC HSD1 SL2 QID PS MON	NORMAL	ALARM	DI	3.2.2.16
DROP13	76PCM03	QAX	M76AT2231	THICK CFUGE 5 SUSPENDED SOLIDS	0	2 gr/L	AI	3.2.5.1
DROP13	76PCM03	QAX	M76ST0115	TC FEED PUMP NO. 5 SPEED	3	100 PCT	AI	3.2.5.4
DROP13	76PCM03	QAX	M76VT2230X	TC 5 BEARING 1 VIBRTN X-AXIS	0	3 IN/SEC	AI	3.2.5.6
DROP13	76PCM03	QAX	M76VT2230Y	TC 5 BEARING 1 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.2.5.7
DROP13	76PCM03	QAX	M76VT2232X	TC 5 BEARING 2 VIBRTN X-AXIS	0	3 IN/SEC	AI	3.2.5.8
DROP13	76PCM03	QAX	M76VT2232Y	TC 5 BEARING 2 VIBRTN Y-AXIS	0	3 IN/SEC	AI	3.2.5.9
DROP13	76PCM03	QAX	M76VT2230Z	TC 5 BEARING 1 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.2.5.10
DROP13	76PCM03	QAX	M76VT2232Z	TC 5 BEARING 2 VIBRTN Z-AXIS	0	3 IN/SEC	AI	3.2.5.11
DROP13	76PCM03	1C31232G01	M13QE1S1	DPU13 QC HSE1 SL1 QID PS MON	NORMAL	ALARM	DI	3.3.1.16
DROP13	76PCM03	QID	M13ESL13B	DPU13 SEC 13VDC PS MON	OPENED	NORMAL	DI	3.3.2.12
DROP13	76PCM03	QID	M13ESL13A	DPU13 PRI 13VDC PS MON	OPENED	NORMAL	DI	3.3.2.13
DROP13	76PCM03	QID	M13ESL24B	DPU13 SEC 24VDC PS MON	OPENED	NORMAL	DI	3.3.2.14
DROP13	76PCM03	QID	M13ESL24A	DPU13 PRI 24VDC PS MON	OPENED	NORMAL	DI	3.3.2.15
DROP13	76PCM03	1C31232G01	M13QF1S2	DPU13 QC HSF1 SL2 QID PS MON	NORMAL	ALARM	DI	3.3.2.16
DROP13	76PCM03	QAO	M76FC2171	THICK CFUGE FD PMP5 SPD DMND	0	100 PCT	AO	3.3.3.1
DROP13	76PCM03	QAO	M76FC2756	TC POLYMER FD P5 SPD DMND	0	100 PCT	AO	3.3.3.2

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP13	76PCM03	QID	M76HS0115B	TC FEED PUMP NO. 5	RUNREQ	NORMAL	DI	3.4.1.1
DROP13	76PCM03	QID	M76MI0115	TC FEED PUMP NO. 5	RUNNNG	OFF	DI	3.4.1.2
DROP13	76PCM03	QID	M76QI0115B	TC FEED PUMP NO. 5	INCOMP	LOCAL	DI	3.4.1.6
DROP13	76PCM03	QID	M76RI0115	TC FEED PUMP NO. 5	READY	WAIT	DI	3.4.1.7
DROP13	76PCM03	QID	M76UA0115	TC FEED PUMP NO. 5	FAIL	NORMAL	DI	3.4.1.8
DROP13	76PCM03	1C31232G01	M13QG1S1	DPU13 QC HSG1 SL1 QID PS MON	NORMAL	ALARM	DI	3.4.1.16
DROP13	76PCM03	1C31232G01	M13QH1S2	DPU13 QC HSH1 SL2 QID PS MON	NORMAL	ALARM	DI	3.4.2.16

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP16	76PCM06	QBO/G01	M76HS0201	DEWAT CFUGE NO. 1	OFF	RUN	DO	3.1.1.10
DROP16	76PCM06	QBO/G01	M76QS2830	DEWAT CFUGE 1 FERRIC FLOW	OFF	CMPRDY	DO	3.1.1.11
DROP16	76PCM06	QBO/G01	M76QS2556	DEWAT CFUGE 1 INLT SLUDGE TMP	OFF	CMPRDY	DO	3.1.1.12
DROP16	76PCM06	QBO/G01	M76QS2771	DEWAT CFUGE 1 POLYMER INLT FLW	OFF	CMPRDY	DO	3.1.1.13
DROP16	76PCM06	QBO/G01	M76QS2506	DEWAT CFUGE 1 SLUDGE FLOW	OFF	CMPRDY	DO	3.1.1.14
DROP16	76PCM06	QAX/G05	M76AT2558	DEWAT CFUGE 1 SUSPENDED SOLIDS	0	2 GR/L	AI	3.2.2.3
DROP16	76PCM06	QAX/G05	M76VT2557X	DC 1 BEARING 1 VIBRATN X-AXIS	0	3 IN/SEC	AI	3.2.2.4
DROP16	76PCM06	QAX/G05	M76VT2557Y	DC 1 BEARING 1 VIBRATN Y-AXIS	0	3 IN/SEC	AI	3.2.2.5
DROP16	76PCM06	QAX/G05	M76VT2559X	DC 1 BEARING 2 VIBRATN X-AXIS	0	3 IN/SEC	AI	3.2.2.6
DROP16	76PCM06	QAX/G05	M76VT2559Y	DC 1 BEARING 2 VIBRATN Y-AXIS	0	3 IN/SEC	AI	3.2.2.7
DROP16	76PCM06	QID/G03	M76QI0201	DEWATERING CFUGE NO. 1	LOCAL	INCOMP	DI	3.2.9.10
DROP16	76PCM06	QID/G03	M76ZB1558	DC 1 CAKE TO CENTRATE VALVE	NORMAL	CLOSED	DI	3.2.9.11
DROP16	76PCM06	QID/G03	M76ZD1558	DC 1 CAKE TO CENTRATE VALVE	NORMAL	OPENED	DI	3.2.9.12
DROP16	76PCM06	QID/G03	M76ZB1557	DEWAT CFUGE 1 DISCH CAKE GATE	CLOSED	NORMAL	DI	3.2.9.13
DROP16	76PCM06	QID/G03	M76ZD1557	DEWAT CFUGE 1 DISCH CAKE GATE	OPENED	NORMAL	DI	3.2.9.14
DROP16	76PCM06	QAO/G01A	M76FC2506	DC FEED PUMP 1 SPEED DEMAND	0	100 PCT	AO	3.3.4.1
DROP16	76PCM06	QAO/G01A	M76FC2771	DC POLY FD PMP 1 SPEED DEMAND	0	100 PCT	AO	3.3.4.2
DROP16	76PCM06	QAO/G01A	M76TC2556	DC HEAT EXCHANGER 1 VLV POS	0	100 PCT	AO	3.3.4.4
DROP16	76PCM06	QID/G03	M76QI2556	DEWAT CFUGE 1 INLT SLUDGE TMP	LOCAL	INCOMP	DI	3.3.9.9
DROP16	76PCM06	QID/G03	M76TAH2560	DC 1 MOTOR WINDING TEMP	HIGH	NORMAL	DI	3.3.9.10
DROP16	76PCM06	QAX/G05	M76VT2559Z	DC 1 BEARING 2 VIBRATN Z-AXIS	0	3 IN/SEC	AI	3.4.1.5
DROP16	76PCM06	QAX/G05	M76VT2557Z	DC 1 BEARING 1 VIBRATN Z-AXIS	0	3 IN/SEC	AI	3.4.1.6
DROP16	76PCM06	QID/G03	M76QI2771	DEWAT CFUGE 1 POLYMER INLT FLW	LOCAL	INCOMP	DI	3.4.9.3
DROP16	76PCM06	QID/G03	M76QI2506	DEWAT CFUGE 1 SLUDGE FLOW	LOCAL	INCOMP	DI	3.4.9.4



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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP17	76PCM07	QBO	M76QS2806	DC 8 POLYMER INLET FLOW	OFF	CMPRDY	DO	3.1.1.11
DROP17	76PCM07	QBO	M76QS2541	DC 8 SLUDGE FLOW	OFF	CMPRDY	DO	3.1.1.12
DROP17	76PCM07	QBO	M76QS2626	DC 8 INLET SLUDGE TEMP	OFF	CMPRDY	DO	3.1.5.5
DROP17	76PCM07	QBO	M76HS1380A	SCREENING CONVEYOR 1 LIME GATE	OFF	OPEN	DO	3.1.5.14
DROP17	76PCM07	QBO	M76HS1380B	SCREENING CONVEYOR 1 LIME GATE	OFF	CLOSE	DO	3.1.5.15
DROP17	76PCM07	QBO	M76HS1112A	GRIT SEPARATOR 3 GRIT VALVE 2	OFF	OPEN	DO	3.1.9.3
DROP17	76PCM07	QBO	M76HS1112B	GRIT SEPARATOR 3 GRIT VALVE 2	OFF	CLOSE	DO	3.1.9.4
DROP17	76PCM07	QBO	M76HS1381A	SCREENING CONVEYOR 2 LIME GATE	OFF	OPEN	DO	3.1.9.8
DROP17	76PCM07	QBO	M76HS1381B	SCREENING CONVEYOR 2 LIME GATE	OFF	CLOSE	DO	3.1.9.9
DROP17	76PCM07	QAX	M76VT2627X	DC 8 BEARING 1 VIBRATN X-AXIS	0	3 IN/SEC	AI	3.2.1.4
DROP17	76PCM07	QAX	M76VT2627Y	DC 8 BEARING 1 VIBRATN Y-AXIS	0	3 IN/SEC	AI	3.2.1.5
DROP17	76PCM07	QAX	M76VT2629X	DC 8 BEARING 2 VIBRATN X-AXIS	0	3 IN/SEC	AI	3.2.1.6
DROP17	76PCM07	QAX	M76VT2629Y	DC 8 BEARING 2 VIBRATN Y-AXIS	0	3 IN/SEC	AI	3.2.1.7
DROP17	76PCM07	QAX	M76AT2628	DEWAT CFUGE 8 SUSPENDE SOLIDS	0	2 gr/L	AI	3.2.1.8
DROP17	76PCM07	QAX	M76VT2627Z	DC 8 BEARING 1 VIBRATN Z-AXIS	0	3 IN/SEC	AI	3.2.2.5
DROP17	76PCM07	QAX	M76VT2629Z	DC 8 BEARING 2 VIBRATN Z-AXIS	0	3 IN/SEC	AI	3.2.2.6
DROP17	76PCM07	QID	M17QD3S6	DPU17 QC SL6 HSD3 QID PS MON	ALARM	NORMAL	DI	3.2.6.16
DROP17	76PCM07	QID	M17QC4S7	DPU17 QC SL7 HSC4 QID PS MON	ALARM	NORMAL	DI	3.2.7.16
DROP17	76PCM07	QID	M76QI0208	DEWAT CFUGE NO. 8	LOCAL	INCOMP	DI	3.2.8.1
DROP17	76PCM07	QID	M76QI2626	DC 8 INLET SLUDGE TEMP	LOCAL	INCOMP	DI	3.2.8.15
DROP17	76PCM07	QID	M17QD4S8	DPU17 QC SL8 HSD4 QID PS MON	ALARM	NORMAL	DI	3.2.8.16
DROP17	76PCM07	QID	M17QC5S9	DPU17 QC SL9 HSC5 QID PS MON	ALARM	NORMAL	DI	3.2.9.16
DROP17	76PCM07	QID	M76ZD1381	SCREENING CONVEYOR 2 LIME GATE	NORMAL	OPENED	DI	3.2.10.10
DROP17	76PCM07	QID	M76QI1381	SCREENING CONVEYOR 2 LIME GATE	LOCAL	INCOMP	DI	3.2.10.7
DROP17	76PCM07	QID	M76RI1381	SCREENING CONVEYOR 2 LIME GATE	WAIT	READY	DI	3.2.10.8
DROP17	76PCM07	QID	M76ZB1381	SCREENING CONVEYOR 2 LIME GATE	NORMAL	CLOSED	DI	3.2.10.9
DROP17	76PCM07	QID	M76MI0412	SCREENINGS CONVEYOR NO. 2	OFF	RUNNNG	DI	3.2.10.11
DROP17	76PCM07	QID	M76NAH0412	SCREENINGS CONVEYOR NO. 2	NORMAL	HIGH	DI	3.2.10.12
DROP17	76PCM07	QID	M76RI0412	SCREENINGS CONVEYOR NO. 2	WAIT	READY	DI	3.2.10.13
DROP17	76PCM07	QID	M76LAH2381	SCREENINGS HOPPER LEVEL	NORMAL	HIGH	DI	3.2.10.14
DROP17	76PCM07	QID	M17QD5S10	DPU17 QC SL10 HSD5 QID PS MON	ALARM	NORMAL	DI	3.2.10.16
DROP17	76PCM07	QID	M76UA0931	LIME DAY TANK UNLOADING SHAKER	NORMAL	FAIL	DI	3.2.11.15
DROP17	76PCM07	QID	M17QC6S11	DPU17 QC SL11 HSC6 QID PS MON	ALARM	NORMAL	DI	3.2.11.16

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP17	76PCM07	QID	M76ZB0421	SCREENING HOPPER BOMBAY DOORS	NORMAL	CLOSED	DI	3.3.4.9
DROP17	76PCM07	QID	M76ZD0421	SCREENING HOPPER BOMBAY DOORS	NORMAL	OPENED	DI	3.3.4.10
DROP17	76PCM07	QID	M17QF2S4	DPU17 QC SL4 HSF2 QID PS MON	ALARM	NORMAL	DI	3.3.4.16
DROP17	76PCM07	QID	M17QE3S5	DPU17 QC SL5 HSE3 QID PS MON	ALARM	NORMAL	DI	3.3.5.16
DROP17	76PCM07	QID	M17ESL13B	DPU17 SEC 13VDC PS MON	NORMAL	ALARM	DI	3.3.6.12
DROP17	76PCM07	QID	M17ESL13A	DPU17 PRI 13VDC PS MON	NORMAL	ALARM	DI	3.3.6.13
DROP17	76PCM07	QID	M17ESL24B	DPU17 SEC 24VDC PS MON	NORMAL	ALARM	DI	3.3.6.14
DROP17	76PCM07	QID	M17ESL24A	DPU17 PRI 24VDC PS MON	NORMAL	ALARM	DI	3.3.6.15
DROP17	76PCM07	QID	M17QF3S6	DPU17 QC SL6 HSF3 QID PS MON	ALARM	NORMAL	DI	3.3.6.16
DROP17	76PCM07	QID	M17QE4S7	DPU17 QC SL7 HSE4 QID PS MON	ALARM	NORMAL	DI	3.3.7.16
DROP17	76PCM07	QID	M76TAH2630	DC 8 MOTOR WINDING TEMP	HIGH	NORMAL	DI	3.3.8.1
DROP17	76PCM07	QID	M76QI2806	DC 8 POLYMER INLET FLOW	LOCAL	INCOMP	DI	3.3.8.10
DROP17	76PCM07	QID	M76QI2541	DC 8 SLUDGE FLOW	LOCAL	INCOMP	DI	3.3.8.11
DROP17	76PCM07	QID	M17QF4S8	DPU17 QC SL8 HSF4 QID PS MON	ALARM	NORMAL	DI	3.3.8.16
DROP17	76PCM07	QID	M76QI1112	GRIT SEPARATOR 3 GRIT VALVE 2	LOCAL	INCOMP	DI	3.3.9.5
DROP17	76PCM07	QID	M76RI1112	GRIT SEPARATOR 3 GRIT VALVE 2	WAIT	READY	DI	3.3.9.6
DROP17	76PCM07	QID	M76ZB1112	GRIT SEPARATOR 3 GRIT VALVE 2	NORMAL	CLOSED	DI	3.3.9.7
DROP17	76PCM07	QID	M76ZD1112	GRIT SEPARATOR 3 GRIT VALVE 2	NORMAL	OPENED	DI	3.3.9.8
DROP17	76PCM07	QID	M17QE5S9	DPU17 QC SL9 HSE5 QID PS MON	ALARM	NORMAL	DI	3.3.9.16
DROP17	76PCM07	QAX	M76LT2381	SCREENINGS HOPPER LEVEL	0	6	AI	3.4.1.1
DROP17	76PCM07	QID	M76QI1380	SCREENING CONVEYOR 1 LIME GATE	LOCAL	INCOMP	DI	3.4.4.7
DROP17	76PCM07	QID	M76RI1380	SCREENING CONVEYOR 1 LIME GATE	WAIT	READY	DI	3.4.4.8
DROP17	76PCM07	QID	M76ZB1380	SCREENING CONVEYOR 1 LIME GATE	NORMAL	CLOSED	DI	3.4.4.9
DROP17	76PCM07	QID	M76ZD1380	SCREENING CONVEYOR 1 LIME GATE	NORMAL	OPENED	DI	3.4.4.10
DROP17	76PCM07	QID	M17QH2S4	DPU17 QC SL4 HSH2 QID PS MON	ALARM	NORMAL	DI	3.4.4.16
DROP17	76PCM07	QID	M17QG3S5	DPU17 QC SL8 HSD4 QID PS MON	ALARM	NORMAL	DI	3.4.5.16
DROP17	76PCM07	QID	M17QG4S7	DPU17 QC SL7 HSG4 QID PS MON	ALARM	NORMAL	DI	3.4.7.16

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP17	76PCM07	QID	M76MI0901	LIME DAY TNK DUST COLLECTR FAN	OFF	RUNNNG	DI	3.4.8.3
DROP17	76PCM07	QID	M76QI0901	LIME DAY TNK DUST COLLECTR FAN	LOCAL	INCOMP	DI	3.4.8.4
DROP17	76PCM07	QID	M76RI0901	LIME DAY TNK DUST COLLECTR FAN	WAIT	READY	DI	3.4.8.5
DROP17	76PCM07	QID	M76LAH9301	LIME DAY TANK LEVEL SWITCHES	NORMAL	HIGH	DI	3.4.8.6
DROP17	76PCM07	QID	M76LAL9301	LIME DAY TANK LEVEL SWITCHES	NORMAL	LOW	DI	3.4.8.7
DROP17	76PCM07	QID	M76LAM9301	LIME DAY TANK LEVEL SWITCHES	NORMAL	MID	DI	3.4.8.8
DROP17	76PCM07	QID	M76ZI9301	LIME DAY TANK LEVEL SWITCHES	NORMAL	OPENED	DI	3.4.8.9
DROP17	76PCM07	QID	M76MI0921	LIME DAY TANK UNLOADING SHAKER	OFF	RUNNNG	DI	3.4.8.10
DROP17	76PCM07	QID	M76MI0931	LIME DAY TANK UNLOADING SHAKER	OFF	RUNNNG	DI	3.4.8.11
DROP17	76PCM07	QID	M76QI0921	LIME DAY TANK UNLOADING SHAKER	LOCAL	INCOMP	DI	3.4.8.12
DROP17	76PCM07	QID	M76QI0931	LIME DAY TANK UNLOADING SHAKER	LOCAL	INCOMP	DI	3.4.8.13
DROP17	76PCM07	QID	M76RI0921	LIME DAY TANK UNLOADING SHAKER	WAIT	READY	DI	3.4.8.14
DROP17	76PCM07	QID	M76RI0931	LIME DAY TANK UNLOADING SHAKER	WAIT	READY	DI	3.4.8.15
DROP17	76PCM07	QID	M17QH4S8	DPU17 QC SL8 HSH4 QID PS MON	ALARM	NORMAL	DI	3.4.8.16

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP18	76PCM08	QID	M18QA1S1	DPU18 QC SL1 HSA1 QID PS MON	ALARM	NORMAL	DI	3.1.1.16
DROP18	76PCM08	QID	M18QB1S2	DPU18 QC SL2 HSB1 QID PS MON	ALARM	NORMAL	DI	3.1.2.16
DROP18	76PCM08	QID	M18QA2S3	DPU18 QC SL3 HSA2 QID PS MON	ALARM	NORMAL	DI	3.1.3.16
DROP18	76PCM08	QID	M18QB2S4	DPU18 QC SL4 HSB2 QID PS MON	ALARM	NORMAL	DI	3.1.4.16
DROP18	76PCM08	QID	M18QA3S5	DPU18 QC SL5 HSA3 QID PS MON	ALARM	NORMAL	DI	3.1.5.16
DROP18	76PCM08	QBO	M76HS0401	SCREEN NO. 1	OFF	RUN	DO	3.1.9.9
DROP18	76PCM08	QBO	M76HS1308A	SCREEN1 SCREENING DIVERTR GATE	OFF	OPEN	DO	3.1.9.10
DROP18	76PCM08	QBO	M76HS1308B	SCREEN1 SCREENING DIVERTR GATE	OFF	CLOSE	DO	3.1.9.11
DROP18	76PCM08	QBO	M76HS1309A	SCREEN 1 SOLIDS DISCH VALVE	OFF	OPEN	DO	3.1.9.12
DROP18	76PCM08	QBO	M76HS1309B	SCREEN 1 SOLIDS DISCH VALVE	OFF	CLOSE	DO	3.1.9.13
DROP18	76PCM08	QAX	M76PT9041A	SCREEN NO. 1 PRESS	0	20 PSIG	AI	3.2.1.1
DROP18	76PCM08	QAX	M76PT9041B	SCREEN NO. 1 PRESS	0	20 PSIG	AI	3.2.1.2
DROP18	76PCM08	QID	M18QD1S2	DPU18 QC SL2 HSD1 QID PS MON	ALARM	NORMAL	DI	3.2.2.16
DROP18	76PCM08	QID	M18QD2S4	DPU18 QC SL4 HSD12QID PS MON	ALARM	NORMAL	DI	3.2.4.16
DROP18	76PCM08	QID	M18QC3S5	DPU18 QC SL5 HSC3 QID PS MON	ALARM	NORMAL	DI	3.2.5.16
DROP18	76PCM08	QID	M18QE1S1	DPU18 QC SL1 HSE1 QID PS MON	ALARM	NORMAL	DI	3.3.1.16
DROP18	76PCM08	QID	M18QF1S2	DPU18 QC SL2 HSF1 QID PS MON	ALARM	NORMAL	DI	3.3.2.16
DROP18	76PCM08	QID	M18QE2S3	DPU18 QC SL3 HSE2 QID PS MON	ALARM	NORMAL	DI	3.3.3.16
DROP18	76PCM08	QID	M18QF2S4	DPU18 QC SL4 HSF2 QID PS MON	ALARM	NORMAL	DI	3.3.4.16
DROP18	76PCM08	QID	M18QE3S5	DPU18 QC SL5 HSE3 QID PS MON	ALARM	NORMAL	DI	3.3.5.16
DROP18	76PCM08	QID	M18ESL13B	DPU18 SEC 13VDC PS MON	NORMAL	ALARM	DI	3.3.6.12
DROP18	76PCM08	QID	M18ESL13A	DPU18 PRI 13VDC PS MON	NORMAL	ALARM	DI	3.3.6.13
DROP18	76PCM08	QID	M18ESL24B	DPU18 SEC 24VDC PS MON	NORMAL	ALARM	DI	3.3.6.14
DROP18	76PCM08	QID	M18ESL24A	DPU18 PRI 24VDC PS MON	NORMAL	ALARM	DI	3.3.6.15
DROP18	76PCM08	QID	M18QF3S6	DPU18 QC SL6 HSF3 QID PS MON	ALARM	NORMAL	DI	3.3.6.16

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP18	76PCM08	QID	M76AI9081	SCREEN 1 SLUDGE PROBE	NORMAL	BRKTHR	DI	3.4.1.1
DROP18	76PCM08	QID	M76MI0401	SCREEN NO. 1	OFF	RUNNNG	DI	3.4.1.2
DROP18	76PCM08	QID	M76NAH0401	SCREEN NO. 1	NORMAL	HIGH	DI	3.4.1.3
DROP18	76PCM08	QID	M76QI0401	SCREEN NO. 1	NORMAL	INCOMP	DI	3.4.1.4
DROP18	76PCM08	QID	M76QI1308	SCREEN1 SCREENING DIVERTR GATE	NORMAL	INCOMP	DI	3.4.1.5
DROP18	76PCM08	QID	M76QI1309	SCREEN 1 SOLIDS DISCH VALVE	NORMAL	INCOMP	DI	3.4.1.6
DROP18	76PCM08	QID	M76RI0401	SCREEN NO. 1	WAIT	READY	DI	3.4.1.7
DROP18	76PCM08	QID	M76RI1308	SCREEN1 SCREENING DIVERTR GATE	WAIT	READY	DI	3.4.1.8
DROP18	76PCM08	QID	M76RI1309	SCREEN 1 SOLIDS DISCH VALVE	WAIT	READY	DI	3.4.1.9
DROP18	76PCM08	QID	M76ZB1305	SCREEN 1 ISOLATION VALVE	NORMAL	CLOSED	DI	3.4.1.10
DROP18	76PCM08	QID	M76ZB1308	SCREEN1 SCREENING DIVERTR GATE	NORMAL	CLOSED	DI	3.4.1.11
DROP18	76PCM08	QID	M76ZB1309	SCREEN 1 SOLIDS DISCH VALVE	NORMAL	CLOSED	DI	3.4.1.12
DROP18	76PCM08	QID	M76ZD1305	SCREEN 1 ISOLATION VALVE	NORMAL	OPENED	DI	3.4.1.13
DROP18	76PCM08	QID	M76ZD1308	SCREEN1 SCREENING DIVERTR GATE	NORMAL	OPENED	DI	3.4.1.14
DROP18	76PCM08	QID	M76ZD1309	SCREEN 1 SOLIDS DISCH VALVE	NORMAL	OPENED	DI	3.4.1.15
DROP18	76PCM08	QID	M18QG1S1	DPU18 QC SL1 HSG1 QID PS MON	ALARM	NORMAL	DI	3.4.1.16
DROP18	76PCM08	QID	M18QH1S2	DPU18 QC SL2 HSH1 QID PS MON	ALARM	NORMAL	DI	3.4.2.16
DROP18	76PCM08	QID	M18QG2S3	DPU18 QC SL3 HSG2 QID PS MON	ALARM	NORMAL	DI	3.4.3.16
DROP18	76PCM08	QID	M18QH2S4	DPU18 QC SL4 HSH2 QID PS MON	ALARM	NORMAL	DI	3.4.4.16
DROP18	76PCM08	QID	M18QG3S5	DPU18 QC SL5 HSG3 QID PS MON	ALARM	NORMAL	DI	3.4.5.16

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP29	94PCM01	QID	M29QA5S9	DPU29 QC SL9 HSA5 QID PS MON	ALARM	NORMAL	DI	3.1.9.16
DROP29	94PCM01	QID	M29QB5S10	DPU29 QC SL10 HSB5 QID PS MON	ALARM	NORMAL	DI	3.1.10.16
DROP29	94PCM01	QID	M29QA6S11	DPU29 QC SL11 HSA6 QID PS MON	ALARM	NORMAL	DI	3.1.11.16
DROP29	94PCM01	QID	M29QB6S12	DPU29 SLOT 12 HS B6 QID PWR MN	ALARM	NORMAL	DI	3.1.12.16
DROP29	94PCM01	QID	M29QC5S9	DPU29 QC SL9 HSC5 QID PS MON	ALARM	NORMAL	DI	3.2.9.16
DROP29	94PCM01	QID	M29QD5S10	DPU29 QC SL10 HSD5 QID PS MON	ALARM	NORMAL	DI	3.2.10.16
DROP29	94PCM01	QID	M29QC6S11	DPU29 QC SL11 HSC6 QID PS MON	ALARM	NORMAL	DI	3.2.11.16
DROP29	94PCM01	QID	M29QD6S12	DPU29 QC SL12 HSD6 QID PS MON	ALARM	NORMAL	DI	3.2.12.16
DROP29	94PCM01	QID	M29QE5S9	DPU29 QC SL9 HSE5 QID PS MON	ALARM	NORMAL	DI	3.3.9.16
DROP29	94PCM01	QID	M29QF5S10	DPU29 QC SL10 HSF5 QID PS MON	ALARM	NORMAL	DI	3.3.10.16
DROP29	94PCM01	QID	M29ESL13A	DPU29 PRI 13VDC PS MON	NORMAL	ALARM	DI	3.3.11.12
DROP29	94PCM01	QID	M29ESL13B	DPU29 SEC 13VDC PS MON	NORMAL	ALARM	DI	3.3.11.13
DROP29	94PCM01	QID	M29ESL24A	DPU29 PRI 24VDC PS MON	NORMAL	ALARM	DI	3.3.11.14
DROP29	94PCM01	QID	M29ESL24B	DPU29 SEC 24VDC PS MON	NORMAL	ALARM	DI	3.3.11.15
DROP29	94PCM01	QID	M29QE6S11	DPU29 QC SL11 HSE6 QID PS MON	ALARM	NORMAL	DI	3.3.11.16
DROP29	94PCM01	QID	M29QF6S12	DPU29 QC SL12 HSF6 QID PS MON	ALARM	NORMAL	DI	3.3.12.16
DROP29	94PCM01	QID	M29QG3S5	DPU29 QC SL5 HSG3 QID PS MON	ALARM	NORMAL	DI	3.4.5.16
DROP29	94PCM01	QID	M29QH3S6	DPU29 QC SL6 HSH3 QID PS MON	ALARM	NORMAL	DI	3.4.6.16
DROP29	94PCM01	QID	M29QH4S8	DPU29 QC SL8 HSH4 QID PS MON	ALARM	NORMAL	DI	3.4.8.16

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP30	94PCM02	QID	M30QD4S8	DPU30 QC SL8 HSD4 QID PS MON	ALARM	NORMAL	DI	3.2.8.16
DROP30	94PCM02	QID	M30QC5S9	DPU30 QC SL9 HSC5 QID PS MON	ALARM	NORMAL	DI	3.2.9.16
DROP30	94PCM02	QID	M30QD5S10	DPU30 QC SL10 HSD5 QID PS MON	ALARM	NORMAL	DI	3.2.10.16
DROP30	94PCM02	QID	M30QC6S11	DPU30 QC SL11 HSC6 QID PS MON	ALARM	NORMAL	DI	3.2.11.16
DROP30	94PCM02	QID	M30QD6S12	DPU30 QC SL12 HSD6 QID PS MON	ALARM	NORMAL	DI	3.2.12.16
DROP30	94PCM02	QID	M30QF4S8	DPU30 QC SL8 HSF4 QID PS MON	ALARM	NORMAL	DI	3.3.8.16
DROP30	94PCM02	QID	M30QE5S9	DPU30 QC SL9 HSE5 QID PS MON	ALARM	NORMAL	DI	3.3.9.16
DROP30	94PCM02	QID	M30QF5S10	DPU30 QC SL8 HSF5 QID PS MON	ALARM	NORMAL	DI	3.3.10.16
DROP30	94PCM02	QID	M30ESL13A	DPU30 PRI 13VDC PS MON	NORMAL	ALARM	DI	3.3.11.12
DROP30	94PCM02	QID	M30ESL13B	DPU30 SEC 13VDC PS MON	NORMAL	ALARM	DI	3.3.11.13
DROP30	94PCM02	QID	M30ESL24A	DPU30 PRI 24VDC PS MON	NORMAL	ALARM	DI	3.3.11.14
DROP30	94PCM02	QID	M30ESL24B	DPU30 SEC 24VDC PS MON	NORMAL	ALARM	DI	3.3.11.15
DROP30	94PCM02	QID	M30QE6S11	DPU30 QC SL11 HSE6 QID PS MON	ALARM	NORMAL	DI	3.3.11.16
DROP30	94PCM02	QID	M30QF6S12	DPU30 QC SL12 HSF6 QID PS MON	ALARM	NORMAL	DI	3.3.12.16
DROP30	94PCM02	QID	M30QG2S3	DPU30 QC SL3 HSG2 QID PS MON	ALARM	NORMAL	DI	3.4.3.16

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP32	80PCM01	QLC	M80MV1151	DIG 1 AXIAL PUMP 1 NOZZLE VLV 1 DATA			SERIAL	3.2.3
DROP32	80PCM01	QLC	M80MV1161	DIG 1 AXIAL PUMP 2 NOZZLE VLV 1 DATA			SERIAL	3.2.3
DROP32	80PCM01	QLC	M80MV1171	DIG 1 AXIAL PUMP 3 NOZZLE VLV 1 DATA			SERIAL	3.2.3
DROP33	80PCM02	QLC	M80MV1251	DIG 2 AXIAL PUMP 1 NOZZLE VLV 1 DATA			SERIAL	3.2.5
DROP33	80PCM02	QLC	M80MV1261	DIG 2 AXIAL PUMP 2 NOZZLE VLV 1 DATA			SERIAL	3.2.5
DROP33	80PCM02	QLC	M80MV1271	DIG 2 AXIAL PUMP 3 NOZZLE VLV 1 DATA			SERIAL	3.2.5
DROP35	80PCM03	QLC	M80MV1351	DIG 3 AXIAL PUMP 1 NOZZLE VLV 1 DATA			SERIAL	3.3.7
DROP35	80PCM03	QLC	M80MV1361	DIG 3 AXIAL PUMP 2 NOZZLE VLV 1 DATA			SERIAL	3.3.7
DROP35	80PCM03	QLC	M80MV1371	DIG 3 AXIAL PUMP 3 NOZZLE VLV 1 DATA			SERIAL	3.3.7

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DCU	PCM Cabinet	Card Type	Tag	Loop Title	Zero State	One State	Type	Existing Location
DROP38	80PCM05	QID	M38QA6S11	DPU38 QC SL11 HSA6 QID PS MON	ALARM	NORMAL	DI	3.1.11.16
DROP38	80PCM05	QID	M38QB6S12	DPU38 QC SL12 HSB6 QID PS MON	ALARM	NORMAL	DI	3.1.12.16
DROP38	80PCM05	QID	M38QC6S11	DPU38 QC2 SL11 HSB6 QID PS MON	ALARM	NORMAL	DI	3.2.11.16
DROP38	80PCM05	QID	M38QD6S12	DPU38 QC SL12 HSD6 QID PS MON	ALARM	NORMAL	DI	3.2.12.16
DROP38	80PCM05	QID	M38QE6S11	DPU38 QC SL11 HSE6 QID PS MON	ALARM	NORMAL	DI	3.3.11.16
DROP38	80PCM05	QID	M38ESL24B	DPU38 SEC 24VDC PS MON	ALARM	NORMAL	DI	3.3.12.12
DROP38	80PCM05	QID	M38ESL24A	DPU38 PRI 24VDC PS MON	ALARM	NORMAL	DI	3.3.12.13
DROP38	80PCM05	QID	M38ESL13B	DPU38 SEC 13VDC PS MON	ALARM	NORMAL	DI	3.3.12.14
DROP38	80PCM05	QID	M38ESL13A	DPU38 PRI 13VDC PS MON	ALARM	NORMAL	DI	3.3.12.15
DROP38	80PCM05	QID	M38QF6S12	DPU38 QC SL12 HSF6 QID PS MON	ALARM	NORMAL	DI	3.3.12.16



**SECTION 44 22 24 <sup>[ADD 1]</sup>**  
**DEWATERING CENTRIFUGES**

**EQUIPMENT NAME AND COMPONENT(S)**

76-DC-01:	Dewatering Centrifuge 1.
76-DC-01.LCP:	Dewatering Centrifuge 1 Control Panel.
76-DC-01.VFD:	Dewatering Centrifuge 1 VFD Panel.
76-DC-08:	Dewatering Centrifuge 8.
76-DC-08.LCP:	Dewatering Centrifuge 8 Control Panel.
76-DC-08.VFD:	Dewatering Centrifuge 8 VFD Panel.

**PART 1 GENERAL**

1.01 WORK OF THIS SECTION

- A. This section covers the work necessary to provide two dewatering centrifuges, two centrifuge control panels, two variable frequency drive (VFD) control panels, and all appurtenances as specified herein.

1.02 GENERAL

- A. **Unit Responsibility:** A single centrifuge manufacturer shall be responsible for supplying the dewatering centrifuges, complete with all accessories and appurtenances (including, but not necessarily limited to, electric motors, VFDs, control panels, VFD panels, shafting, safety guards, speed reducers, and spare parts) and for the design, assembly, delivery, installation supervision, startup, and testing of the centrifuges. The centrifuge manufacturer shall furnish all components and accessories of the system to enhance compatibility, ease of operation and maintenance, and as necessary to place the equipment in operation in conformance with the specified performance, features, and functions. The centrifuges shall be produced and assembled by the manufacturer at a facility owned and operated by the manufacturer and under the direct supervision and control of the manufacturer.
- B. Like items of equipment provided hereunder shall be the end products of one manufacturer in order to achieve standardization for operation, maintenance, spare parts, and manufacturers' services.
- C. **General Requirements:** See Division 1, General Requirements, which contains information and requirements that apply to the Work specified herein and are mandatory for this Project.

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- D. The control functions contained and described herein are intended to provide proposed minimum performance requirements. They do not necessarily identify each and every control function, connection, communications, or equipment to achieve the requirements. Additional specificity and details shall be coordinated at time of submittals.

1.03 REFERENCES

- A. The following is a list of standards which may be referenced in this section:

1. American Bearing Manufacturers Association (ABMA).
2. American Gear Manufacturers Association (AGMA).
3. American National Standards Institute (ANSI).
4. American Society of Mechanical Engineers (ASME): PTC-36, Measurement of Industrial Sound.
5. American Welding Society (AWS).
6. ASTM International (ASTM): G65, Procedure A, Standard Practice for Conducting Dry Sand/Rubber Wheel Abrasion Tests.
7. British Standards Institute (BSI): BS 5490.
8. German Industrial Standards (DIN).
9. Institute of Electrical and Electronics Engineers (IEEE).
10. Instrument Society of American (ISA).
11. National Electric Code (NEC).
12. National Electrical Manufacturers Association (NEMA): MG - Motors and Generators.
13. Occupational Safety and Health Act (OSHA).
14. Society of Protective Coatings (SSPC).
15. UL.

1.04 SUBMITTALS

- A. Submittals shall be made in accordance with Section 01 33 00, Submittal Procedures. In addition, the following specific information shall be provided:

- B. Action Submittals

1. Shop Drawings:
  - a. Documentation of modifications to the manufacturer's standard design to meet the requirements specified in this section.
  - b. Document where the manufacturer's design does not comply with the specified performance, features, functions, and materials of construction specified herein by submitting a copy of this specification with notation of the specific clarifications, deviations, substitutions, and exceptions to the specification.
  - c. Bill of materials listing major system components, special tools, spare parts, and part number of each component and spare part.

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- Include make, model, weight, and horsepower of each equipment assembly.
- d. List of submitted centrifuge model reference installations including location, sludge stream, number of units, starting date of operation, and reference contact information.
  - e. Manufacturer's catalog information, descriptive literature, specifications, and identification of materials of construction for the centrifuge, drive motor, backdrive motor, variable frequency drives, control panels, VFD control panels, power supply, lubrication system, and flexible connectors. Provide listing of materials of construction to match the listing in Paragraph Materials of Construction.
  - f. Data on the characteristics and performance of the units to indicate ability to meet the system performance specified herein, including backdrive gear box rated torque capacity and torque capacity required to meet performance requirements.
  - g. Certified general arrangement and dimensional drawings.
  - h. Detailed structural, mechanical, electrical, and instrumentation drawings showing equipment fabrications, arrangements, components, and interfaces with all equipment that are coordinated with and compatible with existing as-built drawings. Include dimensions, descriptions, materials, quantities, and other information for a complete system.
  - i. Detailed structural, mechanical, electrical, and instrumentation drawings showing the equipment fabrications, arrangements, components, and interfaces. Include:
    - 1) Dimensions, size, and locations of connections to other work, and weights of equipment associated therewith.
    - 2) Weights of individual pieces of equipment and live (dynamic loads) created by the total weight of each centrifuge and ancillary equipment.
    - 3) Scroll hard surfacing materials and coverage.
    - 4) Sizes and locations of space for incoming and outgoing conduits.
    - 5) Minimum clearance distances around equipment required to access equipment for service/repair/removal.
    - 6) Control and VFD panel drawings showing panel size and sizes and locations of raceway connections.
  - j. Outside utility requirements such as air, water, power, drain, etc., for each component.
  - k. Calculated AFBMA L-10 bearing life or DIN ISO 281 L-10 bearing life, and type of lubrication recommended for all equipment.

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- l. Design data for the following:
  - 1) Main drive motor sizing.
  - 2) Backdrive motor sizing.
  - 3) Adjustable frequency drive sizing.
  - 4) Maximum measured sound power levels, octave frequency band data at 3 feet, all sides of equipment.
  - 5) Heat generation for panels.
- m. Motor submittals in conformance with Section 26 20 00, Low-Voltage AC Induction Motors.
- n. VFD submittals in conformance with Section 26 29 23, Low-Voltage Variable Frequency Drive System.
- o. Certificate(s) demonstrating that the centrifuge production and assembly facilities are currently ISO 9001 certified.
- p. Functional description of internal and external instrumentation and controls to be supplied including list of parameters monitored, controlled, or alarmed.
- q. Sequential description of operation under various modes of control, describing the complete control circuit and equipment operation and logic, including interlocks and permissives.
- r. Description of all automatic shutdown features and interfaces with the plant instrumentation and control systems, in both word and schematic form. Standard Instrument Society of America symbols shall be used on all schematics.
- s. Centrifuge Control Panel and VFD Control Panel interconnection diagrams showing wiring interconnections between all centrifuge system components and between centrifuge system components and remote components provided by others. Include MCA (minimum circuit amps) and MOCP (maximum overcurrent protection) information.
- t. Centrifuge Control Panel and VFD Control Panel Elevation Drawings showing construction and placement of operator interface devices and other elements.
- u. Instrumentation and Control Submittals: In conformance with Section 40 99 90, Package Control Systems.
- v. VFD submittals including electronic downloadable backup copies and pdf copies of VFD configuration files.
- w. Power and control wiring diagrams including terminals and numbers.
- x. Shop and Field Painting Systems: Include Manufacturer's descriptive technical catalog literature and specifications, and hazardous communication data sheets.
- y. Seismic anchorage and bracing data sheets and drawings as required by Section 01 88 15, Anchorage and Bracing.
- z. Manufacturer's required alignment tolerances and method for achieving alignment tolerances.

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2. Samples:
  - a. Submit the following items with Shop Drawings:
    - 1) Scroll abrasive resistant tile, quantity of two.
- C. Informational Submittals:
  1. Factory Quality Control Submittals:
    - a. Obtain Engineer's review and approval of the information listed below prior to equipment shipment.
    - b. Manufacturer's Certificate of Compliance.
    - c. Factory test results, reports, and certifications. Include:
      - 1) Vibration Test Reports and Certificates.
      - 2) Noise Test Reports and Certificates.
      - 3) For each ac motor, provide a certified copy of a test report for an identical motor tested in accordance with NEMA MG 1-12.53a and IEEE Standard 112, Test Method B. The test report shall show full-load efficiency and power factor meeting or exceeding the specified minimum guaranteed values. Motors not as specified will be rejected.
      - 4) Certified Scratch Abrasion Test results of the abrasion protection tiles.
    - d. Submit certified copies of mill test results for the stainless steel castings and abrasion-resistant materials to be used. The test reports shall certify that the materials supplied are in accordance with the applicable standards and shall include:
      - 1) The actual material analysis.
      - 2) Applicable standards.
      - 3) Date of manufacture.
      - 4) Place of manufacture.
      - 5) Manufacturer's name.
      - 6) Markings on the materials to denote the batch number.
      - 7) Mechanical property test for rotating parts.
    - e. Test results of the control and VFD control panels for proper operation, construction, electrical connection, and function.
    - f. Test results of controls interface with PCS programmed by Owner Software Integrator.
    - g. Shipping, storage and protection, and handling instructions.
    - h. Design calculations for items covered by these Shop Drawings. Calculations shall show design stresses in structural members and connections for loading combinations.
    - i. Seismic anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
    - j. Manufacturer's written/printed installation instructions.
    - k. Routine maintenance requirements prior to plant startup.

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- l. Spare parts list as specified in Section 01 33 00, Submittal Procedures.
    - m. Special tools list as specified in Section 01 33 00, Submittal Procedures.
  2. Operation and Maintenance Manual with Maintenance Summary Form shall be provided in accordance with Section 01 78 23, Operation and Maintenance Data, and the following requirements:
    - a. Operation, maintenance, recommended spare parts, and renewal parts information for all equipment furnished under this section.
    - b. Set of complete as-reviewed Shop Drawing submittals.
    - c. As-built electric and instrumentation and control wiring diagrams and equipment drawings.
    - d. Index of all equipment suppliers listing current names, addresses, and telephone numbers of those who should be contacted for service, information, and assistance.
    - e. Detailed operational procedures including step-by-step startup, normal operation, shutdown, and troubleshooting procedures.
    - f. Detailed preventative maintenance requirements and recommended schedule.
    - g. Listing of normal values and abnormal value settings for all monitored vibration and bearing temperatures.
    - h. Bill of materials for all components, including part numbers, description, manufacturer, quantity, and seller.
  3. Equipment Field Quality Control Testing Procedure Submittals:
    - a. Centrifuge manufacturer shall submit test procedures for the following tests for review, comment, and approval at least 30 days in advance of the notice to conduct the specific testing:
      - 1) Functional Testing.
      - 2) Pre-Performance Testing.
      - 3) Performance Testing.
      - 4) Optimization Assistance.
  4. Field Quality Control Submittals:
    - a. Obtain Engineer's review and approval of the information listed below prior to project completion. Centrifuge manufacturer shall submit test reports within 20 days after completing field testing.
    - b. Field test results, reports, and certifications. Include:
      - 1) Functional Test Report and Certificates.
      - 2) Pre-Performance Test Report and Certificates.
      - 3) Performance Test Report and Certificates.
      - 4) Optimization Assistance results.
      - 5) Vibration Test Report summarizing readings on the HMI screen during field testing.

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1.05 EXTRA MATERIALS

A. Spare Parts and Special Tools:

<u>Item</u>	<u>Quantity</u>
Plate Dams	One complete set per centrifuge
Drive Belts	Two complete sets
Main Bearings	Two complete sets
Scroll Conveyor Bearings	Two complete sets
Thrust Bearings, Seals, and Lock Washers	Two complete sets
Gaskets, O-rings, and Seals	Two complete sets
Speed Proximity Sensors	Two complete sets
Scroll Conveyor Tiles	One Hundred (100)
Replacement Indicating Lamps	One complete set

B. Special Tools and Accessories: Provide manufacturer’s recommended special tools and accessories beyond those specified above as required to install, startup, and commission the centrifuge including but not limited to, bowl lifter, conveyor lifter and bowl truck.

C. Lubricants: All necessary lubricants shall be provided for the initial startup of the centrifuges. Lubricants and filters shall be provided and changed by the manufacturer as frequent as required during the period between successfully completed functional testing and equipment acceptance, up to a maximum period of 12 months. New lubricants and filters shall be provided and be put into the equipment by manufacturer at Substantial Completion.

D. Delivery: In accordance with Section 01 61 00, Common Product Requirements.

1.06 SAFETY REQUIREMENTS

A. All equipment furnished shall be designed and manufactured with due regard to safety of operation, accessibility, and durability of parts, and shall comply with all applicable Occupational Health and Safety Act, federal, state, and local safety regulations.

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1.07 EXTENDED WARRANTY

- A. Provide manufacturer's extended guarantee or warranty, with Owner named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or removal and replacement of the portion of the Work provided under this Specification (including but not limited to the centrifuges, drive motors, gearboxes, control panels, VFD control panels, and VFDs) found defective during a warranty period of 2 years past the normal one year warranty period. With the exception of warranty period, all other requirements specified in Article 36 of the General Conditions remain in effect. Duties and obligations for correction or removal and replacement of defective Work shall be as specified in the General Conditions.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. Each centrifuge system shall consist of a solid bowl, horizontal, continuous feed, scroll type unit, specifically designed to handle the sludges specified herein. Each unit shall be capable of continuous operations with a minimum of maintenance.
- B. Each centrifuge system shall be equipped with:
1. Variable frequency drive electric main drive motor assembly.
  2. Belt guards.
  3. Variable frequency drive electric backdrive motor assembly.
  4. Automatic lubrication system for the rotating assembly's main bearings.
  5. Vibration isolators.
  6. Flexible connectors.
  7. Centrate sampling provisions.
  8. Dewatered cake sampling provisions.
  9. Control panel and VFD control panel and instrumentation and controls specified herein.
  10. Centrifuge main drive and backdrive adjustable frequency drives.

2.02 MANUFACTURER

- A. The centrifuge manufacturer shall have at least 10 years' experience in the design, application, and supply of centrifuges for dewatering of sewage sludge from municipal sewage treatment works. Centrifuge manufacturer's production and assembly facilities shall be ISO 9001 certified.
- B. The centrifuge manufacturer shall have provided centrifuges with a minimum bowl diameter of 28.35 inches at a minimum of five municipal wastewater sludge dewatering reference installations in North America, with each unit



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operational for a minimum of 5 years. Centrifuge manufacturers not meeting the above minimum reference installation requirement shall not be acceptable. Submit list of reference installations including model number, location, sludge stream, number of units, starting date of operation, and reference contact information.

- C. Modifications to Standard Equipment Model Offerings: Equipment provided shall be furnished, modified as necessary, to conform to the performance, functions, features, and materials of construction as specified herein.
- D. The dewatering centrifuges shall be from the following listed manufacturers:
  - 1. Alfa Laval, Inc. Model G3-125.
  - 2. No accepted substitution.

2.03 SERVICE CONDITIONS

- A. The centrifuges, motors, auxiliary equipment, and appurtenances shall be suitable for exposure to continuous 95 percent relative humidity conditions, for operation in ambient air temperature from 55 degrees F to 104 degrees F, and for exposure to intermittent water or sludge splash and spill conditions.
- B. The centrifuge control panels, centrifuge VFD control panels, and appurtenances will be located in an electrical room separate from the centrifuge process space and shall be suitable for exposure to continuous 95 percent relative humidity conditions, for continuous operation in ambient air temperature from 55 degrees F to 95 degrees F.
- C. The material to be dewatered will be digested sludge resulting from anaerobic digestion of thickened waste activated sludge (WAS) and primary sludge (PS) resulting from biological treatment of municipal wastewater preceded by primary clarification. Performance requirements to be confirmed via the field performance testing specified herein shall be conducted on the following sludge stream:

<b>Parameter</b>	<b>Digested Sludge</b>
Nominal Sludge Composition, Total Dry Solids Weight Basis	65% PS / 35% WAS to 80% PS / 20% WAS
Sludge Feed Concentration, % Total Dry Solids Exclusive of Polymer Solution	1.5 to 3.0 (2.3% average)

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Parameter	Digested Sludge
Sludge Volatile Solids Concentration, % Volatile Solids Dry Weight Basis	52 to 73
Sand Content (mg/L) based on previous field testing at the MBC. Alfa Laval shall provide the best available hard surfacing including the full tungsten carbide feed zone to minimize wear based on sand content	50-60

2.04 PERFORMANCE REQUIREMENTS

- A. Each centrifuge shall continuously receive, condition, and dewater the feed sludges specified herein, and continuously discharge the dewatered solids into an existing piston cake pump. Each unit shall be able to operate continuously on demand; shall be suitable for dewatering the specified sludges continuously for up to 24 hours per day, 7 days per week; and shall operate without spillage of sludge beyond the nominal solids discharge chute and piping envelope or spillage of centrate beyond the liquid (centrate) discharge chute and piping envelope.
- B. Manufacturer shall guarantee that the centrifuges shall be capable of the minimum performance requirements specified below, to be confirmed via the field performance testing specified herein. Feed hydraulic loading rates for sludge dry solids concentrations between points specified will be linearly interpolated between the points specified (i.e., maintaining the specified feed dry solids loading rates).

Parameter	Digested Sludge Guaranteed Performance Normal Operation	Machine Sizing Throughput Criteria
Feed Solids Loading Rate <sup>(1)</sup> , lbs/hr, Total Dry Solids (DS) Basis	2,500	4,600
Feed Hydraulic Loading Rates <sup>(1)</sup> , gpm	278 @ 1.8% DS 217 @ 2.3% DS 200 @ 2.5% DS	400 @ 2.3% DS 306 @ 3.0% DS 263 @ 3.5% DS

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Parameter	Digested Sludge Guaranteed Performance Normal Operation	Machine Sizing Throughput Criteria
Minimum Dewatered Cake Concentration <sup>(2)</sup> , % Total Dry Solids	28	Range 26 to 32
Minimum Total Solids Capture <sup>(3)</sup> , %	95	Range 92 to 96
Maximum Polymer Dose <sup>(2)</sup> , lbs Active per Dry Ton of Feed Solids	20	Range 15 to 30
Notes: (1) The range of feed hydraulic loading rates are calculated based on the total dry solids dry mass loading rate at the expected range of total dry solids concentrations, and are exclusive of polymer solution. (2) Performance Testing results shall be no greater than a 5% deviation from the value specified above (i.e., less than the minimum or greater than the maximum), with the average of test results rounded to one decimal place. Assumes use of the existing Mannich polymer. (3) Performance Testing results shall be no greater than a 2.5% deviation from the value specified above (i.e., less than the minimum), with the average of test results rounded to one decimal place.		

- C. The goal of the specified Optimization Assistance is to minimize polymer dose and electrical use and maximize cake solids and solids capture efficiency of the centrifuge. This will reduce the Owner’s operating cost of sludge dewatering. Optimization Assistance shall be performed after equipment acceptance.

Solids Capture:

$$\% \text{ Capture} = \frac{T}{F} \times \frac{F - C}{T - C} \times 100$$

where: T = Cake total solids concentration (mg/L).

F = Feed sludge total solids concentration, excluding any dilution due to polymer solution addition (mg/L).

C = Centrate total suspended solids concentration, excluding any dilution due to polymer solution addition and centrifuge purge water (mg/L).

- D. Polymer: Make-down of a polymer solution will be from only liquid solution Mannich polymers. Centrifuge manufacturer shall be responsible for polymer selection, in coordination with Owner and Owner’s contracted polymer supplier.

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- E. Water Supply Provided to Centrifuges to Allow For:
  - 1. Bowl Flushing/High Speed Flush: 250 gpm up to the sludge feed rate at 45 psi.
  - 2. CIP Flushing/Low Speed Flush: 110 gpm at 45 psi.
  - 3. Water Temperature: 40 to 90 degrees F.
- F. Cake capacity during a power loss condition: 26.2 cubic feet or 0.97 cubic yard.

2.05 CENTRIFUGE EQUIPMENT

- A. General Description: Each centrifuge shall be of the high-speed, dry solids, solid bowl horizontal, continuous feed, scroll conveyor type specifically configured for dewatering only applications. No disc type or nozzle bowl type or basket type centrifuges will be allowed. The centrifuge design shall limit air leakage into or from the body of the centrifuges by providing gaskets on the casing flange and labyrinth-type seals on both hub ends. The centrifuge equipment shall be designed and built to operate continuously. A variable frequency drive (VFD) main drive system shall be provided to drive the centrifuge rotating assembly. A VFD backdrive system shall be supplied with each centrifuge to provide speed variation between the conveyor and the centrifuge bowl. The centrifuge shall be designed to be mounted on a steel frame allowing discharge into discharge chutes directly beneath the centrifuge bowl.
- B. Materials of Construction:
  - 1. Unless otherwise specified, materials shall conform to the following:
    - a. All sintered tungsten carbide abrasion resistant materials shall be tested in accordance with the ASTM G65, Procedure A, Standard Practice for Conducting Dry Sand/Rubber Wheel Abrasion Tests with volume loss less than 3 cubic millimetres.
    - b. Anchor Bolts, Nuts and Washers: Stainless steel, Type 316, minimum 3/4 inch in diameter for all anchor bolts under the centrifuge frame.
    - c. Bottom Case: Fabricated carbon steel or cast steel, with all surfaces in contact with process material coated with epoxy and Type 316 stainless steel liner. Provide Type 316 stainless steel liner in centrifuge discharge chamber. The bottom casing shall be fully clad with 316 stainless steel.
    - d. Bowl: Stainless steel, ANSI SC2205 or ANSI SC2304 duplex stainless steel centrifugal castings.
    - e. Bowl Wear Strips: Stainless steel, Type 316, minimum 3 mm thickness or longitudinal grooves.

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- f. Fasteners (Wetted): Minimum Type 316 stainless steel.
  - g. Feed Zone: Fully covered with solid sintered tungsten carbon components.
  - h. Feed Tube: Stainless steel, Type 316.
  - i. Main Centrifuge Bearings: Lubricated with grease, L-10 life of 100,000 hours minimum at machine rated operating speed and machine sizing solids loading rate specified in Article Performance Requirements.
  - j. Scroll Conveyor: Stainless steel, ANSI SC2205 or ANSI SC2304 duplex stainless steel.
  - k. Scroll Conveyor Bearings: Grease lubricated, L-10 life of 100,000 hours minimum.
  - l. Scroll Conveyor Tips: Sintered Tungsten Carbide tiles – up to two wraps beyond feed zone. Remaining flight tips protected with flame sprayed tungsten carbide.
  - m. Upper Case: Stainless steel, Type 316.
  - n. Sludge Feed Nozzles: Replaceable Sintered Tungsten Carbide. Part of fully covered feed zone.
  - o. Solids Discharge Nozzles: Replaceable Sintered Tungsten Carbide.
- C. Bowl: The bowl shall be designed to withstand, with an adequate factor of safety, all forces encountered during operation.
- 1. Bowl Inside Diameter: Minimum 28.35 inches.
  - 2. Bowl Inside Length: Minimum 108 inches.
  - 3. Normal Operating Speed: Minimum 1,500 rpm to maximum 2,800 rpm.
  - 4. The minimum bowl wall thickness shall be 0.6-inch. All surfaces shall be examined for cracks, shrinkage, porosity, or other defects by means of an eddy current technology test.
  - 5. Pool depth level must be readily adjustable via weir plates (dams) located at the large diameter end of the bowl where liquid is discharged.
  - 6. Centrate discharges shall be provided with deflector plates or nozzles or power plate or tube weirs to reduce overall centrifuge electrical power consumption. The power plate weirs will direct the centrate in the opposite direction of the bowl rotation to provide additional lower energy consumption for bowl rotation.
  - 7. Solids shall be conveyed through a conical section of the bowl and discharged from the small diameter end of the bowl through multiple solids discharge ports spaced evenly around the bowl end. Solids discharge ports shall be protected against abrasion by field replaceable tungsten carbide wear saddles.

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8. The casting of the centrifugally cast bowls shall be tested with eddy current technology. Casting testing certificates for each component will be required with each centrifuge. Rolled and welded or statically cast bowls shall not be allowed.
9. Bowl shall be provided with a minimum of eight evenly spaced longitudinal bowl strips the entire length of the bowl to trap solids and form a layer to protect the bowl from wear.
10. Material to be processed shall be introduced to the bowl through a compartment which shall evenly distribute the feed. The feed compartment shall be protected against abrasion with liner or flame sprayed hard surfacing.

D. Scroll Conveyor:

1. Centrifuge shall include a horizontal cylindrical-conical scroll conveyor supported by anti-friction bearings and equipped with helical flights independently mounted concentrically within the centrifuge bowl.
2. The scroll conveyor shall be an energy efficient design that will provide increased centrifuge capacity while providing a reduction in power consumption. This design should allow for increased G-Volume capacity without increase in bowl size. This design shall also allow the pond discharge radius to be reduced keeping a deep pond during normal consistent process conditions.
3. Conveyor shall include solids feed ports protected against abrasion by field replaceable solid sintered tungsten carbide wear liners.
4. The conveyor edge and face of the flights shall be protected against abrasion by a series of welded-on sintered tungsten carbide tile assemblies from two wraps beyond the feed zone through to the solids discharge end. Each tile assembly shall be weight correct, and consist of a solid sintered tungsten carbide wear part attached to a stainless steel backup holder. Spray hard surfacing applied to a backup plate is not allowed. Each assembly shall be individually replaceable, and shall include the ability to monitor wear by means of visual inspection. The tile assemblies shall extend a minimum of 0.3-inch beyond the radial edge of the conveyor flight. Remaining portion of scroll edge and face shall be protected with flame sprayed hardsurfacing.
5. All sintered tungsten carbide tiles shall be able to meet ASTM G65 Test Procedure A with a volume loss as specified in Article Centrifuge Factory Tests.
6. One full turn of the conveyor flight in front of the baffle disc will be additionally stiffened. If any flight deflection is observed during the warranty or extended warranty period, the flights will be restraightened, additional stiffeners added, and the conveyor rebalanced at no cost to the Owner.

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E. Case:

1. Centrifuge shall be enclosed in a fabricated case, the purpose of which shall be to contain and direct the solids and liquid discharge from the centrifuge, to act as a protective guard, and to provide complete enclosure for noise reduction and odor control. Case shall be protected at the solids discharge end with a field replaceable Type 316 stainless steel liner. The casing assembly shall be provided with a Type 316 stainless steel per manufacturer's standard, specifically designed for rigidity and noise reduction, Lower case shall be fabricated carbon steel or cast steel, with all surfaces in contact with process material coated with epoxy and Type 316 stainless liner. Provide Type 316 stainless steel liner in centrate discharge chute. The case top shall be bolted in place. Lifting eyes shall be provided for lifting of the case top.
2. A flanged and gasketed seal shall be provided between the upper and lower case components. Flange bolts shall be Type 316 stainless steel.
3. Casing cover hinges: The case top shall have spring loaded hinges located on the left or right side to allow for ease of opening during maintenance or inspection (spring loading prevents cover from closing on its own).

F. Frame:

1. The centrifuge shall be supported on a fabricated carbon steel or combination cast iron and steel base which shall in turn be mounted on vibration isolators.
2. The vibration isolators shall be provided to isolate the centrifuge from the building structure. The number, capacity, and vibration constant of the isolators shall be as recommended by the isolator manufacturer for the load and impact resulting from operation of the centrifuge provided.
3. The bottom portion of the frame shall be provided with machined outlets for the attachment of the solids and centrate flexible connectors.
4. Lifting eyes or solid lifting bars shall be provided for lifting of the frame.

- G. Main Drive System: The bowl drive system shall consist of an electric main drive motor with variable frequency drive and V-belt drive system complete with necessary vibration isolators for the individual support of the motor and centrifuge. The belt drive system shall consist of multiple V-belts as required

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to provide full load capacity and to withstand the full starting torque of the system.

1. Centrifuge Main Drive Motor:
  - a. Provide squirrel-cage ac induction motor meeting the requirement of Section 26 20 00, Low-Voltage AC Induction Motors, and as specified herein.
  - b. Motor shall meet the following specific requirements:
    - 1) Motor Horsepower: 125 HP
    - 2) Nominal Speed: 1,800 rpm.
    - 3) Voltage Rating: 460V, three-phase.
    - 4) Enclosure Type: TEFC.
    - 5) Mounting: Horizontal.
    - 6) Inverter duty rated motor.
  - c. Provide motor modifications as follows:
    - 1) With the motor at ambient temperature (COLD), it shall be capable of making two complete starts in succession with coasting to rest between starts within a 1-hour time period. With the motor running (HOT), it shall be capable of at least one restart within 1 hour after any shutdown. The motor insulation temperature classification shall not be exceeded.
    - 2) The motor shall be of the quiet type design. The noise level shall not exceed 90 dBA sound pressure measured at 3 feet from the motor in all directions.
    - 3) Provide PTC thermistors for thermal protection.

H. Backdrive Systems:

1. Provide a variable frequency drive backdrive system for each centrifuge as specified below. Hydraulic Backdrive systems are not acceptable.
2. Gear Box For Electric Motor Based Backdrive Systems: a two-stage or four-stage planetary gear unit shall maintain a differential speed between the conveyor and bowl. Each of the above devices shall be suitable for 24 hour per day continuous service. The gear box shall have a minimum torque capacity of 30 kNm to meet the specified service conditions and performance requirements with the design required torque not to exceed 80 percent of the gear box full rated torque capacity. Gear boxes shall be capable of withstanding a 200 percent momentary overload and 150 percent intermittent overload. A torque overload control shall be provided to initiate centrifuge shutdown in the event of conveyor overload. Manufacturer shall select the reduction gear ratio as required for the solids to be handled and to be consistent with satisfactory operation. The gear unit shall be oil lubricated with its housing serving as a lubricant reservoir.



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3. An inverter duty backdrive motor shall be supplied and connected to the pinion shaft of the differential gear box. Backdrive system shall provide step-wise or infinite speed variation between the conveyor and the bowl shell of the centrifuge.
  - a. Centrifuge Backdrive Motor:
    - 1) Provide squirrel-cage ac induction motor meeting the requirement of Section 26 20 00, Low-Voltage AC Induction Motors, and as specified herein.
    - 2) Motor shall meet the following specific requirements:
      - a) Motor Horsepower: 50 HP
      - b) Nominal Speed: 1,800 rpm.
      - c) Voltage Rating: 460V, three-phase.
      - d) Enclosure Type: TEFC.
      - e) Mounting: Horizontal.
      - f) Inverter duty rated motor.
    - 3) Provide motor modifications as follows:
      - a) Provide PTC thermistors for thermal protection
      - b) Attach the motor to the pinion shaft of the differential gearbox.
4. The backdrive systems shall be capable of operating in a DIFFERENTIAL or TORQUE control mode that provides for operation at specific adjustable scroll/bowl differential speeds or backdrive torque values. In the DIFFERENTIAL control mode, the backdrive system shall provide for operation at a specific, adjustable scroll differential speed with internal torque allowed to vary up to the maximum allowable scroll shaft torque. In the TORQUE control mode, the backdrive system shall continuously monitor changes in internal torque created by variations in influent feed solids and automatically maintain a preset torque input to the scroll by allowing the differential speed to vary. Backdrive torque controller shall incorporate an auto-tuning feature to automatically adjust the proportional, integral, and derivative constants in order to automatically adjust to sludge and scroll conveyor torque feedback changes.
5. The systems shall provide for automatic shutdown in the event that excessive torque is detected. Torque shall be measured as a function of input in the drive unit. In the event that torque exceeds the normal operating range, monitoring instrumentation shall detect this condition and stop the sludge feed to allow the machine to clear itself. The torque monitoring system shall automatically reset when the torque approaches the normal operating range. In the event that the torque approaches the limit of the backdrive, the centrifuge's controller shall initiate centrifuge shutdown and shutdown of both sludge and polymer feeds.
6. The direct backdrive system shall only require enough power to operate the backdrive system for process control.

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- I. Fasteners: All internal fasteners furnished with the centrifuges which are subject to contact with sludge, centrate, or vapors of wash water and wastewater shall be a minimum Type 316 stainless steel.
- J. Bearings:
1. The entire rotating assembly of each centrifuge shall be supported by two main bearings. Each main bearing shall be lubricated ball or cylindrical roller type bearings. Main bearings shall be housed in one piece pillow blocks with dowel pins for proper alignment. Provide each pillow block bearing with a threaded female connection to permit the use of a lifting eye to facilitate inspection and maintenance.
  2. Bearing temperature monitors shall be provided on each main bearing pillow block, with an analog output signal sent to the control panel for display and monitoring. Provide 100 ohm three-wire platinum resistance temperature detectors (RTDs). Bring the RTD leads out to terminal blocks in threaded cast aluminum junction boxes.
  3. Scroll conveyor bearings shall be anti-friction ball or roller type bearings sealed from process contamination. Bearings shall be permanently greased or have external grease fitting for lubrication.
  4. Drive and non-drive end bearing shall be insulated.
  5. Bearings shall have an AFBMA L-10 or DIN ISO 281 L-10 life of 100,000 hours minimum at machine rated operating speed and machine sizing solids loading rate specified in Article Performance Requirements.
- K. Main Bearing Lubrication System:
1. Lubrication of centrifuge main bearings shall be provided by means of an automatic grease feed system. Lubrication feed system shall be the following type, and include, at a minimum but not limited to:
    - a. Grease Type:
      - 1) Frame-mounted grease pump and tubing
      - 2) Grease reservoir with sight level gauge per bearing.
      - 3) Grease reservoir low level switch and alarm per bearing.
  2. The lubrication system shall be interlocked with the centrifuge main drive motor such that low pressure, low flow, low level and/or high grease temperature will de-energize the centrifuge main drive motor. In all cases, the starter for the grease pump motor controls or metering controller shall be interlocked with the main drive motor so that bearings are lubricated whenever the centrifuge is running and a delayed trip so that bearings continue to be lubricated while the centrifuge coasts to a stop. The grease pump shall also be independently operable. The grease pump, duration between greasing and length of a grease cycle shall be controlled from the centrifuge control panel.

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3. All lubrication system signals shall be wired to a common junction box for connection to the external control panel.
- L. Guards: Fabricated guards shall be provided for all gear boxes, pulleys, and belt drives.
1. Guards shall be 11-gauge minimum thickness Type 304 stainless steel.
  2. The guards shall meet OSHA standards and completely enclose the rotating parts of drive system and shall be designed to minimize vibration and noise.
  3. Guards shall include expanded metal sections, painted flat black, with holes coincident with the shafts and belting of all equipment to facilitate the use of a strobe light for inspection and maintenance of the shafts and belts.
  4. Fasteners shall be externally accessible.
- M. Feed Tube: Sludge shall be fed to the centrifuge by means of a removable feed tube suitable to minimize turbulence. The feed connection to the centrifuge shall be a 3-inch 150-pound ASME flange connection. The maximum inlet pressure required at the centrifuge inlet flange shall be 10 psig at 400 gpm (when based on water with the viscosity of 1 Centipoise). The feed tube shall also include a 3/4-inch NPT connection for polymer.
- N. Flexible Connection: All mechanical and electrical connections to the centrifuge, including, but not necessarily limited to, the feed sludge (minimum 23 inches long black neoprene hose with a 3-inch diameter hose clamp fitting mounted on a 4-inch 150 pound flange connection), polymer (minimum 12 inches long with a custom connector on the centrifuge feed tube side and a 3/4-inch NPT polymer connection to sludge feed piping), centrate (minimum 9 inches long) and dewatered cake (minimum 12 inches long) connections, compressed air piping, cooling water supply and return piping, sample line, vents, and electrical raceways shall be equipped with flexible connections. All flexible connections shall isolate centrifuge vibrations from fixed, rigid external connections. No exterior loads shall be transferred to a centrifuge by external connections to the machine. Centrate and dewatered cake flexible connections shall be flanged and fabricated from neoprene, with Type 316 stainless steel bolts with Type 316 stainless steel retainer plates at each end. Piping flexible connectors shall be metal reinforced elastomer with flanged connections. Tubing flexible connectors shall be metal reinforced hose with Type 316 stainless steel hose clamps. Flexible electrical connections shall be made with liquid-tight conduit.

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- O. Chutes: Provide centrifuge centrate and dewatered cake discharge chutes. Chutes shall be nominally 4 feet-long but shall match the required distance from the new centrifuges to the existing centrate and dewatered cake discharge flanges (Contractor to review drawings and coordinate with centrifuge manufacturer), fabricated from minimum 3/16-inch thick Type 316 stainless steel and have flanged and gasketed ends. Provide each chute with support flange and gasket for support/sealing concrete floor penetrations. Provide each chute with 12-inch high by 18-inch wide bolted access plate, located to provide inspection access.
1. Provide integral functional centrate sample provisions as part of the centrate discharge chute. Provide 2-inch Type 316 stainless steel pipe, with top of pipe slotted to collect representative centrate sample. Pipe shall be horizontal, extend through centrate chute and include tees, threaded ends, and threaded cleanout ports.
  2. Dewatered cake chute shall be rectangular with no reduction in cross-sectional area.
  3. Provide integral dewatered cake sample provisions as part of the centrifuge case or dewatered cake discharge chute extension bolted directly to the centrifuge discharge flange. Sample connection shall allow sampling from the centrifuge operating floor. Sample connection shall be through minimum 2-inch Type 316 stainless steel pipe welded to the centrifuge case or discharge chute extension located to enable representative sampling while not interfering with the rotating elements of the centrifuge. Dewatered cake sample connection shall have a hinged cap and plastic pipe insertion device.
  4. Provide centrate and dewatered cake chutes with nozzles and vent piping for venting the centrifuge to the atmosphere as required by centrifuge design. Configure vent piping to be self-draining and so as to not be filled with centrate or dewatered cake.
- P. Noise: Centrifuge shall be designed such that when running at the normal operating speed, the average noise level measured at 3 feet around the periphery of the complete centrifuge assembly shall not exceed 90 dBA, when tested at the manufacturing facility, without feed and with inlet and discharge connections sealed.
- Q. Vibration Monitoring System:
1. A vibration monitoring system shall be provided for each centrifuge to perform the following functions:
    - a. Convert vibration into velocity.
    - b. Sound a warning and initiate stop of sludge feed if the velocity reaches a certain preset level (HIGH).

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- c. Sound a warning and shut the centrifuge down if the velocity reaches a separate pre-set level (HIGH-HIGH).
  - d. Provide an adjustable time delay during centrifuge startup to account for initial acceleration and feed induced vibration.
  - e. Provide an adjustable time delay, not to exceed 5 seconds, during operation to account for momentary excursions due to process changes.
2. Provide two vibration sensors (one per pillow block bearing) installed on each centrifuge and wired to a common terminal junction box, positioned to measure both horizontal and vertical displacement.
  3. The centrifuge, when running at the normal operating speed, shall not produce vibration velocities greater than 6.5 mm per second at the main bearings when tested at the manufacturing facility without feed.

2.06 ELECTRICAL

A. General:

1. Conform with Division 26, Electrical.
2. Provide all necessary electrical components and wiring for a complete, functional system.
3. All motor variable frequency drives and starters for the centrifuge system shall be provided in the VFD Panel provided as part of this section.
4. Control and electrical panels and interior components shall be rated for continuous operation in 40 degrees C (104 degrees F) ambient conditions.

B. Wiring: Size conductors and conduits for power circuits to all equipment. Factory prewire (size, furnish, install, and connect) all skid mounted equipment control conductors and instrumentation cables to skid mounted terminal junction boxes for connection to the control and VFD panels by Division 26, Electrical. The electrical wiring requirements and proper documentation shall be included as part of the package system scope of supply. All conductors shall be stranded copper, and all wiring shall meet the requirements of NFPA 70, the 2008 National Electrical Code. Conductors shall be stranded copper. Insulation shall be rated 600 volts, minimum. Low-voltage (24V) signals shall be run in 600-volt twisted shielded pair cable. Analog and power circuits shall not be run in the same conduits.

C. Electrical Raceways: All conductors and cables not subject to vibration between prewired devices and skid-mounted terminal junction boxes shall be installed in PVC-coated rigid galvanized steel conduits. Flexible, nonmetallic, liquid-tight conduits shall be provided where flexible conduits are required.

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- D. Terminal Junction Boxes: All skid-mounted devices, except for motor leads, shall be prewired to skid-mounted terminal junction boxes (TJBs). Separate TJBs shall be provided for (a) 120V power and (b) 4 mA to 20 mA analog and 24V dc discrete signals. Size, furnish, and install NEMA 4X, stainless steel TJBs on the centrifuge skid.
- E. Centrifuge Main Drive VFD: Main drive motor shall be controlled by an active front end ABB ACS800 variable frequency drive provided in the Centrifuge VFD Panel.
1. The system shall be sized in accordance with manufacturer’s design requirements and shall be as specified in Section 26 29 23, Low-Voltage Variable Frequency Drive System.
  2. The motor shall be capable of delivering full load torque across a 10:1 turndown ratio.
  3. Drive system shall be capable of flying restart.
- F. Centrifuge Backdrive VFD: Backdrive motor shall be controlled by an active front end ABB ACS800 variable frequency drive provided in the Centrifuge VFD Panel.
1. The backdrive system shall provide infinite speed variation between the scroll conveyor and bowl shell of the centrifuge.
  2. The system shall be sized in accordance with manufacturer’s design requirements and shall be as specified in Section 26 29 23, Low-Voltage Variable Frequency Drive System.
  3. The motor shall be capable of delivering full load torque across a 10:1 turn down ratio.
  4. Drive systems shall be capable of flying restart.
- G. Centrifuge VFD Panels: Provide an VFD Panel for each centrifuge.

<b>Panel Nos.</b>	<b>Name</b>	<b>NEMA Enclosure</b>	<b>Material</b>
76-DC-01.VFD	Centrifuge 1 VFD Panel	12	Painted Steel
76-DC-08.VFD	Centrifuge 8 VFD Panel	12	Painted Steel

1. Each VFD Panel shall be a freestanding enclosure, containing the following:
  - a. A main circuit breaker with a through the door lockable handle.
  - b. VFD controls for main drive motor.

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- c. VFD controls for backdrive motor.
- d. E-stop pushbutton.
- 2. Variable frequency drives shall be sized in accordance with NEC and Division 26, Electrical.
- 3. The fused disconnect switch in accordance with centrifuge system requirements.
- 4. Power Supply: 480-volt, three-phase, three-wire, 60-Hz.

2.07 CONTROLS

A. General:

- 1. In accordance with general control requirements specified in Section 40 99 90, Package Control Systems.
- 2. Instrumentation component qualities shall be in accordance with components specified in 40 90 00, Instrumentation and Control.
- 3. Provide centrifuge controls equipment in a dedicated compartment of the Control and VFD Panel specified herein, in Article Electrical.

<b>Panel Nos.</b>	<b>Name</b>	<b>NEMA Enclosure</b>	<b>Material</b>
76-DC-01.LCP	Centrifuge 1 Control Panel	12	Painted Steel
76-DC-08.LCP	Centrifuge 8 Control Panel	12	Painted Steel

- 4. Control Panels: Provide a control panel for each centrifuge.
- 5. The controls for all components of each centrifuge shall be provided by a dedicated programmable logic controller (PLC), mounted in the Centrifuge Control Panel. The PLC shall provide all control and monitoring functions as required for the operation and monitoring of the centrifuge including, but not limited to, timing, interlocks, startup sequencing, normal and emergency shutdowns, and permissive functions required for safe operation of each centrifuge.
  - a. Critical field alarm instruments and contacts will be wired for failsafe operation where an open circuit will alarm. PLC communications and faults shall be monitored.
  - b. All indicating lights shall be in accordance with Section 40 99 90, Package Control Systems, with equipment tag numbering as specified herein and as shown on Drawings.
- 6. Provide uninterruptible power supply (UPS) backup power for all PLC OIT, network, and instrument components of the centrifuge control

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system. Size UPS to supply power for a minimum of 20 minutes under connected load.

7. PLC Manufacturer and Products: As specified in Section 40 99 90, Package Control Systems.
8. Provide Application software for all digital, programmable components of the centrifuge systems as specified in Section 40 99 90, Package Control Systems.
9. Provide Ethernet TCP/IP 100 Mbps network communications module to support communications between the PLC and the Owner's Plant Control System network.

B. Control Panel Functions:

1. Operator Interface Terminal (OIT):
  - a. Provide a panel-mounted OIT on the Centrifuge Control Panel.
  - b. OIT Manufacturer and Product: As specified in Section 40 99 90, Package Control Systems.
  - c. The OIT for each centrifuge shall provide the primary method for an operator to monitor the status of the centrifuge and to affect its operation by command or directive entry. The OIT shall provide the graphics-based interface between the operator and the centrifuge controller. The graphics and their layout/presentation shall be manufacturer's standard.
  - d. The OIT shall provide all displays and control screens needed to monitor and control the associated dewatering centrifuge system safely and efficiently.
  - e. The OIT shall provide for selection of the following:
    - 1) Centrifuge Control Mode: LOCAL/REMOTE.
    - 2) Backdrive Control Mode: TORQUE/DIFFERENTIAL.
    - 3) Centrifuge START (in LOCAL mode).
    - 4) Centrifuge STOP (in both LOCAL and REMOTE modes).
    - 5) Centrifuge Clean-In-Place (CIP) initiation (in both LOCAL and REMOTE modes).
  - f. Display (at a minimum):
    - 1) Alarms.
    - 2) Status and control of each system component.
    - 3) Bowl speed.
    - 4) Backdrive gear shaft speed if gearbox is supplied.
    - 5) Main drive motor amperage (rms value).
    - 6) Differential Speed: Scroll versus bowl.
    - 7) Bearing temperatures.
    - 8) Backdrive torque.
    - 9) Vibration.
    - 10) Centrifuge Control Mode: LOCAL/REMOTE.
    - 11) Backdrive Control Mode: TORQUE/DIFFERENTIAL.



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- 12) The specific shutdown condition.
- 13) Sludge and polymer flow rates.
- 14) All inputs from and outputs to the plant SCADA system.
- g. The OIT shall have operator adjustable parameters for backdrive control. In addition, there should be one set of backdrive control parameters for use during cleaning or flush cycles. Backdrive control should be automatically changed to cleaning parameters in auto shutdown of the centrifuge or in CIP mode and return to the previous parameter set afterwards
2. Controller Sequencing: The centrifuge PLC shall contain all programming necessary to safely START and STOP the centrifuge, in either the LOCAL or REMOTE mode. Provide STANDBY and PRODUCTION modes. The following minimum sequences and control shall be provided.
  - a. LOCAL/REMOTE: In the LOCAL model, centrifuge control shall only be available through the centrifuge control and VFD panel. All outputs to the Plant Control System shall still be available in LOCAL mode. In the REMOTE mode, Centrifuge Start, Stop, Backdrive Control mode, torque set point, differential speed set point, and other specified centrifuge controls shall be from the Plant SCADA System. In the LOCAL mode, provide controls to Start and Stop the sludge feed pump and polymer feed pump. In the LOCAL mode, provide for operator entry of sludge feed and polymer feed flow rate setpoints. Start, stop, and setpoint commands shall be communicated to the Plant Control System.
  - b. Start: This command shall instruct the centrifuge control system to begin its start sequence. The centrifuge shall not be allowed to start more than the stated number of times per hour (two if cold, one if hot). The centrifuge control system shall confirm the successful initiation and/or completion of each step in the startup sequence before continuing with the next step in the sequence.
    - 1) The start sequence can only begin when the sludge pump and polymer blend system are not running (OFF status).
    - 2) Provided all interlocks are in the normal state, the centrifuge control system shall bring the bowl and scroll up to speed and signal when proper conditions have been attained to begin feeding polymer and sludge.
    - 3) Initiate open of the Bypass (Cake) To Centrate valve to direct mixed solids/liquids discharge to the centrate piping system.
    - 4) Initiate start of the polymer feed pump.
    - 5) Initiate start of the sludge feed pump (after a preset time delay).
    - 6) Upon reaching an operator entered torque set point, initiate close of the Bypass (Cake) To Centrate valve.

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- 7) If the start sequence is interrupted for any reason, including, but not limited to equipment failure, interlock failure, or manual (operator initiated) interrupt, the centrifuge controller shall generate a time delayed FAIL TO START alarm, with an operator adjustable delay from 0 minute to 5 minutes. Initiate stop of the sludge feed pump and polymer feed pump, and allow the machine to coast to a standstill.
  - 8) If the start sequence is successful, discontinue monitoring interlock status of polymer feed and sludge feed.
- c. Normal Stop: This command shall instruct the centrifuge control system to begin its normal stop sequence. The centrifuge control system shall confirm the successful initiation and/or completion of each step in the stop sequence. If any step in the sequence fails, the centrifuge controller shall generate an alarm specifying the failed step.
- 1) Stop the sludge feed pump and polymer feed pump (disable ENABLE commands).
  - 2) Maintain a preset differential speed to clear the remaining solids from the bowl.
  - 3) After a set adjustable time for removal of resident solids or upon reaching an operator entered falling backdrive torque set point, initiate opening of the Bypass (Cake) To Centrate valve, opening of the centrifuge flush valve to direct mixed solids/liquids discharge to the centrate piping system.
  - 4) After a predetermined (adjustable) time period, initiate closing of the centrifuge flush water valve. The machine shall then coast to a standstill.
- d. The control system shall cause a “Controlled Shutdown” of the centrifuge and alarm this condition to the plant SCADA system in the event that any of the following interlocks are triggered. These automatic shutdown interlocks shall include, but are not limited to:
- 1) Backdrive controller malfunction.
  - 2) Left/right bearing HIGH-HIGH temperature alarms.
  - 3) Backdrive malfunction.
  - 4) HIGH-HIGH torque.
  - 5) HIGH-HIGH vibration.
- e. The control system shall cause an automatic “Shutdown” sequence shutdown of the centrifuge and alarm this condition to the plant SCADA system in the event that any of the following interlocks are triggered. These automatic shutdown interlocks shall include, but are not limited to:
- 1) Backdrive HIGH temperature alarm.
  - 2) Drive motor over temperature.

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- 3) Drive motor overload.
- f. During normal operation an excessive solids build-up shall be detected by the centrifuge control system as a higher than normal torque requirement or by sensing excessive vibration. Should the torque or vibration exceed a preset point, the HIGH torque or vibration switch shall close, sending a signal to the centrifuge control system which shall initiate shutdown of the sludge and polymer feeds. This action will normally result in a reduction of torque and vibration as the buildup is removed from the bowl. When the torque or vibration falls to an acceptable limit, reinitiate start of sludge and polymer feeds. The high torque control shall be not more than twice the normal operating torque or pressure. The controls shall also allow operation at a set differential speed allowed to vary within the normal operating limits. Controls shall include adjustable timers and or a count of HIGH torque or vibration events in order to initiate an automatic “Normal Stop” in the event of repeated torque or vibration excursions.
- g. In the event that the above clearing action fails to remedy the high torque or vibration situation and the torque or vibration continues to increase, the centrifuge control system shall respond by issuing a torque or vibration HIGH-HIGH alarm at the control panel and similar signal to the plant SCADA system in addition to initiating a “Controlled Shutdown”.
- h. In the event of a power loss the Decanter Monitoring System shall have the ability to provide Power Loss Ride Through Protection that will allow the centrifuge to run through a short duration power blip, generally defined as 3-5 seconds. If the power outage extends past the 3-5 seconds the system will down the feed pump and polymer pump and put the centrifuge into the production standby mode for a programmed set time. If power is restored during this time the feed pump and polymer pump will automatically restart and production will resume. Should the power not be restored, the control system must allow the centrifuge to be brought to a stop in a normal shutdown mode (as if it had power), including a normal flush cycle along with maintaining the differential speed during the coast down period. This system will allow the centrifuge to scroll the solids out and be available for an immediate restart once power is restored. During the power loss ride through sequence, the centrifuge must produce its own power back to the controller so as to not lose any control or supervisory signals going to the DCS. The Power Loss Ride Through Protection shall be demonstrated during the pre-performance testing phase (see section 3.04.C) with the procedure agreed to by Alfa Laval on February 8, 2020 after discussion with the City MBC staff and summarized in submittal No. 31R1,

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“Power Loss Ride Through Feature,” dated February 27, 2017 and shown below:

- 1) Prerequisite:
  - a) Operations to determine which Centrifuge will be used for the test. Run this Centrifuge in normal Production Mode. Site is to have a means of tripping Feeder Breaker in instead of Main Disconnect. Site to provide an externally powered source of 120V ac at the chosen centrifuge’s control panel. Flush Valve and Diverter Gate Valves are to be put in Hand to simulate loss of site power.
- 2) Procedure for Test
  - a) Power Down from Starter Panel Disconnect.
  - b) Connect Fiber Optic cable from Laptop to Main Drive Control card.
  - c) Hook up Ethernet cable from Laptop to Ethernet Switch in Control Panel.
  - d) Temporarily take out Type 2 Alarms with Power Loss Alarm in PLC Code.
  - e) Power Up Starter Panel in Estop. Connect the Drives Windows software to the ABB Main Drive. Connect the AB RSLogix 5000 software to the PLC Processor. Trend points are defined in the submittals stated above.
  - f) Emerson to monitor the Trend points defined in the submittal stated above.
  - g) Jumper (or force) the external drive run enable from the PLC and jump Type 2 Alarms in PLC to prevent the PLC from prematurely stopping the PLRT due to potential software glitch or other undetected condition.
  - h) City to set up the robot for triggering the corresponding Feeder Breaker to trip off if required.
  - i) City to perform a startup on selected centrifuge and put into operation with feed following normal startup procedures.
  - j) Prior to performing PLRT test, located one person out by Centrifuge, one person observing Drive keypads to see if any faults occur, and one person in the Control Room to monitor Plant SCADA. All people should have a common communication path to coordinate testing. Flush Water Valve and Diverter Gate Valve to be turned off manually.

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- k) With the Decanter running in production and with a stable load, test can begin. Trending to start on observed points.
  - l) Open Incoming Disconnect Switch/Feeder Breaker to Designated Starter Panel. This will initiate PLRT Test.
  - m) Trending will continue until it is determined that the PLRT function has transitioned to a Coast Mode. This would be DC Voltage Undervoltage.
  - n) An observer will continue to monitor the four drive keypads.
  - o) At this time Centrifuge is Coasting down.
  - p) PLC Trends can continue. Drive Trends will end. Emerson Trends can continue.
  - q) When Centrifuge comes to a mechanical stop, results of Test will be reviewed, any issues identified and resolved
  - r) Restart test from step f above, this time skipping step g.
  - s) Assuming second test is successful, continue to step s.
  - t) All test equipment will be disconnected.
  - u) Power will be restored to Starter Panel and machine turned over to Operations.
- i. Controlled Shutdown: Controlled Shutdown shall require reset action at the centrifuge control panel before the unit can be restarted.
- 1) This command shall de-energize the centrifuge main drive motor. The centrifuge shall be allowed to coast to a standstill. If available, the backdrive shall remain active until the bowl has coasted to a standstill, controlled to clear as much solids as possible from the bowl.
  - 2) Initiate stop of the sludge feed pump and polymer feed pump.
  - 3) Initiate the centrifuge flush water valve open for flushing and subsequently initiate close after an adjustable time period.
- j. Emergency Stop: Emergency Stop initiated via E-STOP pushbutton at the centrifuge control and VFD panel or from the plant SCADA system shall stop the centrifuge and all associated equipment instantaneously with no flush water.
- 1) This command shall de-energize the centrifuge system.
  - 2) Initiate stop of the sludge feed pump and polymer feed pump.
- k. Provide clean-in-place (CIP) function to clean solids out of the bowl. In a CIP cycle a CIP START pushbutton is pressed, the

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centrifuge flush water valve OPEN is initiated, the backdrive energized and begin to rotate in the reverse (if required by the manufacturer's particular design) direction at a low speed for a predetermined time. At the end of the set time, the backdrive shall toggle direction, causing a water "sloshing" effect within the centrifuge bowl and conveyor. The process shall continue until the predetermined overall times ends, a CIP STOP key is depressed, or a fault occurs. Any shutdown fault shall terminate the CIP cycle.

3. Controller Interface (Data Exchange with the plant SCADA System): Provide provisions to make available and receive in contiguous registers the following data to and from the plant control system, through the centrifuge PLC Ethernet network communication module.
  - a. Discrete Outputs to the Plant Control System:
    - 1) Emergency Stop.
    - 2) Centrifuge RUNNING status.
    - 3) Centrifuge READY status.
    - 4) Centrifuge FAILED TO START status.
    - 5) Centrifuge FAILED TO STOP status.
    - 6) Centrifuge control mode LOCAL/REMOTE status.
    - 7) Backdrive TORQUE/DIFFERENTIAL control mode status.
    - 8) Clean mode status.
    - 9) Vibration warning (HIGH) alarm.
    - 10) Vibration shutdown (HIGH-HIGH) alarms.
    - 11) Motor faults.
    - 12) High torque alarm.
    - 13) Torque overload (HIGH-HIGH) alarm.
    - 14) Drive-end/idle-end main bearing HIGH temperature alarm.
    - 15) Drive motor HIGH temperature alarm.
    - 16) Backdrive motor HIGH temperature alarm.
    - 17) Backdrive controller (VFD) malfunction alarm.
    - 18) Main drive controller (VFD) malfunction alarm.
    - 19) Sludge feed pump ENABLE signal.
    - 20) Polymer feed pump ENABLE signal.
    - 21) Centrifuge flush water valve OPEN command.
    - 22) Centrifuge flush valve AUTO/MANUAL status.
    - 23) Bypass (Cake) To Centrate valve OPEN /CLOSE status.
    - 24) Bypass (Cake) To Centrate valve AUTO/MANUAL status.
    - 25) Diverter gate OPEN/CLOSE status.
    - 26) Diverter gate AUTO/MANUAL status.
    - 27) Centrifuge common alarm.
    - 28) Quantity of 12 additional discrete outputs.
  - b. Analog outputs to the plant control system:
    - 1) Bowl speed.
    - 2) Scroll drive gear shaft speed if gearbox is supplied.

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- 3) Bowl/scroll differential speed.
  - 4) Backdrive torque.
  - 5) Main drive motor amperage (rms value).
  - 6) Drive-end main bearing temperature.
  - 7) Idle-end main bearing temperature.
  - 8) Drive-end main bearing vibration value.
  - 9) Idle-end main bearing vibration value.
  - 10) Sludge feed pump flowrate setpoint (in LOCAL mode).
  - 11) Polymer feed pump flowrate setpoint (in LOCAL mode).
  - 12) Quantity of six additional analog outputs.
- c. Discrete Inputs from the Plant Control System:
- 1) Emergency STOP.
  - 2) Centrifuge START command.
  - 3) Centrifuge SHUTDOWN command.
  - 4) Centrifuge CIP START command.
  - 5) Backdrive control mode (TORQUE/DIFFERENTIAL).
  - 6) Sludge feed pump ON status.
  - 7) Polymer feed pump ON status.
  - 8) Centrifuge flush valve OPEN/CLOSE command.
  - 9) Centrifuge flush valve AUTO/MANUAL command.
  - 10) Bypass (Cake) To Centrate valve OPEN/CLOSE command.
  - 11) Bypass (Cake) To Centrate valve AUTO/MANUAL command.
  - 12) Diverter gate OPEN/CLOSE command.
  - 13) Diverter gate AUTO/MANUAL command.
  - 14) Cake pump strategy READY status.
  - 15) Quantity of six additional discrete inputs.
- d. Analog inputs from the plant control system:
- 1) Backdrive torque set point (torque control mode).
  - 2) Differential speed set point (differential control mode).
  - 3) Bowl speed set point.
  - 4) Quantity of three additional analog inputs.
- e. Any other data or status considered by manufacturer as essential to safe operation.
- f. Sludge feed pump START/STOP and flow control loop will be controlled by the Plant Control System. The centrifuge PLC shall communicate ENABLE (start) signal for the sludge feed pump as specified for centrifuge startup and shutdown functions.
- g. Polymer feed pump START/STOP and flow control loop will be controlled by the Plant Control System. The centrifuge PLC shall communicate ENABLE (start) signal for the polymer feed pump as specified for centrifuge startup and shutdown functions.

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2.08 ACCESSORIES

- A. Equipment Identification Plates: Provide a 16-gauge stainless steel identification plate for all equipment, valves, appurtenances, and instruments with equipment/component numbers, securely mounted on the equipment in a readily visible location. The plate shall bear the 1/4-inch die-stamped equipment identification numbers indicated in this Specification and as shown on Drawings.
- B. Lifting Lugs: Equipment and each component thereof weighing over 50 pounds shall be provided with lifting lugs for easy handling.

2.09 PAINTING

- A. The paint system shall be a catalyzed epoxy primer with a top coating of aliphatic acrylic urethane in accordance with manufacturer's typical paint specifications.
- B. All carbon steel and cast iron shall be properly prepared and cleaned in accordance with the best standard practices. Minimum surface preparation shall include solvent cleaning, SSPC SP-1 followed by abrasive blasting to near white metal, SSPC SP-10. Or other surface preparation methods will be considered, provided that the method results in the minimum surface profile required by the paint manufacturer. Apply 3 mils minimum dry film thickness of lead-free catalyzed epoxy polyamide metal primer and one finish coat of aliphatic acrylic urethane, 3 mils minimum dry film thickness. Prepare all surfaces and apply all paint in accordance with the paint manufacturer's written directions. The color shall be the manufacturers standard.

2.10 CENTRIFUGE FACTORY TESTS

- A. The Owner reserves the right to witness the tests specified herein and to inspect the fabrication procedures at any time during the fabrication stage(s) of the centrifuge and associated equipment. Owner's travel expenses will be borne by the Owner.
- B. Notify the Owner of the schedule for centrifuge system testing not less than 45 days in advance and Owner will travel to the factory and inspect and witness the centrifuge system factory testing.
- C. Perform manufacturer's standard functional tests on each centrifuge unit as follows:
  - 1. Gather and furnish test information necessary to show conformance to specified requirements.
  - 2. Manufacturer's Test Representative shall certify test results.



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3. Perform tests on all components and actually furnished. Use of factory control panels and factory motors are acceptable.
  4. Vibration measurement with bowl empty.
  5. Vibration measurement with bowl filled with water.
  6. Operation of machine for minimum of 2 hours with water.
  7. Motor starting amperage.
  8. Obtain acceptance of test reports from Engineer prior to shipment of equipment.
- D. Noise Test: Measure free field sound pressure levels of centrifuge running at the normal operating speed with bowl filled with water and/or with water feed.
- E. Scratch Abrasion Test:
1. The sintered tungsten carbide tiles to be used on the wearing face of the conveyor shall be subjected to a dry sand rubber wheel abrasion test. This test shall be conducted in accordance with the current ASTM G65 Procedure A. The test shall be conducted with the following requirements:
    - a. Wheel Load: 30 pounds.
    - b. Grit: AFS 50/70.
    - c. Grit Flow Rate: 250 grams to 350 grams per minute.
    - d. Shape of Sand Curtain: Streamlined.
    - e. Test Duration: 6,000 revolutions.
    - f. Rubber Wheel: Chlorobutyl rubber with a Durometer A of 58-62.
    - g. Wheel Speed: 200 rpm (plus or minus 10 rpm).
    - h. Wheel Diameter: 8.50 inches to 9 inches.
    - i. Linear Abrasion Distance: 14,138 feet.
    - j. Sand Nozzle: Special fabricated design.
  2. Provide historical abrasion test data for tiles identical to the ones used for the provided centrifuges.
    - a. The following laboratories are equipped to conduct these tests in accordance with the ASTM Standards and can provide certification of the results:
      - 1) Colorado School of Mines, Golden, Colorado 80401.
      - 2) Falex Corp., Aurora, Illinois 60505.
      - 3) FMC Corp., 1205 Coleman Avenue, Santa Clara, California.
  3. The volume loss of the proposed wear resistant material shall not exceed 3 cubic millimeters per tile during the 30-minute test period. Any material that exceeds 3.0 cubic millimeters loss in 30 minutes will not be allowed.

2.11 PANEL FACTORY TESTS

- A. The Owner reserves the right to witness the tests specified herein and to inspect the fabrication procedures at any time during the fabrication stage(s) of the centrifuge control panel and centrifuge VFD control panel and associated equipment. Owner's travel expenses will be borne by the Owner.
- B. Notify the Owner of the schedule for panel factory testing not less than 45 days in advance and Owner will travel to the factory and inspect and witness the panel factory testing.
- C. Perform manufacturer's standard functional tests on each centrifuge control panel and centrifuge VFD control panel as follows:
  - 1. Gather and furnish test information necessary to show conformance to specified requirements.
  - 2. Manufacturer's Test Representative shall certify test results.
  - 3. Perform tests on centrifuge control panel and centrifuge VFD control panel actually furnished.
  - 4. Test panel for proper construction, electrical connection, and function.
  - 5. Test all PLC inputs and outputs for proper connection and function.
  - 6. Check all alarms, shutdown conditions, and automatic sequences to verify proper function.
  - 7. Simulate interlocks and signals from other connected equipment in order to demonstrate specified operator interface functions and controls.
  - 8. Obtain acceptance of test reports from Engineer prior to shipment of equipment.

**PART 3 EXECUTION**

3.01 INSTALLATION

- A. Contractor will install equipment in conformance with the manufacturer's written instructions, with supervision and inspection performed by manufacturer's representative.
- B. Equipment anchoring and mounting shall be in accordance with manufacturer's requirements for the load criteria specified in Section 01 61 00, Common Product Requirements.
- C. Alignment shall meet or exceed manufacturer's required alignment tolerances.

3.02 PRE-INSTALLATION CONFERENCE

- A. Centrifuge manufacturer service technician and centrifuge manufacturer's local equipment representative shall attend pre-installation conference with

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Owner and installing Contractor to coordinate. Conference shall be held at the plant and be 3 hours long.

3.03 FIELD TESTS

- A. Field Motor Tests: At the time of equipment delivery to the jobsite and after installation prior to startup, the Contractor, manufacturer's representative, or another subcontractor shall megger test (500-volt megger) each motor phase-to-phase and phase-to-ground in the presence of the Engineer. The Engineer record the test values and provide the data to the centrifuge manufacturer. Centrifuge manufacturer shall document the motor resistance test values in the installation report or in the field functional test report. Values of resistance less than 1 megohm will not be acceptable.

3.04 FIELD QUALITY CONTROL

- A. The timing and scheduling for testing shall be coordinated with and be dependent upon the Owner's schedule and quantity of sludge available for testing.
- B. Functional Test:
1. Functional tests specified herein shall be performed for the two centrifuge units furnished as part of the Work of this section.
  2. Prior to startup, all equipment described herein shall be inspected for proper alignment, quiet operation, proper connection, and satisfactory performance of all components by means of a functional test conducted by the manufacturer's representative, assisted by the Owner, and as approved by the Engineer.
  3. Perform on each completed centrifuge system without sludge feed prior to startup. Test to be in coordination with the DCSP and include verification of all communications with DCS including DCS graphics, alarms, status, and control functions.
  4. Each unit shall be submitted to complete normal start, normal stop, and controlled shutdown cycles. The unit shall then be submitted to a 2-hour running test. At the beginning and end of the test, and at periodic intervals between, all temperature monitoring devices shall be observed and recorded. The belt tension shall be adjusted at the start of the test, checked and readjusted if necessary at the end of the test. All safety devices and the differential speed control for the backdrive unit shall be checked for satisfactory operation. Instrumentation and control systems shall be checked for conformance with the specifications.
  5. After approximately 1 hour of runtime, the centrifuge shall be measured for proper vibration. Vibration velocities shall not exceed 6.5 mm per second RMS at the main bearings. If units exhibit vibration in excess of

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the limits specified, manufacturer shall adjust or modify the unit as necessary. After adjustment and/or modification, unit shall be retested to prove conformance.

6. As part of the test, each centrifuge shall be operated with water feed for a minimum of 30 minutes. At the beginning and end of the 30-minute water test, observe and record all thermometer, pressure gauges, and flow indicator readings.
7. Proposed test procedures shall be developed by the centrifuge manufacturer and submitted to the Engineer for review, comment, and approval. Testing shall not begin until the test procedures have been approved by the Engineer.
8. A qualified representative of the manufacturer shall supervise each test, analyze data, and certify the centrifuge's performance during the test.
9. Submit test log to Engineer upon completion of each test.
10. Complete successful functional testing prior to pre-performance testing.

C. Pre-Performance Test:

1. Pre-Performance tests specified herein shall be performed for the two centrifuge units furnished as part of the Work of this section.
2. Manufacturer's representative, assisted by the Owner, shall conduct testing to demonstrate continuous, reliable operation, not performance, while dewatering all of the sludge streams specified herein for durations for each as determined by the Owner.
3. Centrifuge manufacturer shall notify Owner in writing at least 14 days prior to when the Pre-Performance Test will occur. Prior to any testing, the centrifuge manufacturer shall have provided complete Operation and Maintenance Manuals and conducted Prestartup classroom training on the dewatering centrifuge. Field training may occur during the Pre-Performance Test. The Functional Test shall be successful before the Pre-Performance Test may be conducted.
4. Pre-Performance Test shall include operation of each dewatering centrifuge for a period of 5 working days (one 5-day, 8-hour work day week) without shutdown due to equipment or system failures. No more than one centrifuge shall be operated at a time.
5. Stoppages due to any failure of provided equipment and instrumentation, such as the centrifuge control panel, centrifuge VFD panel, or other auxiliary equipment shall not exceed 30 minutes, and such stoppages shall not number more than three over the 5-day test period. A greater number of stoppages or a stoppage longer than 30 minutes shall be deemed a failure of the Pre-Performance Test and the test will stop. Stoppages caused by the Owner may occur without causing failure of the test.
6. Proposed test procedures shall be developed by the centrifuge manufacturer and submitted to the Engineer for review, comment, and

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- approval. Testing shall not begin until the test procedures have been approved by the Engineer.
7. Include the Power Loss Ride Through Feature during this pre-performance testing phase.
  8. A qualified representative of the manufacturer shall supervise each test, analyze data, and certify the centrifuge's performance during the test.
  9. If, in the opinion of the Engineer, the Pre-Performance Test is successful and meets the requirements specified herein, the Engineer will recommend to the Owner, by letter, the acceptance of the Pre-Performance Test and that the dewatering centrifuge may begin the Performance Test, providing other requirements for the Performance Test to begin are satisfied.
  10. Should the dewatering centrifuges be unable to achieve the Pre-Performance Test requirements, the centrifuge manufacturer shall perform whatever equipment modifications are deemed necessary such that the equipment can achieve the performance specified. All modifications shall be documented and submitted to the Engineer. Following completion of the equipment modifications, the Pre-Performance Test shall be run again in its entirety.
  11. If, in the opinion of the Engineer, any one centrifuge did not meet the pre-performance requirements specified herein after a second pre-performance test, then the equipment shall be subject to rejection.
  12. For the first and second (if required) Pre-Performance Tests, the cost and responsibility for supplying polymer shall be the responsibility of the Owner. The costs for power, feed sludge, centrate disposal, and dewatered cake disposal shall be borne by the Owner. Centrifuge manufacturer shall be responsible for recommending the Mannich polymer to use and centrifuge operational settings.

D. Performance Test:

1. General:
  - a. Performance tests specified herein shall be performed for the two centrifuge units furnished as part of the Work of this section.
  - b. Performance testing shall be done to demonstrate the actual system operating conditions and verify that each dewatering centrifuge meets or exceeds the minimum performance requirements specified in Article Performance Requirements while dewatering the digested sludge stream specified in Article Service Conditions. Performance testing shall be performed at the solids loading rate specified in Article Performance Requirements and under stable operating conditions.

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- c. The centrifuge manufacturer shall notify the Owner in writing at least 14 days prior to when the Performance Test will occur. Performance Test shall not proceed until after the Pre-Performance Test is successfully concluded.
  - d. The cost of all laboratory tests necessary to confirm the sludge characteristics for the initial performance test on a centrifuge will be borne by the Owner. All laboratory tests for performance testing shall be performed by the Owner in conformance with the applicable portions of standard methods. If retesting is required, the centrifuge manufacturer shall pay the Owner for all laboratory tests subsequent to the initial test. Payment rate for Owner performed laboratory testing shall be as documented by Owner and agreed prior to testing. If desired by the centrifuge manufacturer for initial performance test and/or retesting, centrifuge manufacturer may take duplicate samples and have laboratory tests performed by an independent laboratory at centrifuge manufacturer's expense.
  - e. Polymer used shall be as recommended by the centrifuge manufacturer. The cost and responsibility for supplying polymer shall be the responsibility of the Owner until the equipment is accepted.
  - f. The cost of power, water, and feed sludge shall be borne by the Owner.
2. Performance Test Procedures:
- a. Manufacturer's representative, assisted by the Owner, shall startup and operate each centrifuge system on the digested sludge dewatering scenario specified herein, for a period of 2 working days, with 8 hours per day, once stable operation is achieved, with no interruptions allowed during each 8-hour period. All centrifuge operations and associated manufacturer's field services required to adjust machine settings shall be performed prior to and exclusive of the above specified performance test duration. No more than one centrifuge shall be operated at a time.
  - b. Proposed test procedures shall be developed by the centrifuge manufacturer and submitted to the Engineer for review, comment and approval. Testing shall not begin until the test procedures have been approved by the Engineer.
  - c. A qualified representative of the manufacturer shall supervise each test, analyze data, and certify the centrifuge's performance during the test.
  - d. Steady state operation at the specified sludge feed solids rates shall be maintained throughout the test and all hourly quantities shall be the average during the test period. The centrifuge shall maintain acceptable performance while dewatering feed sludge

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- with properties within plus or minus 10 percent of the specified criteria listed in Article Service Conditions.
- e. Centrifuge manufacturer shall verify accuracy of instrumentation used to confirm performance prior to conducting the Performance Test.
  - f. During each performance test, take measurements and collect all required samples for analysis in order to make the following determinations:
    - 1) Sludge Feed Concentration: The total dry solids concentration of the feed sludge entering the centrifuge (percent TS), taken by sample.
    - 2) Dewatered Cake Concentration: The total dry solids concentration of the dewatered cake discharged from the centrifuge (percent TS), taken by sample. Take two duplicate samples per sample interval.
    - 3) Centrate Concentration: The total suspended solids concentration of the centrate discharged from the centrifuge (percent TSS), taken by sample.
    - 4) Solids Capture: Percent, by calculation specified herein.
    - 5) Feed Hydraulic Loading Rate (Exclusive of Polymer): gpm, as measured by sludge feed flowmeter.
    - 6) Feed Solids Loading Rate (Exclusive of Polymer): Pounds per hour of total dry solids, by calculation.
    - 7) Polymer Feed Rate: gpm, as measured by polymer feed flowmeter.
    - 8) Polymer Dose: Pounds active per dry ton of feed solids, by calculation.
  - g. Collect samples at approximate 1 hour intervals for a minimum of eight samples for each test period. Additional sampling may be made at centrifuge manufacturer's option.
  - h. Performance evaluation will be based upon the arithmetic average of the test results obtained during the test period, with the average rounded to one decimal place. The Owner reserves the right to discard obviously high or low erroneous test results. As specified below, laboratory testing will be performed by the Owner. Turnaround time for dewatered cake concentration samples are approximately 24 hours. For more immediate dewatered cake results, centrifuge manufacturer may supply their own instrumentation. Performance results shall be based on the laboratory standard methods results.
  - i. Prepare a formal test report including all laboratory analysis reports, all measured flows, the mass balance calculations, polymer dose, and solids capture. Submit final report to the Engineer within 20 days after completion of the test.

CITY OF SAN DIEGO  
METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

3. Performance Test Acceptance Procedures:
  - a. If, in the opinion of the Engineer, the Performance Test is successful and meets the requirements specified herein, the Engineer will recommend to the Owner, by letter, the acceptance of the Performance Test.
  - b. If, in the opinion of the Engineer, the centrifuge does not meet the minimum performance requirements specified in Article Performance Requirements, the representative of the manufacturer shall make such changes in the equipment and methods of operation as deemed necessary and as approved by the Engineer. The necessary adjustments shall be made as soon as practical, but within a period not to exceed 30 days.
  - c. Following the adjustments, centrifuge manufacturer and shall repeat the Performance Test (“retest”). Prepare a formal test report including all laboratory analysis reports, all measured flows, the mass balance calculations, polymer dose, and solids capture. Submit the final report to the Engineer within 20 days after completion of the retest.
  - d. If, in the opinion of the Engineer, the retest Performance Test is successful and meets the requirements specified herein, the Engineer will recommend to the Owner, by letter, the acceptance of the Performance Test.
  - e. If, in the opinion of the Engineer, the centrifuge did not meet the minimum performance requirements specified in Article Performance Requirements during the retest, then the equipment shall be subject to rejection.
4. Equipment Rejection: Equipment subject to rejection shall be removed by the centrifuge manufacturer, at centrifuge manufacturer’s expense, as defined in the Contract Documents.

E. Optimization Assistance:

1. Optimization Assistance shall not begin until a minimum of 6 weeks after successful completion of the Performance Test.
2. Optimization Assistance shall include Supplemental Training and Performance Optimization as further specified herein with specified services to be provided within 3 months following successful completion of the Performance Test.
3. Supplemental Training:
  - a. Supplemental Training shall consist of additional classroom and hands-on training by a qualified representative of the manufacturer to refresh Owner’s staff on operation and maintenance procedures and to respond to questions once Owner’s staff have operated the equipment. Durations as specified herein.



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METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

- b. Conduct additional classroom training.
  - c. Hands-on training shall include a demonstration of equipment breakdown, inspection of internal components, assembly, and on-line adjustments for equipment performance. In addition to operations and maintenance staff, include training for controls and electrical staff.
4. Performance Optimization:
- a. Provide a qualified representative of the manufacturer, assisted by the Owner, to operate the centrifuges to optimize machine settings to maximize solids concentration and solids capture efficiency and minimize polymer and electrical power consumption.
  - b. Proposed optimization procedures shall be developed by the centrifuge manufacturer and submitted to the Engineer for review, comment, and approval. Optimization services shall not begin until the test procedures have been approved by the Engineer.
  - c. A qualified representative of the manufacturer shall supervise the testing, analyze data, and provide a report summarizing trials, measured performance, and recommendations.
  - d. During optimization testing, take measurements as specified for performance testing, collecting samples at approximately 2-hour intervals, or when operation has stabilized at each trial condition.
  - e. The cost of all laboratory tests will be borne by the Owner. All laboratory tests for performance testing shall be performed by the Owner in conformance with the applicable portions of standard methods.
  - f. Mannich polymer used shall be as recommended by the centrifuge manufacturer. The cost of polymer, power, water, and feed sludge shall be borne by the Owner. Prepare and submit optimization results.

3.05 MANUFACTURER'S FIELD SERVICES

- A. Manufacturer's Authorized Representative: Present at Work site or classroom designated by the Owner, for the minimum person-days listed below, travel time excluded. A minimum of five trips shall be required.
- B. Minimum Services to Include:
  - 1. 3 person-days for inspection and functional testing.
  - 2. 2 person-days for prestartup classroom or jobsite training.
  - 3. 4 person-days for pre-performance testing.
  - 4. 5 person-days for performance testing and operator training during facility startup.

CITY OF SAN DIEGO  
METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

5. 4 person-days for optimization assistance consisting of the following activities:
  - a. 1/2 person-day for supplemental classroom training.
  - b. 1/2 person-day for supplemental hands-on training.
  - c. 3 person-days for performance optimization.
  
- C. The periods and trips stated above are minimums only and the manufacturer is required to be onsite for all of the functions listed above to the extent that is required to complete those functions to the satisfaction of the Owner and Engineer.

**END OF SECTION**









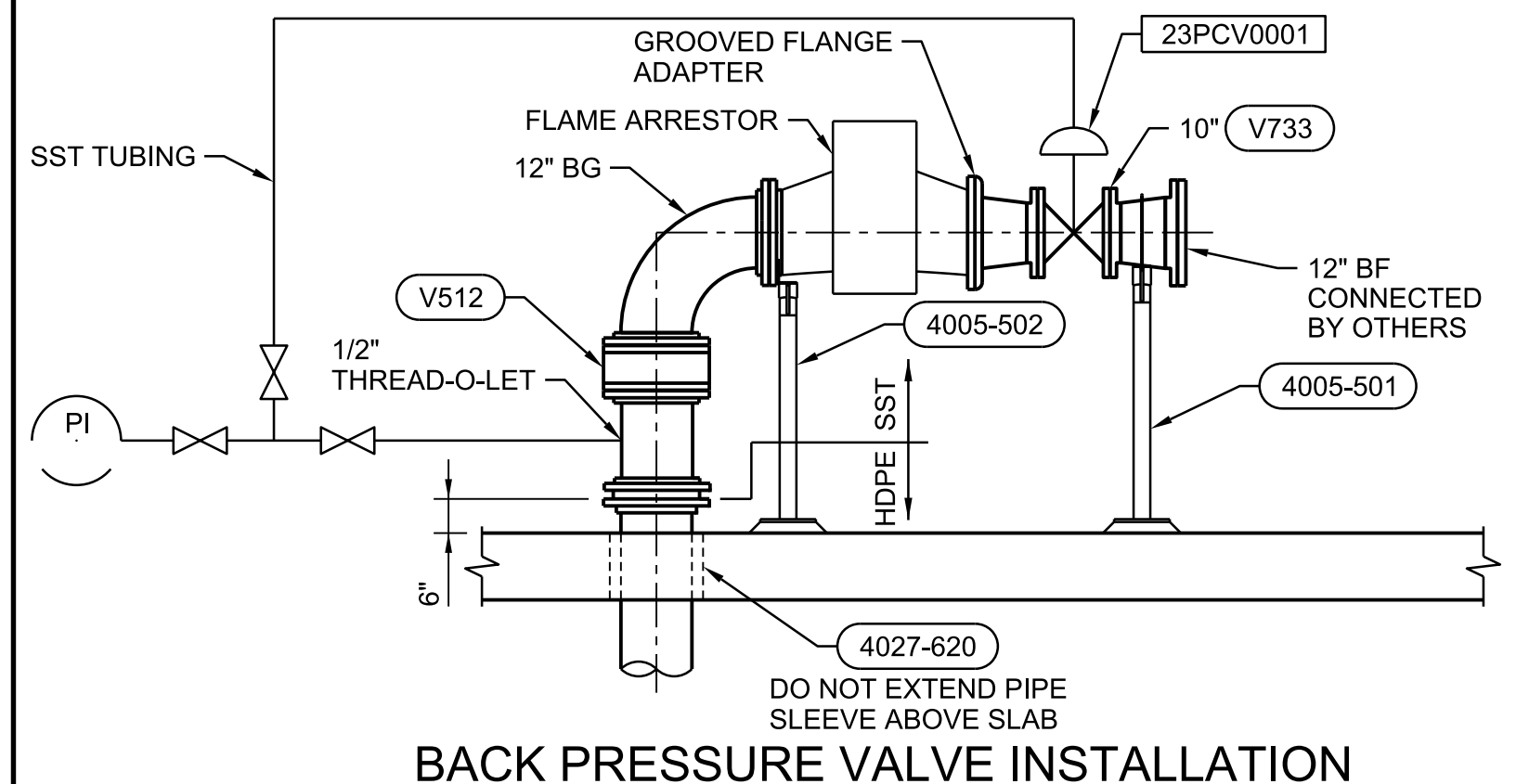
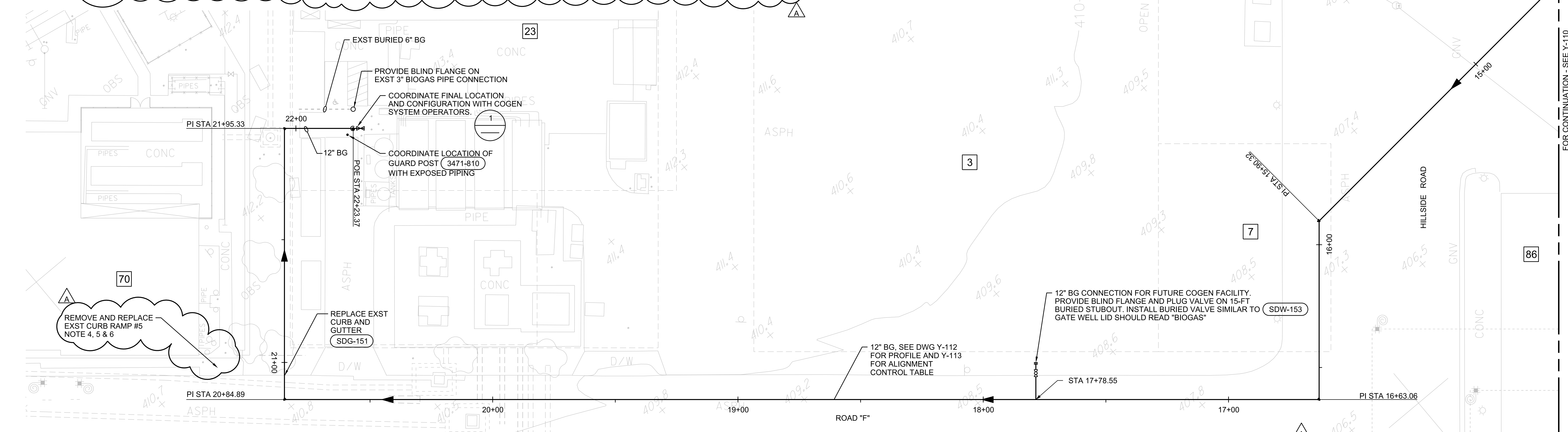
FOR CONTINUATION - SEE Y-110

**GENERAL NOTES:**

1. THE DESIGN OF THE CURB RAMP SHALL NOT AFFECT THE DRAINAGE PATTERN ON THE STREET.
2. CONTRACTOR TO REPLACE LIFTED, DAMAGED, OR MISSING SIDEWALK PANELS WITHIN THE CURB RETURN AND WITHIN THE ADJACENT AREAS OF THE CURB RETURN.
3. COUNTER SLOPES (CURB RAMP SLOPE PLUS STREET SLOPE) WHEN ADDED CANNOT EXCEED 13.0%.
4. CONTRACTOR TO PROTECT EXISTING PERMITTED WALLS/FENCES DURING DEMOLITION AND CONSTRUCTION OF CURB RAMP.
5. ALL CROSSWALKS TO BE REPLACED OR AFFECTED BY IMPROVEMENTS FOR THIS PROJECT SHALL BE RESTRIPTED AND STRAIGHTENED AS REQUIRED BY THE MUTCD AND SDM-116.
6. PATCH AND REPAIR SURFACE DAMAGES, WHERE APPLICABLE, ALONG THE BOTTOM OF THE CURB RAMP, CROSS GUTTERS, AND AT THE PEDESTRIAN CROSSING AREA SERVING THE CURB RAMP. COORDINATE WORK WITH RESIDENT ENGINEER.
7. CONTRACTOR TO VERIFY POLE SIGN(S) WITHIN OR NEAR CURB RETURNS. PROVIDE AT LEAST 70" CLEARANCE BETWEEN THE BOTTOM OF THE SIGN(S) AND THE SIDEWALK SURFACE. IF 70" MINIMUM CLEARANCE DOES NOT EXIST, ADJUST HEIGHT OF THE SIGN(S).
8. CONTRACTOR TO REMOVE ANY PORTIONS OF EXISTING MEDIANS THAT MAY ENCRACH ON THE CROSSWALK AREA THAT ARE BEING UPGRADED PER SDM-116. NEW CROSSWALK STRIPING SHALL NOT BE RE-ALIGNED TO AVOID EXISTING RAISED MEDIAN.

CURB RAMP NOTES TABLE							
LOCATION NO.	RAMP TYPE	NEW	REPLACEMENT	HISTORIC STAMPS	DETECTABLE WARNING TILES - STAINLESS STEEL	CONSTRAINTS	COMMENTS - MODIFICATIONS
5	TYPE D	-	X	-	X	NO	REMOVE AND REPLACE EXISTING RAMP. SEE SDG-130, SDG-131, SDG-132 SDG-137
6	TYPE A	-	X	-	X	NO	REMOVE AND REPLACE EXISTING RAMP. SEE SDG-130, SDG-131, SDG-132, SDG-133

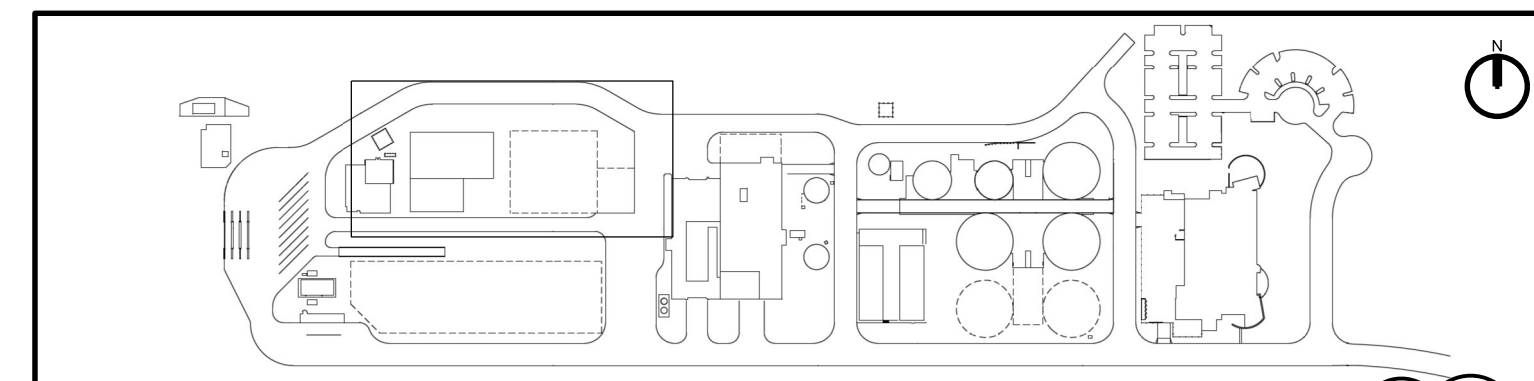
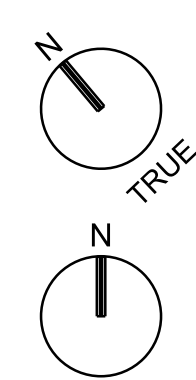
\* THE DETECTABLE WARNING TILES SHALL BE PER THE CITY'S APPROVED MATERIALS LIST



**1** **DETAIL**  
3/8"=1'-0"

**NOTES:**

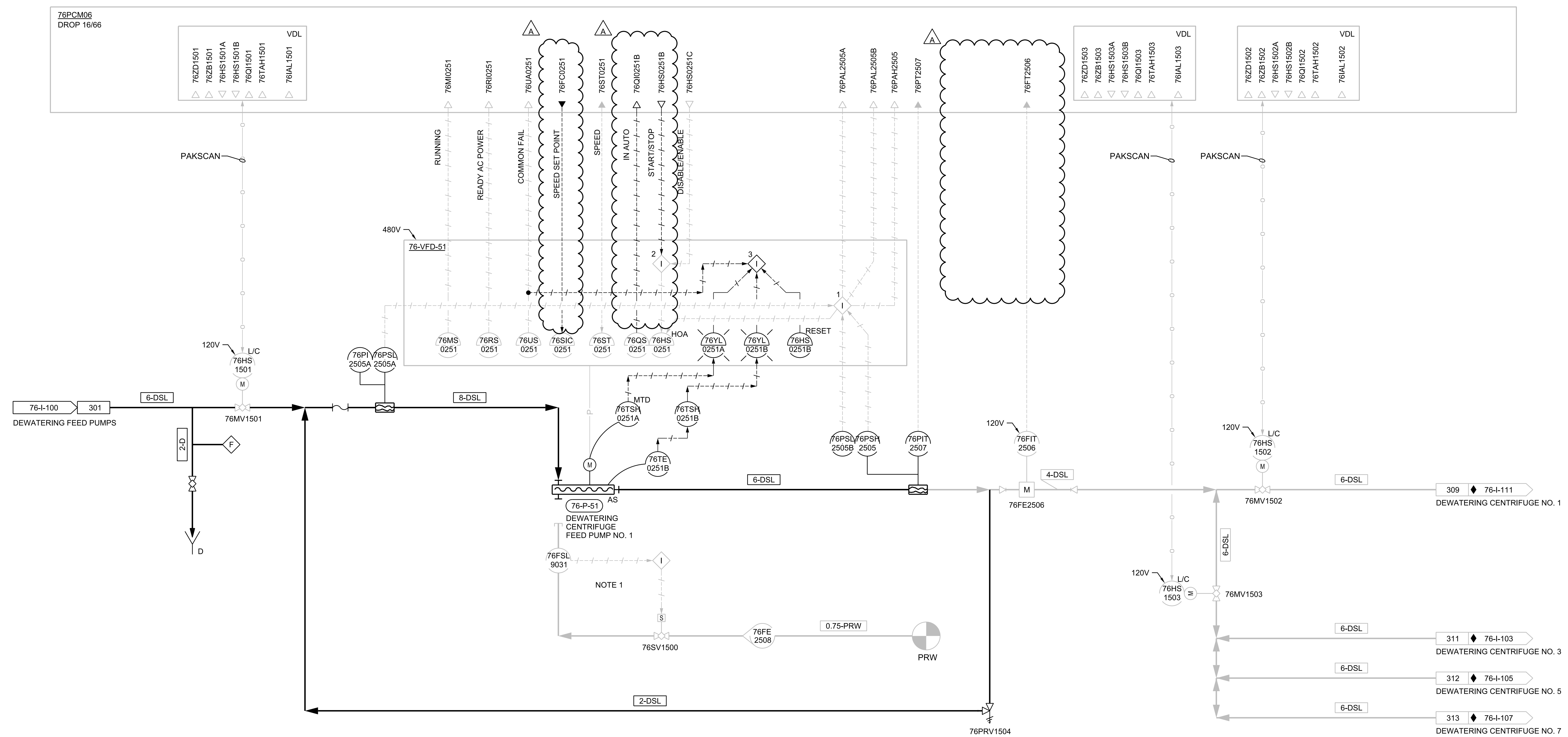
1. FURNISH AND INSTALL 10" V733 BACK PRESSURE REGULATOR AS PER SPECIFICATION AND IN ACCORDANCE WITH VALVE MANUFACTURER'S INSTRUCTIONS.
2. BACK PRESSURE REGULATOR SHALL OPEN WHEN INLET PRESSURE REACHES SET POINT. INITIAL SET POINT IS 2.5 PSIG (ADJUSTABLE).
3. THIS DETAIL SHOWS GENERAL PIPING CONFIGURATION ONLY. CONTRACTOR SHALL COORDINATE WITH COGEN FACILITY TO FIELD DETERMINE PIPING LOCATION, ORIENTATION AND ELEVATIONS.
4. AS-BUILT SURVEY WILL BE CONDUCTED BY CITY OF SAN DIEGO SURVEY CONSULTANT AND WILL BE PROVIDED TO CITY CM PRIOR TO DEMOLITION OF EXISTING FACILITIES FOR USE IN NOTE 6 BELOW.
5. CITY PM WILL PROVIDE POT HOLE SURVEY FILE TO CITY SURVEY CONSULTANT FOR USE DURING AS-BUILT SURVEY ACTIVITIES. CITY SURVEY CONSULTANT SHALL TIE POT HOLE SURVEY TO RECORD OF SURVEY 14492 WITH MINIMUM TWO (2) POINTS CALLED OUT SHOWING COORDINATE VALUES ON SITE SPECIFIC COORDINATE SYSTEM AND RECORD OF SURVEY 14492.
6. ONCE AS-BUILT SURVEY IS COMPLETE CITY SURVEY CONSULTANT WILL PROVIDE CURB STAKING FOR LOCATION OF REPLACEMENT CURB AND CURB RAMP USING THE AS-BUILT SURVEY IN NOTE 4 ABOVE.



CONSULTANT

SAN DIEGO MBC IMPROVEMENTS YARD PIPING			
<b>BIOGAS YARD PIPING, AND CURB RAMP PLAN 2 OF 2</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 31 OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: <i>Andrew Derrich</i> FOR CITY ENGINEER PRINT DCE NAME: Andrew Derrich	DATE: 12/30/2020 RCE# C70321	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER	
DESCRIPTION	BY	APPROVED	DATE
ORIGINAL	JACOBS	<i>Reynold...</i>	2/5/20
ADDENDUM A	JACOBS		3/9/21
		PROJECT ENGINEER	
		382 - 457	
		CCS27 COORDINATE	
		1888 - 6280	
		CCS83 COORDINATE	
		41198-1031-D	
		DATE STARTED	
		DATE COMPLETED	





**NOTES:**

- SEAL WATER SETUP WILL BE LEFT IN PLACE FOR FUTURE USE.

**INTERLOCK DESCRIPTION:**

- STOP PUMP(S) ON LOW SUCTION PRESSURE, LOW DISCHARGE PRESSURE, OR HIGH DISCHARGE PRESSURE CONDITION(S) AFTER ADJUSTABLE TIME DELAY (0-30 SEC) AND ALARM TO DCS.
- START PUMP WHEN BOTH START AND ENABLE SIGNALS ARE PRESENT. STOP PUMP UPON LOSS OF EITHER SIGNAL.
- STOP PUMP ON HIGH MOTOR TEMPERATURE ALARM AND HIGH PUMP TEMPERATURE ALARM AFTER ADJUSTMENT TIME DELAY (0-30 SEC) AND LOCKOUT WITH MANUAL RESET.

◆ P&ID NOT INCLUDED IN THIS CONTRACT. SEE EXISTING CONTRACT DOCUMENTS.

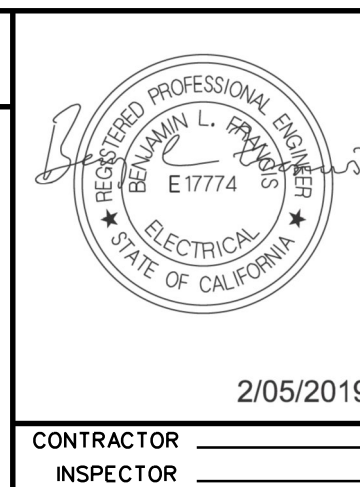
76-I-101

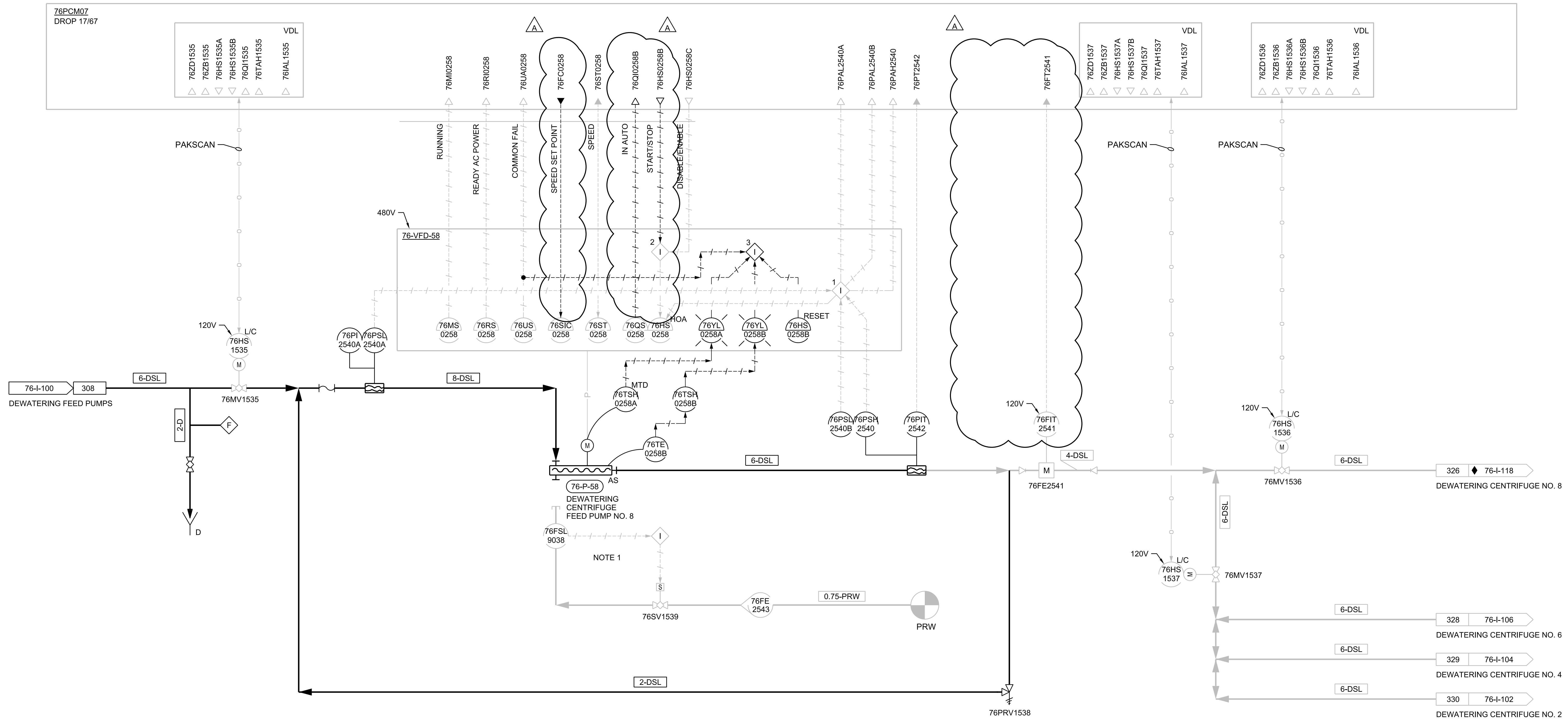
SAN DIEGO MBC IMPROVEMENTS INSTRUMENTATION AND CONTROL - P&ID CENTRIFUGE BUILDING			
<b>DEWATERING CENTRIFUGE FEED PUMP NO. 1</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 279 OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: FOR CITY ENGINEER Andreas Derrich PRINT DCE NAME	DATE 12/30/2020 C70321	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER	
DESIGNER: <b>MONIKA SMOCZYNSKI</b> PROJECT ENGINEER		DATE STARTED 382 - 457	
DESCRIPTION	BY	APPROVED	DATE
ORIGINAL	JACOBS	<i>Reynold...</i>	2/5/20
ADDENDUM A	JACOBS		3/9/21
1888 - 6280		CCS27 COORDINATE	
41198-1279-D		CCS83 COORDINATE	
CONTRACTOR		DATE COMPLETED	

CONSULTANT

2/05/2019

CONTRACTOR  
INSPECTOR





**NOTES:**

- SEAL WATER SETUP WILL BE LEFT IN PLACE FOR FUTURE USE.

**INTERLOCK DESCRIPTION:**

- STOP PUMP(S) ON LOW SUCTION PRESSURE, LOW DISCHARGE PRESSURE, OR HIGH DISCHARGE PRESSURE CONDITION(S) AFTER ADJUSTABLE TIME DELAY (0-30 SEC) AND ALARM TO DCS.
- START PUMP WHEN BOTH START AND ENABLE SIGNALS ARE PRESENT. STOP PUMP UPON LOSS OF EITHER SIGNAL.
- STOP PUMP ON HIGH MOTOR TEMPERATURE ALARM AND HIGH PUMP TEMPERATURE ALARM AFTER ADJUSTMENT TIME DELAY (0-30 SEC) AND LOCKOUT WITH MANUAL RESET.

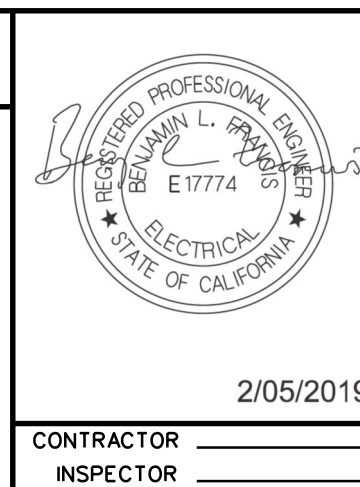
◆ P&ID NOT INCLUDED IN THIS CONTRACT. SEE EXISTING CONTRACT DOCUMENTS.

76-I-108

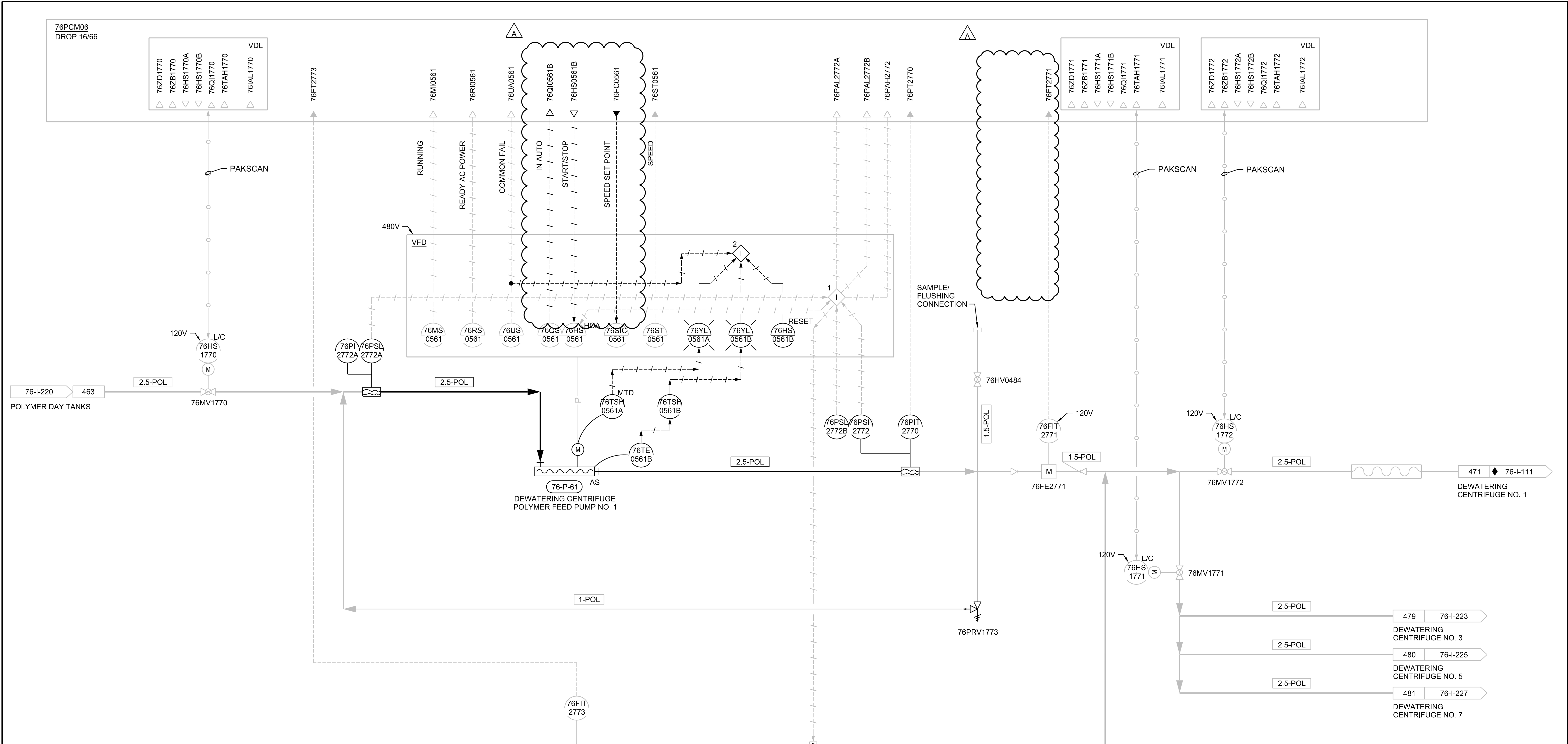
SAN DIEGO MBC IMPROVEMENTS INSTRUMENTATION AND CONTROL - P&ID CENTRIFUGE BUILDING <b>DEWATERING CENTRIFUGE FEED PUMP NO. 8</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 286 OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: FOR CITY ENGINEER Andree Derrich	DATE 12/30/2020 C70321	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER	
PRINT DCE NAME	DATE	CHECKED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT ENGINEER	
DESCRIPTION	BY	APPROVED	DATE FILM
ORIGINAL	JACOBS		2/5/20
ADDENDUM A	JACOBS	<i>Reynold...</i>	3/9/21
		382 - 457 CCS27 COORDINATE	
		1888 - 6280 CCS83 COORDINATE	
CONTRACTOR		DATE STARTED	
INSPECTOR		DATE COMPLETED	
		41198-1286-D	

CONSULTANT

2/05/2019







**INTERLOCK DESCRIPTION:**

- STOP PUMP(S) ON LOW SUCTION PRESSURE, LOW DISCHARGE PRESSURE, OR HIGH DISCHARGE PRESSURE CONDITION(S) AFTER ADJUSTABLE TIME DELAY (0-30 SEC), AND OPEN DILUTION WATER SOLENOID WHEN THE PUMP OPERATES.
- STOP PUMP ON HIGH MOTOR TEMPERATURE ALARM AND HIGH PUMP TEMPERATURE ALARM AFTER ADJUSTABLE TIME DELAY (0-30 SEC) AND LOCKOUT WITH MANUAL RESET.

♦ P&ID NOT INCLUDED IN THIS CONTRACT. SEE EXISTING CONTRACT DOCUMENTS.

76-I-221

SAN DIEGO MBC IMPROVEMENTS  
INSTRUMENTATION AND CONTROL - P&ID  
CENTRIFUGE BUILDING

**DEWATERING CENTRIFUGE  
POLYMER FEED PUMP NO. 1**

CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 294 OF 381 SHEETS		WBS S-17013/B-17006
APPROVED: FOR CITY ENGINEER ANDREA DERRICH	DATE 12/30/2020	SUBMITTED BY <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER
PRINT DCE NAME ANDREA DERRICH	RCE# C70321	CHECKED BY <b>MONIKA SMOCZYNSKI</b> PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL	JACOBS	2/5/20
ADDENDUM A	JACOBS	3/9/21
		DATE FILM
		382 - 457
		1888 - 6280
		41198-1294-D

CONSULTANT

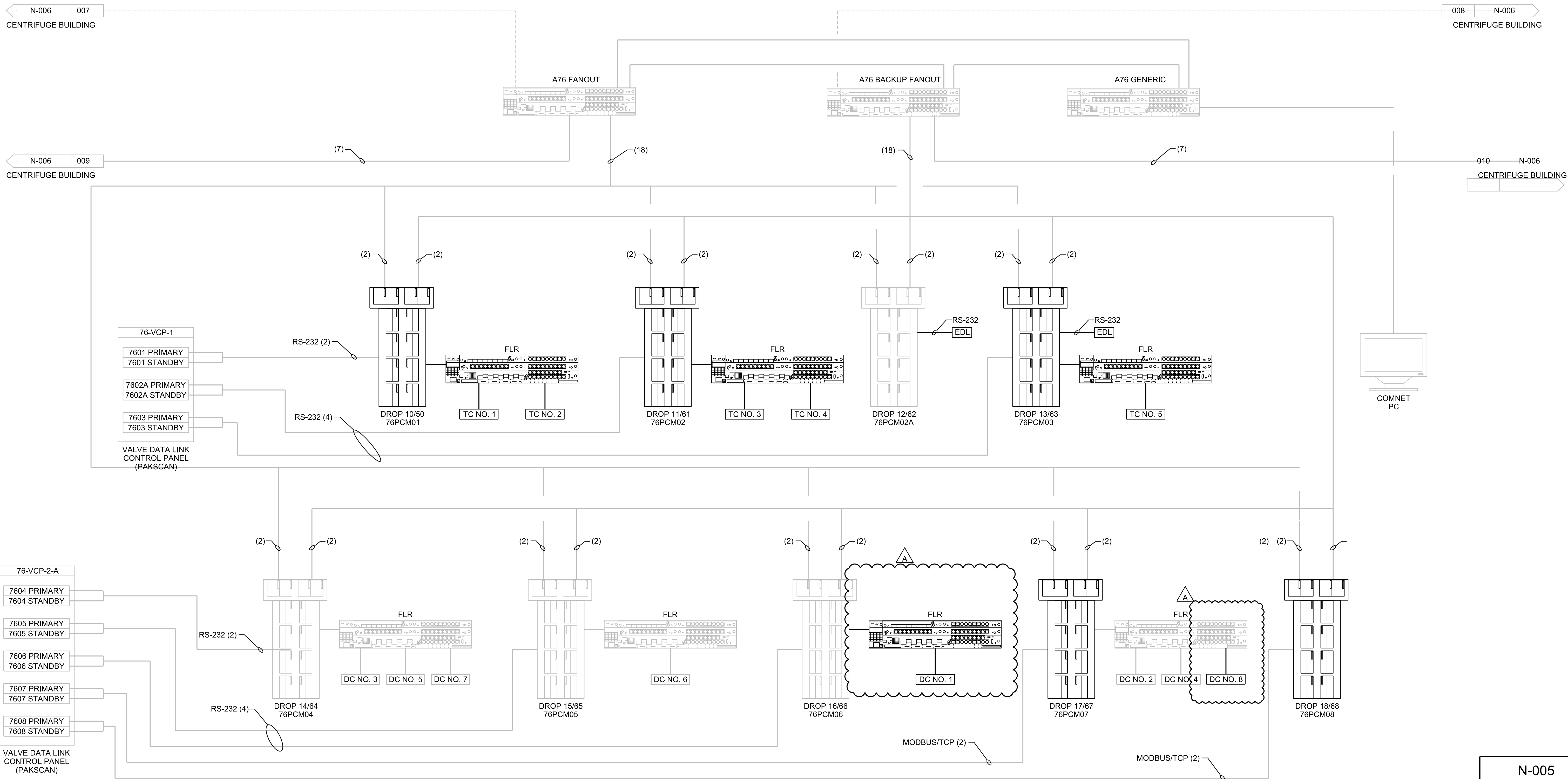
2/05/2019

CONTRACTOR \_\_\_\_\_ DATE STARTED \_\_\_\_\_

INSPECTOR \_\_\_\_\_ DATE COMPLETED \_\_\_\_\_





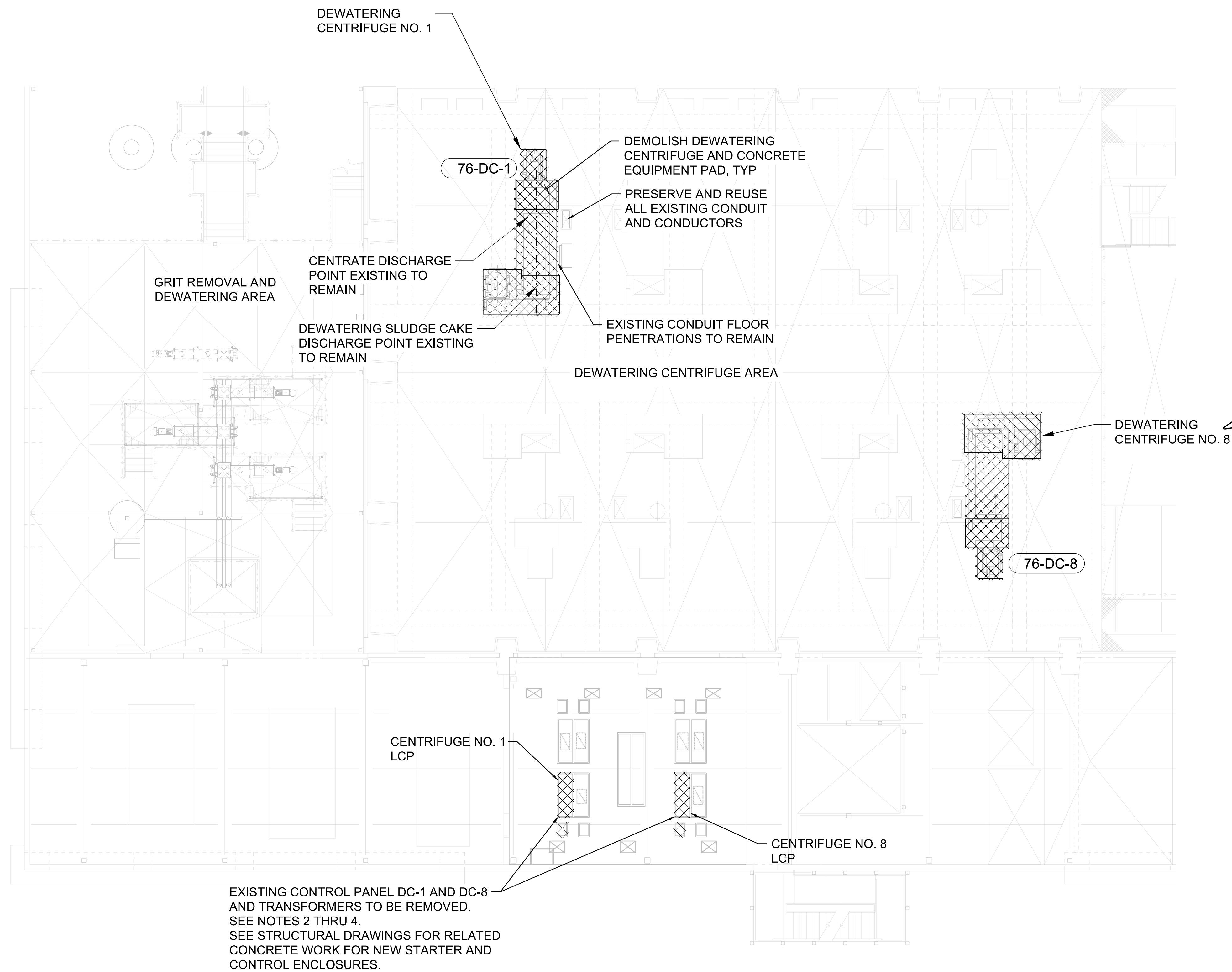
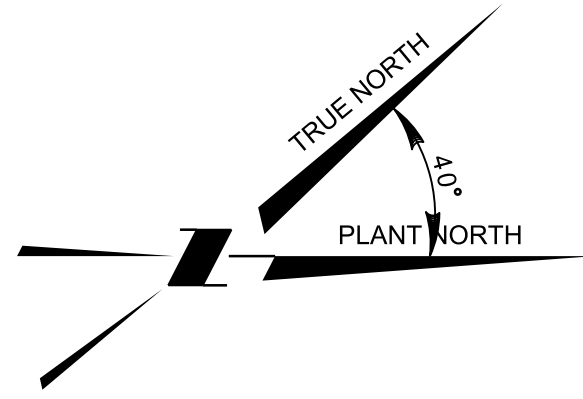


**NOTE:**  
 1. EXISTING EQUIPMENT COPIED FROM CLIENT PROVIDED DOCUMENTATION AND HAS NOT BEEN FIELD VERIFIED.

SAN DIEGO MBC IMPROVEMENTS INSTRUMENTATION AND CONTROL CENTRIFUGE BUILDING <b>NETWORK BLOCK DIAGRAM</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 352 OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: <i>[Signature]</i> FOR CITY ENGINEER PRINT DCE NAME: Andrea Derrich	DATE: 12/30/2020 RCE#: C70321	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER PROJECT ENGINEER: <b>MONIKA SMOCZYNSKI</b>	
DESCRIPTION ORIGINAL	BY JACOBS	APPROVED <i>[Signature]</i>	DATE 2/5/20
ADDENDUM A	JACOBS	DATE 3/9/21	382 - 457 CCS27 COORDINATE 1888 - 6280 CCS83 COORDINATE
CONTRACTOR INSPECTOR		DATE STARTED DATE COMPLETED	
		41198-1352-D	

CONSULTANT  	
2/05/2019	





NOTES:

1. EXISTING INLET PIPING FOR DEWATERING CENTRIFUGES NO. 1 AND NO. 8 SHALL BE REMOVED, MODIFIED AND REUSED IN THE INSTALLATION OF THE NEW DEWATERING CENTRIFUGES NO. 1 AND NO. 8 TO SUIT THE RAISED INLET OF THE NEW CENTRIFUGES, THE EXISTING INLET PIPING SHALL BE MODIFIED AS SHOWN ON DRAWING NO. 76-D-322.
2. REMOVE EXISTING CONTROL PANEL, ISOLATION TRANSFORMER AND TRANSFORMER PAD FOR EACH CORRESPONDING EXISTING CENTRIFUGE. SEE STRUCTURAL DRAWINGS FOR SLAB MODIFICATION FOR NEW ELECTRICAL ENCLOSURE.
3. PROTECT IN PLACE DEGASSING APPARATUS. REMOVE AND REPLACE PIPING AND TUBING AS NECESSARY.
4. SEE ELECTRICAL DRAWINGS FOR ELECTRICAL WORK ASSOCIATED WITH THE NEW ENCLOSURES.

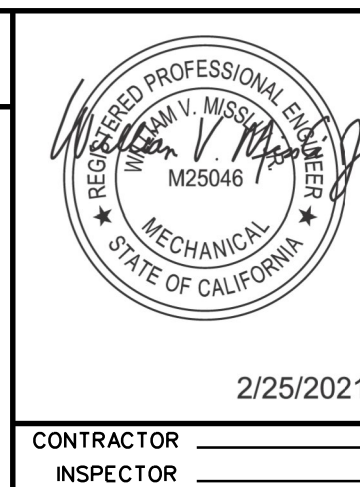
SECOND FLOOR PLAN  
SCALE: NONE

76-X-121

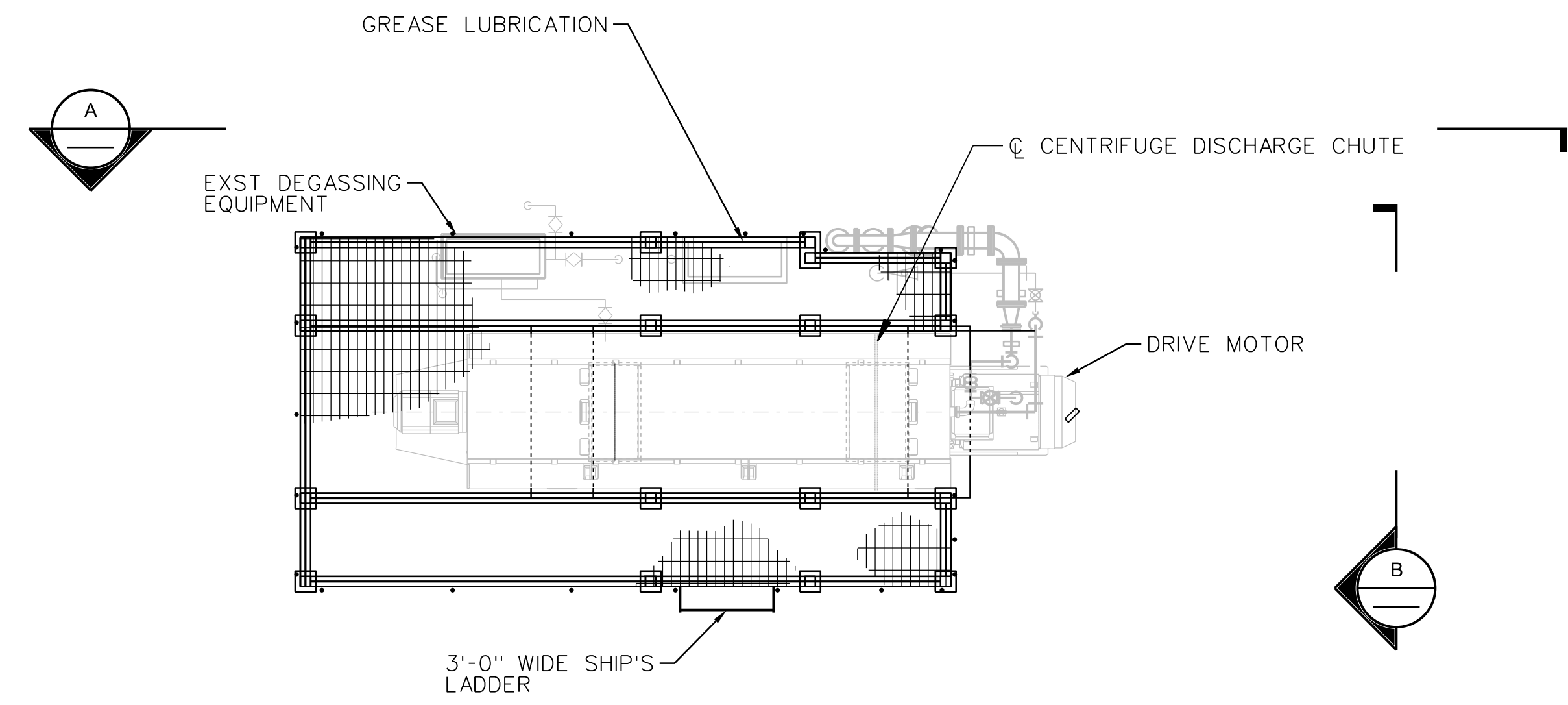
SAN DIEGO MBC IMPROVEMENTS DEMOLITION CENTRIFUGE BUILDING DEWATERING CENTRIFUGE SECOND FLOOR PLAN				WBS S-17013/B-17006
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 60A OF 381 SHEETS		DATE 3/09/2021 PROJECT MANAGER MONIKA SMOCZYNSKI		
APPROVED: <i>Raymond Martin</i> FOR CITY ENGINEER PRINT DCE NAME: Raymond Martin M25046	DATE: 3/9/21 PROJECT ENGINEER: MONIKA SMOCZYNSKI	DATE: 3/9/21	DATE: 3/9/21	DATE: 3/9/21
DESCRIPTION	BY	APPROVED	DATE	FILM
ADDENDUM A	JACOBS	<i>Raymond Martin</i>	3/9/21	382 - 457
				1888 - 6280
				41198-1060A-D
CONTRACTOR		DATE STARTED		DATE COMPLETED
INSPECTOR				

CONSULTANT

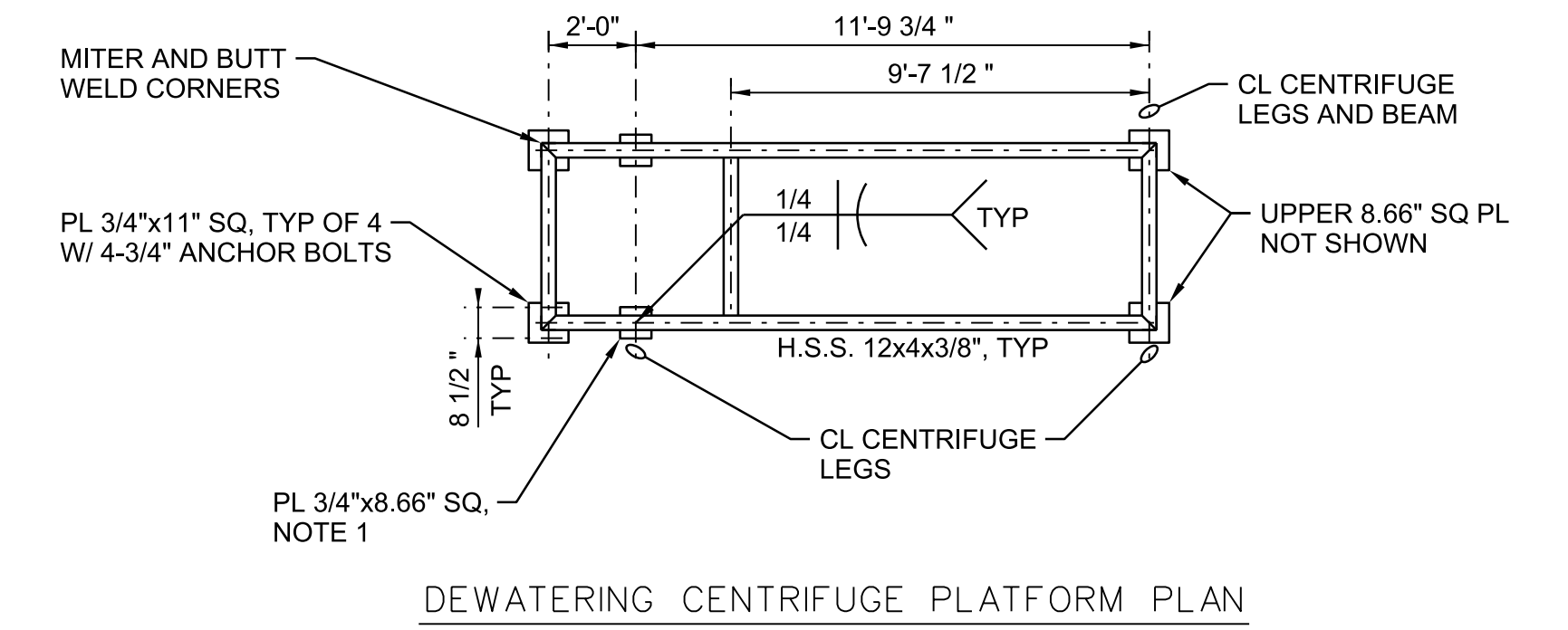
2/25/2021



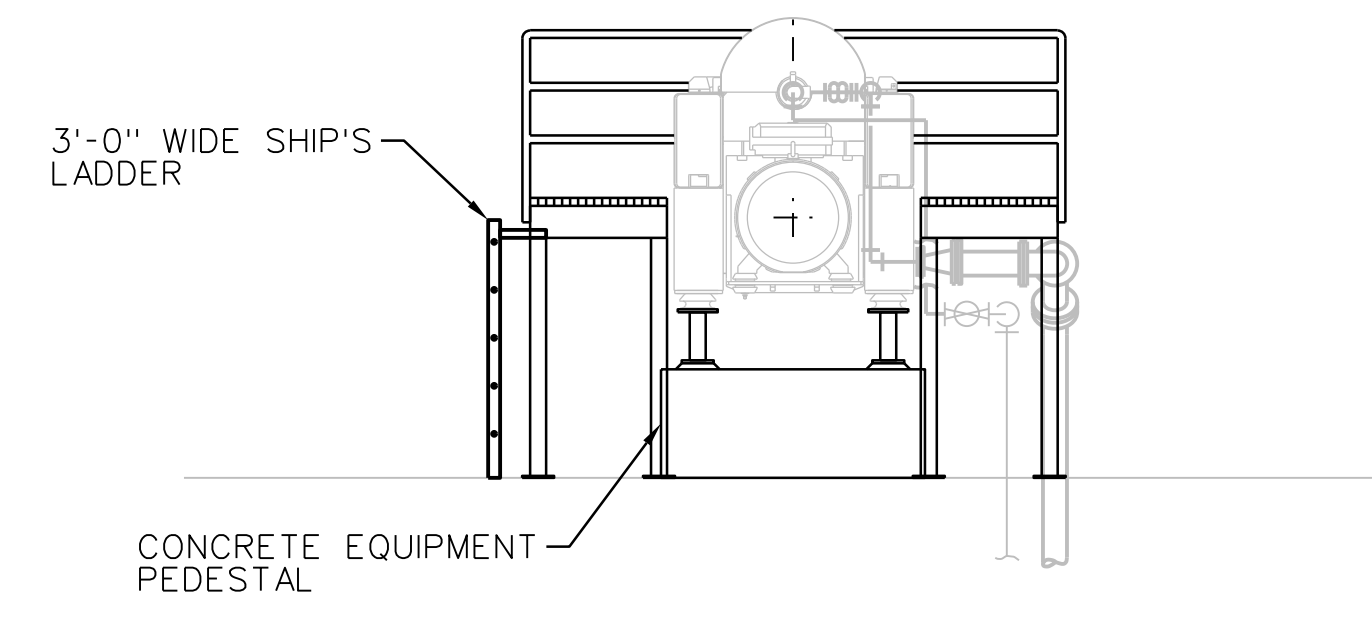
SAN DIEGO METROPOLITAN BIOSOLIDS CENTER



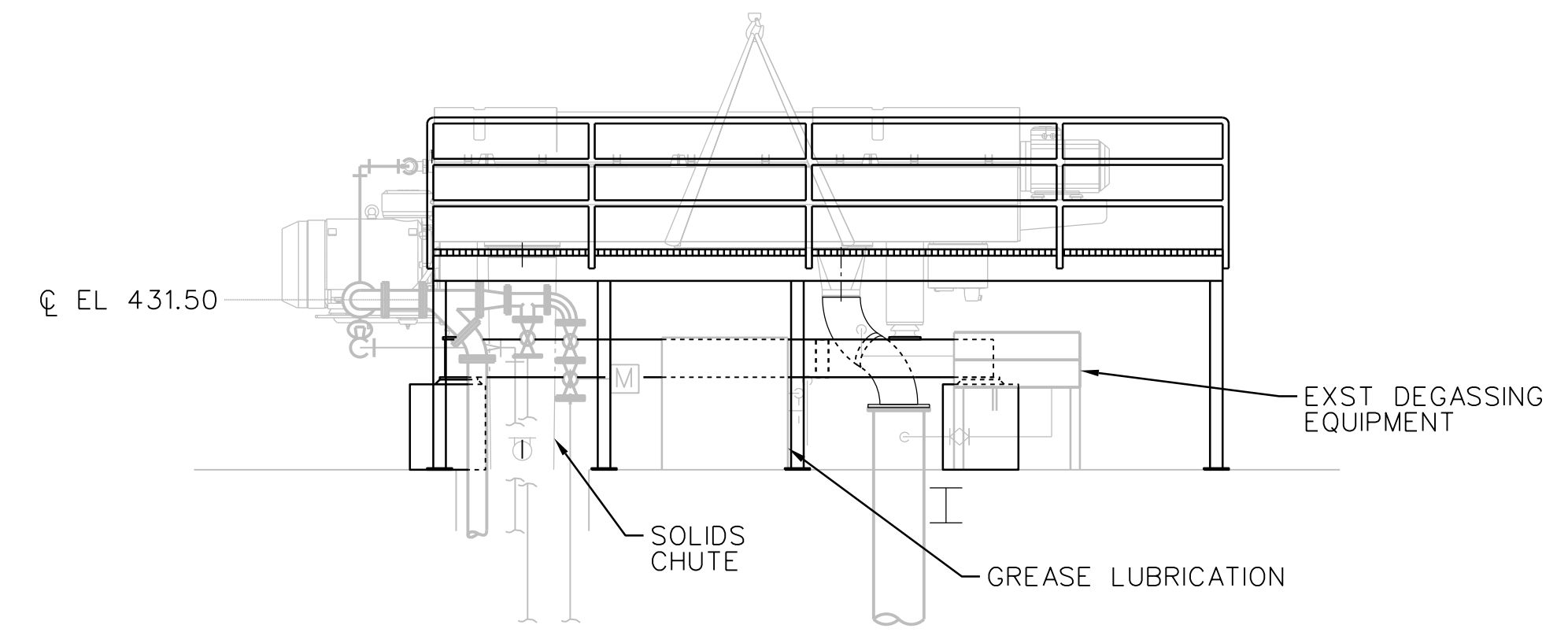
DEWATERING CENTRIFUGE PLAN  
 (76-DC-1) (76-DC-8)  
 SIMILAR



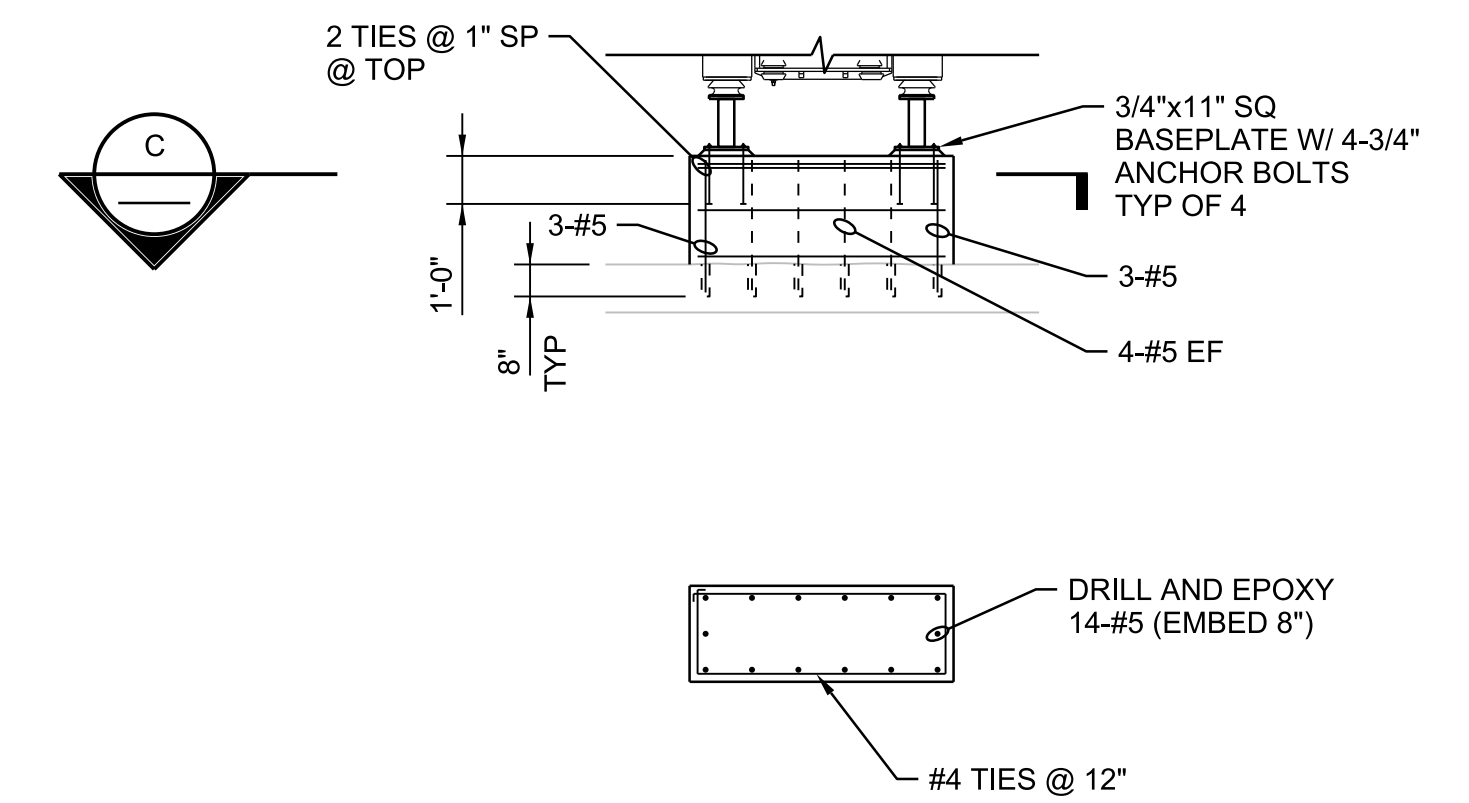
- NOTES:  
 1. VERIFY DIMENSIONS OF BASEPLATE FOR CENTRIFUGE AND MATCH PLAN DIMENSIONS AND BOLTING PATTERN.



**B** SECTION  
 1/4"=1'-0"



**A** SECTION  
 1/4"=1'-0"



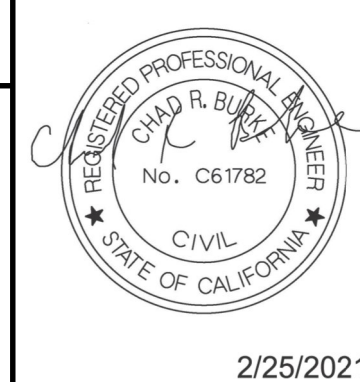
**C** SECTION  
 1/4"=1'-0"

76-S-322

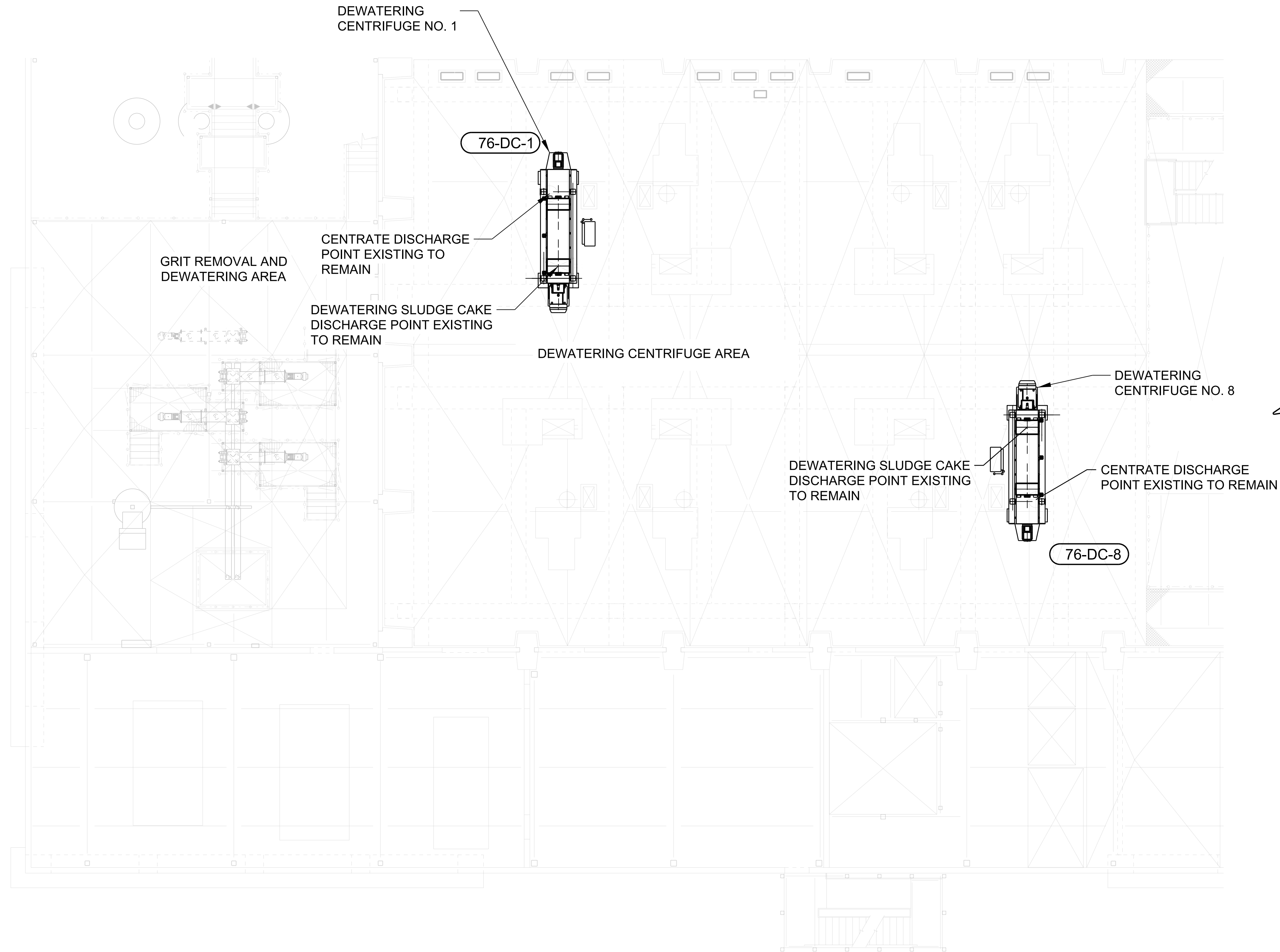
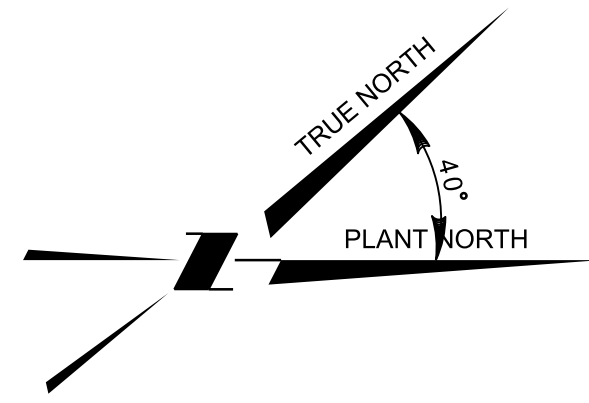
SAN DIEGO MBC IMPROVEMENTS STRUCTURAL CENTRIFUGE BUILDING <b>DEWATERING CENTRIFUGE PLANS AND SECTIONS</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 92A OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: <i>Reynold Martin</i> FOR CITY ENGINEER PRINT DCE NAME: Reynold Martin	DATE: 3/09/2021 C89963	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER	
DESCRIPTION	BY	APPROVED	DATE
ADDENDUM A	JACOBS	<i>Reynold Martin</i>	3/9/21
		DATE STARTED	DATE COMPLETED
		41198-1092A-D	

CONSULTANT

2/25/2021







SECOND FLOOR PLAN  
SCALE: NONE

NOTES:

1. AS ONE OF THE FIRST TASKS, CONTRACTOR TO FIELD VERIFY DIMENSIONS FOR DEWATERING CENTRIFUGE NO. 1 AND NO. 8 FOR INLET PIPING, CENTRATE CHUTE, AND SOLIDS CHUTE DIMENSIONS AND ALL DIMENSIONS SHOWN ON DRAWINGS. CONTRACTOR SHALL SUBMIT VERIFIED FIELD DIMENSIONS TO ENGINEER FOR COORDINATION.
2. FOR THE COMPLETE SECOND FLOOR PLAN, SEE THE ORIGINAL CONTRACT DRAWING NO. 76-M-121.
3. EXISTING INLET PIPING FOR DEWATERING CENTRIFUGES NO. 1 AND NO. 8 SHALL BE REMOVED, MODIFIED AND REUSED IN THE INSTALLATION OF THE NEW DEWATERING CENTRIFUGES NO. 1 AND NO. 8 TO SUIT THE RAISED INLET OF THE NEW CENTRIFUGES, THE EXISTING INLET PIPING SHALL BE MODIFIED AS SHOWN ON DRAWING NO. 76-D-322
4. PRIOR TO INSTALLATION OF NEW DEWATERING CENTRIFUGES NO. 1 AND NO. 8, CONTRACTOR SHALL MODIFY EXISTING STRUCTURAL CONCRETE AS SHOWN ON DRAWING NO. 76-D-321.
5. CONTRACTOR SHALL FURNISH, INSTALL, COMMISSION, AND TEST THE NEW DEWATERING CENTRIFUGES NO. 1 AND NO. 8 AS SPECIFIED AND AND AS INDICATED UNDER, AND COMMISSIONING REQUIREMENTS IN TECHNICAL SPECIFICATIONS 44 22 24.
6. HORIZONTAL ALIGNMENT OF CENTRIFUGES: THE PROPOSED CENTRIFUGES SHALL BE ALIGNED SO THAT THE SLUDGE CAKE DISCHARGE CONNECTION FOR EACH NEW CENTRIFUGE ALIGNS WITH THE EXISTING SLUDGE CAKE DISCHARGE.
7. CONTRACTOR TO FURNISH AND INSTALL PIPING SPACERS AND MAKEUP SPOOL PIECES REQUIRED TO REUSE THE EXISTING INLET PIPING AND RECONNECT EXISTING INLET PIPING TO THE EXISTING RISERS.
8. VERTICAL ALIGNMENT OF CENTRIFUGES: THE VERTICAL ALIGNMENT OF THE CENTRIFUGE INLET WILL BE DETERMINED BY THE EXISTING TOP OF PAD ELEVATION AND THE ALFA LAVAL SHOP DRAWINGS. CONTRACTOR SHALL FIELD-VERIFY PAD ELEVATIONS AND DETERMINE THE NEW CENTERLINE ELEVATION FOR USE IN MAKING THE INLET PIPING MODIFICATIONS SHOWN ON 76-D-322. ESTIMATED EXISTING CENTRIFUGE CENTERLINE ELEVATION = 431.63', ESTIMATED PROPOSED CENTRIFUGE CENTERLINE ELEVATION = 435.0.
9. REMOVE EXISTING CONTROL PANEL, ISOLATION TRANSFORMER AND TRANSFORMER PAD FOR EACH CORRESPONDING EXISTING CENTRIFUGE. SEE STRUCTURAL DRAWINGS FOR SLAB MODIFICATION FOR NEW ELECTRICAL ENCLOSURE.
10. SEE ELECTRICAL DRAWINGS FOR ELECTRICAL WORK ASSOCIATED WITH NEW ENCLOSURES.
11. SEE STRUCTURAL DRAWINGS FOR STRUCTURAL WORK ASSOCIATED WITH NEW CENTRIFUGES.

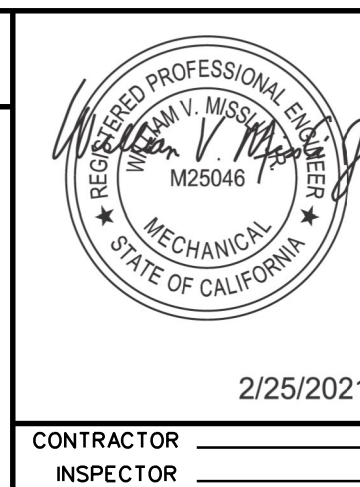
SAN DIEGO METROPOLITAN BIOSOLIDS CENTER

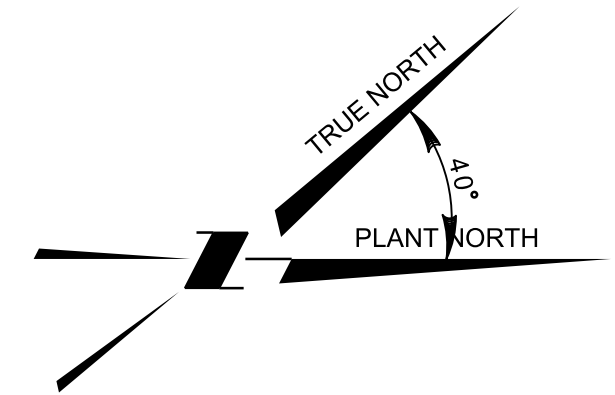
76-D-122

SAN DIEGO MBC IMPROVEMENTS PROCESS CENTRIFUGE BUILDING <b>DEWATERING CENTRIFUGE SECOND FLOOR PLAN</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 106A OF 381 SHEETS			WBS S-17013/B-17006
APPROVED: <i>Reynold Martin</i> FOR CITY ENGINEER PRINT DCE NAME: Reynold Martin M25046	DATE: 3/09/2021 C89963	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER	
DESCRIPTION		BY	APPROVED
ADDENDUM A		JACOBS	<i>Reynold Martin</i>
			DATE
			3/9/21
			FILM
			382 - 457
			CCS27 COORDINATE
			1888 - 6280
			CCS83 COORDINATE
CONTRACTOR			DATE STARTED
INSPECTOR			DATE COMPLETED
			41198-1106A-D

CONSULTANT

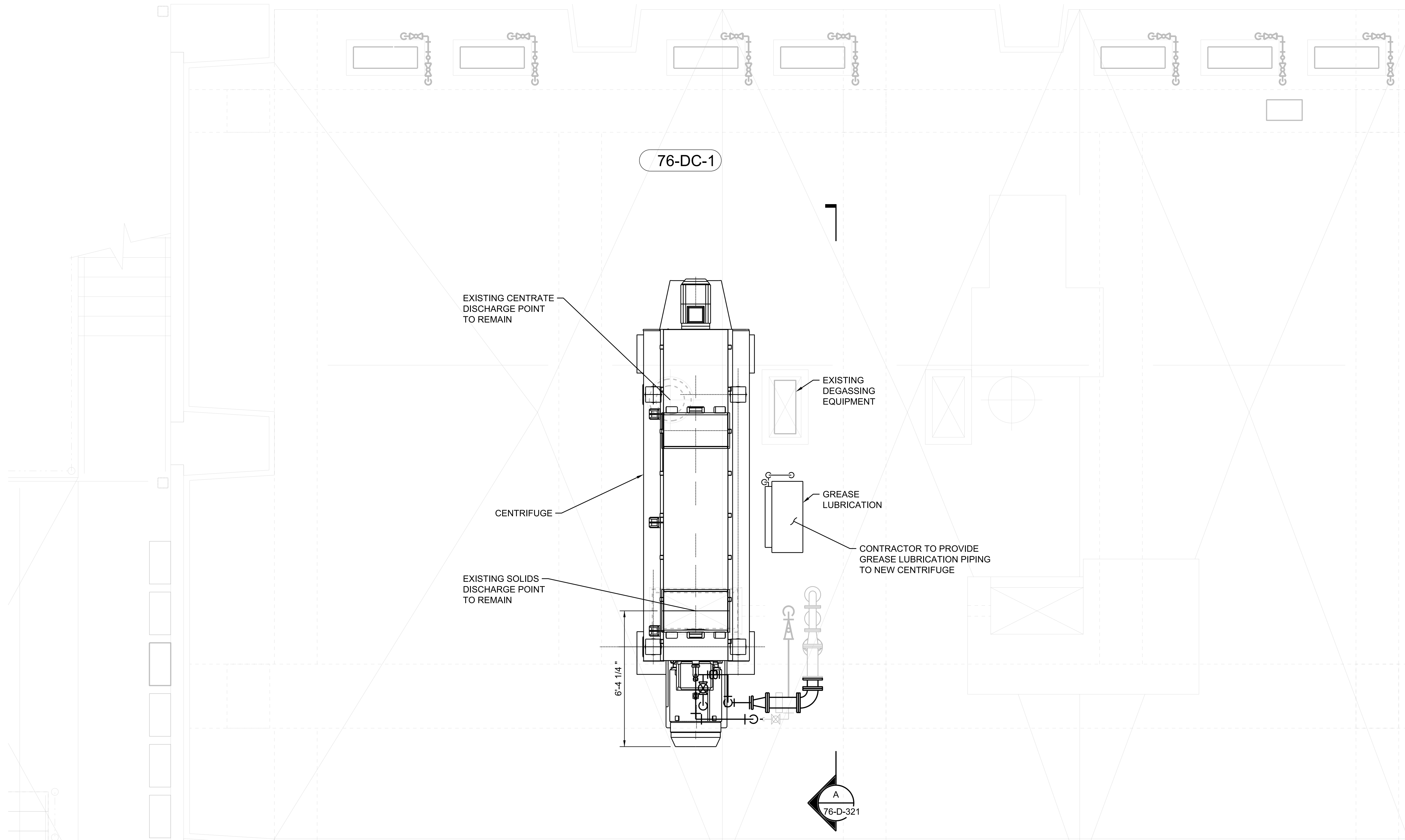
2/25/2021





**NOTES:**

1. DIMENSION ARE SHOWN TO THE CENTER OF THE CENTRIFUGE CHUTE. CONTRACTOR TO CONFIRM DIMENSIONS OF FLOOR OPENINGS.



**DEWATERING CENTRIFUGE NO. 1**  
**PLAN**  
 3/8"=1'-0"

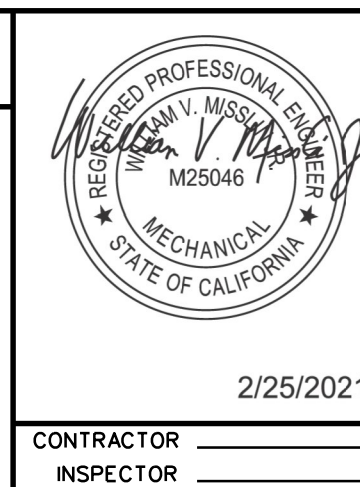
76-D-123

SAN DIEGO MBC IMPROVEMENTS PROCESS CENTRIFUGE BUILDING																							
<b>DEWATERING CENTRIFUGE NO. 1 SECOND FLOOR PLAN</b>																							
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 106B OF 381 SHEETS		WBS S-17013/B-17006																					
APPROVED: <i>Raymond Martin</i> FOR CITY ENGINEER PRINT DCE NAME: Raymond Martin	DATE: 3/09/2021 C89963	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER																					
<table border="1"> <thead> <tr> <th>DESCRIPTION</th> <th>BY</th> <th>APPROVED</th> <th>DATE</th> <th>FIRM</th> </tr> </thead> <tbody> <tr> <td>ADDENDUM A</td> <td>JACOBS</td> <td><i>Raymond Martin</i></td> <td>3/9/21</td> <td>382 - 457</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>1888 - 6280</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		DESCRIPTION	BY	APPROVED	DATE	FIRM	ADDENDUM A	JACOBS	<i>Raymond Martin</i>	3/9/21	382 - 457					1888 - 6280						PROJECT ENGINEER <b>MONIKA SMOCZYNSKI</b> 382 - 457 1888 - 6280	
DESCRIPTION	BY	APPROVED	DATE	FIRM																			
ADDENDUM A	JACOBS	<i>Raymond Martin</i>	3/9/21	382 - 457																			
				1888 - 6280																			
CONTRACTOR INSPECTOR		DATE STARTED DATE COMPLETED																					
		41198-1106B-D																					

CONSULTANT

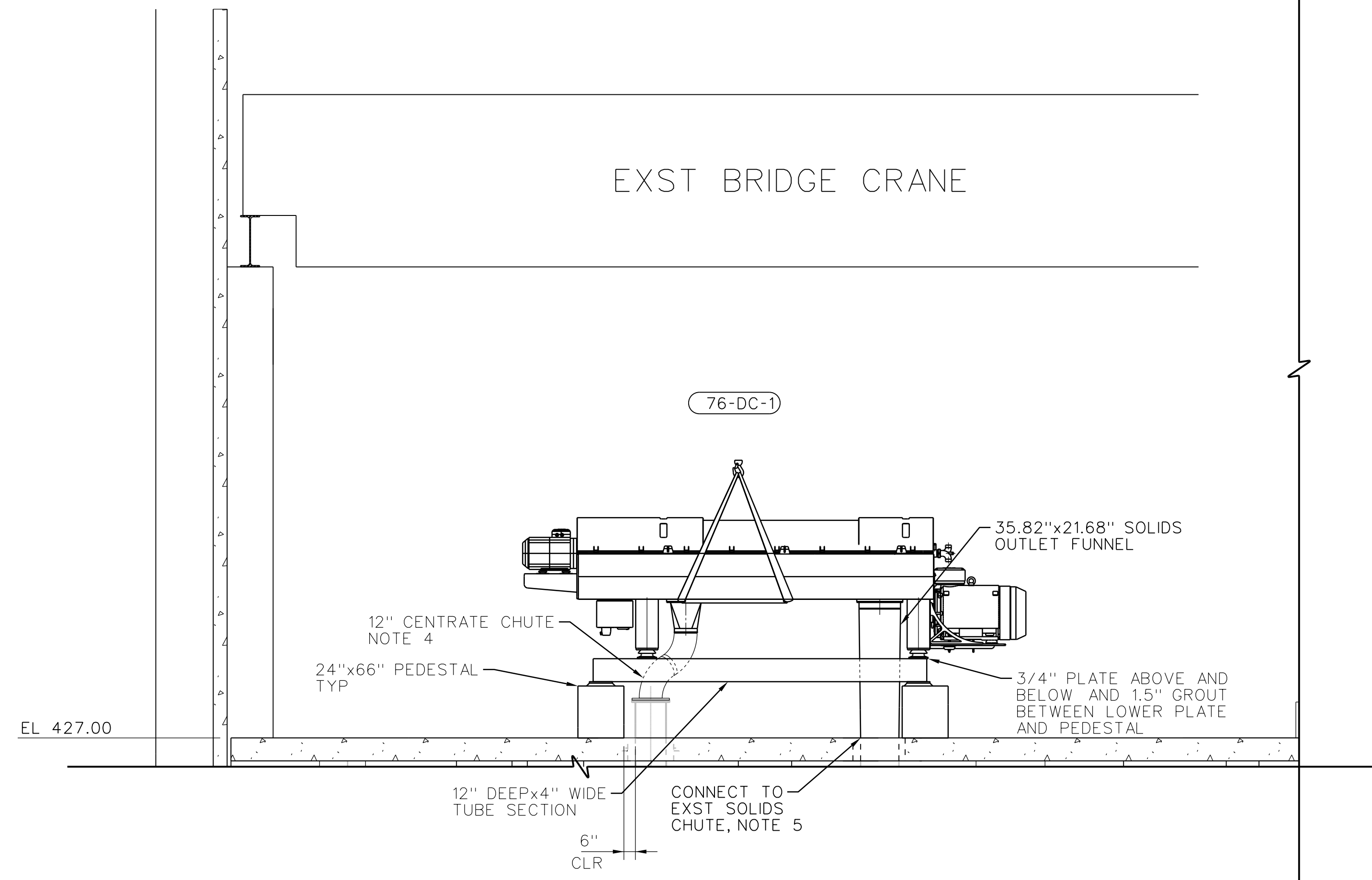


2/25/2021









**A SECTION**  
1/4"=1'-0"  
76-D-123

- NOTES:
1. THE ELEVATION AND LOCATION OF PIPE MAY BE ADJUSTED IN THE FIELD TO FACILITATE CONSTRUCTION.
  2. CENTRIFUGES WILL BE SOURCED FROM ALFA LAVAL.
  3. THE INSTALLATION OF CENTRIFUGES WILL BE DONE UNDER THIS CONTRACT.
  4. FIELD VERIFY EXISTING SOLIDS CHUTE. CONTRACTOR TO PROVIDE TRANSITION TO MATCH CENTRATE OUTPUT ON NEW CENTRIFUGE TO EXISTING CENTRATE CHUTE.
  5. PROVIDE TRANSITION FROM SOLIDS OUTPUT TO EXISTING SOLIDS CHUTE.
  6. SOLIDS AND CENTRATE CHUTE MATERIALS OF CONSTRUCTION IN ACCORDANCE WITH SPECIFICATION SECTION 44 22 24.
  7. INSPECT CRANE FOR PROPER OPERATING AND SAFETY PRIOR TO CONSTRUCTION START. INSPECT CRANE FOLLOWING COMPLETION OF CRANE TASK AND BEFORE PROJECT COMPLETION.

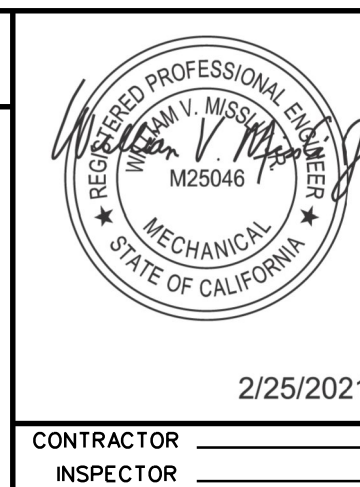
76-D-321

SAN DIEGO MBC IMPROVEMENTS PROCESS CENTRIFUGE BUILDING <b>DEWATERING CENTRIFUGE SECTION</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 115A OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: <i>Reynold Martin</i> FOR CITY ENGINEER PRINT DCE NAME: Reynold Martin	DATE: 3/09/2021 C89963	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER	
DESCRIPTION	BY	APPROVED	DATE
ADDENDUM A	JACOBS	<i>Reynold Martin</i>	3/9/21
CONTRACTOR		DATE STARTED	DATE COMPLETED
INSPECTOR			
		41198-1115A-D	

CONSULTANT

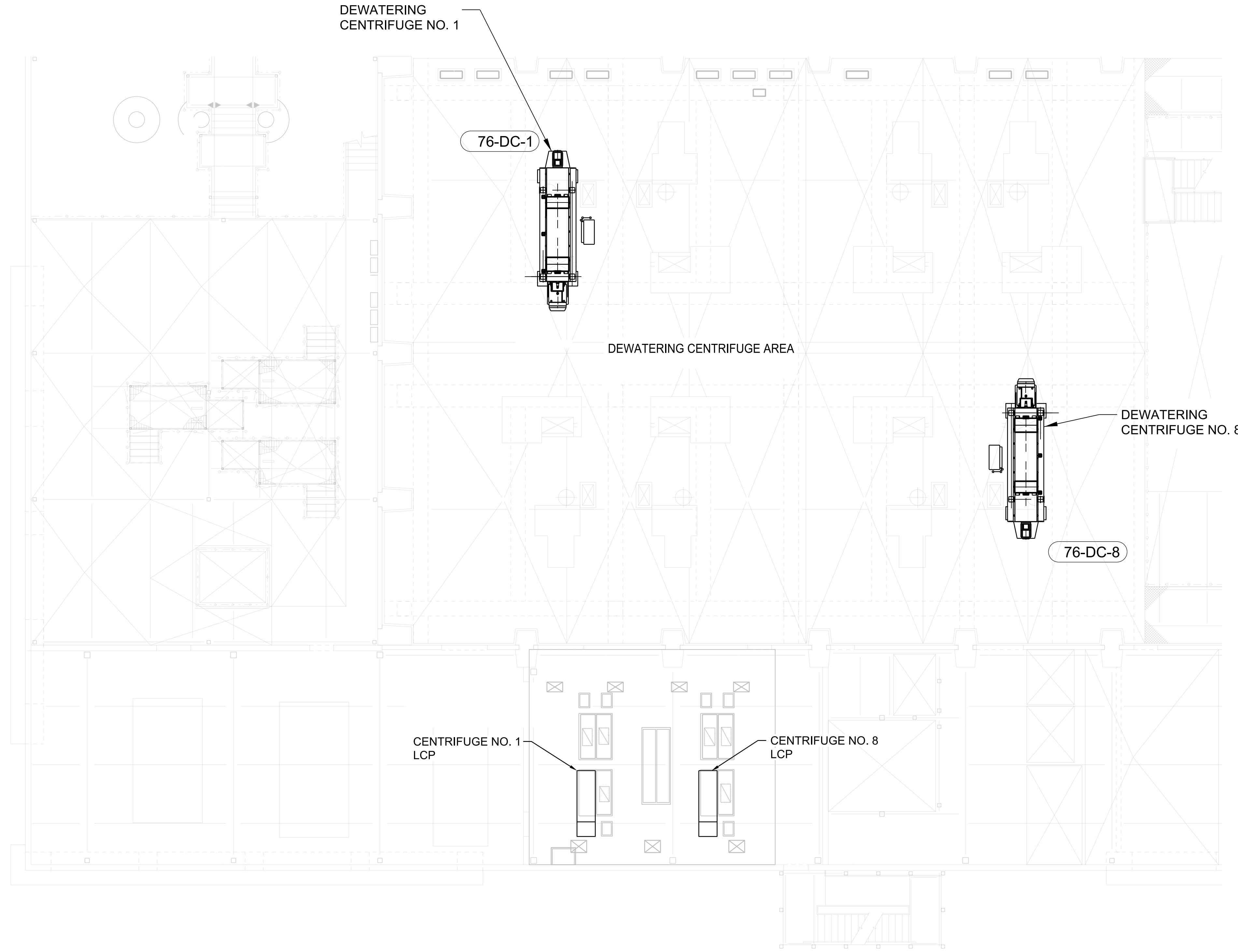
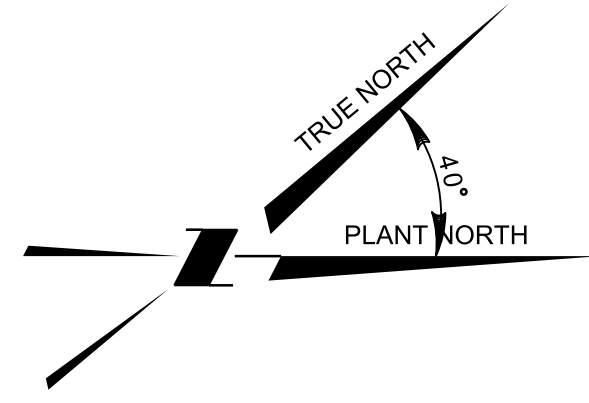


2/25/2021









**SECOND FLOOR PLAN**  
SCALE: NONE

76-E-121

SAN DIEGO MBC IMPROVEMENTS ELECTRICAL CENTRIFUGE BUILDING <b>DEWATERING CENTRIFUGE SECOND FLOOR PLAN</b>				WBS S-17013/B-17006
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 126A OF 381 SHEETS		DATE 3/09/2021 RICE# C89963		APPROVED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER
APPROVED FOR CITY ENGINEER: <i>Raymond Martin</i>	DATE 3/9/21		PROJECT ENGINEER: <b>MONIKA SMOCZYNSKI</b>	
DESCRIPTION	BY	APPROVED	DATE	FILM
ADDENDUM A	JACOBS	<i>Raymond Martin</i>	3/9/21	
CONTRACTOR			DATE STARTED	41198-1126A-D
INSPECTOR			DATE COMPLETED	

CONSULTANT

2/25/2021

SAN DIEGO METROPOLITAN BIOSOLIDS CENTER



Conduit and Wire Schedule						
Cable / Raceway #	Conduit Size	Wiring		From	To	Remarks
		Quantity	Size			
76USSC-3A	3	3	350KCM	76USSC	76DC1.LCP	POWER GROUND
		1	1/0			
76USSC-3B	3	3	350KCM	76USSC	76DC1.LCP	POWER GROUND
		1	1/0			
76USSC-3C	3	3	350KCM	76USSC	76DC1.LCP	POWER GROUND
		1	1/0			
76DC1-2A	3	3	350KCM	76DC1.LCP	MAIN DRIVE MOTOR	POWER GROUND
		1	1/0			
76DC1-2B	3	3	350KCM	76DC1.LCP	MAIN DRIVE MOTOR	POWER GROUND
		1	1/0			
76-DC1-3	3/4	4	12	76DC1.LCP	MAIN DRIVE MOTOR	MOTOR HEATER & SPARE EMERGENCY STOP. NOTE 1.
		3	14			
76DC1-4	1	4	12	76DC1.LCP	LUBE OIL STAND	POWER & GROUND (LUBE PUMP) CONTROL. NOTE 1.
		9	14			
76DC1-5	1 1/2	8	16 SHLD	76DC1.LCP	ANALOG W/X100 CONNECTOR	NOTE 1.
		6	14			
76DC1-7	3/4	3	14	76DC1.LCP	THERMISTOR	THERMISTOR - CONTROL
76DC1-8	3/4	7	12	76DC1.LCP	BACK DRIVE BLOWER MOTOR	POWER & GROUND BLOWER BACK DRIVE HEATER. NOTE 1.
76DC1-9	2	3	4	76DC1.LCP	BACK DRIVE MOTOR	POWER & GROUND
		1	8			
76DC1-10	3/4	1-2/C	16 SHLD	76DC1.LCP	BACK DRIVE MOTOR	THERMISTOR
76DC1-11	3/4	EMPTY	EMPTY	76DC1.LCP	CAP CONDUIT	BACK DRIVE MOTOR. NOTE 2.
76S-1	3/4	2-2/C	16 SHLD	76VFD61	76PCM6	SPEED CONTROL
76S-92A	3/4	2-2/C	16 SHLD.	76FIT-2776 (JUNCTION BOX)	76PCM6	NOTE 1.
76C-163	3/4	5	14	76MG-1557	76DC-1.LCP	CONTROL 76MV-1558 76MG-1551
-	-	-	-	-	-	-
76C-179	3/4	8	14	76MV-1628	76DC-8.LCP	CONTROL 76MV-1628 & 76MG-1627
76S-78	1 1/2	1-2/C	16 SHLD	76FIT-2541 (JUNCTION BOX)	76PCM7	76FIT-2626. NOTE 1.
		1-2/C	16 SHLD			76FIT-2541. NOTE 1
		1-2/C	16 SHLD			76PIT-2542. NOTE 1
		1-2/C	16 SHLD			76PIT-2625. NOTE 1
		2-2/C	16 SHLD			SPARE. NOTE 1
76S-79	3/4	EMPTY	EMPTY	76FIT-2541	76DC8.LCP	NOTE 3.
76C-148	3/4	10	14	76MV-0208	76DC-8.LCP	76MV-0208. NOTE 1.
		3	12	76SV-0208B		
76C-115	3/4	EMPTY	EMPTY	76DC8.LCP	76VFD58	NOTE 3
76S-46	3/4	2-2/C	16 SHLD	76VFD58	76PCM7	SPEED CONTROL
76C-38	1 1/4	14	14	76VFD58	76PCM7	CONTROL & INDICATION
		-	-			SPARE
		4	14			
76C-99	3/4	EMPTY	EMPTY	76DC8.LCP	76VFD68	NOTE 3
76S-136	3/4	EMPTY	EMPTY	76DC8.LCP	76VFD68	NOTE 3
76S-8	3/4	2-2/C	16 SHLD	76VFD68	76PCM7	SPEED CONTROL
76C-8	1 1/4	14	14	76VFD68	76PCM7	NOTE 1
		-	-			
		4	14			
76USSB-6A	3	3	350KCM	76USSB	76DC8.LCP	POWER GROUND
		1	1/0			
76USSB-6B	3	3	350KCM	76USSB	76DC8.LCP	POWER GROUND
		1	1/0			
76C-46	2	1	CAT 6	76DC8.LCP	76PCM7	NOTE 1
76C-179	3/4	12	14	JBOX	76DC8.LCP	NOTE 1

Conduit and Wire Schedule						
Cable / Raceway #	Conduit Size	Wiring		From	To	Remarks
		Quantity	Size			
76S-39	3/4	2-2/C	16 SHLD	76VFD51	76PCM6	SPEED CONTROL
76S-92	1 1/2	1-2/C	16 SHLD	76FIT-2506 (JUNCTION BOX)	76PCM6	76FIT-2506. NOTE 1.
		1-2/C	16 SHLD			76FIT-2556. NOTE 1.
		1-2/C	16 SHLD			76PIT-2555. NOTE 1.
		2-2/C	16 SHLD			76-PIT-2507. NOTE 1.
						SPARE. NOTE 1.
76S-93	3/4	EMPTY	EMPTY	76FIT-2506	76DC1.LCP	NOTE 3.
76S-129	3/4	EMPTY	EMPTY	76DC1.LCP	76VFD61	NOTE 3.
76S-145	3/4	EMPTY	EMPTY	76DC1.LCP	76VFD-51	NOTE 3.
76S-190	3/4	EMPTY	EMPTY	CENTRIFUGE	76DC-1.LCP	NOTE 1.
76S-299	3/4	EMPTY	EMPTY	76FIT-2776	76LCP_DC2 VIA JB	NOTE 3.
76C-1	1 1/4	14	14	76VFD61	76PCM6	NOTE 1.
		4	14			
76C-31	1 1/4	14	14	76VFD51	76PCM6	NOTE 1.
		-	-			
		4	14			
76C-39	2	1	CAT 6	76DC1.LCP	76PCM6	CONTROL & INDICATION. NOTE 1.
76C-92	3/4	EMPTY	EMPTY	76DC1.LCP	76VFD61	NOTE 3.
76C-108	3/4	EMPTY	EMPTY	76DC1.LCP	76VFD51	NOTE 3.
76C-141	3/4	10	14	76MV-0201	76DC-1.LCP	76MV-0201. NOTE 1.
		3	12	76SV-0201B		
-	-	-	-	-	-	-
-	-	-	-	-	-	-
76USSB-6C	3	3	350KCM	76USSB	76DC8.LCP	POWER GROUND
		1	1/0			
76S-38	2	EMPTY	EMPTY	76DC8.LCP	76PCM7	NOTE 3.
		EMPTY	EMPTY			
76DC8-2A	3	3	350KCM	76DC8.LCP	76DC8 MAIN DRIVE MOTOR	POWER GROUND
		1	1/0			
76DC8-2B	3	3	350KCM	76DC8.LCP	76DC8 MAIN DRIVE MOTOR	POWER GROUND
		1	1/0			
76DC8-3	3/4	4	12	76DC8.LCP	76DC8 MAIN DRIVE MOTOR	NOTE 1.
		3	14			
76DC8-4	1	4	12	76DC8.LCP	LUBE OIL STAND	POWER AND GROUND LUBE OIL PUMP CONTROL. NOTE 1.
		9	14			
76DC8-5	1 1/2	16	16 SHLD	76DC8.LCP	ANALOG W/X100 CONNECTOR	NOTE 1.
76DC8-7	3/4	3	14	76DC8.LCP	THERMISTOR	THERMISTOR - CONTROL
76DC8-8	3/4	7	12	76DC8.LCP	BACK DRIVE BLOWER MOTOR	NOTE 1.
76DC8-9	2	3	4	76DC8.LCP	BACK DRIVE MOTOR	POWER & GROUND
		1	8			
76DC8-10	3/4	1-2/C	16 SHLD.	76DC8.LCP	BACK DRIVE MOTOR	THERMISTOR
76DC8-11	3/4	EMPTY	EMPTY	76DC8.LCP	CAP CONDUIT	BACK DRIVE MOTOR. NOTE 2.
76S-152	3/4	EMPTY	EMPTY	76DC8.LCP	76VFD-58	NOTE 3.
76S-196	3/4	EMPTY	EMPTY	CENTRIFUGE	76DC8.LCP	NOTE 3.
76S-300	3/4	1-2/C	16 SHLD.	76FIT-2781	76PCM7	NOTE 1.
76S-78A	3/4	2-2/C	16 SHLD.	76FIT-2781 (JUNCTION BOX)	76PCM7	NOTE 1.

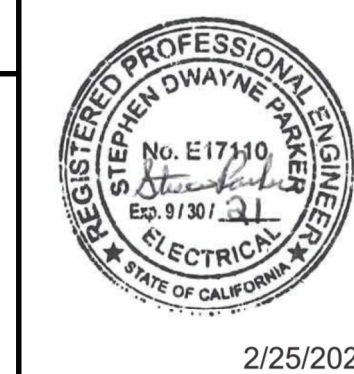
NOTES:

- REMOVE EXISTING CONDUCTORS AND REPLACE WITH NEW CONDUCTORS PER SCHEDULE.
- REMOVE EXISTING CONDUCTORS AND CAP CONDUIT.
- REMOVE EXISTING CONDUCTORS

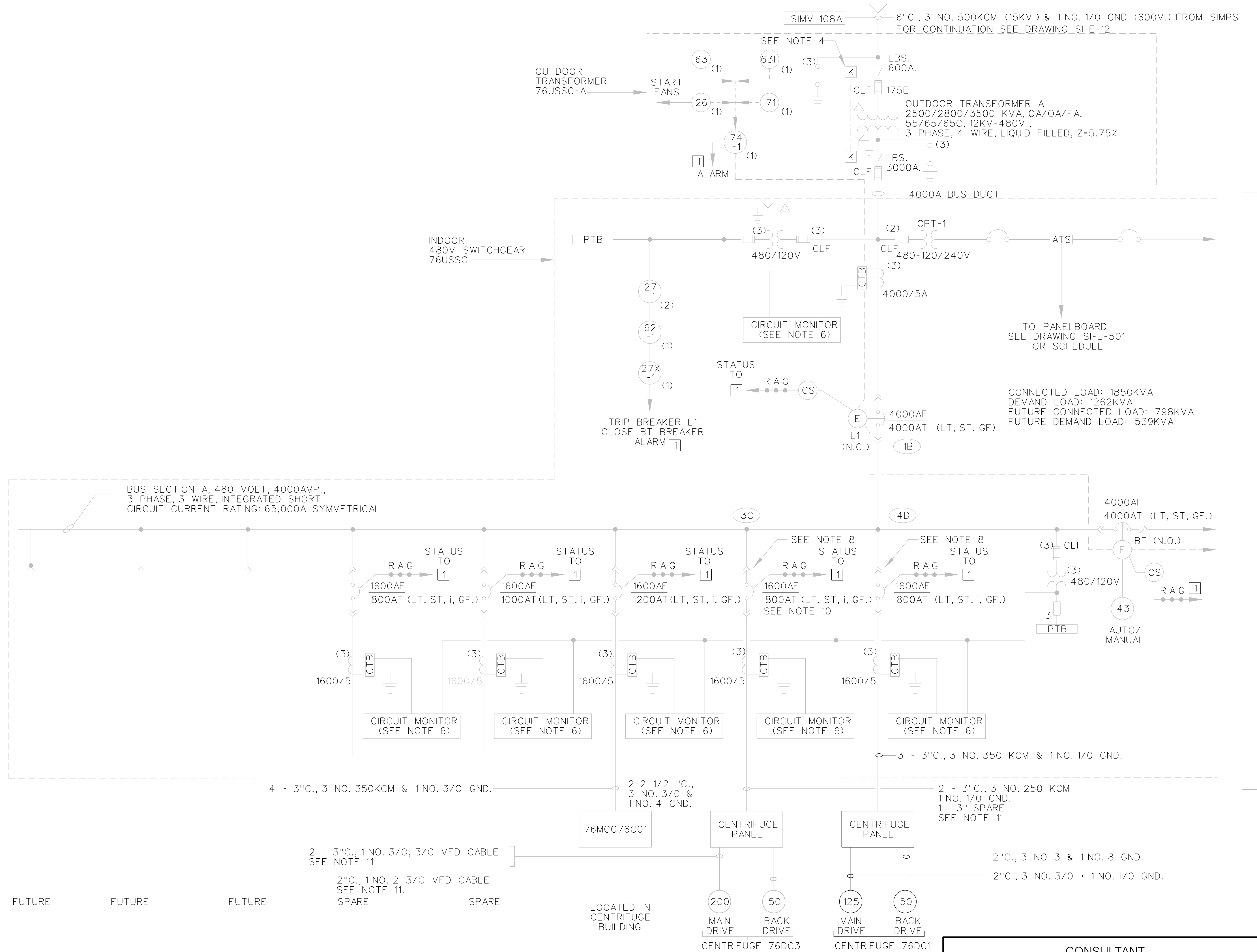
76-E-634

SAN DIEGO MBC IMPROVEMENTS ELECTRICAL CENTRIFUGE BUILDING <b>CABLE AND CONDUIT SCHEDULES</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 158A OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: <i>Raymond Martin</i> FOR CITY ENGINEER Raymond Martin	DATE: 3/09/2021 C89963	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER	
PRINT DCE NAME: <i>Raymond Martin</i>	RICE#	DESIGNED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT ENGINEER	
DESCRIPTION	BY	APPROVED	DATE
ADDENDUM A	JACOBS	<i>Raymond Martin</i>	3/9/21
DATE STARTED			41198-1158A-D
DATE COMPLETED			

CONSULTANT	
<b>ch2m</b> <sup>SM</sup>	
2/25/2021	



CONTRACTOR INSPECTOR



**NOTES:**

1. FOR LEGEND AND GENERAL NOTES, SEE DRAWINGS NO. R-71, R-72 & R-73.
2. NOT USED
3. NOT USED
4. NOT USED
5. NOT USED
6. NOT USED
7. NOT USED
8. NOT USED
9. NOT USED
10. NOT USED
11. EXISTING CONDUIT. NEW CABLE

CONTINUED ON DRAWING NO. 76-E-4

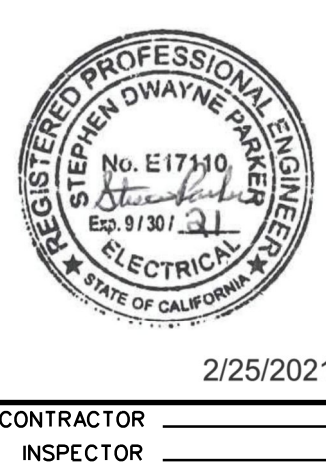
**LEGEND**

- 1 INDICATES PCM SYSTEM INTERFACE
- 25 RELAY
  - 25 - SYNCHRO-CHECK RELAY
  - 26 - TRANSFORMER TEMPERATURE SWITCH
    - HI - TO START FANS & ALARM
    - HI-HI - TO TRIP MAIN BREAKER
  - 27 - UNDERVOLTAGE RELAY
  - 62 - TIMING RELAY
  - 63 - TRANSFORMER PRESSURE SWITCH
  - 63F - TRANSFORMER FAULT PRESSURE RELAY
  - 71 - TRANSFORMER LOW LIQUID LEVEL
- BREAKER TRIP DEVICE
  - LT - LONG TIME DELAY
  - ST - SHORT TIME DELAY
  - I - INSTANTANEOUS
  - GF - GROUND FAULT

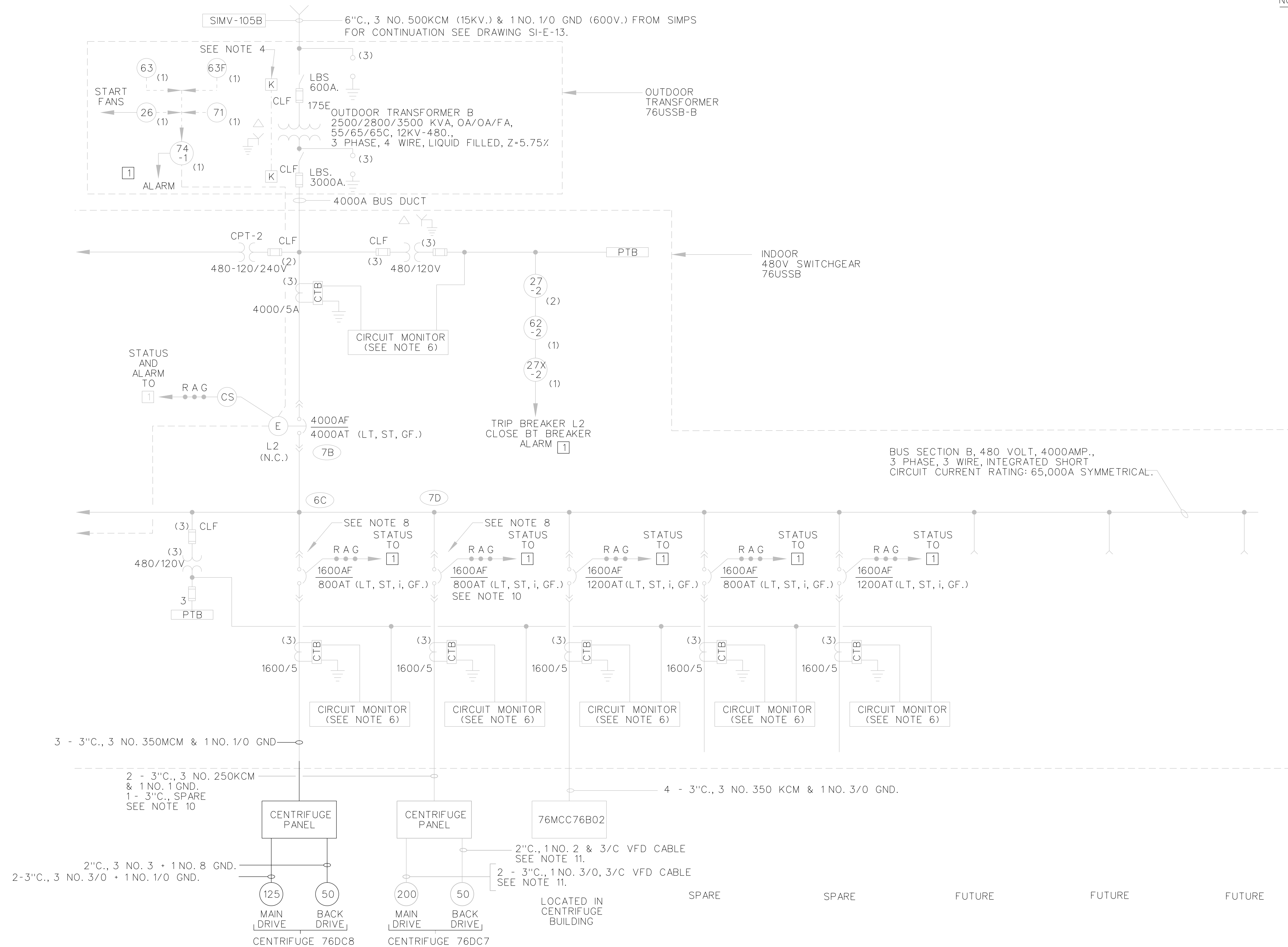
76-E-636

SAN DIEGO MBC IMPROVEMENTS ELECTRICAL CENTRIFUGE BUILDING <b>SINGLE LINE DIAGRAM                  SUBSTATION 76USSB</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 159A OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: <i>Reynold Martin</i> FOR CITY ENGINEER PRINT DCE NAME: Reynold Martin	DATE: 3/09/2021 C89963	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER DESIGNED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT ENGINEER	
DESCRIPTION ADDENDUM A	BY JACOBS	APPROVED <i>Reynold Martin</i>	DATE 3/9/21 FILED 382 - 457 CC527 COORDINATE 1888 - 6280 CC583 COORDINATE
CONTRACTOR INSPECTOR		DATE STARTED DATE COMPLETED 41198-1159A-D	

CONSULTANT







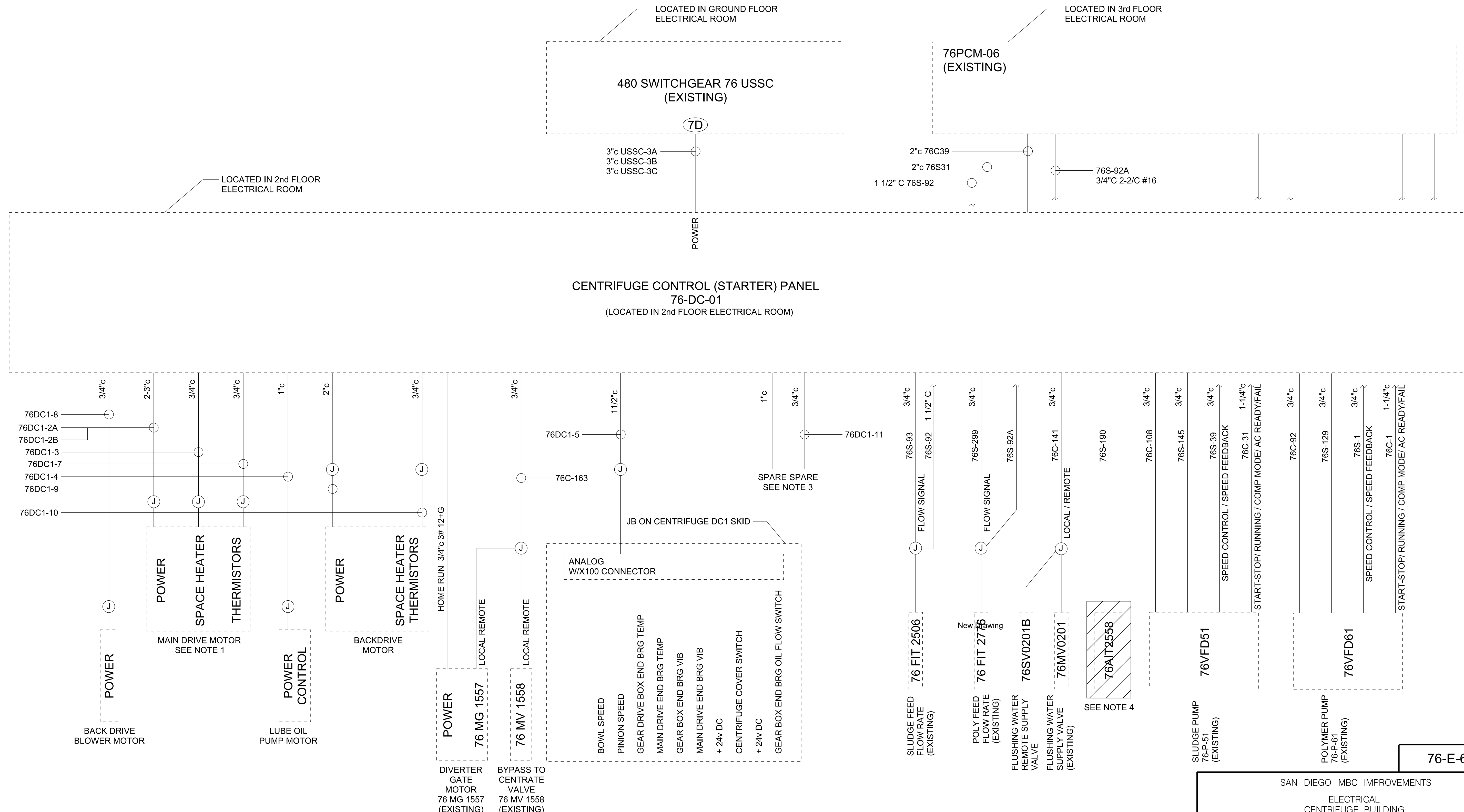
- NOTES:
1. FOR LEGEND AND GENERAL NOTES, SEE DRAWINGS NO. R-71, R-72 & R-73.
  2. NOT USED
  3. NOT USED
  4. NOT USED
  5. NOT USED
  6. NOT USED
  7. NOT USED
  8. NOT USED
  9. NOT USED
  10. NOT USED
  11. EXISTING CONDUIT. NEW CABLE

76-E-637

SAN DIEGO MBC IMPROVEMENTS ELECTRICAL CENTRIFUGE BUILDING			
<b>SINGLE LINE DIAGRAM SUBSTATION 76USSB</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 159B OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: <i>Raymond Martin</i> FOR CITY ENGINEER	DATE 3/9/2021	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER	
PRINT DCE NAME Raymond Martin	RICE# C89963	DESIGNED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT ENGINEER	
DESCRIPTION	BY	APPROVED	DATE FILED
ADDENDUM A	JACOBS	<i>Raymond Martin</i>	3/9/21
CONTRACTOR			DATE STARTED
INSPECTOR			DATE COMPLETED
			41198-1159B-D

CONSULTANT

2/25/2021

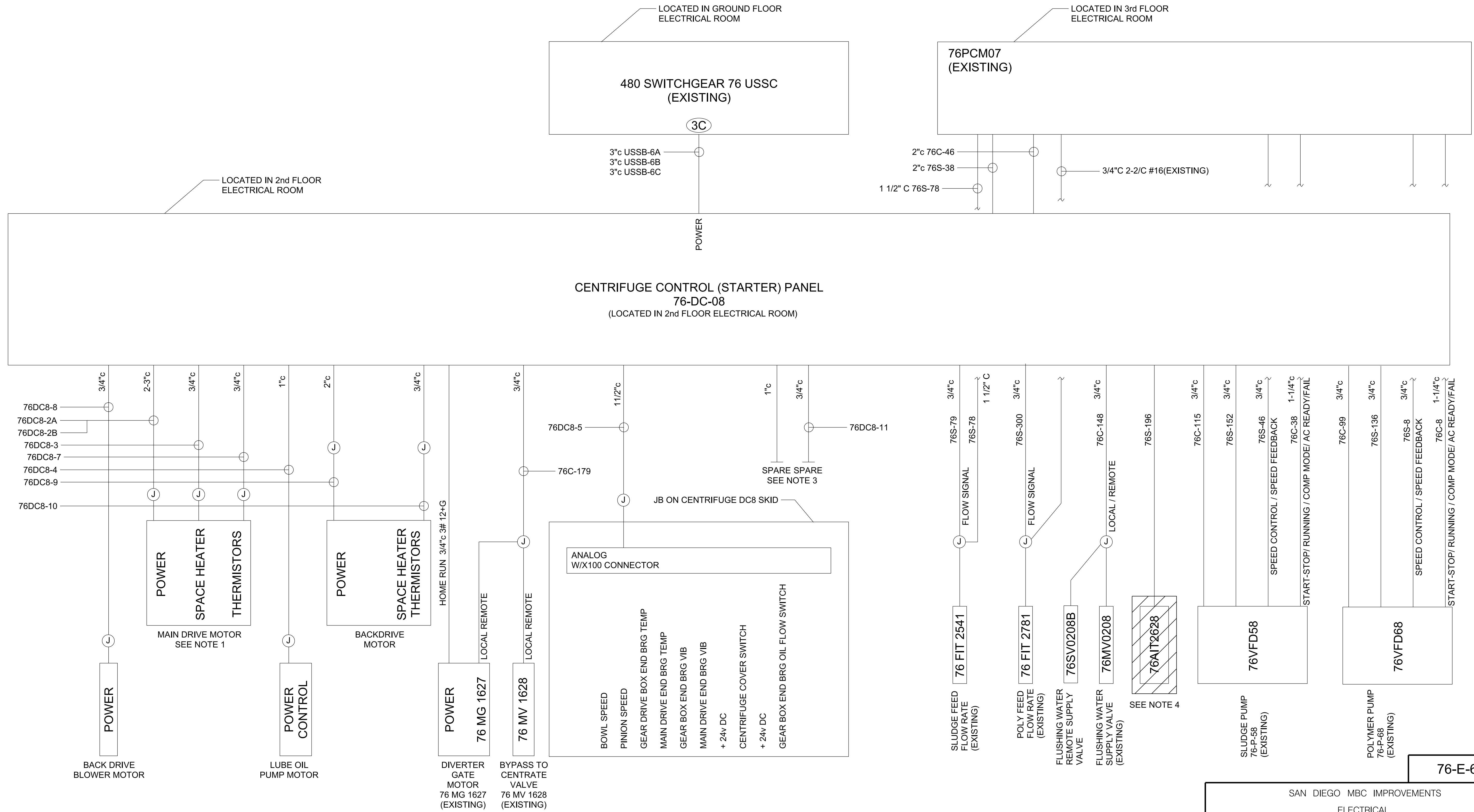


- NOTES:**
1. CONDUIT 76DC1-3 CONTAINS CENTRIFUGE EMERGENCY STOP PUSH BUTTON WIRING.
  2. ALL CONDUITS ARE EXISTING. PROVIDE NEW CONDUCTORS IN EXISTING CONDUITS. SEE RACEWAY SCHEDULE FOR SIZE AND COUNT.
  3. EXISTING CONDUITS ARE STUBBED UP AT EXISTING CENTRIFUGE AND CAPPED.
  4. DEMO AIT, REMOVE CONDUCTORS FROM SOURCE TO LOAD AND CAP CONDUITS.

SAN DIEGO MBC IMPROVEMENTS ELECTRICAL CENTRIFUGE BUILDING			
<b>BLOCK DIAGRAM AND NOTES DEWATERING CENTRIFUGE NO. 1</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 159C OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: <i>Raymond Martin</i> FOR CITY ENGINEER	DATE: 3/09/2021	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER	
PRINT DCE NAME: <i>Raymond Martin</i>	RICE# C89963	DRAWN BY: <b>MONIKA SMOCZYNSKI</b> PROJECT ENGINEER	
DESCRIPTION	BY	APPROVED	DATE / FILE
ADDENDUM A	JACOBS	<i>Raymond Martin</i>	3/9/21
		DATE STARTED	DATE COMPLETED

CONSULTANT	
<b>ch2m</b> <sup>SM</sup>	
	2/25/2021
CONTRACTOR	INSPECTOR



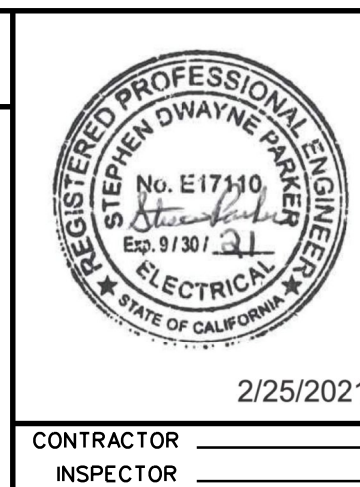


- NOTES:**
1. CONDUIT 76DC1-3 CONTAINS CENTRIFUGE EMERGENCY STOP PUSH BUTTON WIRING.
  2. ALL CONDUITS ARE EXISTING. PROVIDE NEW CONDUCTORS IN EXISTING CONDUITS. SEE RACEWAY SCHEDULE FOR SIZE AND COUNT.
  3. EXISTING CONDUITS ARE STUBBED UP AT EXISTING CENTRIFUGE AND CAPPED.
  4. DEMO AIT, REMOVE CONDUCTORS FROM SOURCE TO LOAD AND CAP CONDUITS.

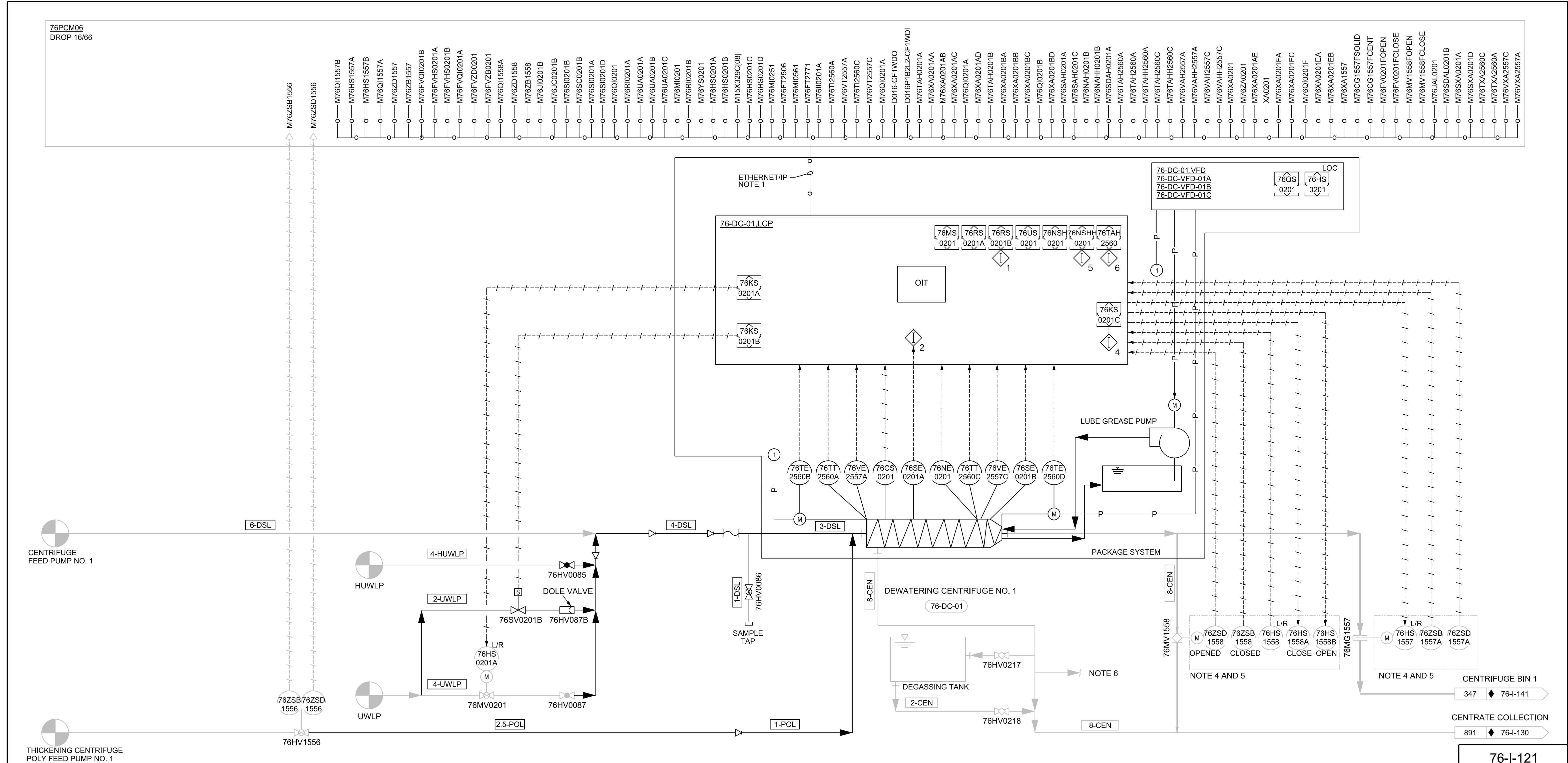
SAN DIEGO MBC IMPROVEMENTS ELECTRICAL CENTRIFUGE BUILDING			
<b>BLOCK DIAGRAM AND NOTES DEWATERING CENTRIFUGE NO. 8</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 159D OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: <i>Raymond Martin</i> FOR CITY ENGINEER Raymond Martin	DATE 3/09/2021	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER	
PRINT DCE NAME Raymond Martin	DATE 3/9/21	PROJECT ENGINEER: <b>MONIKA SMOCZYNSKI</b>	
DESCRIPTION ADDENDUM A	BY JACOBS	APPROVED <i>Raymond Martin</i>	DATE 3/9/21
			FILM 382 - 457
			1888 - 6280
			41198-1159D-D
CONTRACTOR INSPECTOR		DATE STARTED DATE COMPLETED	

CONSULTANT

2/25/2021



76PCM06  
DROP 16/66



- NOTES:**
- SEE N-005 AND N-017 FOR NETWORK COMMUNICATIONS.
  - SEE 76-I-101 FOR DC FEED PUMP NO. 1.
  - SEE 76-I-221 FOR DC NO. 1 POLY FEED PUMP.
  - CONTRACTOR TO OBTAIN MANUF'S WIRING DIAGRAMS BASED ON ACTUATOR NAMEPLATE DATA AND FIELD VERIFY ALL SIGNAL AND CONTROL WIRING PRIOR TO COMMENCING WORK.
  - EXISTING DCS I/O POINTS TO BE ABANDONED. OPEN/CLOSE POSITION FEED BACK AT THE DCS TO BE OBTAINED VIA ETHERNET COMMUNICATION FROM THE STARTER PANEL.
  - SEE DWG 76-I-301 FOR THE FOUL AIR SYSTEM.

- CENTRIFUGE INTERLOCKS:**
- START POLYMER AND SLUDGE PUMPS WHEN THE CENTRIFUGE REACHES OPERATING SPEED AND STOP PUMPS WHEN CENTRIFUGE STOPS.
  - STOP CENTRIFUGE UPON HIGH VIBRATION CONDITION AND LOCKOUT WITH A MANUAL RESET.
  - OVERRIDE THE SLUDGE FEED FLOWRATE DURING HIGH TORQUE CONDITIONS. WHEN TORQUE RETURNS TO A NORMAL LEVEL RELEASE SLUDGE FEED RATE TO ORIGINAL SETPOINT.
  - OPEN DISCHARGE GATE AND CLOSE BYPASS TO CENTRATE PLUG VALVE AFTER AN ADJUSTABLE TIME DELAY UPON CENTRIFUGE STARTUP.
  - STOP CENTRIFUGE UPON HIGH-HIGH TORQUE CONDITION AND LOCKOUT WITH MANUAL RESET.
  - STOP CENTRIFUGE UPON HIGH MOTOR WINDING TEMPERATURE AND LOCKOUT WITH MANUAL RESET.

♦ P&ID NOT INCLUDED IN THIS CONTRACT.  
SEE EXISTING CONTRACT DOCUMENTS.

CONSULTANT

2/25/2021

SAN DIEGO MBC IMPROVEMENTS  
INSTRUMENTATION AND CONTROL - P&ID  
CENTRIFUGE BUILDING

**DEWATERING CENTRIFUGE NO. 1  
P&ID**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC UTILITIES DEPARTMENT  
SHEET 286A OF 381 SHEETS

WBS S-17013/B-17006

APPROVED: *Reynold Martin* 3/09/2021  
FOR CITY ENGINEER: *Reynold Martin* DATE: 3/09/2021  
PRINT DCE NAME: *Reynold Martin* RICE# C8993

SUBMITTED BY: **MONIKA SMOCZYNSKI**  
PROJECT MANAGER

DESIGNED BY: **MONIKA SMOCZYNSKI**  
PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILM
ADDENDUM A	JACOBS	<i>Reynold Martin</i>	3/9/21	

382 - 457  
CCS27 COORDINATE  
1888 - 6280  
CCS83 COORDINATE

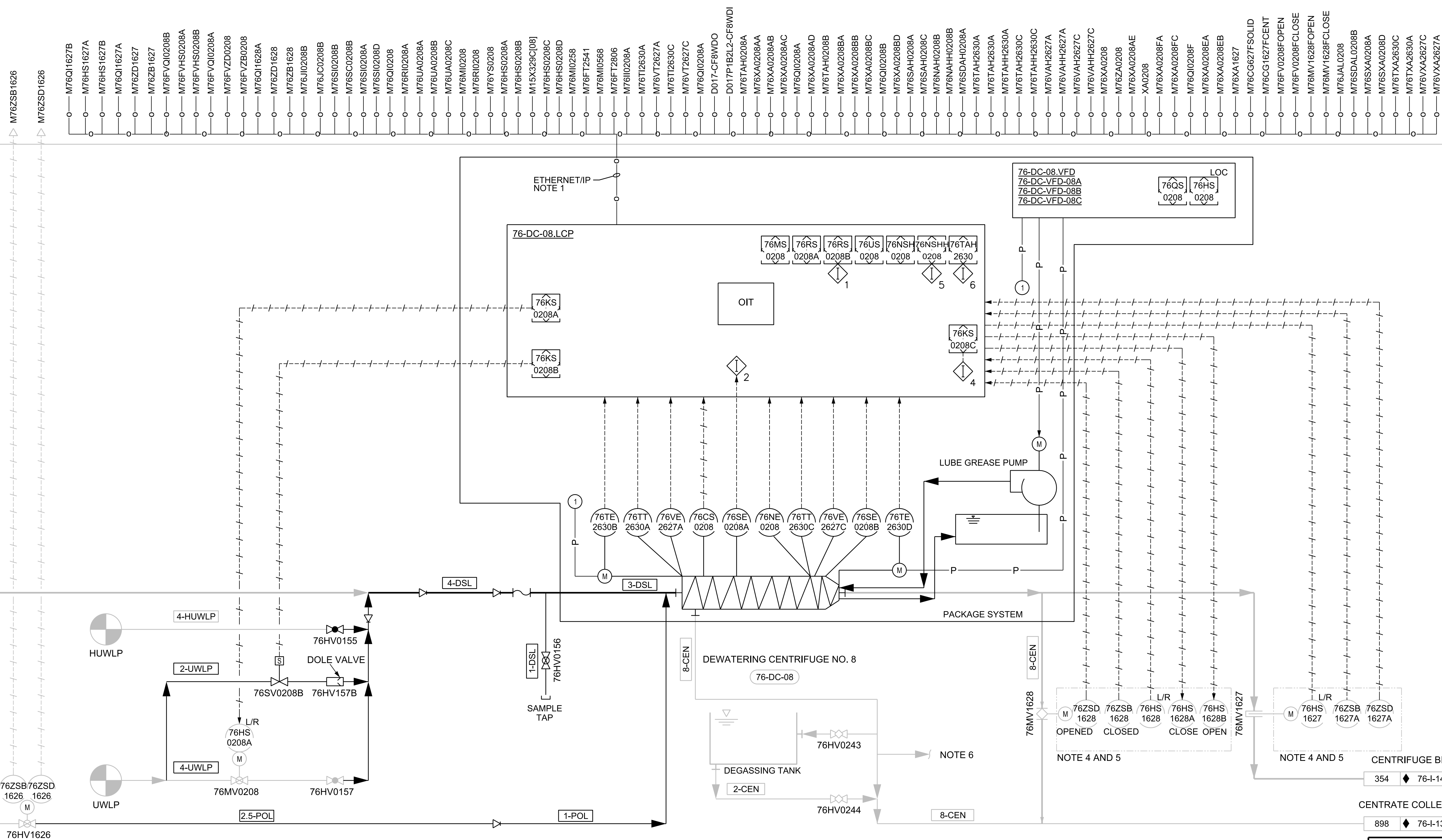
CONTRACTOR: \_\_\_\_\_ DATE STARTED: \_\_\_\_\_  
INSPECTOR: \_\_\_\_\_ DATE COMPLETED: \_\_\_\_\_

41198-1286A-D

SAN DIEGO METROPOLITAN BIOSOLIDS CENTER



76PCM07  
DROP 17/66



CENTRIFUGE FEED PUMP NO. 8

HUWLP

UWLP

THICKENING CENTRIFUGE POLY FEED PUMP NO. 8

76HV1626

- NOTES:**
- SEE N-005 AND N-017 FOR NETWORK COMMUNICATIONS.
  - SEE 76-I-108 FOR DC FEED PUMP NO. 8.
  - SEE 76-I-228 FOR DC NO. 8 POLY FEED PUMP.
  - CONTRACTOR TO OBTAIN MANUF'S WIRING DIAGRAMS BASED ON ACTUATOR NAMEPLATE DATA AND FIELD VERIFY ALL SIGNAL AND CONTROL WIRING PRIOR TO COMMENCING WORK.
  - EXISTING DCS I/O POINTS TO BE ABANDONED. OPEN/CLOSE POSITION FEED BACK AT THE DCS TO BE OBTAINED VIA ETHERNET COMMUNICATION FROM THE STARTER PANEL.
  - SEE DWG 76-I-304 FOR THE FOUL AIR SYSTEM.

- CENTRIFUGE INTERLOCKS:**
- START POLYMER AND SLUDGE PUMPS WHEN THE CENTRIFUGE REACHES OPERATING SPEED AND STOP PUMPS WHEN CENTRIFUGE STOPS.
  - STOP CENTRIFUGE UPON HIGH VIBRATION CONDITION AND LOCKOUT WITH A MANUAL RESET.
  - OVERRIDE THE SLUDGE FEED FLOWRATE DURING HIGH TORQUE CONDITIONS. WHEN TORQUE RETURNS TO A NORMAL LEVEL RELEASE SLUDGE FEED RATE TO ORIGINAL SETPOINT.
  - OPEN DISCHARGE GATE AND CLOSE BYPASS TO CENTRATE PLUG VALVE AFTER AN ADJUSTABLE TIME DELAY UPON CENTRIFUGE STARTUP.
  - STOP CENTRIFUGE UPON HIGH-HIGH TORQUE CONDITION AND LOCKOUT WITH MANUAL RESET.
  - STOP CENTRIFUGE UPON HIGH MOTOR WINDING TEMPERATURE AND LOCKOUT WITH MANUAL RESET.

CONSULTANT

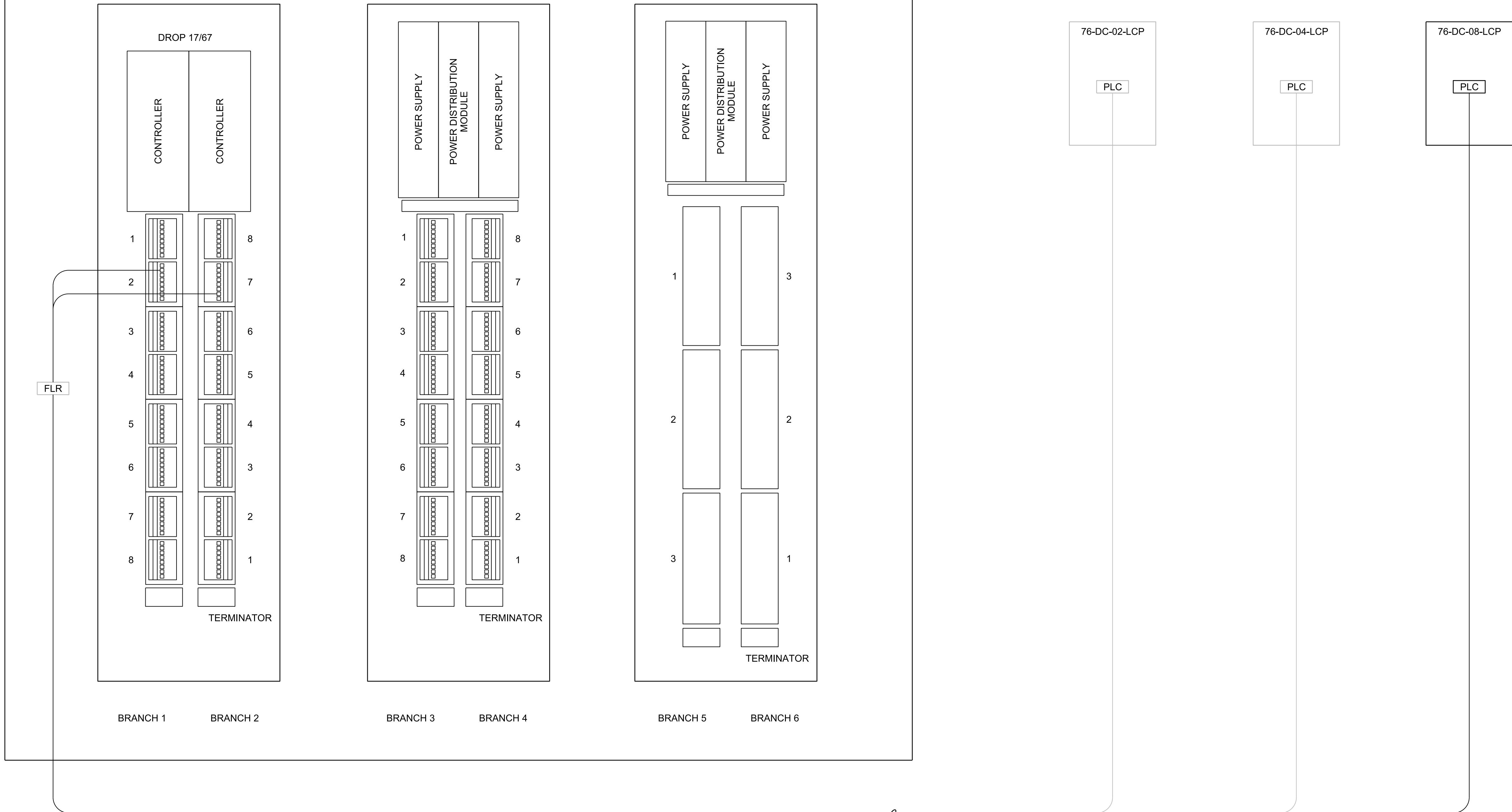
2/25/2021

2/25/2021

SAN DIEGO MBC IMPROVEMENTS INSTRUMENTATION AND CONTROL - P&ID CENTRIFUGE BUILDING			
<b>DEWATERING CENTRIFUGE NO. 8 P&amp;ID</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 286B OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: <i>Raymond Martin</i> FOR CITY ENGINEER Raymond Martin	DATE: 3/09/2021 C89963	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER	
DESCRIPTION	BY	APPROVED	DATE
ADDENDUM A	JACOBS	<i>Raymond Martin</i>	3/9/21
PROJECT ENGINEER		382 - 457	
CCS27 COORDINATE		1888 - 6280	
CCS83 COORDINATE		41198-1286B-D	
CONTRACTOR		DATE STARTED	
INSPECTOR		DATE COMPLETED	



FACILITY 76  
CENTRIFUGE BUILDING  
PANEL 76PCM07



ETHERNET  
CAT 6 (TYP)

**LEGEND**

- FIBER
- COPPER

N-018

SAN DIEGO MBC IMPROVEMENTS  
INSTRUMENTATION AND CONTROL  
CENTRIFUGE BUILDING  
**NETWORK BLOCK DIAGRAM**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC UTILITIES DEPARTMENT  
SHEET 363B OF 381 SHEETS

WBS S-17013/B-17006



2/25/2021

APPROVED: <i>Raymond Martin</i> FOR CITY ENGINEER Raymond Martin PRINT DCE NAME	DATE 3/09/2021 DATE 3/9/21	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER
BY: <i>Raymond Martin</i> APPROVED: <i>Raymond Martin</i>	DATE 3/9/21	PROJECT ENGINEER <b>MONIKA SMOCZYNSKI</b>
DESCRIPTION ADDENDUM A	BY JACOBS	382 - 457 CCS27 COORDINATE
		1888 - 6280 CCS83 COORDINATE
CONTRACTOR INSPECTOR	DATE STARTED DATE COMPLETED	41198-1363B-D

CONSULTANT

# City of San Diego

**CITY CONTACT:** Rosa Riego, Senior Contract Specialist, Email: [RRiego@sandiego.gov](mailto:RRiego@sandiego.gov)  
Phone No. (619) 533-3426

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## ADDENDUM B



**FOR**

## **PURE WATER PROGRAM: METRO BIOSOLIDS CENTER IMPROVEMENTS**

BID NO.:	<b>K-21-1867-DBB-3</b>
SAP NO. (WBS/IO/CC):	<b>B-17006, S-17013</b>
CLIENT DEPARTMENT:	<b>2000</b>
COUNCIL DISTRICT:	<b>6</b>
PROJECT TYPE:	<b>BO</b>

---

### **BID DUE DATE:**

**2:00 PM  
APRIL 20, 2021**


**CITY OF SAN DIEGO'S ELECTRONIC BIDDING SITE, PLANETBIDS**

<http://www.sandiego.gov/cip/bidopps/index.shtml>



## ENGINEER OF WORK

The Engineering Specifications and Special Provisions contained herein have been prepared by or under the direction of the following Registered Engineer:



3/22/2021

Seal:



1) Registered Engineer

Date



3/22/2021

Seal:



2) For City Engineer

Date

## **A. CHANGES TO CONTRACT DOCUMENTS**

The following changes to the Contract Documents are hereby made effective as though originally issued with the bid package. Bidders are reminded that all previous requirements to this solicitation remain in full force and effect.

THE SUBMITTAL DATE FOR THIS PROJECT HAS BEEN **EXTENDED AS STATED ON THE COVER PAGE.**

## **B. BIDDER'S QUESTIONS**

Q1. Per the Pipe Schedule on Sheet G-100, the buried portion of the Biogas pipe is covered under Specification Section 33 05 01.10. This specification section does not provide details on the pipe zone backfill material that is called out on standard detail 3123-110 (Sheet 246). However, Specification Section 31 23 23.15 does specify pipe zone backfill for other buried utilities. Please confirm that pipe zone backfill material as specified in section 31 23 23.15 should also be applied to the buried biogas pipe.

A1. Refer to Section 33 05 01 Conveyance Piping - General that provides information for trench materials.

Q2. Refer to Standard Detail 0330-056 on sheet 241 of 364.

Note 8 states concrete anchors may be used in lieu of cast in place anchor bolts less than 3/4" diameter. It is assumed this includes any type of post installed anchor as long as it is approved by the equipment manufacturer. Can post installed anchors including 3/4" and large be used as long as the manufacturer approves?

A2. Requests to use post-installed anchors for sizes larger than 3/4" are subject to engineer approval on an individual basis for each type of equipment anchored and the anchors chosen will need to be certified by ICC for seismic loading or vibratory loadings, where necessary. Request shall be made prior to placing equipment pads.

Q3. General Note 1 on drawing Y-112 states that utilities shown are based in information from as-builts and pot holing. It appears that some of the existing utilities are conflicting with the new 12" BG line. Please confirm who will re-locate utilities in conflict with the new line.

A3. Profile on drawing Y-112 shows the conflicts with existing lines and provides information about the existing lines including a reference to Note 3 which indicates to "RELOCATE UTILITY AS REQUIRED".

Q4. Refer to Drawing G-40.

Per note 10 pipe supports determined to be in "Special Condition" may be reused upon the approval of the Engineer. Please clarify the definition of "Special Condition".

A4. New pipe supports shall be provided as specified. Reuse of existing supports as a Special Condition will be determined in the Field by the Owner and Construction Manager.

Q5. Drawings or specifications do not mention seal water piping. Please confirm that seal water at all the pumps does not need to be re-installed and that Contractor is just to use the existing seal water.

A5. Demo sheets show limits of seal water piping work. Where no new seal water piping is shown, pumps are being provided with seals that do not need external seal water.

Q6. Refer to Technical Specification Section 02 41 00, Part 3.06, "Title to Materials," for reference.

Section 3.06, B, 1 states that, "With the exception of the following listed salvaged equipment and materials, all items designated to be removed shall become the property of Contractor," including, "Two of the six valves to be re-installed and re-named as indicated in these construction documents."

Please confirm that all valves called out in the construction documents to be re-installed shall remain the property of the Owner.

Please provide a list of valves that shall be salvaged and re-installed.

A6. Valves listed in Article 3.06 B. 1. are part of the grit separator system. Article 2.02 D. of Spec Section 46 23 00 Grit Separators provides a detailed list of salvaged and new valves.

Q7. Refer to Technical Specification Section 02 41 00, Part 3.06, "Title to Materials," for reference.

Section 3.06, B, 2 state that, the owner may identify additional equipment and materials that must be salvaged on the project.

Please confirm that for the purposes of bidding the contract should assume that all material that is called to be demolished and is not listed in Section 3.06, B, 1 or otherwise identified in the contract documents or by addendum as salvage, will become the property of the contractor and will require removal from the jobsite in accordance with the applicable disposal requirements.

A7. Confirmed.

Q8. RFP 12.8 Note 3 says the Contractor may use MBDA web portal to post subcontracting opportunities. The Pasadena MBDA website (link in 12.8) does not provide a web portal to post subcontracting opportunities. Please clarify website address to the MBDA web portal for posting subcontracting opportunities.

A8. Please utilize the contact information listed under Attachment D – Funding Agency Provisions, Section 12.8 for website address to the MBDA web portal for posting subcontracting opportunities. For guidance on the process, refer to Attachment D – Funding Agency Provisions, Section 11.2.1.2, under the California State Revolving Fund (CASRF) Requirements.

Q9. Refer to Drawing 80-D-121 for reference.

There is a note pointing to the 6" BG line stating to "Plug with concrete to top of slab". Please confirm this is only referring to plugging the vertical stub out of the pipe and not the entire underground 6" BG line to the Cogen Facility.

A9. Confirmed, plug with concrete to top of slab down to change of pipe to horizontal direction.

Q10. Referencing section 01 12 01 and Whitebook section 3-14.1, notes that Formal Partnering Facilitator costs shall be split equally by the City and the Contractor. Please provide a budgetary value the City would expect to pay for the Partnering Consultant. Please confirm based on the duration of the project there will be a total of 10 each 8-hour sessions.

A10. Bidders should estimate shared cost of providing a partnering facilitator and a workshop site. Approximately 14 each 8-hour sessions are anticipated for the initial and quarterly partnering sessions through Substantial Completion.

Q11. Sheet 30 shows the biogas yard pipe. The installation of the 12" BG system looks to require a lot more site work removal and reinstatement than shown. The extents of the removal and reinstatement of curb and gutters, sidewalks and asphalt are not clear on this sheet.

A11. For sidewalk and curb and gutter replacement see modification Addendum A.

Q12. Sheet 31 detail 1 note 3, indicates that the pipe configuration shown in detail 1 is for informational purposes only and the contractor is to coordinate with the cogen facility to determine actual the installation. Please confirm the contractor is to base their bid proposal on the location shown and the configuration in detail 1 and anything additional required by the cogen facility will be an issued change order to the project.



- A12. Confirmed, bid based on the piping location and configuration shown on the Drawings.
- Q13. Referencing Section 01 91 14 3.11 and Supplement 1. Please confirm that this project is not linked or reliant on any other projects listed.
- A13. The Contractor shall coordinate the Work with the Separate Contractors listed in Supplementary Special Provisions 3-15.2 and 3-15.3. Coordination may include planning and scheduling of any shutdowns or change in operation of the blended sludge pipeline and centrate pipeline with NCWRP Expansion Contractors, site access for MBC Dewatering Centrifuge Replacement Project, and Integration Period commissioning and testing.
- Q14. Referencing the Scope of Work Attachment, A, 4.2 Milestone 2 Start of 120-Day Integration Period – “The 120-Day Integration Period starts with the Intermediate Substantial Completion of the Morena Pump Station and Conveyance, North City Water Reclamation Plant Expansion, North City Pure Water Facility, North City Pure Water Pump Station, and North City Pure Water Pipeline and Dechlorination Facility”.
- a. Does this mean that in order for the MBC Improvement project will start the 120 Integration Period after all of the other listed projects will be started?
  - b. What are the means for compensation for this project if the integration of the other facilities is not on schedule?
- A14. Yes, the intent is for the Integration Period to start after Intermediate Substantial Completion of the other Phase 1 North City projects as specified and illustrated in Section 01 91 14. The City may omit other Phase 1 North City projects from the Integration Period if determined to avoid delays. A modification to the scheduled start of Integration Period specified in Supplementary Special Provision 6-9 will be considered a change or mitigated through alternate testing and commissioning plan.
- Q15. Reference spec section 44 46 23 1.07 Digester Cleaning Quantities – the specifications state the approximate volume of the sludge expected to be in the digesters. Section 3.04 Weighing Procedure Subsection A – “requires certified weights for billing (if required)”. Subsection B states “Tickets in non-compliance shall be rejected and no payment shall be made for that portion of the work. The bid form does not contemplate any breakout for the digester cleaning.
- a. Is the contractor going to be paid for the digester cleaning on a unit price basis? \$/gallon?, \$/ton?

- b. If the answer is based on volume, then what specific unit of weight can be expected for the materials within the digesters (in situ)?
  - c. What is the cost for disposal of the cleaned and dewatered content from digesters at the City's Miramar landfill?
- A15. a. Digester cleaning is included in the lump sum bid item price.
- b. Digester cleaning is included in the lump sum bid item price.
- c. Contractor is responsible for removal and proper disposal.
- Q16. Will the digester cleaning contractor need to provide scaffolding for inspection?
- A16. See specification Section 01 45 16.13 CONTRACTOR QUALITY CONTROL for inspection requirements.
- Q17. Referencing sheets 25 & 26, note 1 says that valves that are part of a package system are not listed. Referencing sheets 253 to 347, there is no clear indication on any P & ID's of which valves outside of the "package system" are required to be provided by the process package systems suppliers. Please confirm that all valves outside the "package system" boxes on sheets 253 to 347 are listed on sheets 25 and 26.
- A17. Provide all valves for a complete, operable system as specified and shown on Process & Instrumentation Drawings and Valve Schedules.
- Q18. Referencing section 40 27 02-3.03 and 01 43 33, these specifications note that training and field services is required, please clarify which valves require such training. Currently there is no such indication.
- A18. All valves require training and field services as specified.
- Q19. Referencing sheets 160 and 180, there are new 10" OF lines shown coming from the Biosolids Storage and Emergency Storage Tanks. Are these existing lines that need to be demolished and replaced? Please provide any demolition requirements in this area.
- A19. Demolition of existing OF lines is indicated on drawing 80-X-111, Note 2; Y-123; and Y-124.
- Q20. When was the last time digesters number 1, 2 and 3 were cleaned?
- A20. Digester 1 was cleaned and placed into service in June 2020. Digester 2 is clean, empty and has been out of service for over 15 years. Digester 3 was cleaned in June 2020 and is empty and out of service.

- Q21. Sht. 80-E-121 shows conduit 80/010 serving Biogas Compressor No. 3. Note 1 is referenced for said conduit and identifies existing conduit to be used. Sht. 80-E-613 depicts this conduit on the one line and references note 3 to reuse the existing conduit.

Sht. 80-E-621 Circuit & Raceway Schedule calls for the Conduit To be new in the routing information Colum.

We assume that the conduit is existing and will bid as such, unless directed otherwise.

- A21. All conduits associated with Biogas Compressor No. 3 will be new.
- Q22. We're interested in supplying the end suction centrifugal pumps specified in section 44 42 56.10. Can you please clarify why flywheels have been specified for this application?

Flywheels are uncommon for the type of pump specified and typically used only on high head applications, which this is not. Further, this is specified as a variable speed application so we're thinking that the VFD ramp-up & ramp-down settings should be sufficient to cover any function provided by a flywheel.

- A22. Flywheels are to be provided for pipeline surge protection.
- Q23. Electric Panelboard 80IP1A, (new) and 80IP1, 80IP2, 80IP3, 80IP5 (existing) are all located in the Gallery.

I do not see a plan view of the gallery which shows the location of these panelboards.

Please provide a plan view of the gallery showing the location of these panelboards.

- A23. All conduits and conductors from panels 80IP1A, 80IP1, 80IP2, 80IP3 and 80IP5 shown on the Contract Drawings are feeding new motorized valves which are replacing existing motorized valves in the same location. The intent is to reuse the existing power conductors. This information is not required for bidding.
- Q24. Referencing sheet 25 and specification section 40 27 02-2.05. D.3 & 4. Sheet 25 has valve 60MV1303 as type V406 designation, per sheet 25 this valve is on the BG system should this designation be type V408?
- A24. There is no 60MV1303 on the valve schedule. There is an 80MV1303 and it is a V408 on the schedule.

- Q25. Drawings Y-111 and Y-112 show the profile views of the various yard pipelines. Please provide the existing pavement thickness required for reinstatement per detail 3123-115.
- A25. Per Record Drawings, the pavement section is 3" Asphalt Concrete and 11.5" Cement Treated Base. Contractor shall install pavement section as identified in record drawings.
- Q26. Detail 3123-115 note 2 "if the location of trench saw cut is within 2 feet of an existing joint or edge of concrete, replace entire concrete to the joint or edge. Please confirm that the reinstatement shown on the civil drawings takes into account this requirement and the contractor is only required to replace what is shown on the drawings.
- A26. For sidewalk and curb and gutter replacement see modification in Addendum A. Asphalt concrete restoration will be required up to the lip of gutter as required based on trench width.
- Q27. Sht. 80-E-121 shows conduit 80/010 going to 80-JB-C03. This should be conduit 80/010A.

We assume that the correct conduit is 80/010A, and conduit 80/010 is feeding the disconnect switch for 80-C-03.

The conduit schedule calls out 80/010A to be new conduit.

Note 4 on sht. 80-E-121 calls out existing conduit.

We assume that conduit 80/010A is existing and will bid as such, unless directed otherwise.

- A27. The assumption of the conduit being 80/010A is correct. All conduits associated with Biogas Compressor No. 3 will be new.

- Q28. 46 23 10

1.02: Please confirm if the control panel refurbishment for the dewatering equipment is to be performed by the Contractor or equipment supplier.

3.02.B.3: Please specify which party (contractor or equipment supplier) is responsible for taking the samples, lab analysis, and report.

3.03.A. Please confirm if equipment supplier is to provide field service support to assist the Contractor in replacing the refurbished parts of the Grit Dewatering unit.

A28. Answer to 1.02: In addition to requirements of paragraph 1.02, please review all specification requirements including paragraph 1.03 B.

Answer to 3.02.B.3: In addition to requirements of paragraph 1.02, please review all specification requirements including paragraph 1.03 B.

Answer to 3.03.A: In addition to requirements of paragraph 3.03 A., please review all specification requirements including paragraph 1.03 B.

Q29. 40 90 00 (as it pertains to the equipment in 46 23 00 and 46 23 10).

The pressure indicating transmitter and differential pressure transmitter are 2-wire, loop powered, 4-20mA. The specified control panel is relay logic based so additional control components to process these analog signals would need to be specified and supplied. The programmable relay control system is not capable of processing the analog signals. Does the equipment supplier need to provide an alarm based on a pressure set point for each of these transmitters? Please advise if there is any special sequencing associated with the pressure signals.

A29. 40.90.00 analog instrumentation as it pertains to 46.23.00 is tied to one single loop controller per Grit Separator. The loop controller make and model should be coordinated with the new Grit Separator package so that all four units controls match when the project is complete. See 46.23.00.2.05.A.2 Furnish, replace and tune existing under flow controls, including: Single loop controllers, modulating control valves, differential pressure (flow) and pressure transmitters.

No pressure alarms are needed.

Unit supplier to provide proper control sequencing of under flow controls.

There is no 40 90 00 equipment as it pertains to 46 23 10.

Q30. Dwgs

76-S-311: Please confirm the equipment supplier will only be supplying the legs for the TeaCup down to elevation 415.00. The grating and platform will be supplied by others.

76-I-14: Please confirm the air vac valve 76ARV0020 will be supplied by others.

76-I-14 & N-100: Please confirm if 76-LCP-01A local station is to be provided by the equipment supplier.

76-I-14: Please confirm the location of panel 76-GRS-02.LCP.

76-I-14: This drawing includes panel 76-GRS-02.LCP receiving signals from 76MV1118 (inlet valve), 76MV1119, 76SV1125A, and flow switch 76FSL2127. Please confirm if equipment supplier is required to provide power connections for these valves and instruments in the control panel.

A30. Answer to 76-S-311: Refer to Details 3 and 4 on sheet 76-S-511.

Answer to 76-I-14 (1): Valve 76ARV0020 is shown on the self-regulated valve schedule on sheet G-111. Per note 1, valves not shown on this schedule are part of a package system.

Answer to 76-I-14 & N-100: 76-LCP-01A is not indicated as part of the supplier's package on the plans or in the specifications.

Answer to 76-I-14 (2): Location of Panel 76-GSR-02.LCP is shown on drawing 76-E-111.

Answer to 76-I-14 (3): See sheets 76-E-110, 76-E-111, and 76-E-631 for details. Power for the 76MV1118 and 76MV1119 is from 76-RP6-40 and 76-RP6-41. 76SV1125A, and flow switch 76FSL2127 are powered from 76-GRS-02.LCP.

Q31. If I have overlooked it, can you point me in the direction of the Bid Form/schedule? I see that the "Payment and Procedures" seems to list "bid Items", however despite the mention of "Bid Items" and a "Bid Schedule", I am not able to find it.

i. Please provide bid schedule.

A31. The Bid Schedule is the "Line Items" tab in PlanetBids.

Q32. Spec 33 05 01.10, 2.01 B, 1 a calls for 316SS back-up rings, whereas spec 40 27 00, 2.03, F 2 (Process pipe, General) calls for 304SS back-up rings.

i. Please confirm HDPE back-up ring materials.

A32. HDPE back-up Ring material to be 316SS, as per Spec 33 05 01.10, 2.01 B, 1

Q33. P&ID SHTs 76-1-14 (for Grit unit 4) there is a new 2" ball valve on the UWLP line – Valve type? (301, 306, 307?)

i. Please provide valve type for 2" UWLP for Grit unit 4.

A33. The new 2" ball valve will be valve type, V-301.

Q34. 44 46 20

1.01 Suggest removing the following specifications as they are not applicable:

B16.1 (There is no gray iron on this equipment).

BPVC Section VIII (The system will be operated at a pressure considerably less than the 15 psig where Section VIII becomes applicable).

Suggest adding the following applicable reference specifications:

ANSI/CSA B149.6 Code for digester gas, landfill gas, and biogas generation and utilization.

NFPA 820 Standard for Fire Protection in Wastewater Treatment and Collection Facilities.

A34. Bid as specified.

Q35. Add 1.02.A.2

2. Manufacturer's/Supplier's Certificate of Compliance:

Manufacturer's Suppliers Certificate of Compliance shall include a copy of this specification section, with addendum updates and all referenced and applicable sections:

- a. Provide each paragraph, check -marked to indicate specification compliance or marked to indicate requested deviations from specification requirements or those parts which are to be provided by the Contractor or others.
- b. Checkmarks shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation.
- c. The Engineer shall be the final authority for determining the acceptability of requested deviations.
- d. The remaining portions of the paragraph not underlined shall signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked -up

specification sections, along with justification(s) for any requested deviations to the specification requirements shall be cause for rejection of the entire submittal and no further submittal material will be reviewed.

A35. Bid as specified.

Q36. 3. Manufacturer's Certificate of Unit Responsibility

The Digester Gas Safety Equipment and Specialties supplied under this Section shall be furnished by one (1) manufacturer, who shall have responsibility for the performance and compatibility of all equipment specified herein.

A36. Bid as specified.

Q37. Add under 1.02.B

10. Manufacturer of flares shall have a minimum of 25 operating installations with equipment of the size specified and in the same service as specified operating for not less than five (5) years.

Para. 2.02.C Emissions Requirement.

Add:

3. Manufacturer shall submit at least three (3) certified test reports for a similar sized facility from an independent emissions testing company showing proof of compliance with the emissions requirements of this specification. Minimum Flow rate during these tests should be close to 33,000 scfh.

Paragraph 2.02.D.2. Delete the words "Dual coil, energized open and". Add the words "Explosion proof and watertight, all stainless-steel construction."

Delete Para. 2.02.D.3 and replace with:

The Pilot ignition system shall consist of the following components:

- a. Continuous pilot nozzle that shall burn a stoichiometric air/gas mixture.
- b. Retention flame retention nozzle that flows pilot gas upon demand during the ignition cycle.



- c. Type K 316SS thermocouple with thermowell installed in the continuous pilot nozzle.
- d. 2" NPT inspirating venturi for delivery of combustible air/gas mixture to continuous nozzle. Venturi shall include combustion chamber, spark plug, and backflash preventer.
- e. Valve and regulator package for controlling the pilot fuel gas. Package shall include isolation valves, pressure regulators, pressure gauges, and explosion proof solenoid valve, (blower and air/gas mixing chamber included with the blower-driven system when pilot gas pressure available is less than 10 psig).
- f. All components shall be copper free and shall be installed on a mounting panel. Provide with 316L Stainless Steel weather hood and 304L SS mounting stand.
- g. Gas inlet connection shall be 1/2" NPT. Gas outlet connections shall be 2" NPT to the continuous flame line and 1/2"NPT to the flame retention line.
- h. Spark plug.

A37. Bid as specified.

Q38. Delete para. 2.02.E and replace with:

E. Ignition System

- a. The waste gas burner ignition occurs at the venturi exit which is installed a minimum of 15 feet from the waste gas burner stack assembly.
- b. Either a plant signal, or a pressure transmitter installed on the main gas line, initiates start-up sequence through the remote start contacts. The start-up sequence will open the continuous pilot solenoid valve and the flame retention solenoid valve.
- c. The continuous pilot line receives a constant air/gas supply from the inspirating venturi the transformer sends voltage to the spark plug.
- d. This generates a flame front. The Retention Nozzle catches the Flame Front and lights the Continuous Nozzle.

- e. The thermocouple located inside the continuous flame nozzle heats up. When it exceeds its temperature set point, the retention solenoid valve closes. Pilot ON indication comes on in the control panel.
- f. The three-way explosion proof solenoid valve on the pressure relief regulator and flame trap assembly) is energized, opening the regulator, and permitting flow of digester gas to the burner for combustion.
- g. LOCAL START OPERATION – In “AUTO” mode, the burner and the pilot will remain lit and will attempt re- ignition in case the pilot is lost. Ignition will continue to occur until PILOT ON indication is achieved. If the flare system fails to reignite in a set amount of Spark On attempts, the flare goes into system failure. The solenoid valves closes, the blower shuts down (blower- driven system only), and, the System Failure Dry Contact changes state.
- h. REMOTE START OPERATION
  - 1. The flare system will be in standby until it receives the Remote Start Permissive signal.
  - 2. If the Remote Start Permissive signal is not present, the Remote Start Time Delay starts to time. Once it times out, the flare goes into stand by and waits for the Permissive signal to start up again.
- i. The additional flare zones are controlled by motorized ball valves that will open based on the pressure transmitter signal or from the Plant signal.

A38. Bid as specified.

Q39. 2.02.F. Delete this paragraph. It is covered by 2.02.H and 2.05.

A39. Bid as specified.

Q40. 2.02.G.2.b Replace the word “backplate” with “Stainless Steel backplate with weather hood and mounting stand.”

A40. Bid as specified.

Q41. 2.02.H.1 Delete and replace with:

1. Material of Construction
  - a. The flare shall be constructed to allow combustion air to be naturally inspirated to obtain proper air-gas mixture. This shall be done without the use of motorized dampers, blowers or like devices. Refractory lining on the combustion chamber is not allowed.
  - b. The flare stack shall be constructed with 304 stainless chambers having 10 Ga # 2B wall thickness. All stack piping will be 1-1/4" 304 SS SCH 40, all other stack materials to be 304SS.
  - c. The burner base, pedestal and waste gas inlet manifold shall be constructed 304SS. The burner base and pedestal are designed to secure the stack firmly to the foundation and comes with 1" diameter bolt holes.
  - d. Operator shall have complete access to the main manifold in the base of the flare for removal and replacement of the individual flare nozzles, and for maintenance on the piping. Unit shall not have any screens blocking access to the burners. Flare shall have a sectional manifold to accommodate removal and repair of the individual headers. Manifold shall have a 1" drain connection and shall be supplied with a drip trap. Manifold shall also have a 10" x 10" removable cover to allow clean out of the manifold.
  - e. Venturi housings shall be cast 316 Stainless Steel with lock-in place flow conditioners. Fabricated venturi nozzles shall not be allowed.

A41. Bid as specified.

Q42. 2.02.H.3 Delete and replace with:

3. Provide a thermocouple to monitor combustion temperature. Provide outputs to the flare panel for plant DCS recording.

A42. Bid as specified.

Q43. 2.02.H.5 Delete.

A43. Bid as specified.

- Q44. 2.02.H.6 Delete.
- A44. Bid as specified.
- Q45. 2.02.J.1 Change NEMA 7 rating to NEMA 4X.
- A45. Bid as specified.
- Q46. 2.02.J.2.a Change the word "COMPUTER" to "AUTO".
- A46. Bid as specified.
- Q47. Add 2.02.J.2.f Selector button for Plant signal/pressure.
- A47. Bid as specified.
- Q48. 2.02.J.4.a
- Change Hand/Off/Computer to Hand/Off/Auto.
- Delete the Plugged signal as that is not applicable.
- A48. Bid as specified.
- Q49. 2.02.J.5.a
- Change the word COMPUTER to AUTO.
- A49. Bid as specified.
- Q50. 2.02.J.5.B
- Change the word COMPUTER to AUTO.
- Change the word pressure switch to pressure transmitter.
- Replace the sentence "When in COMPUTER mode allow DCS to issue START/STOP command to the flare" with "A selector switch on the HMI for DCS Signal or Pressure will determine how the flare is operated in AUTO mode."
- A50. Bid as specified.
- Q51. 2.02.J.5.c Delete.
- A51. Bid as specified.

Q52. 2.03.A.3.a.

- 1) Change the word "groove" to "fill".

A52. Bid as specified.

Q53. Add 2.03.A.3.a.4) Make-up water connection: 1" NPT on the vessel.

A53. Bid as specified.

Q54. Replace para. 2.05. with:

2.05 Pressure regulator and flame trap assembly

A. Provide a 10" Pressure Relief and Flame Trap Assembly on the gas header to the burner. Unit must be installed no more than 15 feet from the burner and shall be designed as follows:

- 1) The regulator shall operate normally closed and be set to relieve pressure to the burner for combustion with an adjustable set pressure range of 7"– 15" WC pressure.
- 2) A large spring-loaded diaphragm shall control regulator valve. Regulator shall provide tight shut-off. It shall maintain a back pressure within approximately 10% of the setting. The spring barrel shall include a glass-enclosed pointer and scale to indicate setting. A spring adjusting screw shall permit setting adjustments without disassembling the diaphragm housing.
- 3) Construction shall be low copper cast aluminum body, diaphragm and spring housings, and diaphragm inner plate. Inner valve shall include low copper aluminum pallet with 304 SS stems and bushings. Diaphragm shall be molded Buna-N rubber with Nylon reinforcement. Setting spring shall be zinc plated steel.
- 4) Valve shall include 1/2" NPT connections for the pressure sensing line.
- 5) Flame arrester net free area through the bank assembly shall be not less than three times the corresponding size standard pipe. Entire bank assembly shall slide easily out of the arrester housing to facilitate inspection and cleaning. Removing or replacing the bank assembly shall not require support for alignment, jackscrew for extending the housing, and shall not place a strain on the connecting piping. Bank

frame shall be extensible and shall be filled with corrugated rectangular shaped bank sheets. Flame arresters shall include an offset housing with a 1/2" NPT drip trap connection at the low point.

- 6) Arrester housing construction shall be low copper cast aluminum. Bank assembly shall include a low copper aluminum frame and 316 stainless steel bank sheets.
- 7) The assembly shall be interconnected with a thermal bypass shut-off valve. Valve shall be the spring-actuated double acting needle type. Bypass valve shall operate within 15 seconds when the thermal element reaches 260° F (127° C).
- 8) Bypass valve shall automatically close the regulator by applying full upstream gas pressure on the upper portion of the diaphragm. Fusible element shall be replaceable without disassembling the valve. By-pass valve assembly shall be constructed of aluminum and stainless steel with Buna-N "O" rings.
- 9) The regulator will be provided with a three-way solenoid valve that will energize open on PILOT ON in the flare panel.
- 10) Regulator, flame arrester, and bypass valve shall be factory assembled as a single unit. Flanges shall be drilled to ASA 125 FF Flanged dimensions. Assembly shall be leak proof to 5 psig (34.5 kPa).

A54. Bid as specified.

Q55. Add 3.03.A.2

2. Provide a minimum of three working days for Manufacturer to assist in source emissions test. Source emissions test shall be conducted by a third party by the Contractor.

A55. Bid as specified.

## C. ADDENDUM

1. To Addendum A, Section E, ATTACHMENTS, page 7, **DELETE** in its entirety and **SUBSTITUTE** with the following:
  1. To Attachment D, FUNDING AGENCY PROVISIONS, pages 32 through 60, **DELETE** in its entirety and **SUBSTITUTE** with pages 22 through 50 of this addendum.

## D. SUPPLEMENTARY SPECIAL PROVISIONS

1. To Technicals, Section 01 13 13 Project Coordination, Part 1 General, Item 1.05 Project Milestones, Sub-Item A, Page 183, **DELETE** in its entirety and **SUBSTITUTE** with the following:
  - A. Project Milestones shall be as specified in Attachment A Scope of Work and Supplementary Special Provisions 6-9 Liquidated Damages.
2. To Technicals, Section 01 61 00 Common Product Requirements, Part 2 Products, Page 303, **ADD** the following after Item 2.03 Source Quality Control:

### 2.04 TELECOMMUNICATIONS

- A. The Contractor certifies that no Project Funds will be used on:
  1. Video surveillance or telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities), telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities);
  2. Telecommunications or video surveillance services produced by such entities;
  3. Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country; or

4. Other telecommunications or video surveillance services or equipment in violation of 2 CFR 200.216.

James Nagelvoort, Director  
Engineering & Capital Projects Department

Dated: *March 23, 2021*  
San Diego, California

JN/AJ/rd



**10. DAVIS-BACON WAGE RATE AND PROVISIONS:**

**10.1. WAGE RATES:** This contract shall be subject to the following Davis-Bacon Wage Decisions:

General Decision Number: CA20210001 03/19/2021

Superseded General Decision Number: CA20200001

State: California

Construction Types: Building, Heavy (Heavy and Dredging), Highway and Residential

County: San Diego County in California.

BUILDING CONSTRUCTION PROJECTS; DREDGING PROJECTS (does not include hopper dredge work); HEAVY CONSTRUCTION PROJECTS (does not include water well drilling); HIGHWAY CONSTRUCTION PROJECTS; RESIDENTIAL CONSTRUCTION PROJECTS (consisting of single family homes and apartments up to and including 4 stories)

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Modification Number	Publication Date
0	01/01/2021
1	01/08/2021
2	03/05/2021
3	03/19/2021

ASBE0005-002 07/06/2020

	Rates	Fringes
Asbestos Workers/Insulator (Includes the application of all insulating materials, protective coverings, coatings, and finishes to all types of mechanical systems).....	\$ 45.39	23.74
Fire Stop Technician (Application of Firestopping Materials for wall openings and penetrations in walls, floors, ceilings and curtain walls).....	\$ 28.92	18.73

ASBE0005-004 07/01/2019

	Rates	Fringes
Asbestos Removal worker/hazardous material handler (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from mechanical systems, whether they contain asbestos or not)....	\$ 20.63	12.17

\* BOIL0092-003 01/01/2021

	Rates	Fringes
BOILERMAKER.....	\$ 46.03	38.81

BRCA0004-008 11/01/2019

	Rates	Fringes
BRICKLAYER; MARBLE SETTER.....	\$ 39.60	18.05

BRCA0018-004 06/01/2019

	Rates	Fringes
MARBLE FINISHER.....	\$ 33.43	14.11
TILE FINISHER.....	\$ 28.23	12.65
TILE LAYER.....	\$ 40.07	18.36

BRCA0018-010 09/01/2020

	Rates	Fringes
TERRAZZO FINISHER.....	\$ 33.66	14.20
TERRAZZO WORKER/SETTER.....	\$ 41.60	14.73

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CARP0409-002 07/01/2016

	Rates	Fringes
Diver		
(1) Wet.....	\$ 712.48	17.03
(2) Standby.....	\$ 356.24	17.03
(3) Tender.....	\$ 348.24	17.03
(4) Assistant Tender.....	\$ 324.24	17.03

Amounts in "'Rates' column are per day

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CARP0409-008 08/01/2010

	Rates	Fringes
Modular Furniture Installer.....	\$ 17.00	7.41

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CARP0547-001 07/01/2018

	Rates	Fringes
CARPENTER		
(1) Bridge.....	\$ 42.34	19.17
(2) Commercial Building....	\$ 37.11	19.17
(3) Heavy & Highway.....	\$ 42.21	19.17
(4) Residential Carpenter..	\$ 29.69	19.17
(5) Residential Insulation Installer.....	\$ 18.00	8.16
MILLWRIGHT.....	\$ 42.71	19.17
PILEDRIVERMAN.....	\$ 42.34	19.17

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CARP0547-002 07/01/2017

	Rates	Fringes
Drywall		
(1) Work on wood framed construction of single family residences, apartments or condominiums under four stories Drywall Installer/Lather...\$ 22.95		18.85
Drywall Stocker/Scrapper...\$ 12.50		12.27
(2) All other work Drywall Installer/Lather...\$ 32.00		17.63
Drywall Stocker/Scrapper...\$ 12.50		12.27

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ELEC0569-001 06/01/2020

	Rates	Fringes
Electricians (Tunnel Work)		
Cable Splicer.....	\$ 51.38	3%+14.88
Electrician.....	\$ 50.63	3%+14.88
Electricians: (All Other Work, Including 4 Stories Residential)		
Cable Splicer.....	\$ 45.75	3%+14.88
Electrician.....	\$ 45.00	3%+14.88

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ELEC0569-004 06/01/2020

	Rates	Fringes
ELECTRICIAN (Sound & Communications Sound Technician).....	\$ 33.95	13.55

SCOPE OF WORK Assembly, installation, operation, service and maintenance of components or systems as used in closed circuit television, amplified master television distribution, CATV on private property, intercommunication, burglar alarm, fire alarm, life support and all security alarms, private and public telephone and related telephone interconnect, public address, paging, audio, language, electronic, background music system less than line voltage or any system acceptable for class two wiring for private, commercial, or industrial use furnished by leased wire, frequency modulation or other recording devices, electrical apparatus by means of which electricity is applied to the amplification, transmission, transference, recording or reproduction of voice, music, sound, impulses and video. Excluded from this Scope of Work - transmission, service and maintenance of background music. All of the above shall include the installation and transmission over fiber optics.

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ELEC0569-005 06/01/2020

	Rates	Fringes
Sound & Communications Sound Technician.....	\$ 33.95	13.55

SCOPE OF WORK Assembly, installation, operation, service and maintenance of components or systems as used in closed circuit television, amplified master television distribution, CATV on private property, intercommunication, burglar alarm, fire alarm, life support and all security alarms, private and public telephone and related telephone interconnect, public address, paging, audio, language, electronic, background music system less than line voltage or any system acceptable for class two wiring for private, commercial, or industrial use furnished by leased wire, frequency modulation or other recording devices, electrical apparatus by means of which electricity is applied to the amplification, transmission, transference, recording or reproduction of voice, music, sound, impulses and video. Excluded from this Scope of Work - transmission, service and maintenance of background music. All of the above shall include the installation and transmission over fiber optics.

SOUND TECHNICIAN: Terminating, operating and performing final check-out

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ELEC0569-006 10/01/2020

Work on street lighting; traffic signals; and underground systems and/or established easements outside of buildings

	Rates	Fringes
Traffic signal, street light and underground work		
Utility Technician #1.....	\$ 33.42	3%+7.70
Utility Technician #2.....	\$ 27.85	3%+7.70

STREET LIGHT & TRAFFIC SIGNAL WORK:

UTILITY TECHNICIAN #1: Installation of street lights and traffic signals, including electrical circuitry, programmable controller, pedestal-mounted electrical meter enclosures and laying of pre-assembled cable in ducts. The layout of electrical systems and communication installation including proper position of trench depths, and radius at duct banks, location for manholes, street lights and traffic signals.

UTILITY TECHNICIAN #2: Distribution of material at jobsite, installation of underground ducts for electrical, telephone, cable TV land communication systems. The setting, leveling, grounding and racking of precast manholes, handholes and transformer pads.

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ELEC0569-008 08/31/2020

	Rates	Fringes
ELECTRICIAN (Residential, 1-3 Stories).....	\$ 35.74	7.68

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ELEC1245-001 06/01/2020

	Rates	Fringes
LINE CONSTRUCTION		
(1) Lineman; Cable splicer..	\$ 59.14	20.78
(2) Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), overhead & underground distribution line equipment).....	\$ 47.24	19.59
(3) Groundman.....	\$ 36.12	19.19
(4) Powderman.....	\$ 51.87	18.79

HOLIDAYS: New Year's Day, M.L. King Day, Memorial Day,  
 Independence Day, Labor Day, Veterans Day, Thanksgiving Day  
 and day after Thanksgiving, Christmas Day

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 ELEV0018-001 01/01/2021

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 59.32	35.825+a+b

FOOTNOTE:

- a. PAID VACATION: Employer contributes 8% of regular hourly rate as vacation pay credit for employees with more than 5 years of service, and 6% for 6 months to 5 years of service.
- b. PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, Friday after Thanksgiving, and Christmas Day.

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 ENGI0012-003 07/01/2020

	Rates	Fringes
OPERATOR: Power Equipment (All Other Work)		
GROUP 1.....	\$ 48.25	27.20
GROUP 2.....	\$ 49.03	27.20
GROUP 3.....	\$ 49.32	27.20
GROUP 4.....	\$ 50.81	27.20
GROUP 5.....	\$ 48.96	25.25
GROUP 6.....	\$ 51.03	27.20
GROUP 8.....	\$ 51.14	27.20
GROUP 9.....	\$ 49.29	25.25
GROUP 10.....	\$ 51.26	27.20
GROUP 11.....	\$ 49.41	25.25
GROUP 12.....	\$ 51.43	27.20
GROUP 13.....	\$ 51.53	27.20
GROUP 14.....	\$ 51.56	27.20
GROUP 15.....	\$ 51.64	27.20
GROUP 16.....	\$ 51.76	27.20
GROUP 17.....	\$ 51.93	27.20
GROUP 18.....	\$ 52.03	27.20
GROUP 19.....	\$ 52.14	27.20
GROUP 20.....	\$ 52.26	27.20
GROUP 21.....	\$ 52.43	27.20
GROUP 22.....	\$ 52.53	27.20
GROUP 23.....	\$ 52.64	27.20
GROUP 24.....	\$ 52.76	27.20
GROUP 25.....	\$ 52.93	27.20
OPERATOR: Power Equipment (Cranes, Piledriving & Hoisting)		
GROUP 1.....	\$ 49.60	27.20
GROUP 2.....	\$ 50.38	27.20
GROUP 3.....	\$ 50.67	27.20

	Rates	Fringes
GROUP 4.....	\$ 50.81	27.20
GROUP 5.....	\$ 51.03	27.20
GROUP 6.....	\$ 51.14	27.20
GROUP 7.....	\$ 51.26	27.20
GROUP 8.....	\$ 51.43	27.20
GROUP 9.....	\$ 51.60	27.20
GROUP 10.....	\$ 52.60	27.20
GROUP 11.....	\$ 53.60	27.20
GROUP 12.....	\$ 54.60	27.20
GROUP 13.....	\$ 55.60	27.20
OPERATOR: Power Equipment		
(Tunnel Work)		
GROUP 1.....	\$ 50.10	27.20
GROUP 2.....	\$ 50.88	27.20
GROUP 3.....	\$ 51.17	27.20
GROUP 4.....	\$ 51.31	27.20
GROUP 5.....	\$ 51.53	27.20
GROUP 6.....	\$ 51.64	27.20
GROUP 7.....	\$ 51.76	27.20

PREMIUM PAY:

\$3.75 per hour shall be paid on all Power Equipment Operator work on the following Military Bases: China Lake Naval Reserve, Vandenberg AFB, Point Arguello, Seely Naval Base, Fort Irwin, Nebo Annex Marine Base, Marine Corp Logistics Base Yermo, Edwards AFB, 29 Palms Marine Base and Camp Pendleton

Workers required to suit up and work in a hazardous material environment: \$2.00 per hour additional. Combination mixer and compressor operator on gunite work shall be classified as a concrete mobile mixer operator.

SEE ZONE DEFINITIONS AFTER CLASSIFICATIONS

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Bargeman; Brakeman; Compressor operator; Ditch Witch, with seat or similar type equipment; Elevator operator-inside; Engineer Oiler; Forklift operator (includes loed, lull or similar types under 5 tons; Generator operator; Generator, pump or compressor plant operator; Pump operator; Signalman; Switchman

GROUP 2: Asphalt-rubber plant operator (nurse tank operator); Concrete mixer operator-skip type; Conveyor operator; Fireman; Forklift operator (includes loed, lull or similar types over 5 tons; Hydrostatic pump operator; oiler crusher (asphalt or concrete plant); Petromat laydown machine; PJU side dum jack; Screening and conveyor machine operator (or similar types); Skiploader (wheel type up to 3/4 yd. without attachment); Tar pot fireman; Temporary heating plant operator; Trenching machine oiler

GROUP 3: Asphalt-rubber blend operator; Bobcat or similar type (Skid steer); Equipment greaser (rack); Ford Ferguson (with dragtype attachments); Helicopter radioman (ground); Stationary pipe wrapping and cleaning machine operator

GROUP 4: Asphalt plant fireman; Backhoe operator (mini-max or similar type); Boring machine operator; Boxman or mixerman (asphalt or concrete); Chip spreading machine operator; Concrete cleaning decontamination machine operator; Concrete Pump Operator (small portable); Drilling machine operator, small auger types (Texoma super economatic or similar types - Hughes 100 or 200 or similar types - drilling depth of 30' maximum); Equipment greaser (grease truck); Guard rail post driver operator; Highline cableway signalman; Hydra-hammer-aero stomper; Micro Tunneling (above ground tunnel); Power concrete curing machine operator; Power concrete saw operator; Power-driven jumbo form setter operator; Power sweeper operator; Rock Wheel Saw/Trencher; Roller operator (compacting); Screed operator (asphalt or concrete); Trenching machine operator (up to 6 ft.); Vacuum or much truck

GROUP 5: Equipment Greaser (Grease Truck/Multi Shift).

GROUP 6: Articulating material hauler; Asphalt plant engineer; Batch plant operator; Bit sharpener; Concrete joint machine operator (canal and similar type); Concrete planer operator; Dandy digger; Deck engine operator; Derrickman (oilfield type); Drilling machine operator, bucket or auger types (Calweld 100 bucket or similar types - Watson 1000 auger or similar types - Texoma 330, 500 or 600 auger or similar types - drilling depth of 45' maximum); Drilling machine operator; Hydrographic seeder machine operator (straw, pulp or seed), Jackson track maintainer, or similar type; Kalamazoo Switch tamper, or similar type; Machine tool operator; Maginnis internal full slab vibrator, Mechanical berm, curb or gutter (concrete or asphalt); Mechanical finisher operator (concrete, Clary-Johnson-Bidwell or similar); Micro tunnel system (below ground); Pavement breaker operator (truck mounted); Road oil mixing machine operator; Roller operator (asphalt or finish), rubber-tired earth moving equipment (single engine, up to and including 25 yds. struck); Self-propelled tar pipelining machine operator; Skiploader operator (crawler and wheel type, over 3/4 yd. and up to and including 1-1/2 yds.); Slip form pump operator (power driven hydraulic lifting device for concrete forms); Tractor operator-bulldozer, tamper-scraper (single engine, up to 100 h.p. flywheel and similar types, up to and including D-5 and similar types); Tugger hoist operator (1 drum); Ultra high pressure waterjet cutting tool system operator; Vacuum blasting machine operator



GROUP 8: Asphalt or concrete spreading operator (tamping or finishing); Asphalt paving machine operator (Barber Greene or similar type); Asphalt-rubber distribution operator; Backhoe operator (up to and including 3/4 yd.), small ford, Case or similar; Cast-in-place pipe laying machine operator; Combination mixer and compressor operator (gunite work); Compactor operator (self-propelled); Concrete mixer operator (paving); Crushing plant operator; Drill Doctor; Drilling machine operator, Bucket or auger types (Calweld 150 bucket or similar types - Watson 1500, 2000 2500 auger or similar types - Texoma 700, 800 auger or similar types - drilling depth of 60' maximum); Elevating grader operator; Grade checker; Gradall operator; Grouting machine operator; Heavy-duty repairman; Heavy equipment robotics operator; Kalamazoo balliste regulator or similar type; Kolman belt loader and similar type; Le Tourneau blob compactor or similar type; Loader operator (Athey, Euclid, Sierra and similar types); Mobark Chipper or similar; Ozzie padder or similar types; P.C. slot saw; Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pumpcrete gun operator; Rock Drill or similar types; Rotary drill operator (excluding caisson type); Rubber-tired earth-moving equipment operator (single engine, caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator (multiple engine up to and including 25 yds. struck); Rubber-tired scraper operator (self-loading paddle wheel type-John Deere, 1040 and similar single unit); Self-propelled curb and gutter machine operator; Shuttle buggy; Skiploader operator (crawler and wheel type over 1-1/2 yds. up to and including 6-1/2 yds.); Soil remediation plant operator; Surface heaters and planer operator; Tractor compressor drill combination operator; Tractor operator (any type larger than D-5 - 100 flywheel h.p. and over, or similar-bulldozer, tamper, scraper and push tractor single engine); Tractor operator (boom attachments), Traveling pipe wrapping, cleaning and bending machine operator; Trenching machine operator (over 6 ft. depth capacity, manufacturer's rating); trenching Machine with Road Miner attachment (over 6 ft depth capacity): Ultra high pressure waterjet cutting tool system mechanic; Water pull (compaction) operator

GROUP 9: Heavy Duty Repairman

GROUP 10: Drilling machine operator, Bucket or auger types (Calweld 200 B bucket or similar types-Watson 3000 or 5000 auger or similar types-Texoma 900 auger or similar types-drilling depth of 105' maximum); Dual drum mixer, dynamic compactor LDC350 (or similar types); Monorail locomotive operator (diesel, gas or electric); Motor patrol-blade operator (single engine); Multiple engine tractor operator (Euclid and similar type-except Quad 9

cat.); Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Pneumatic pipe ramming tool and similar types; Prestressed wrapping machine operator; Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Rubber tired earth moving equipment operator (multiple engine, Euclid, caterpillar and similar over 25 yds. and up to 50 yds. struck), Tower crane repairman; Tractor loader operator (crawler and wheel type over 6-1/2 yds.); Woods mixer operator (and similar Pugmill equipment)

GROUP 11: Heavy Duty Repairman - Welder Combination, Welder - Certified.

GROUP 12: Auto grader operator; Automatic slip form operator; Drilling machine operator, bucket or auger types (Calweld, auger 200 CA or similar types - Watson, auger 6000 or similar types - Hughes Super Duty, auger 200 or similar types - drilling depth of 175' maximum); Hoe ram or similar with compressor; Mass excavator operator less tha 750 cu. yards; Mechanical finishing machine operator; Mobile form traveler operator; Motor patrol operator (multi-engine); Pipe mobile machine operator; Rubber-tired earth- moving equipment operator (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck); Rubber-tired self- loading scraper operator (paddle-wheel-auger type self-loading - two (2) or more units)

GROUP 13: Rubber-tired earth-moving equipment operator operating equipment with push-pull system (single engine, up to and including 25 yds. struck)

GROUP 14: Canal liner operator; Canal trimmer operator; Remote- control earth-moving equipment operator (operating a second piece of equipment: \$1.00 per hour additional); Wheel excavator operator (over 750 cu. yds.)

GROUP 15: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine-up to and including 25 yds. struck)

GROUP 16: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 17: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine,

Euclid, Caterpillar and similar, over 50 cu. yds. struck);  
Tandem tractor operator (operating crawler type tractors in  
tandem - Quad 9 and similar type)

GROUP 18: Rubber-tired earth-moving equipment operator,  
operating in tandem (scrapers, belly dumps and similar  
types in any combination, excluding compaction units -  
single engine, up to and including 25 yds. struck)

GROUP 19: Rotex concrete belt operator (or similar types);  
Rubber-tired earth-moving equipment operator, operating in  
tandem (scrapers, belly dumps and similar types in any  
combination, excluding compaction units - single engine,  
Caterpillar, Euclid, Athey Wagon and similar types with any  
and all attachments over 25 yds. and up to and including 50  
cu. yds. struck); Rubber-tired earth-moving equipment  
operator, operating in tandem (scrapers, belly dumps and  
similar types in any combination, excluding compaction  
units - multiple engine, up to and including 25 yds. struck)

GROUP 20: Rubber-tired earth-moving equipment operator,  
operating in tandem (scrapers, belly dumps and similar  
types in any combination, excluding compaction units -  
single engine, over 50 yds. struck); Rubber-tired  
earth-moving equipment operator, operating in tandem  
(scrapers, belly dumps, and similar types in any  
combination, excluding compaction units - multiple engine,  
Euclid, Caterpillar and similar, over 25 yds. and up to 50  
yds. struck)

GROUP 21: Rubber-tired earth-moving equipment operator,  
operating in tandem (scrapers, belly dumps and similar  
types in any combination, excluding compaction units -  
multiple engine, Euclid, Caterpillar and similar type, over  
50 cu. yds. struck)

GROUP 22: Rubber-tired earth-moving equipment operator,  
operating equipment with the tandem push-pull system  
(single engine, up to and including 25 yds. struck)

GROUP 23: Rubber-tired earth-moving equipment operator,  
operating equipment with the tandem push-pull system  
(single engine, Caterpillar, Euclid, Athey Wagon and  
similar types with any and all attachments over 25 yds. and  
up to and including 50 yds. struck); Rubber-tired  
earth-moving equipment operator, operating with the tandem  
push-pull system (multiple engine, up to and including 25  
yds. struck)

GROUP 24: Rubber-tired earth-moving equipment operator,  
operating equipment with the tandem push-pull system  
(single engine, over 50 yds. struck); Rubber-tired  
earth-moving equipment operator, operating equipment with  
the tandem push-pull system (multiple engine, Euclid,

Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 25: Concrete pump operator-truck mounted; Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

#### CRANES, PILEDRIVING AND HOISTING EQUIPMENT CLASSIFICATIONS

GROUP 1: Engineer oiler; Fork lift operator (includes loed, lull or similar types)

GROUP 2: Truck crane oiler

GROUP 3: A-frame or winch truck operator; Ross carrier operator (jobsite)

GROUP 4: Bridge-type unloader and turntable operator; Helicopter hoist operator

GROUP 5: Hydraulic boom truck; Stinger crane (Austin-Western or similar type); Tugger hoist operator (1 drum)

GROUP 6: Bridge crane operator; Cretor crane operator; Hoist operator (Chicago boom and similar type); Lift mobile operator; Lift slab machine operator (Vagtborg and similar types); Material hoist and/or manlift operator; Polar gantry crane operator; Self Climbing scaffold (or similar type); Shovel, backhoe, dragline, clamshell operator (over 3/4 yd. and up to 5 cu. yds. mrc); Tugger hoist operator

GROUP 7: Pedestal crane operator; Shovel, backhoe, dragline, clamshell operator (over 5 cu. yds. mrc); Tower crane repair; Tugger hoist operator (3 drum)

GROUP 8: Crane operator (up to and including 25 ton capacity); Crawler transporter operator; Derrick barge operator (up to and including 25 ton capacity); Hoist operator, stiff legs, Guy derrick or similar type (up to and including 25 ton capacity); Shovel, backhoe, dragline, clamshell operator (over 7 cu. yds., M.R.C.)

GROUP 9: Crane operator (over 25 tons and up to and including 50 tons mrc); Derrick barge operator (over 25 tons up to and including 50 tons mrc); Highline cableway operator; Hoist operator, stiff legs, Guy derrick or similar type (over 25 tons up to and including 50 tons mrc); K-crane operator; Polar crane operator; Self erecting tower crane operator maximum lifting capacity ten tons

GROUP 10: Crane operator (over 50 tons and up to and including 100 tons mrc); Derrick barge operator (over 50 tons up to and including 100 tons mrc); Hoist operator,

stiff legs, Guy derrick or similar type (over 50 tons up to and including 100 tons mrc), Mobile tower crane operator (over 50 tons, up to and including 100 tons M.R.C.); Tower crane operator and tower gantry

GROUP 11: Crane operator (over 100 tons and up to and including 200 tons mrc); Derrick barge operator (over 100 tons up to and including 200 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 100 tons up to and including 200 tons mrc); Mobile tower crane operator (over 100 tons up to and including 200 tons mrc)

GROUP 12: Crane operator (over 200 tons up to and including 300 tons mrc); Derrick barge operator (over 200 tons up to and including 300 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 200 tons, up to and including 300 tons mrc); Mobile tower crane operator (over 200 tons, up to and including 300 tons mrc)

GROUP 13: Crane operator (over 300 tons); Derrick barge operator (over 300 tons); Helicopter pilot; Hoist operator, stiff legs, Guy derrick or similar type (over 300 tons); Mobile tower crane operator (over 300 tons)

#### TUNNEL CLASSIFICATIONS

GROUP 1: Skiploader (wheel type up to 3/4 yd. without attachment)

GROUP 2: Power-driven jumbo form setter operator

GROUP 3: Dinkey locomotive or motorperson (up to and including 10 tons)

GROUP 4: Bit sharpener; Equipment greaser (grease truck); Slip form pump operator (power-driven hydraulic lifting device for concrete forms); Tugger hoist operator (1 drum); Tunnel locomotive operator (over 10 and up to and including 30 tons)

GROUP 5: Backhoe operator (up to and including 3/4 yd.); Small Ford, Case or similar; Drill doctor; Grouting machine operator; Heading shield operator; Heavy-duty repairperson; Loader operator (Athey, Euclid, Sierra and similar types); Mucking machine operator (1/4 yd., rubber-tired, rail or track type); Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pneumatic heading shield (tunnel); Pumpcrete gun operator; Tractor compressor drill combination operator; Tugger hoist operator (2 drum); Tunnel locomotive operator (over 30 tons)

GROUP 6: Heavy Duty Repairman

GROUP 7: Tunnel mole boring machine operator

ENGINEERS ZONES

\$1.00 additional per hour for all of IMPERIAL County and the portions of KERN, RIVERSIDE & SAN BERNARDINO Counties as defined below:

That area within the following Boundary: Begin in San Bernardino County, approximately 3 miles NE of the intersection of I-15 and the California State line at that point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Continue W in a straight line to that point which is the SW corner of the northwest quarter of Section 6, T27S, R42E, Mt. Diablo Meridian. Continue North to the intersection with the Inyo County Boundary at that point which is the NE corner of the western half of the northern quarter of Section 6, T25S, R42E, MDM. Continue W along the Inyo and San Bernardino County boundary until the intersection with Kern County, as that point which is the SE corner of Section 34, T24S, R40E, MDM. Continue W along the Inyo and Kern County boundary until the intersection with Tulare County, at that point which is the SW corner of the SE quarter of Section 32, T24S, R37E, MDM. Continue W along the Kern and Tulare County boundary, until that point which is the NW corner of T25S, R32E, MDM. Continue S following R32E lines to the NW corner of T31S, R32E, MDM. Continue W to the NW corner of T31S, R31E, MDM. Continue S to the SW corner of T32S, R31E, MDM. Continue W to SW corner of SE quarter of Section 34, T32S, R30E, MDM. Continue S to SW corner of T11N, R17W, SBM. Continue E along south boundary of T11N, SBM to SW corner of T11N, R7W, SBM. Continue S to SW corner of T9N, R7W, SBM. Continue E along south boundary of T9N, SBM to SW corner of T9N, R1E, SBM. Continue S along west boundary of R1E, SMB to Riverside County line at the SW corner of T1S, R1E, SBM. Continue E along south boundary of T1S, SBM (Riverside County Line) to SW corner of T1S, R10E, SBM. Continue S along west boundary of R10E, SBM to Imperial County line at the SW corner of T8S, R10E, SBM. Continue W along Imperial and Riverside county line to NW corner of T9S, R9E, SBM. Continue S along the boundary between Imperial and San Diego Counties, along the west edge of R9E, SBM to the south boundary of Imperial County/California state line. Follow the California state line west to Arizona state line, then north to Nevada state line, then continuing NW back to start at the point which is the NW corner of Section 1, T17N, R14E, SBM

\$1.00 additional per hour for portions of SAN LUIS OBISPO, KERN, SANTA BARBARA & VENTURA as defined below:

That area within the following Boundary: Begin approximately 5 miles north of the community of Cholame, on the Monterey County and San Luis Obispo County boundary at the NW corner of T25S, R16E, Mt. Diablo Meridian. Continue south along the west side of R16E to the SW corner of T30S, R16E, MDM. Continue E to SW corner of T30S, R17E, MDM. Continue S to SW corner of T31S,

R17E, MDM. Continue E to SW corner of T31S, R18E, MDM. Continue S along West side of R18E, MDM as it crosses into San Bernardino Meridian numbering area and becomes R30W. Follow the west side of R30W, SBM to the SW corner of T9N, R30W, SBM. Continue E along the south edge of T9N, SBM to the Santa Barbara County and Ventura County boundary at that point which is the SW corner of Section 34. T9N, R24W, SBM, continue S along the Ventura County line to that point which is the SW corner of the SE quarter of Section 32, T7N, R24W, SBM. Continue E along the south edge of T7N, SBM to the SE corner to T7N, R21W, SBM. Continue N along East side of R21W, SBM to Ventura County and Kern County boundary at the NE corner of T8N, R21W. Continue W along the Ventura County and Kern County boundary to the SE corner of T9N, R21W. Continue North along the East edge of R21W, SBM to the NE corner of T12N, R21W, SBM. Continue West along the north edge of T12N, SBM to the SE corner of T32S, R21E, MDM. [T12N SBM is a think strip between T11N SBM and T32S MDM]. Continue North along the East side of R21E, MDM to the Kings County and Kern County border at the NE corner of T25S, R21E, MDM, continue West along the Kings County and Kern County Boundary until the intersection of San Luis Obispo County. Continue west along the Kings County and San Luis Obispo County boundary until the intersection with Monterey County. Continue West along the Monterey County and San Luis Obispo County boundary to the beginning point at the NW corner of T25S, R16E, MDM.

\$2.00 additional per hour for INYO and MONO Counties and the Northern portion of SAN BERNARDINO County as defined below:

That area within the following Boundary: Begin at the intersection of the northern boundary of Mono County and the California state line at the point which is the center of Section 17, T10N, R22E, Mt. Diablo Meridian. Continue S then SE along the entire western boundary of Mono County, until it reaches Inyo County at the point which is the NE corner of the Western half of the NW quarter of Section 2, T8S, R29E, MDM. Continue SSE along the entire western boundary of Inyo County, until the intersection with Kern County at the point which is the SW corner of the SE 1/4 of Section 32, T24S, R37E, MDM. Continue E along the Inyo and Kern County boundary until the intersection with San Bernardino County at that point which is the SE corner of section 34, T24S, R40E, MDM. Continue E along the Inyo and San Bernardino County boundary until the point which is the NE corner of the Western half of the NW quarter of Section 6, T25S, R42E, MDM. Continue S to that point which is the SW corner of the NW quarter of Section 6, T27S, R42E, MDM. Continue E in a straight line to the California and Nevada state border at the point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Then continue NW along the state line to the starting point, which is the center of Section 18, T10N, R22E, MDM.

REMAINING AREA NOT DEFINED ABOVE RECIEVES BASE RATE

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ENGI0012-004 08/01/2020

	Rates	Fringes
OPERATOR: Power Equipment (DREDGING)		
(1) Leverman.....	\$ 56.40	30.00
(2) Dredge dozer.....	\$ 50.43	30.00
(3) Deckmate.....	\$ 50.32	30.00
(4) Winch operator (stern winch on dredge).....	\$ 49.77	30.00
(5) Fireman-Oiler, Deckhand, Bargeman, Leveehand.....	\$ 49.23	30.00
(6) Barge Mate.....	\$ 49.84	30.00

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IRON0433-006 07/01/2020

	Rates	Fringes
IRONWORKER		
Fence Erector.....	\$ 34.58	24.81
Ornamental, Reinforcing and Structural.....	\$ 41.00	33.45

PREMIUM PAY:

\$6.00 additional per hour at the following locations:

China Lake Naval Test Station, Chocolate Mountains Naval Reserve-Niland, Edwards AFB, Fort Irwin Military Station, Fort Irwin Training Center-Goldstone, San Clemente Island, San Nicholas Island, Susanville Federal Prison, 29 Palms - Marine Corps, U.S. Marine Base - Barstow, U.S. Naval Air Facility - Sealey, Vandenberg AFB

\$4.00 additional per hour at the following locations:

Army Defense Language Institute - Monterey, Fallon Air Base, Naval Post Graduate School - Monterey, Yermo Marine Corps Logistics Center

\$2.00 additional per hour at the following locations:

Port Hueneme, Port Mugu, U.S. Coast Guard Station - Two Rock

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LABO0089-001 07/01/2020

	Rates	Fringes
LABORER (BUILDING and all other Residential Construction)		
Group 1.....	\$ 34.18	20.48
Group 2.....	\$ 34.86	20.48



Group 3.....	\$ 35.57	20.48
Group 4.....	\$ 36.37	20.48
Group 5.....	\$ 38.30	20.48

LABORER (RESIDENTIAL  
CONSTRUCTION - See definition  
below)

(1) Laborer.....	\$ 30.82	18.80
(2) Cleanup, Landscape, Fencing (Chain Link & Wood).	\$ 29.53	18.80

RESIDENTIAL DEFINITION: Wood or metal frame construction of single family residences, apartments and condominiums - excluding (a) projects that exceed three stories over a garage level, (b) any utility work such as telephone, gas, water, sewer and other utilities and (c) any fine grading work, utility work or paving work in the future street and public right-of-way; but including all rough grading work at the job site behind the existing right of way

LABORER CLASSIFICATIONS

GROUP 1: Cleaning and handling of panel forms; Concrete Screeding for Rought Strike-off; Concrete, water curing; Demolition laborer; Flagman; Gas, oil and/or water pipeline laborer; General Laborer; General clean-up laborer; Landscape laborer; Jetting laborer; Temporary water and air lines laborer; Material hoseman (walls, slabs, floors and decks); Plugging, filling of Shee-bolt holes; Dry packing of concrete; Railroad maintenance, Repair Trackman and road beds, Streetcar and railroad construction trac laborers; Slip form raisers; Slurry seal crews (mixer operator, applicator operator, squeegee man, Shuttle man, top man), filling of cracks by any method on any surface; Tarman and mortar man; Tool crib or tool house laborer; Window cleaner; Wire Mesh puling-all concrete pouring operations

GROUP 2: Asphalt Shoveler; Cement Dumper (on 1 yard or larger mixer and handling bulk cement); Cesspool digger and installer; Chucktender; Chute man, pouring concrete, the handling of the cute from ready mix trucks, such as walls, slabs, decks, floors, foundations, footings, curbs, gutters and sidewalks; Concrete curer-impervious membrane and form oiler; Cutting torch operator (demoliton); Guinea chaser; Headboard man-asphlt; Laborer, packing rod steel and pans; membrane vapor barrier installer; Power broom sweepers (small); Riiprap, stonepaver, placing stone or wet sacked concrete; Roto scraper and tiller; Tank sealer and cleaner; Tree climber, faller, chain saw operator, Pittsburgh Chipper and similar type brush shredders; Underground laborers, including caisson bellower

GROUP 3: Buggymobile; Concrete cutting torch; Concrete cutting torch; Concrete pile cutter; Driller, jackhammer, 2

1/2 feet drill steel or longer; Dri Pak-it machine; High sealer (including drilling of same); Hydro seeder and similar type; Impact wrench, mult-plate; Kettlemen, potmen and men applying asphalt, lay-kold, creosote, line caustic and similar type materials (applying means applying, dipping, brushing or handling of such materials for pipe wrapping and waterproofing); Operators of pneumatic, gas, electric tools, vibrating machines, pavement breakers, air blasting, come-along, and similar mechanical tools not separately classified herein; Pipelayers back up man coating, grouting, making of joints, sealing, caulking, diapering and including rubber gasket joints, pointing and any and all other services; Rotary Scarifier or multiple head concrete chipping scarifier; Steel header board man and guideline setter; Tampers, Barko, Wacker and similar type; Trenching machine, handpropelled

GROUP 4: Asphalt raker, luterman, ironer, asphalt dumpman and asphalt spreader boxes (all types); Concrete core cutter (walls, floors or ceilings), Grinder or sander; Concrete saw man; cutting walls or flat work, scoring old or new concrete; Cribber, shorer, lagging, sheeting and trench bracing, hand-guided lagging hammer; Laser beam in connection with laborer's work; Oversize concrete vibrator operator 70 pounds and over; Pipelayer performing all services in the laying, installation and all forms of connection of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, metallic or non-metallic, conduit, and any other stationary type of tubular device used for the conveying of any substance or element, whether water, sewage, solid, gas, air or other product whatsoever and without regard to the nature of material from which the tubular material is fabricated; No joint pipe and stripping of same; Prefabricated manhole installer; Sandblaster (nozzleman), Porta shot-blast, water blasting

GROUP 5: Blasters Powderman-All work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Driller-all power drills, excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and any and all other types of mechanical drills without regard to the form of motive power.

LABO0089-002 11/01/2020

	Rates	Fringes
LABORER (MASON TENDER).....	\$ 33.00	19.23

LABO0089-004 07/01/2020

HEAVY AND HIGHWAY CONSTRUCTION

	Rates	Fringes
Laborers:		
Group 1.....	\$ 35.30	20.48
Group 2.....	\$ 35.76	20.48
Group 3.....	\$ 36.17	20.48
Group 4.....	\$ 37.01	20.48
Group 5.....	\$ 40.28	20.48

LABORER CLASSIFICATIONS

GROUP 1: Laborer: General or Construction Laborer, Landscape Laborer. Asphalt Rubber Material Loader. Boring Machine Tender (outside), Carpenter Laborer (cleaning, handling, oiling & blowing of panel forms and lumber), Concrete Laborer, Concrete Screeding for rough strike-off, Concrete water curing. Concrete Curb & Gutter laborer, Certified Confined Space Laborer, Demolition laborer & Cleaning of Brick and lumber, Expansion Joint Caulking; Environmental Remediation, Monitoring Well, Toxic waste and Geotechnical Drill tender, Fine Grader, Fire Watcher, Limbers, Brush Loader, Pilers and Debris Handlers. flagman. Gas Oil and Water Pipeline Laborer. Material Hoseman (slabs, walls, floors, decks); Plugging, filling of shee bolt holes; Dry packing of concrete and patching; Post Holer Digger (manual); Railroad maintenance, repair trackman, road beds; Rigging & signaling; Scaler, Slip-Form Raisers, Filling cracks on any surface, tool Crib or Tool House Laborer, Traffic control (signs, barriers, barricades, delineator, cones etc.), Window Cleaner

GROUP 2: Asphalt abatement; Buggymobile; Cement dumper (on 1 yd. or larger mixers and handling bulk cement); Concrete curer, impervious membrane and form oiler; Chute man, pouring concrete; Concrete cutting torch; Concrete pile cutter; driller/Jackhammer, with drill steel 2 1/2 feet or longer; Dry pak-it machine; Fence erector; Pipeline wrapper, gas, oil, water, pot tender & form man; Grout man; Installation of all asphalt overlay fabric and materials used for reinforcing asphalt; Irrigation laborer; Kettleman-Potman hot mop, includes applying asphalt, lay-klold, creosote, lime caustic and similar tyhpes of materials (dipping, brushing, handling) and waterproofing; Membrane vapor barrier installer; Pipelayer backup man (coating, grouting, making of joints, sealing caulkiing,

diapering including rubber basket joints, pointing); Rotary scarifier, multiple head concrete chipper; Rock slinger; Roto scraper & tiller; Sandblaster pot tender; Septic tank digger/installer; Tamper/wacker operator; Tank scaler & cleaner; Tar man & mortar man; Tree climber/faller, chain saw operator, Pittsburgh chipper & similar type brush shredders.

GROUP 3: Asphalt, installation of all fabrics; Buggy Mobile Man, Bushing hammer; Compactor (all types), Concrete Curer - Impervious membrane, Form Oiler, Concrete Cutting Torch, Concrete Pile Cutter, Driller/Jackhammer with drill steel 2 1/2 ft or longer, Dry Pak-it machine, Fence erector including manual post hole digging, Gas oil or water Pipeline Wrapper - 6 ft pipe and over, Guradrail erector, Hydro seeder, Impact Wrench man (multi plate), kettleman-Potman Hot Mop includes applying Asphalt, Lay-Kold, Creosote, lime caustic and similar types of materials (dipping, brushing or handling) and waterproofing. Laser Beam in connection with Laborer work. High Scaler, Operators of Pneumatic Gas or Electric Tools, Vibrating Machines, Pavement Breakers, Air Blasting, Come-Alongs and similar mechanical tools, Remote-Controlled Robotic Tools in connection with Laborers work. Pipelayer Backup Man (Coating, grouting, making of joints, sealing, caulking, diapering including rubber gasket joints, pointing and other services). Power Post Hole Digger, Rotary Scarifier (multiple head concrete chipper scarifier), Rock Slinger, Shot Blast equipment (8 to 48 inches), Steel Headerboard Man and Guideline Setter, Tamper/Wacker operator and similar types, Trenching Machine hand propelled.

GROUP 4: Any worker exposed to raw sewage. Asphalt Raker, Luteman, Asphalt Dumpman, Asphalt Spreader Boxes, Concrete Core Cutter, Concrete Saw Man, Cribber, Shorer, Head Rock Slinger. Installation of subsurface instrumentation, monitoring wells or points, remediation system installer; Laborer, asphalt-rubber distributor bootman; Oversize concrete vibrator operators, 70 pounds or over. Pipelayer, Prefabricated Manhole Installer, Sandblast Nozzleman (Water Blasting-Porta Shot Blast), Traffic Lane Closure.

GROUP 5: Blasters Powderman-All work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Horizontal directional driller, Boring system, Electronic tracking, Driller: all power drills excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and all other types of mechanical drills without regard to form of motive power. Environmental remediation, Monitoring well, Toxic waste and Geotechnical driller, Toxic waste removal. Welding in connection with Laborer's work.

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LABO0300-005 03/01/2021

	Rates	Fringes
Asbestos Removal Laborer.....	\$ 37.49	21.88

SCOPE OF WORK: Includes site mobilization, initial site cleanup, site preparation, removal of asbestos-containing material and toxic waste, encapsulation, enclosure and disposal of asbestos- containing materials and toxic waste by hand or with equipment or machinery; scaffolding, fabrication of temporary wooden barriers and assembly of decontamination stations.

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LABO0345-001 07/01/2020

	Rates	Fringes
LABORER (GUNITE)		
GROUP 1.....	\$ 45.05	19.62
GROUP 2.....	\$ 44.10	19.62
GROUP 3.....	\$ 40.56	19.62

FOOTNOTE: GUNITE PREMIUM PAY: Workers working from a Bosn'n's Chair or suspended from a rope or cable shall receive 40 cents per hour above the foregoing applicable classification rates. Workers doing gunite and/or shotcrete work in a tunnel shall receive 35 cents per hour above the foregoing applicable classification rates, paid on a portal-to-portal basis. Any work performed on, in or above any smoke stack, silo, storage elevator or similar type of structure, when such structure is in excess of 75'-0" above base level and which work must be performed in whole or in part more than 75'-0" above base level, that work performed above the 75'-0" level shall be compensated for at 35 cents per hour above the applicable classification wage rate.

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Rodmen, Nozzlemen

GROUP 2: Gunmen

GROUP 3: Reboundmen

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LABO1184-001 07/01/2020

	Rates	Fringes
Laborers: (HORIZONTAL DIRECTIONAL DRILLING)		
(1) Drilling Crew Laborer...	\$ 37.85	15.99
(2) Vehicle Operator/Hauler.	\$ 38.02	15.99
(3) Horizontal Directional Drill Operator.....	\$ 39.87	15.99
(4) Electronic Tracking Locator.....	\$ 41.87	15.99
Laborers: (STRIPING/SLURRY SEAL)		
GROUP 1.....	\$ 39.06	19.01
GROUP 2.....	\$ 40.36	19.01
GROUP 3.....	\$ 42.37	19.01
GROUP 4.....	\$ 44.11	19.01

LABORERS - STRIPING CLASSIFICATIONS

GROUP 1: Protective coating, pavement sealing, including repair and filling of cracks by any method on any surface in parking lots, game courts and playgrounds; carstops; operation of all related machinery and equipment; equipment repair technician

GROUP 2: Traffic surface abrasive blaster; pot tender - removal of all traffic lines and markings by any method (sandblasting, waterblasting, grinding, etc.) and preparation of surface for coatings. Traffic control person: controlling and directing traffic through both conventional and moving lane closures; operation of all related machinery and equipment

GROUP 3: Traffic delineating device applicator: Layout and application of pavement markers, delineating signs, rumble and traffic bars, adhesives, guide markers, other traffic delineating devices including traffic control. This category includes all traffic related surface preparation (sandblasting, waterblasting, grinding) as part of the application process. Traffic protective delineating system installer: removes, relocates, installs, permanently affixed roadside and parking delineation barricades, fencing, cable anchor, guard rail, reference signs, monument markers; operation of all related machinery and equipment; power broom sweeper

GROUP 4: Striper: layout and application of traffic stripes and markings; hot thermo plastic; tape traffic stripes and markings, including traffic control; operation of all related machinery and equipment

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LABO1414-003 08/05/2020

	Rates	Fringes
LABORER		
PLASTER CLEAN-UP LABORER....	\$ 36.03	21.01
PLASTER TENDER.....	\$ 38.58	21.01

Work on a swing stage scaffold: \$1.00 per hour additional.

Work at Military Bases - \$3.00 additional per hour:  
 Coronado Naval Amphibious Base, Fort Irwin, Marine Corps Air Station-29 Palms, Imperial Beach Naval Air Station, Marine Corps Logistics Supply Base, Marine Corps Pickle Meadows, Mountain Warfare Training Center, Naval Air Facility-Seeley, North Island Naval Air Station, Vandenberg AFB.

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PAIN0036-001 07/01/2020

	Rates	Fringes
Painters: (Including Lead Abatement)		
(1) Repaint (excludes San Diego County).....	\$ 29.59	17.12
(2) All Other Work.....	\$ 33.12	17.24

REPAINT of any previously painted structure. Exceptions: work involving the aerospace industry, breweries, commercial recreational facilities, hotels which operate commercial establishments as part of hotel service, and sports facilities.

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PAIN0036-010 10/01/2020

	Rates	Fringes
DRYWALL FINISHER/TAPER		
(1) Building & Heavy Construction.....	\$ 36.69	18.90
(2) Residential Construction (Wood frame apartments, single family homes and multi-duplexes up to and including four stories).....	\$ 27.11	17.51

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PAIN0036-012 10/01/2020

	Rates	Fringes
GLAZIER.....	\$ 45.55	18.06

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PAIN0036-019 01/01/2021

	Rates	Fringes
SOFT FLOOR LAYER.....	\$ 33.52	17.59

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PLAS0200-005 08/07/2019

	Rates	Fringes
PLASTERER.....	\$ 43.73	16.03

NORTH ISLAND NAVAL AIR STATION, COLORADO NAVAL AMPHIBIOUS BASE, IMPERIAL BEACH NAVAL AIR STATION: \$3.00 additional per hour.

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PLAS0500-001 07/01/2018

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER		
GROUP 1.....	\$ 26.34	21.12
GROUP 2.....	\$ 27.99	21.12
GROUP 3.....	\$ 30.07	21.12

CEMENT MASONS - work inside the building line, meeting the following criteria:

GROUP 1: Residential wood frame project of any size; work classified as Type III, IV or Type V construction; interior tenant improvement work regardless the size of the project; any wood frame project of four stories or less.

GROUP 2: Work classified as type I and II construction

GROUP 3: All other work

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 PLUM0016-006 09/01/2020

	Rates	Fringes
PLUMBER, PIPEFITTER, STEAMFITTER		
Camp Pendleton; Vandenberg Air Force Base.....	\$ 55.88	23.66
Work ONLY on new additions and remodeling of commercial buildings, bars, restaurants, and stores not to exceed 5,000 sq. ft. of floor space.....	\$ 50.70	23.73
Work ONLY on strip malls, light commercial, tenant improvement and remodel work.....	\$ 38.73	22.06
All other work except work on new additions and remodeling of bars, restaurant, stores and commercial buildings not to exceed 5,000 sq. ft. of floor space and work on strip malls, light commercial, tenant improvement and remodel work.....	\$ 52.28	24.71

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 PLUM0016-011 09/01/2020

	Rates	Fringes
PLUMBER/PIPEFITTER		
Residential.....	\$ 41.62	20.63

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 PLUM0345-001 09/01/2020

	Rates	Fringes
PLUMBER		
Landscape/Irrigation Fitter..	\$ 35.30	24.10
Sewer & Storm Drain Work....	\$ 39.39	21.48



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\* ROOF0045-001 03/01/2021

	Rates	Fringes
ROOFER.....	\$ 36.25	9.49

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SFCA0669-001 01/01/2021

	Rates	Fringes
SPRINKLER FITTER.....	\$ 41.57	24.62

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SHEE0206-001 07/01/2020

	Rates	Fringes
SHEET METAL WORKER		
Camp Pendleton.....	\$ 42.62	29.55
Except Camp Pendleton.....	\$ 40.62	29.55
Sheet Metal Technician.....	\$ 30.51	9.49

SHEET METAL TECHNICIAN - SCOPE:

a. Existing residential buildings, both single and multi-family, where each unit is heated and/or cooled by a separate system b. New single family residential buildings including tracts. c. New multi-family residential buildings, not exceeding five stories of living space in height, provided each unit is heated or cooled by a separate system. Hotels and motels are excluded. d. LIGHT COMMERCIAL WORK: Any sheet metal, heating and air conditioning work performed on a project where the total construction cost, excluding land, is under \$1,000,000 e. TENANT IMPROVEMENT WORK: Any work necessary to finish interior spaces to conform to the occupants of commercial buildings, after completion of the building shell

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TEAM0166-001 09/01/2019

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 18.90	34.69
GROUP 2.....	\$ 26.49	34.69
GROUP 3.....	\$ 26.69	34.69
GROUP 4.....	\$ 26.89	34.69
GROUP 5.....	\$ 27.09	34.69
GROUP 6.....	\$ 27.59	34.69
GROUP 7.....	\$ 29.09	34.69

FOOTNOTE: HAZMAT PAY: Work on a hazmat job, where hazmat certification is required, shall be paid, in addition to the classification working in, as follows: Levels A, B and C - +\$1.00 per hour. Workers shall be paid hazmat pay in increments of four (4) and eight (8) hours.

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Fuel Man, Swamper

GROUP 2: 2-axle Dump Truck, 2-axle Flat Bed, Concrete Pumping Truck, Industrial Lift Truck, Motorized Traffic Control, Pickup Truck on Jobsite

GROUP 3: 2-axle Water Truck, 3-axle Dump Truck, 3-axle Flat Bed, Erosion Control Nozzleman, Dump Crete Truck under 6.5 yd, Forklift 15,000 lbs and over, Prell Truck, Pipeline Work Truck Driver, Road Oil Spreader, Cement Distributor or Slurry Driver, Bootman, Ross Carrier

GROUP 4: Off-road Dump Truck under 35 tons 4-axles but less than 7-axles, Low-Bed Truck & Trailer, Transit Mix Trucks under 8 yd, 3-axle Water Truck, Erosion Control Driver, Grout Mixer Truck, Dump Crete 6.5yd and over, Dumpster Trucks, DW 10, DW 20 and over, Fuel Truck and Dynamite, Truck Greaser, Truck Mounted Mobile Sweeper 2-axle Winch Truck

GROUP 5: Off-road Dump Truck 35 tons and over, 7-axles or more, Transit Mix Trucks 8 yd and over, A-Frame Truck, Swedish Cranes

GROUP 6: Off-Road Special Equipment (including but not limited to Water Pull Tankers, Athey Wagons, DJB, B70 Wuclids or like Equipment)

GROUP 7: Repairman

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information

on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the

wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

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#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"



## ENGINEER OF WORK

The Engineering Specifications and Special Provisions contained herein have been prepared by or under the direction of the following Registered Engineer:

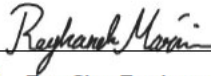


1) Registered Engineer

3/25/2021

Date

Seal:



2) For City Engineer

3/25/2021

Date

Seal:



## **A. CHANGES TO CONTRACT DOCUMENTS**

The following changes to the Contract Documents are hereby made effective as though originally issued with the bid package. Bidders are reminded that all previous requirements to this solicitation remain in full force and effect.

## **B. BIDDER'S QUESTIONS**

Q1. RFI #1: Section 44 42 56.16 Supplement -1 Peristaltic Hose Pump. Specified manufacturer is Watson Marlow/Bredel Pumps Bredel 620DUN/RE. I'd like to inquire about the Blue-White M-4 metering pump being accepted as an approved equal for this spec section. Please see attached cutsheet and specification.

A1. Bid as specified.

Q2. Detail 4027-607 Note 1 calls out core drill on existing wall. The detail shows a sleeve embedded in the wall with a modular seal. If we are core drill existing concrete do, we need to embed a sleeve as shown in the drawing or can the modular seal make tier seal directly against the concrete cored hole?

A2. See modification in this Addendum.

Q3. Sheet 27, 187 and 193 show the civil, mechanical and section view for the new BG pipe system installation and tie-ins. There is no clear shut off shown in order to facilitate the tie-in. Please confirm this system will be shut down and purged by the City prior to tie-in of the new 18x12" reducer/spool as shown in section B on sheet 193. In addition, there are no clear removal and reinstatement requirements shown for the slab at the existing Gas Flare 80-GFL-01. Please provide details for demolishing and reinstatement for the concrete slab.

A3. For demolishing and reinstatement of the concrete slab see note 5 on sheet 80-D-122.

Q4. Sht. 80-E-121 calls out Conduit 80/014 & 80/015 and the Conduit Schedule on Sht. 80-E-622 calls out the conduits to be new.

Please confirm if these conduits are new.

If said conduits are new, please define the physical routing of these conduits on plan view drawings, and how they are routed to the Gallery.

Panel 80IP4A is located in the Gallery but I do not see this on the drawings.



Please provide a plan view of the Panel and the conduits being Routed to this panel.

A4. See drawing modification in this addendum. Sheets Y-122, Y-123 and Y-124 have been revised.

Q5. Sht. Y-320 shows Details A, B, C, (cross sections of the pipe gallery).

What is the vertical distance from the top of the pipe gallery to finished grade?

A5. Per record drawings the distance from the top of the pipe gallery to finished grade ranges from 0 feet to 11 feet.

Q6. Valve 76MV1125B is shown on the valve schedule to be provided by the Contractor, drawing 76-I-14 has it within the scope of the manufacture. Please clarify who is to provide the valve.

A6. See modified valve schedule in this Addendum.

Q7. Valve 76MV0101A is shown on drawing 76-I-41, this valve is not shown on the valve schedule, please confirm who is to provide this valve.

A7. See modified valve schedule in this Addendum.

Q8. Valve 76SV0101B is shown on drawing 76-I-41, this valve is not shown on the valve schedule, please confirm who is to provide this valve.

A8. See modified valve schedule in this Addendum.

Q9. Valve 76MV0102A is shown on drawing 76-I-42, this valve is not shown on the valve schedule, please confirm who is to provide this valve.

A9. See modified valve schedule in this Addendum.

Q10. Valve 76SV0102B is shown on drawing 76-I-42, this valve is not shown on the valve schedule, please confirm who is to provide this valve.

A10. See modified valve schedule in this Addendum.

Q11. Valve 76MV0103A is shown on drawing 76-I-43, this valve is not shown on the valve schedule, please confirm who is to provide this valve.

A11. See modified valve schedule in this Addendum.

Q12. Valve 76SV0103B is shown on drawing 76-I-43, this valve is not shown on the valve schedule, please confirm who is to provide this valve.

- A12. See modified valve schedule in this Addendum.
- Q13. Valve 76MV0104A is shown on drawing 76-I-44, this valve is not shown on the valve schedule, please confirm who is to provide this valve.
- A13. See modified valve schedule in this Addendum.
- Q14. Valve 76SV0104B is shown on drawing 76-I-44, this valve is not shown on the valve schedule, please confirm who is to provide this valve.
- A14. See modified valve schedule in this Addendum.
- Q15. Valve 76MV0105 is shown on drawing 76-I-45, this valve is not shown on the valve schedule, please confirm who is to provide this valve.
- A15. See modified valve schedule in this Addendum.
- Q16. Valve 76SV0105B is shown on drawing 76-I-45, this valve is not shown on the valve schedule, please confirm who is to provide this valve.
- A16. See modified valve schedule in this Addendum.
- Q17. Valve 80MV1129 is shown on drawing 80-I-1, this valve is not shown on the valve schedule, please confirm who is to provide this valve.
- A17. Valve is existing and will not be replaced. See modification in this Addendum.
- Q18. Valve 80MV1107 is shown on drawing 80-I-1, this valve is not shown on the valve schedule, please confirm who is to provide this valve.
- A18. Valve is existing and will not be replaced. See modification in this Addendum.
- Q19. Valve 80MV1229 is shown on drawing 80-I-51, this valve is not shown on the valve schedule, please confirm who is to provide this valve.
- A19. Valve is existing and will not be replaced. See modification in this Addendum.
- Q20. Valve 80MV1207 is shown on drawing 80-I-51, this valve is not shown on the valve schedule, please confirm who is to provide this valve.
- A20. Valve is existing and will not be replaced. See modification in this Addendum.

- Q21. Valve 80MV1329 is shown on drawing 80-I-101, this valve is not shown on the valve schedule, please confirm who is to provide this valve.
- A21. Valve is existing and will not be replaced. See modification in this Addendum.
- Q22. Valve 80MV1307 is shown on drawing 80-I-101, this valve is not shown on the valve schedule, please confirm who is to provide this valve.
- A22. Valve is existing and will not be replaced. See modification in this Addendum.
- Q23. Valve 23PCV0001 is shown on drawing 80-I-272, this valve is called out as 10" on the valve schedule but shown as 12" on 80-I-272. Please confirm the diameter of 23PCV0001.
- A23. See modification in this Addendum.
- Q24. Valves 80M1810, 80PCV1811, and 80SV1812 are shown on the valve schedule to be provided by the Contractor, drawing 80-I-280 has it within the scope of the manufacture. Please clarify who is to provide these valves.
- A24. See modified valve schedule in this Addendum.
- Q25. 46 23 00
- 2.02.D.1.f: Please confirm the 1.25-inch valve is a modulating ball valve. Also confirm the attached Don Johns modulating ball valve is acceptable as none were specified in section 40 90 00.
- 2.02.D.2.a.b.d: Please confirm if the controls need to modulate the ball and plug valves or are for Open/Close service only. We won't have that capability to modulate with the specified programmable relay logic controls specified.
- 2.05.A. Please confirm if the existing control panel refurbishment is to be performed by the Contractor or equipment supplier.
- 3.06.A: Please confirm when the testing period will commence during the 889-day project timeline to so we can assess our warranty coverage accordingly.
- A25. Answer to 2.02.D.1.f: Valves 76MV1104B, 76MV1109B, and 76MV1114B are modulating ball valves with the same functionality as 76MV1125B, described in paragraph 2.02.D.2.d. Ball valves shall be in accordance with specification section 40 27 02 paragraph 2.05.C. Alternate valve manufacturers will be evaluated during submittal review.

Answer to 2.02.D.2.a.b.d: These valves may be open/close, so long as they are per the manufacturer's recommendation and do not impair the function of the grit separator. The existing system uses Single Loop Controllers to provide flow control. Controllers have been specified 2.03.B.6.b.

Answer to 2.05.A: The specification allows for these services to be provided by either the contractor or the supplier.

Answer to 3.06.A: Warranty shall start on the date the Work is accepted by the City unless the City has Beneficial Use or takes Occupancy of the project earlier as specified in Supplementary Special Provisions Section 3-13.3. The warranty period for specific items covered under manufacturers or suppliers' warranties shall commence on the date they are placed into service at the direction of the Engineer in writing. See modification to Specification Section 01 91 14 this Addendum. The start of overall Facility Acceptance Testing will be as Specified in Section 01 91 14 and Supplementary Special Provisions Section 6-9 Milestones.

Q26. Drawing 80-D-121 shows a flame arrester to be refurbished. Please provide make and model of arrester.

A26. The make and model of the flame arrester is a Varec 12".

Q27. Valves 80MV1129 and 80MV1107 are shown on drawing 80-I-1, these valves are not shown on the valve schedule, please confirm who is to provide these valves.

A27. Valve is existing and will not be replaced. See modification in this Addendum.

Q28. Valves 80MV1229 and 80MV1207 are shown on drawing 80-I-51, these valves are not shown on the valve schedule, please confirm who is to provide these valves.

A28. Valve is existing and will not be replaced. See modification in this Addendum.

Q29. Valves 80MV1329 and 80MV1307 are shown on drawing 80-I-101, these valves are not shown on the valve schedule, please confirm who is to provide these valves.

A29. Valve is existing and will not be replaced. See modification in this Addendum.

- Q30. Please consider adding Fluid Components International (FCI) as an approved manufacturer for the Thermal Mass Flowmeters (F51 Flow Element & Transmitter, Thermal Mass Flow).

FCI is #1 in the world for thermal mass flowmeters in this application, and is headquartered in San Diego County, San Marcos, CA. In addition, with an installed base at the Metro Biosolids Center and Point Loma WWTP, the City of San Diego, along with nearly all other WWTP's in San Diego County are current customers of FCI.

Please see attached and let us know if you have questions or need any additional information.

- A30. Bid as specified.
- Q31. Attachment A – Scope of Work, Section 3, states that the overall time for completion of the work is 889 Working Days. Section 4 provides the descriptions of four (4) Milestones. Attachment E - Supplementary Special Provision, Section 6-9, sets forth the required completion dates in working days for each of the 4 milestones. However, Section 01 32 00, Item 1.02.U. states "Contract duration is measured in calendar days against contract milestones". Please confirm that the contract duration for all milestones and final completion will be measured in working days and not in calendar days.
- A31. Confirmed. See modification to Specification Section 01 32 00 in this Addendum.
- Q32. Since this project is subject to a Project Labor Agreement (PLA), has an agreement been made between the Laborers and Pipefitters Unions as to which will provide labor for installation of piping, valves, and process equipment inside of the pipe galleries and buildings? Please advise so that we can determine which labor rates to use in our estimate.
- A32. Any questions about agreements between PLA-signatory union(s) regarding union jurisdiction may be directed to the affected union(s). The PLA requirements for union work assignments and jurisdictional disputes are addressed in PLA Article 8. The PLA requirements for wages and benefits are addressed in PLA Article 6.
- Q33. Section 01 31 13 - 1.05.A includes a description of only 2 Milestones that is different from the 4 Milestones listed in Attachment E, Section 6-9. Please confirm that we are to use the milestones listed in Attachment E, Section 6-9.

- A33. Refer to modification to Section 01 13 13 in Addendum B.
- Q34. Please confirm this project is subject to the California Acts of God statute which relieves the contractor from the cost associated with damage caused by an earthquake exceeding 3.5 on the Richter Scale in excess of 5% of the contractor's bid.
- A34. All Pure Water projects are exempt from mandatory requirements of California Public Contract Code 7105 (a).
- Q35. Drawing Volume 7 N-003 shows Drop 7/57 and Drop 8/58 highlighted in black. Are these Drops (and all other Drops shown in a similar manner) highlighted in black due to new I/O modules being provided in existing PCM cabinets or are completely new PCM cabinets required?
- A35. All drops highlighted in black are to upgrade per 40.90.07.3.01.B, see 40.90.06 for the quantity of IO modules required and 40.94.24 for the IO affected.
- Q36. When was the last time the Digesters have been cleaned?
- A36. Refer to Addendum B, Answer 20.
- Q37. Due to the scope of work added in addendum #1 we request the bid date be extended.
- A37. Refer to Addendum B.
- Q38. Refer to Section 12.5 from the Notice Inviting Bids.
- This section appears to be missing the information that is referred to, "as follows." Please provide this additional information or clarify what information is being referenced.
- A38. Refer to 12.6 for agreeable fair share objective.

## **C. SUPPLEMENTARY SPECIAL PROVISIONS**

1. To Technicals, Section 01 29 00, Payment Procedures, Part 1, Item 1.10 Bid Items, Sub-Item E Site Civil Grading – Lump Sum, Item 3, Page 174, **DELETE** in its entirety and **SUBSTITUTE** with the following:
  3. Payment is made for this item for the following:
    - a. Civil demolition work and grading as shown on Drawings and as specified, including protection of existing facilities, excavation, grading, erosion control, tree trimming and protection, tree removal and replacement, fencing removal and replacement, irrigation system removal and replacement, and all appurtenant work, complete.

- b. Payment under this Bid Item shall be made as the lump sum price named in the Bid Schedule.
2. To Technicals, Section 01 32 00, Construction Progress Documentation, Part 1 General, Item 1.02 Definitions, Sub-Item U, Page 200, **DELETE** in its entirety and **SUBSTITUTE** with the following:
  - U. Calendar Day: All days in a calendar year including weekends and holidays.
3. To Technicals, Section 01 91 14, Testing, Integration and Startup, Part 3 Execution, Item 3.08, Equipment Performance Testing, Page 358, **ADD** the following after Sub-Item C:
  - D. Equipment and systems may be placed into service for beneficial use after successful completion of factory acceptance testing, function testing, pre-performance and performance testing. Warranties for equipment and systems placed into service shall commence after successful completion of all functional and performance testing and meeting all specified requirements as notified in writing by the Engineer. Placing equipment and systems into service and beneficial use does not relieve the Contractor of any of the Integration Period, Facility Acceptance Testing and Digester Stress Testing requirements.

#### **D. PLANS**

1. To Drawing Numbers 44198-1001-D, 44198-1025-D, 44198-1026-D, 44198-1036-D, 44198-1037-D, 44198-1038-D, 44198-1249-D, 44198-1302-D, 44198-1311-D, 44198-1320-D, and 44198-1338-D, **DELETE** in their entirety and **REPLACE** with pages 11 through 21 in this Addendum.

James Nagelvoort, Director  
Engineering & Capital Projects Department

Dated: *March 25, 2021*  
San Diego, California

JN/AJ/rd



# SAN DIEGO METROPOLITAN BIOSOLIDS CENTER IMPROVEMENTS

CITY OF SAN DIEGO, CA 92111

## EXISTING LEGAL DESCRIPTION

LOT 78, PARTITION OF RANCHO MISSION OF SAN DIEGO, MAP 330.

## SCOPE OF WORK

1. THE MBC IMPROVEMENTS PROJECT INCREASES PLANT CAPACITY BY MODIFYING THE GRIT SEPARATION SYSTEM; THE SLUDGE THICKENING SYSTEM; THE SLUDGE DEWATERING SYSTEM; THE DIGESTER MIXING AND RECIRCULATION SYSTEM; THE BIOGAS COLLECTION AND TRANSFER SYSTEM; THE BIOGAS FLARE SYSTEM; AND THE CENTRATE SYSTEM. THE PROJECT INCLUDES MODIFICATIONS TO THE CONTROL AND ELECTRICAL SYSTEMS, AS WELL AS OTHER WORK SHOWN WITHIN THE CONTRACT DOCUMENTS.

## CONTRACTOR'S RESPONSIBILITIES

1. PURSUANT TO SECTION 4216 OF THE GOVERNMENT CODE, AT LEAST 2 WORKING DAYS PRIOR TO EXCAVATION, YOU MUST CONTACT THE REGIONAL NOTIFICATION CENTER (E.G. UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA) AND OBTAIN AN INQUIRY IDENTIFICATION NUMBER.
2. NOTIFY SDG&E AT LEAST 10 WORKING DAYS PRIOR TO EXCAVATING WITHIN 10' OF SDG&E UNDERGROUND HIGH VOLTAGE TRANSMISSION POWER LINES. (I.E., 69 KV & HIGHER)
3. THE LOCATIONS OF EXISTING BUILDINGS AS SHOWN ON THE PLAN ARE APPROXIMATE.
4. STORM DRAIN INLETS SHALL REMAIN FUNCTIONAL AT ALL TIMES DURING CONSTRUCTION.
5. UNLESS OTHERWISE NOTED AS PREVIOUSLY POTHOLED (PH), ELEVATIONS SHOWN ON THE PROFILE FOR EXISTING UTILITIES ARE BASED ON A SEARCH OF THE AVAILABLE RECORD INFORMATION ONLY AND ARE SOLELY FOR THE CONTRACTOR'S CONVENIENCE. THE CITY DOES NOT GUARANTEE THAT IT HAS REVIEWED ALL AVAILABLE DATA. THE CONTRACTOR SHALL POTHOLE ALL EXISTING UTILITIES EITHER SHOWN ON THE PLANS OR MARKED IN THE FIELD IN ACCORDANCE WITH THE SPECIFICATIONS SECTION 5-UTILITIES.
6. EXISTING UTILITY CROSSING AS SHOWN ON THE PLANS ARE APPROXIMATE AND ARE NOT REPRESENTATIVE OF ACTUAL LENGTH AND LOCATION OF CONFLICT AREAS. SEE PLAN VIEW.
7. ALL ADVANCE METERING INFRASTRUCTURE (AMI) DEVICES ATTACHED TO THE WATER METER OR LOCATED IN OR NEAR WATER METER BOXES, COFFINS, OR VAULTS SHALL BE PROTECTED AT ALL TIMES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

## BUILDING DATA

1. REFER TO DRAWING G-034 FOR BUILDING DATA OF EXISTING BUILDINGS.

## CONSTRUCTION STORM WATER PROTECTION NOTES

1. TOTAL SITE DISTURBANCE AREA (ACRES) : 0.14 AC  
HYDROLOGIC UNIT/ WATERSHED : PENASQUITOS HU/ MISSION BAY WATERSHED  
HYDROLOGIC SUBAREA NAME & NO. : MIRAMAR HSA 906.4
2. THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE
  - WPCP  
THE PROJECT IS SUBJECT TO MUNICIPAL STORM WATER PERMIT NO. R9-2013-0001 AS AMENDED BY R9-2015-0001 AND R9-2015-0100
  - SWPPP  
THE PROJECT IS SUBJECT TO MUNICIPAL STORM WATER PERMIT NO. R9-2013-0001 AS AMENDED BY R9-2015-0001 AND R9-2015-0100 AND CONSTRUCTION GENERAL PERMIT ORDER 2009-0009-DWQ AS AMENDED BY ORDER 2010-0014-DWQ AND 2012-0006-DWQ

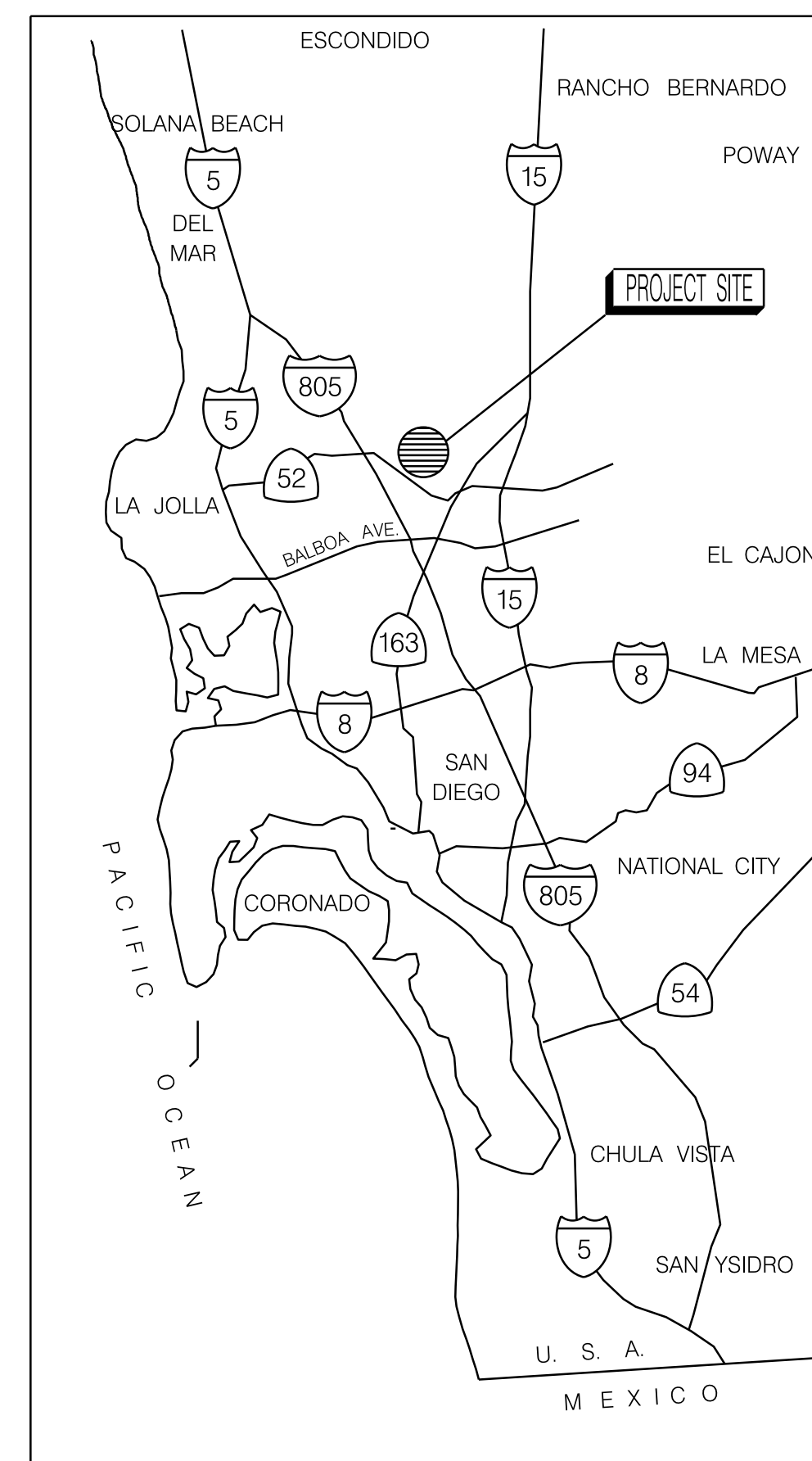
TRADITIONAL: RISK LEVEL  1  2  3  
LUP: RISK TYPE  1  2  3
3. CONSTRUCTION SITE PRIORITY  
 ASBS  HIGH  MEDIUM  LOW  NOT APPLICABLE

VOLUME 5  
FEBRUARY 2019  
CONTRACT NO. XXXX

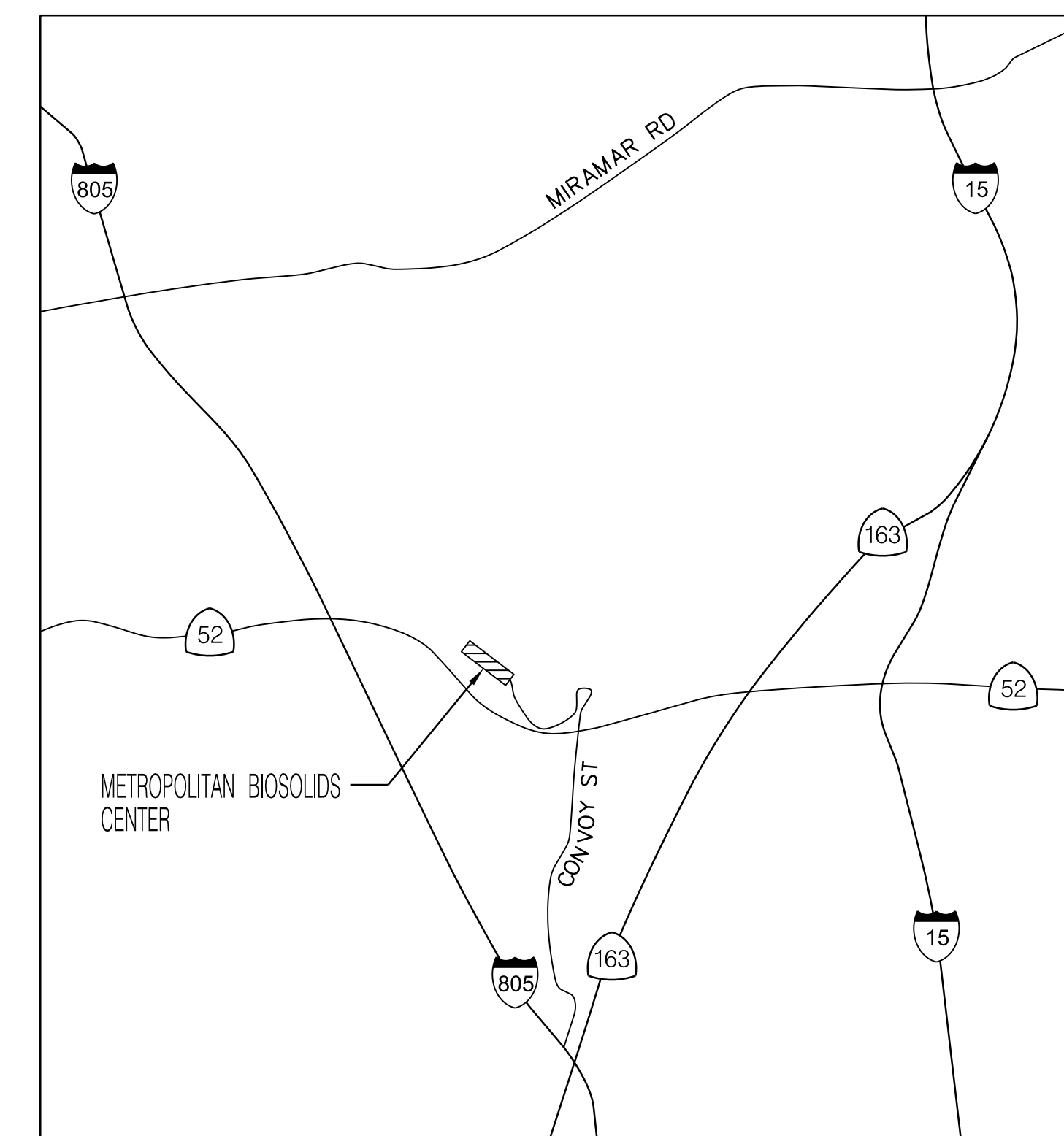


### Beyaz & Patel Inc.

10920 Via Frontera, Ste 210  
San Diego, California 92127  
ph: 858-451-0374  
www.beyazpatel.com



VICINITY MAP  
TRUE



LOCATION MAP  
TRUE

## DECLARATION OF RESPONSIBLE CHARGE

\* I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS. I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

MARK ELLIOTT  
DATE 12/18/2020

CONSULTANT

DIGITALLY SIGNED: 12/18/2020

SAN DIEGO MBC IMPROVEMENTS GENERAL		G-001	
COVER SHEET, VICINITY AND LOCATION MAPS			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 1 OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED FOR CITY ENGINEER Andreas Demich	DATE 12/30/2020	SUBMITTED BY MONIKA SMOCZYNSKI PROJECT MANAGER	
PRINT DCE NAME	RCE# C70321	DESIGNED BY MONIKA SMOCZYNSKI PROJECT ENGINEER	
DESCRIPTION	BY	APPROVED	DATE
			FILM
CONTRACTOR	INSPECTOR	DATE STARTED	DATE COMPLETED
			41198-1001-D

CONSTRUCTION CHANGE / ADDENDUM			
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.
▲	2/2021	30, 31, 60A, 92A, 106A, 106B, 106C, 115A, 115B, 126A, 158A, 159A, 159B, 159C, 159D, 279, 286, 286A, 286B, 294, 301, 352, 363A, 363B	
▲	3/2021	25, 26, 36, 37, 38, 249, 302, 311, 320, 338	

SAN DIEGO METROPOLITAN BIOSOLIDS CENTER



MBC - POWER OPERATED VALVE SCHEDULE

P&ID	REFERENCE DRAWING	TAG NUMBER	VALVE SIZE (INCHES)	VALVE TYPE (NOTE 6)	FLOW STREAM	MIN OPERATING FLOW (NOTE 2)	INLET TEMPERATURE (°F)	MIN INLET PRESSURE (PSIG)	Cv @ MIN FLOW	VALVE OPEN % AT MIN FLOW (NOTE 4)	MAX OPERATING FLOW (NOTE 2)	MAX INLET PRESSURE (PSIG)	Cv @ MAX FLOW	VALVE OPEN % AT MAX FLOW (NOTE 4)	ACTUATOR TYPE (NOTE 3)	COMMUNICATION PROTOCOL	VOLTAGE	NOTES
76-I-41	76-D-132	76MV101A	4"	V405	UWLP	0	70	5	-	-	250	50	-	-	O/C	HARDWIRED	120	ADDED BY ADDENDUM C
76-I-42	76-D-330	76MV102A	4"	V405	UWLP	0	70	5	-	-	250	50	-	-	O/C	HARDWIRED	120	ADDED BY ADDENDUM C
76-I-43	76-D-132	76MV103A	4"	V405	UWLP	0	70	5	-	-	250	50	-	-	O/C	HARDWIRED	120	ADDED BY ADDENDUM C
76-I-44	76-D-132	76MV104A	4"	V405	UWLP	0	70	5	-	-	250	50	-	-	O/C	HARDWIRED	120	ADDED BY ADDENDUM C
76-I-45	76-D-132	76MV105A	4"	V405	UWLP	0	70	5	-	-	250	50	-	-	O/C	HARDWIRED	120	ADDED BY ADDENDUM C
76-I-10	76-D-311	76MV1090	14"	V406	RSL	0	70	5	-	-	3120	50	-	-	O/C	PAKSCAN	120	
76-I-14	76-D-311	76MV1118	8"	V405	RSL	0	70	5	-	-	1040	50	-	-	O/C	HARDWIRED	120	
76-I-14	76-D-311	76MV1140	8"	V405	RSL	0	70	5	-	-	1040	50	-	-	O/C	HARDWIRED	120	
76-I-14	76-D-311	76MV1125B	1.5"	V100	UWHP	0	70	50	-	-	250	85	-	-	O/C	HARDWIRED	120	DELETED BY ADDENDUM C
76-I-31	76-D-330	76MV1101	10"	V405	RSL	0	70	9	-	-	1200	50	-	-	O/C	PAKSCAN	120	
76-I-31	76-D-330	76MV1152	8"	V405	RSL	0	70	0	-	-	1200	50	-	-	O/C	PAKSCAN	120	
76-I-31	76-D-131	76MV1153	8"	V405	RSL	0	70	0	-	-	1200	50	-	-	O/C	PAKSCAN	120	
76-I-32	76-D-330	76MV1155	10"	V405	RSL	0	70	0	-	-	1200	50	-	-	O/C	PAKSCAN	120	
76-I-32	76-D-330	76MV1156	8"	V405	RSL	0	70	0	-	-	1200	50	-	-	O/C	PAKSCAN	120	
76-I-32	76-D-131	76MV1157	8"	V405	RSL	0	70	0	-	-	1200	50	-	-	O/C	PAKSCAN	120	
76-I-33	76-D-330	76MV1160	10"	V405	RSL	0	70	0	-	-	1200	50	-	-	O/C	PAKSCAN	120	
76-I-33	76-D-330	76MV1161	8"	V405	RSL	0	70	0	-	-	1200	50	-	-	O/C	PAKSCAN	120	
76-I-33	76-D-131	76MV1162	8"	V405	RSL	0	70	0	-	-	1200	50	-	-	O/C	PAKSCAN	120	
76-I-34	76-D-330	76MV1165	10"	V405	RSL	0	70	0	-	-	1200	50	-	-	O/C	PAKSCAN	120	
76-I-34	76-D-330	76MV1166	8"	V405	RSL	0	70	0	-	-	1200	50	-	-	O/C	PAKSCAN	120	
76-I-34	76-D-131	76MV1167	8"	V405	RSL	0	70	0	-	-	1200	50	-	-	O/C	PAKSCAN	120	
76-I-35	76-D-330	76MV1170	10"	V405	RSL	0	70	0	-	-	1200	50	-	-	O/C	PAKSCAN	120	
76-I-35	76-D-330	76MV1171	8"	V405	RSL	0	70	0	-	-	1200	50	-	-	O/C	PAKSCAN	120	
76-I-35	76-D-131	76MV1172	8"	V405	RSL	0	70	0	-	-	1200	50	-	-	O/C	PAKSCAN	120	
76-I-41	76-D-132	76SV101B	2"	V940	UWLP	0	70	5	-	-	110	50	-	-	O/C	HARDWIRED	120	ADDED BY ADDENDUM C
76-I-42	76-D-330	76SV102B	2"	V940	UWLP	0	70	5	-	-	110	50	-	-	O/C	HARDWIRED	120	ADDED BY ADDENDUM C
76-I-43	76-D-132	76SV103B	2"	V940	UWLP	0	70	5	-	-	110	50	-	-	O/C	HARDWIRED	120	ADDED BY ADDENDUM C
76-I-44	76-D-132	76SV104B	2"	V940	UWLP	0	70	5	-	-	110	50	-	-	O/C	HARDWIRED	120	ADDED BY ADDENDUM C
76-I-45	76-D-132	76SV105B	2"	V940	UWLP	0	70	5	-	-	110	50	-	-	O/C	HARDWIRED	120	ADDED BY ADDENDUM C
80-I-250	80-D-312, SIM	80MV1103	14"	V408	BG	0	70	0	-	-	2600	0.5	-	-	O/C	FLOWERVE	120	
80-I-3	Y-124	80MV1120	6"	V405	TSL	0	70	0	-	-	400	100	-	-	O/C	FLOWERVE	120	
80-I-3	Y-124	80MV1121	6"	V405	TSL	0	70	0	-	-	400	100	-	-	O/C	FLOWERVE	120	
80-I-3	Y-124	80MV1132	6"	V405	TSL	0	70	0	-	-	400	100	-	-	O/C	HARDWIRED	120	
80-I-3	Y-124	80MV1133	6"	V405	TSL	0	70	0	-	-	400	100	-	-	O/C	HARDWIRED	120	
80-I-3	Y-124	80MV1134	6"	V405	TSL	0	70	0	-	-	400	100	-	-	O/C	HARDWIRED	120	
80-I-251	80-D-312, SIM	80MV1203	14"	V408	BG	0	70	0	-	-	2600	0.5	-	-	O/C	FLOWERVE	120	
80-I-53	Y-124	80MV1220	6"	V405	TSL	0	70	0	-	-	400	100	-	-	O/C	FLOWERVE	120	
80-I-53	Y-124	80MV1221	6"	V405	TSL	0	70	0	-	-	400	100	-	-	O/C	FLOWERVE	120	
80-I-53	Y-124	80MV1232	6"	V405	TSL	0	70	0	-	-	400	100	-	-	O/C	HARDWIRED	120	
80-I-53	Y-124	80MV1233	6"	V405	TSL	0	70	0	-	-	400	100	-	-	O/C	HARDWIRED	120	
80-I-53	Y-124	80MV1234	6"	V405	TSL	0	70	0	-	-	400	100	-	-	O/C	HARDWIRED	120	
80-I-252	80-D-312	80MV1303	14"	V408	BG	0	70	0	-	-	2600	0.5	-	-	O/C	FLOWERVE	120	
80-I-103	Y-124	80MV1320	6"	V405	TSL	0	70	0	-	-	400	100	-	-	O/C	FLOWERVE	120	
80-I-103	Y-124	80MV1321	6"	V405	TSL	0	70	0	-	-	400	100	-	-	O/C	FLOWERVE	120	
80-I-103	Y-124	80MV1332	6"	V405	TSL	0	70	0	-	-	400	100	-	-	O/C	HARDWIRED	120	
80-I-103	Y-124	80MV1333	6"	V405	TSL	0	70	0	-	-	400	100	-	-	O/C	HARDWIRED	120	
80-I-103	Y-124	80MV1334	6"	V405	TSL	0	70	0	-	-	400	100	-	-	O/C	HARDWIRED	120	
80-I-272	80-D-121	80MV1670	8"	V512	BG	0	70	0	-	-	600	0.45	-	-	MODULATING	FLOWERVE	120	
80-I-272	80-D-121	80MV1671	8"	V512	BG	0	70	3	-	-	600	6	-	-	O/C	FLOWERVE	120	
80-I-272	80-D-121	80MV1672	8"	V512	BG	0	70	0	-	-	600	0.45	-	-	MODULATING	FLOWERVE	120	
80-I-272	80-D-121	80MV1673	8"	V512	BG	0	70	3	-	-	600	6	-	-	O/C	FLOWERVE	120	
80-I-272	80-D-320	80MV1674	2"	V512	BG	50	70	3	-	-	150	5.5	-	-	MODULATING	FLOWERVE	120	
80-I-273	80-D-121	80MV1677	8"	V512	BG	0	70	0	-	-	600	0.45	-	-	MODULATING	FLOWERVE	120	
80-I-273	80-D-122	80MV1678	8"	V512	BG	0	70	3	-	-	600	6	-	-	O/C	FLOWERVE	120	
80-I-275	80-D-321	80MV1693	12"	V408	BG	0	70	0.28	-	-	600	0.45	-	-	O/C	HARDWIRED	120	
80-I-280	80-D-320	80SV1812	1"	V940	NG	0	70	0.00	-	-	TBD	40	-	-	O/C	HARDWIRED	120	DELETED BY ADDENDUM C
80-I-280	80-D-321	80MV1810	12"	V512	BG	0	70	0.28	-	-	550	0.45	-	-	O/C	HARDWIRED	120	DELETED BY ADDENDUM C
80-I-159	80-D-110	80MV1390	10"	V405	DSL/OF	0	100	0	-	-	2500	20	-	-	O/C	HARDWIRED	120	
80-I-159	80-D-110	80MV1391	10"	V405	DSL/OF	0	100	0	-	-	2500	20	-	-	O/C	HARDWIRED	120	
80-I-159	80-D-110	80MV1392	10"	V405	DSL/OF	0	100	0	-	-	2500	20	-	-	O/C	HARDWIRED	120	
80-I-159	80-D-110	80MV1395	10"	V405	DSL/EOF	0	100	0	-	-	2500	20	-	-	O/C	HARDWIRED	120	
80-I-159	80-D-110	80MV1396	10"	V405	DSL/EOF	0	100	0	-	-	2500	20	-	-	O/C	HARDWIRED	120	
80-I-159	80-D-110	80MV1397	10"	V405	DSL/EOF	0	100	0	-	-	2500	20	-	-	O/C	HARDWIRED	120	
80-I-254	80-D-311	80MV1420	10"	V408	BG	0	70	0	-	-	600	1	-	-	O/C	FLOWERVE	120	
80-I-254	80-D-311	80MV1460	10"	V408	BG	0	70	0	-	-	600	1	-	-	O/C	FLOWERVE	120	

- NOTES:
- MOTORIZED VALVES THAT ARE PART OF A PACKAGE SYSTEM ARE NOT LISTED.
  - GPM FOR LIQUID AND SLUDGE SERVICES, CFM FOR AIR SERVICE
  - M = MODULATING  
O/C = OPEN/CLOSE
  - AT VALVE MAXIMUM AND MINIMUM POSITION, THE VALVE SHALL BE +/- 10% OF THE LISTED VALUE AT THE SPECIFIED CV.
  - LINE SIZE SAME AS VALVE SIZE UNLESS OTHERWISE NOTED.
  - SEE SPECIFICATION SECTION 40 27 02 FOR VALVE TYPE.

G-110

CONSULTANT



2/05/2019



SAN DIEGO MBC IMPROVEMENTS  
GENERAL

VALVE SCHEDULE  
POWER OPERATED VALVES

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC UTILITIES DEPARTMENT  
SHEET 25 OF 381 SHEETS

WBS S-17013/B-17006

APPROVED: *Andrew Demich* DATE: 12/30/2020  
FOR CITY ENGINEER: *Andrew Demich* PROJECT MANAGER: MONIKA SMOCZYNSKI  
PRINT DCE NAME: Andrew Demich RCE# C70321 PROJECT ENGINEER: MONIKA SMOCZYNSKI

DESCRIPTION	BY	APPROVED	DATE	FIRM
ORIGINAL	JACOBS		2/5/20	382 - 457
ADDENDUM C	JACOBS	<i>Richard H...</i>	3/24/21	CCS27 COORDINATE 1888 - 6280 CCS83 COORDINATE

CONTRACTOR INSPECTOR: \_\_\_\_\_ DATE STARTED: \_\_\_\_\_ DATE COMPLETED: \_\_\_\_\_ 41198-1025-D



MBC - MANUAL OPERATED VALVES									
LEGEND	SERVICE	GATE VALVE	GLOBE VALVE	BALL VALVE	PLUG VALVE	BUTTERFLY VALVE	DIAPHRAGM VALVE	CHECK VALVE	REMARKS
BG	BIOGAS			V307	V408	V512		V612	
CN	CENTRATE								
DSL/D	DIGESTED SLUDGE DRAIN								
DSL	DIGESTED SLUDGE	V130			V405				
EOF	EMERGENCY OVERFLOW	V150			V405, V410				
G	GRIT								
HUWLP	HOT UTILITY WATER LOW PRESSURE		V210						
NG	NATURAL GAS								
OF	OVERFLOW				V405, V410				
POL	POLYMER								
UWHP	UTILITY WATER HIGH PRESSURE								
UWLP	UTILITY WATER LOW PRESSURE								
RSL	RAW SOLIDS							V608	
TSL	THICKENED SOLIDS				V405			V608	

**NOTES:**

1. POWER ACTUATED VALVES AND SELF-CONTAINED REGULATING VALVES SHALL BE SHOWN ON THE DRAWINGS AND AS SPECIFIED.
2. MANUAL VALVES SMALLER THAN 2-1/2" SHALL BE SHOWN ON THE DRAWINGS AND AS SPECIFIED.
3. SEE SPECIFICATION SECTION 40 27 02 FOR VALVE TYPE AS DESIGNATED IN THE SCHEDULE.

MBC - SELF-REGULATED VALVE SCHEDULE											
P&ID NO.	REFERENCE DRAWING	TAG NUMBER	QUANTITY	VALVE SIZE	VALVE TYPE	VALVE DESCRIPTION	FLOW STREAM	MAXIMUM OPERATING PRESSURE	NOMINAL OPERATING PRESSURE	PRESSURE SETPOINT	
76-I-11	76-D-110	76PCV1104	1	2"	V710	PRESSURE CONTROL VALVE	UWLP	100	70	50	
76-I-12	76-D-110	76PCV1109	1	2"	V710	PRESSURE CONTROL VALVE	UWLP	100	70	50	
76-I-13	76-D-110	76PCV1114	1	2"	V710	PRESSURE CONTROL VALVE	UWLP	100	70	50	
76-I-14	76-D-110	76PCV1125	1	2"	V710	PRESSURE CONTROL VALVE	UWLP	100	70	50	
76-I-14	76-D-311	76ARV0020	1	2"	V754	AIR RELEASE VALVE	AIR	50	20	20	
76-I-31	76-D-331	76PRV1154	1	2"	V731	PRESSURE RELEASE VALVE	RSL	75	45	60	
76-I-32	76-D-331	76PRV1158	1	2"	V731	PRESSURE RELEASE VALVE	RSL	75	45	60	
76-I-33	76-D-331	76PRV1163	1	2"	V731	PRESSURE RELEASE VALVE	RSL	75	45	60	
76-I-34	76-D-331	76PRV1168	1	2"	V731	PRESSURE RELEASE VALVE	RSL	75	45	60	
76-I-35	76-D-331	76PRV1173	1	2"	V731	PRESSURE RELEASE VALVE	RSL	75	45	60	
76-I-52	76-D-330	76PRV1287	1	2"	V731	PRESSURE RELEASE VALVE	TSL	150	100	130	
76-I-53	76-D-330	76PRV1292	1	2"	V731	PRESSURE RELEASE VALVE	TSL	150	100	130	
76-I-54	76-D-330	76PRV1297	1	2"	V731	PRESSURE RELEASE VALVE	TSL	150	100	130	
76-I-101	76-D-320	76PRV1504	1	2"	V731	PRESSURE RELEASE VALVE	DSL	100	35	65	
76-I-102	76-D-320	76PRV1508	1	2"	V731	PRESSURE RELEASE VALVE	DSL	100	35	65	
76-I-103	76-D-320	76PRV1513	1	2"	V731	PRESSURE RELEASE VALVE	DSL	100	35	65	
76-I-104	76-D-320	76PRV1518	1	2"	V731	PRESSURE RELEASE VALVE	DSL	100	35	65	
76-I-105	76-D-320	76PRV1523	1	2"	V731	PRESSURE RELEASE VALVE	DSL	100	35	65	
76-I-106	76-D-320	76PRV1528	1	2"	V731	PRESSURE RELEASE VALVE	DSL	100	35	65	
76-I-107	76-D-320	76PRV1533	1	2"	V731	PRESSURE RELEASE VALVE	DSL	100	35	65	
76-I-108	76-D-320	76PRV1538	1	2"	V731	PRESSURE RELEASE VALVE	DSL	100	35	65	
76-I-211	76-D-150	76PRV1738	1	1"	V720	PRESSURE RELEASE VALVE	POL	100	50	75	
76-I-212	76-D-150	76PRV1743	1	1"	V720	PRESSURE RELEASE VALVE	POL	100	50	75	
76-I-213	76-D-150	76PRV1748	1	1"	V720	PRESSURE RELEASE VALVE	POL	100	50	75	
76-I-214	76-D-150	76PRV1753	1	1"	V720	PRESSURE RELEASE VALVE	POL	100	50	75	
76-I-215	76-D-150	76PRV1758	1	1"	V720	PRESSURE RELEASE VALVE	POL	100	50	75	
76-I-221	76-D-140	76PRV1773	1	1"	V720	PRESSURE RELEASE VALVE	POL	115	60	95	
76-I-222	76-D-140	76PRV1778	1	1"	V720	PRESSURE RELEASE VALVE	POL	115	60	95	
76-I-223	76-D-140	76PRV1783	1	1"	V720	PRESSURE RELEASE VALVE	POL	115	60	95	
76-I-224	76-D-140	76PRV1788	1	1"	V720	PRESSURE RELEASE VALVE	POL	115	60	95	
76-I-225	76-D-140	76PRV1793	1	1"	V720	PRESSURE RELEASE VALVE	POL	115	60	95	
76-I-226	76-D-140	76PRV1798	1	1"	V720	PRESSURE RELEASE VALVE	POL	115	60	95	
76-I-227	76-D-140	76PRV1803	1	1"	V720	PRESSURE RELEASE VALVE	POL	115	60	95	
80-I-272	Y-111	23PCV0001	1	10"	V733	PRESSURE CONTROL VALVE	BG				
76-I-238	76-D-140	76PRV1808	1	1"	V720	PRESSURE RELEASE VALVE	POL	115	60	95	
80-I-280	80-D-321	80PCV1811	4	4"	V710	PRESSURE CONTROL VALVE	NG				
N/A	Y-130	N/A	1	4"	V741	AIR RELEASE VALVE	AIR	25			DELETED BY ADDENDUM C

**NOTES:**

1. SELF - REGULATED VALVES THAT ARE PART OF A PACKAGE SYSTEM SPECIFICATION ARE NOT LISTED.
2. PRESSURE IS PSIG UNLESS OTHERWISE NOTED.
3. SEE SPECIFICATION SECTION 40 27 02 FOR VALVE TYPE.

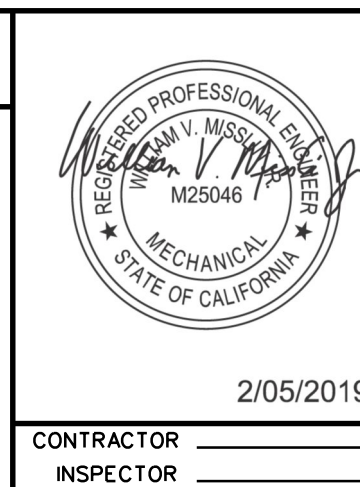
G-111

SAN DIEGO MBC IMPROVEMENTS GENERAL			
VALVE SCHEDULE MANUAL AND SELF-REGULATED VALVES			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 26 OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: <i>Jan DeL</i> FOR CITY ENGINEER	DATE: 12/30/2020	SUBMITTED BY: MONIKA SMOCZYNSKI PROJECT MANAGER	
PRINT DCE NAME: Andrea Demich	RCE#: C70321	DESIGNED BY: MONIKA SMOCZYNSKI PROJECT ENGINEER	
DESCRIPTION	BY	APPROVED	DATE
ORIGINAL	JACOBS		2/5/20
ADDENDUM C	JACOBS	<i>Robert H...</i>	3/24/21
		382 - 457 CCS27 COORDINATE	
		1888 - 6280 CCS83 COORDINATE	
CONTRACTOR		DATE STARTED	
INSPECTOR		DATE COMPLETED	
		41198-1026-D	

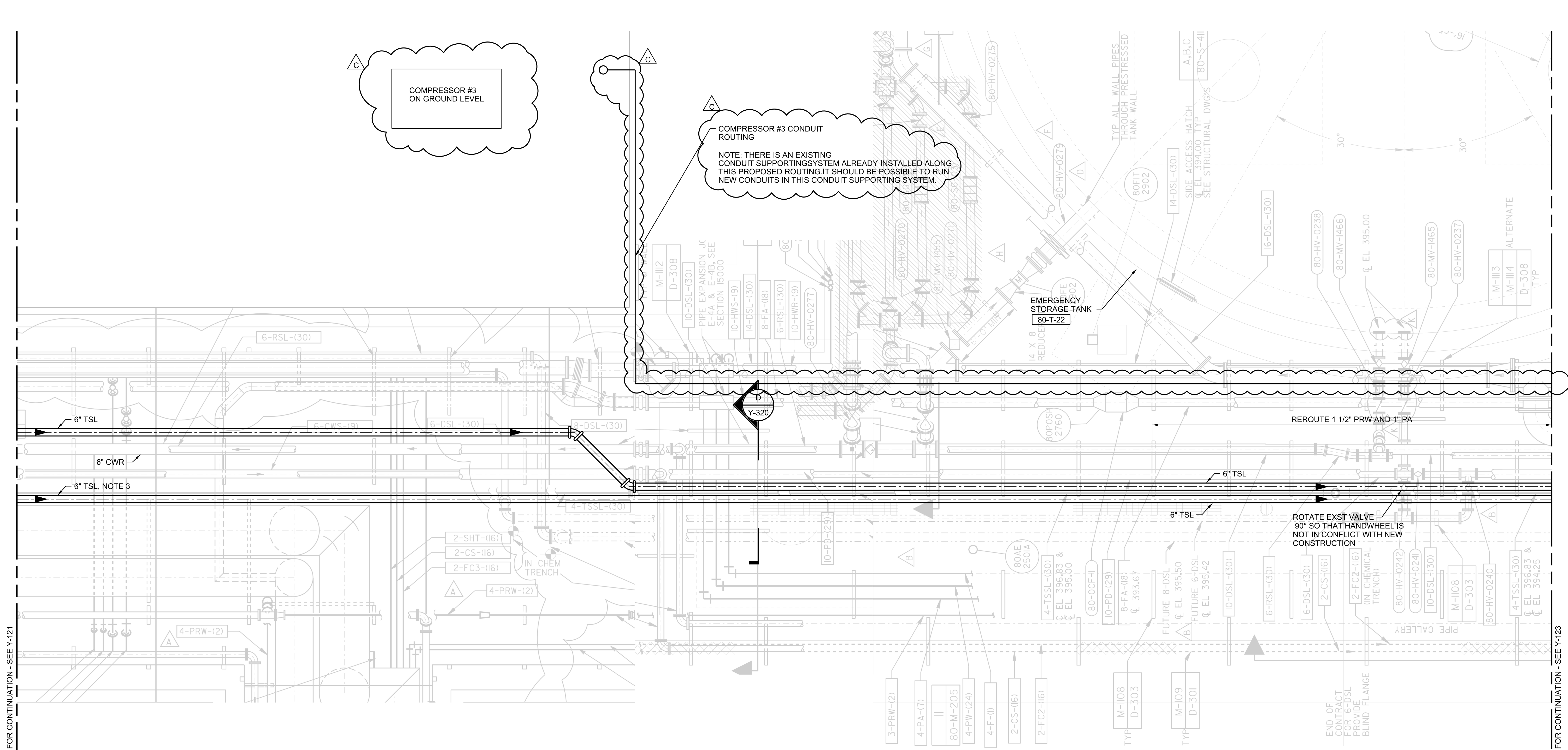
CONSULTANT



2/05/2019







FOR CONTINUATION - SEE Y-121

FOR CONTINUATION - SEE Y-123

**PLAN**  
 1/4"=1'-0"

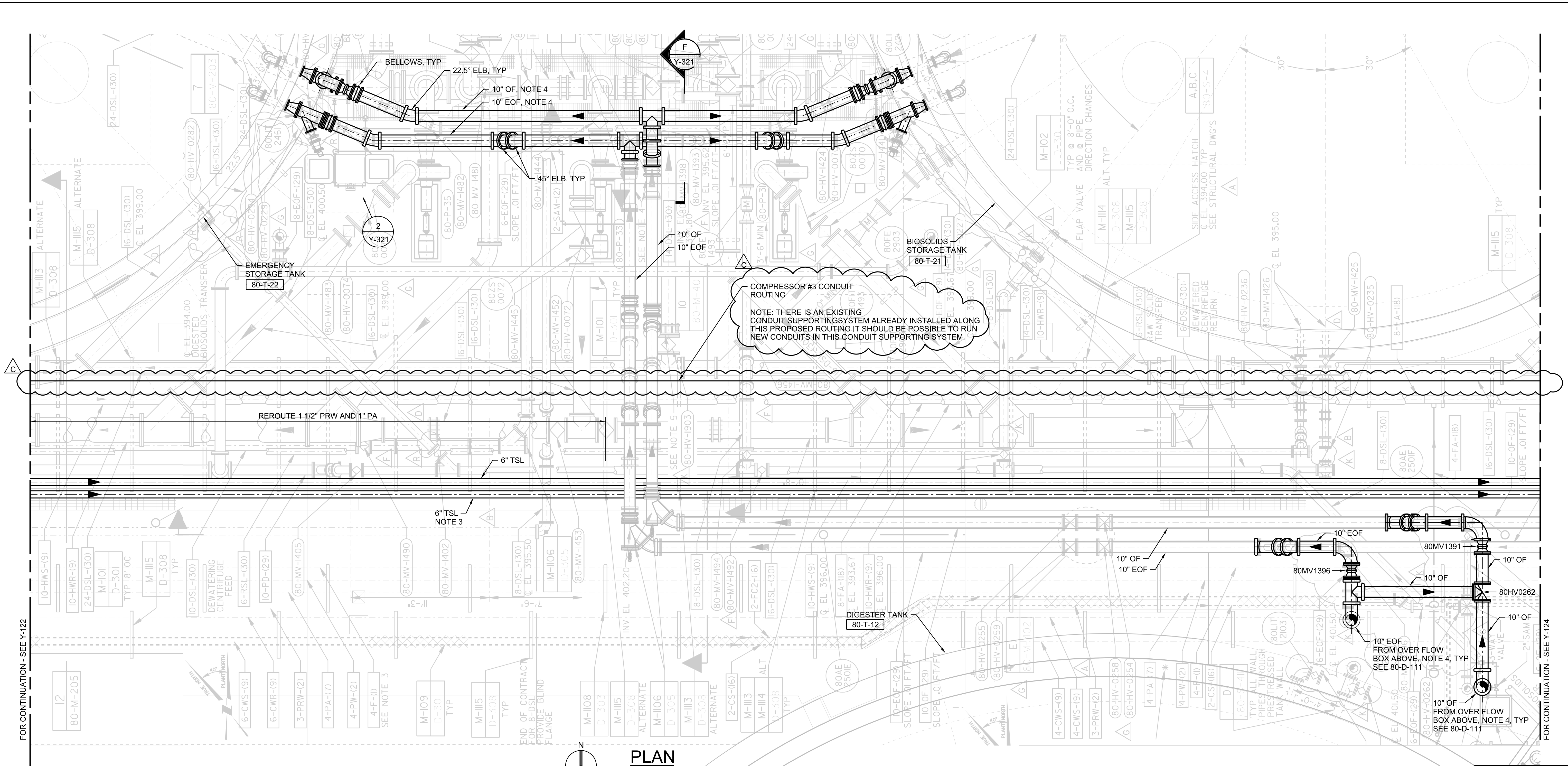
**NOTES**

1. INSTALL NEW 6" TSL IN EXISTING CONCRETE PIPE GALLERY. PIPE GALLERY BACKGROUND IS FROM RECORD DRAWINGS. EXISTING SITE CONDITIONS MAY VARY FROM WHAT IS SHOWN ON THIS SHEET. FIELD VERIFY PROPOSED PIPE ROUTE PRIOR TO CONSTRUCTION.
2. PIPE SUPPORTS NOT SHOWN. CONTRACTOR TO ADD / MODIFY PIPE SUPPORTS AND HANGERS AS SPECIFIED.
3. DEMOLISH 4" TSL. INSTALL 6" TSL LINE IN SAME LOCATION AS DEMOLISHED 4" TSL. FOR CONSTRUCTION SEQUENCING SEE SPECIFICATIONS.

Y-122

		<b>SAN DIEGO MBC IMPROVEMENTS</b> YARD PIPING <b>THICKENED SLUDGE PIPELINE</b> <b>PLAN - 3</b>	
<b>CONSULTANT</b>  		CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 36 OF 381 SHEETS	
		WBS S-17013/B-17006 SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER PROJECT ENGINEER	
CONTRACTOR INSPECTOR		DATE STARTED DATE COMPLETED	





FOR CONTINUATION - SEE Y-122

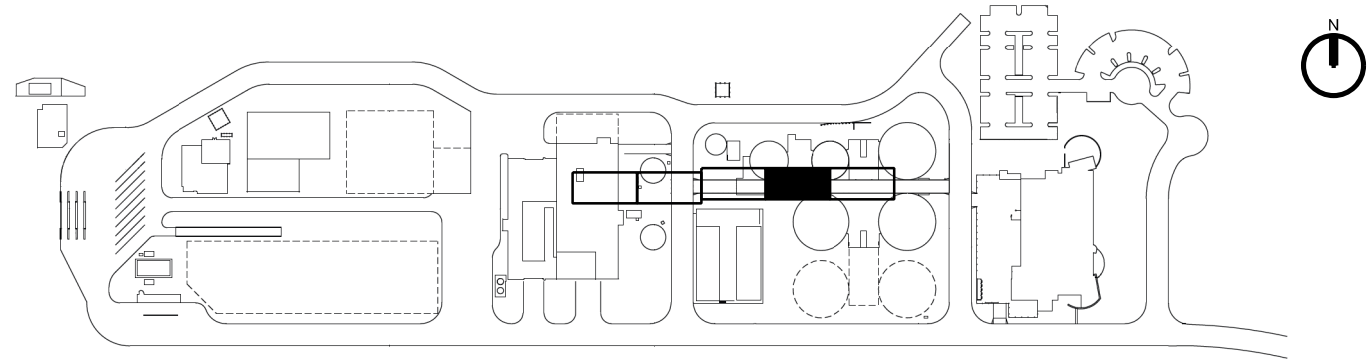

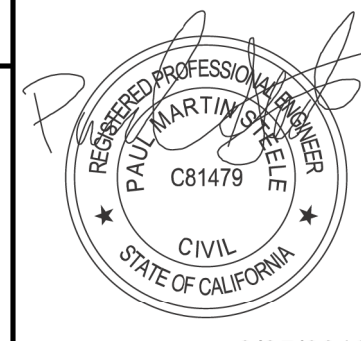
FOR CONTINUATION - SEE Y-124

**NOTES**

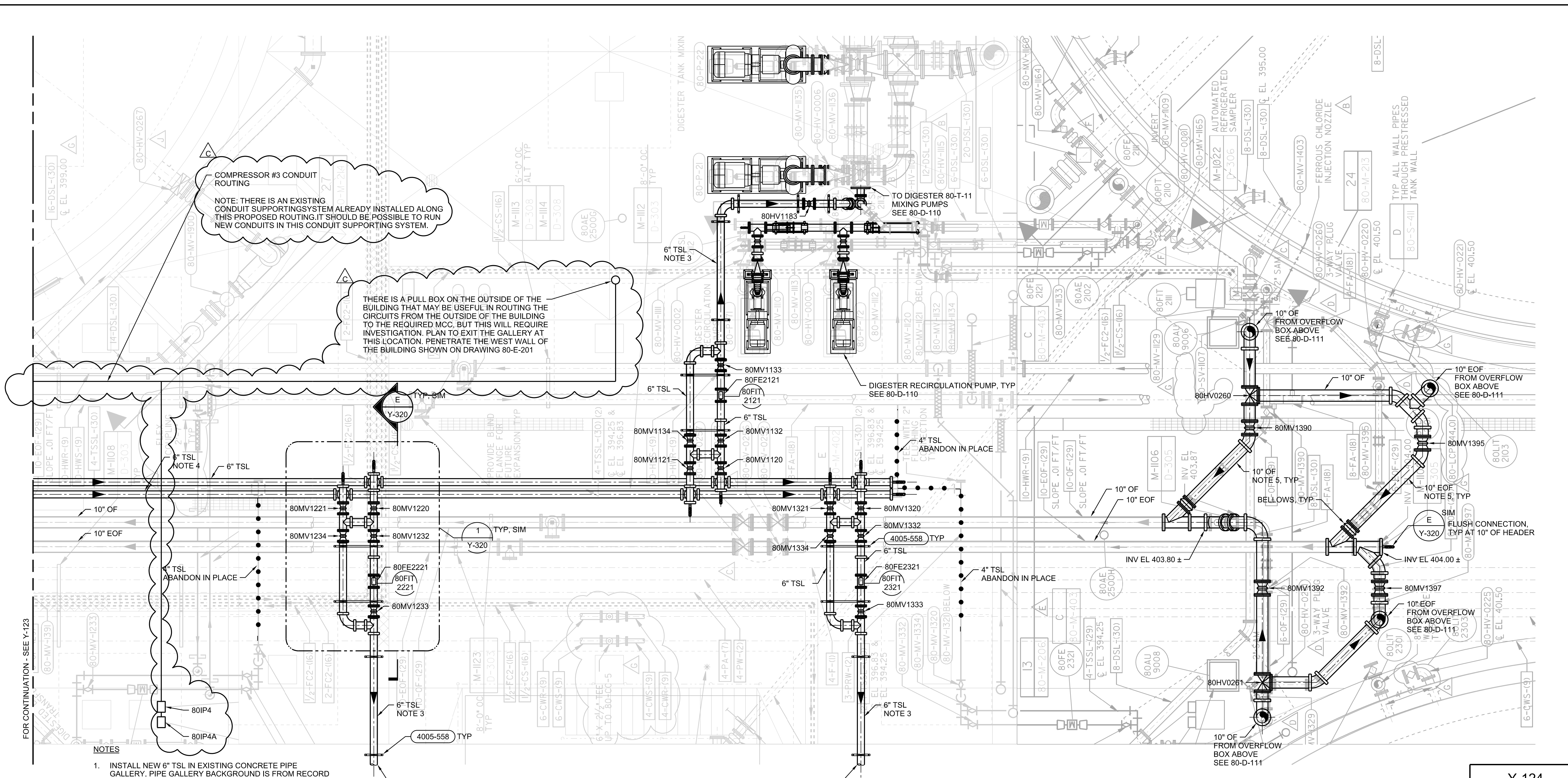
1. INSTALL NEW 6" TSL IN EXISTING CONCRETE PIPE GALLERY. PIPE GALLERY BACKGROUND IS FROM RECORD DRAWINGS. EXISTING SITE CONDITIONS MAY VARY FROM WHAT IS SHOWN ON THIS SHEET. FIELD VERIFY PROPOSED PIPE ROUTE PRIOR TO CONSTRUCTION.
2. PIPE SUPPORTS NOT SHOWN. CONTRACTOR TO ADD / MODIFY PIPE SUPPORTS AND HANGERS AS SPECIFIED.
3. DEMOLISH 4" TSL. INSTALL 6" TSL LINE IN SAME LOCATION AS DEMOLISHED 4" TSL. FOR CONSTRUCTION SEQUENCING SEE SPECIFICATIONS.
4. DEMOLISH 6" EOF AND 6" OF. INSTALL 10" EOF AND 10" OF IN SAME LOCATION AS DEMOLISHED OVERFLOW PIPES.

**PLAN**  
1/4"=1'-0"

Y-123

		SAN DIEGO MBC IMPROVEMENTS YARD PIPING <b>THICKENED SLUDGE PIPELINE</b> PLAN - 4	
CONSULTANT  		CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 37 OF 381 SHEETS	
		APPROVED: <i>Paul Hartman</i> FOR CITY ENGINEER: <i>Andrea Demich</i> PRINT DCE NAME: <i>Andrea Demich</i> DATE: 12/30/2020 RCE#: C70321	
CONTRACTOR INSPECTOR		SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER PROJECT ENGINEER: <b>MONIKA SMOCZYNSKI</b> 382 - 457 CCS27 COORDINATE 1888 - 6280 CCS83 COORDINATE	
DATE STARTED DATE COMPLETED		41198-1037-D	





COMPRESSOR #3 CONDUIT ROUTING  
NOTE: THERE IS AN EXISTING CONDUIT SUPPORTING SYSTEM ALREADY INSTALLED ALONG THIS PROPOSED ROUTING. IT SHOULD BE POSSIBLE TO RUN NEW CONDUITS IN THIS CONDUIT SUPPORTING SYSTEM.

THERE IS A PULL BOX ON THE OUTSIDE OF THE BUILDING THAT MAY BE USEFUL IN ROUTING THE CIRCUITS FROM THE OUTSIDE OF THE BUILDING TO THE REQUIRED MCC. BUT THIS WILL REQUIRE INVESTIGATION. PLAN TO EXIT THE GALLERY AT THIS LOCATION. PENETRATE THE WEST WALL OF THE BUILDING SHOWN ON DRAWING 80-E-201

6" TSL NOTE 4  
6" TSL  
10" OF  
10" EOF  
4" TSL ABANDON IN PLACE

1 TYP. SIM  
Y-320

6" TSL NOTE 3  
80MV1133  
80FE2121  
80FIT 2121  
6" TSL  
80MV1134  
80MV1121  
80MV1120  
80MV1122

DIGESTER RECIRCULATION PUMP, TYP SEE 80-D-110  
80MV1132  
80MV1133  
80MV1134  
80MV1120  
80MV1121  
80MV1122  
80MV1123  
80MV1124  
80MV1221  
80MV1232  
80MV1233  
80MV1234  
80FE2221  
80FIT 2221  
80MV1233  
6" TSL NOTE 3  
4005-558 TYP

6" TSL  
80MV1321  
80MV1320  
80MV1332  
80MV1334  
80MV1333  
80FE2321  
80FIT 2321  
80MV1333  
6" TSL NOTE 3

4" TSL ABANDON IN PLACE  
4" TSL ABANDON IN PLACE

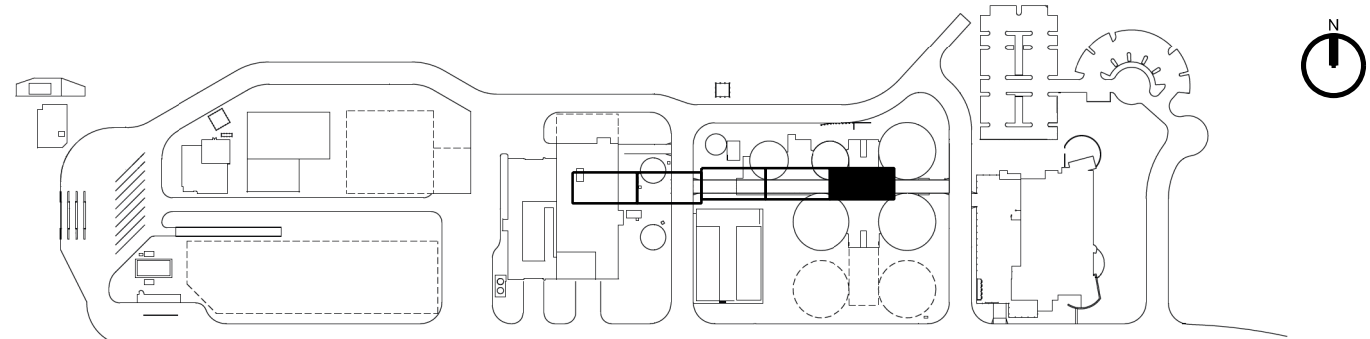
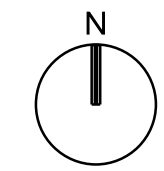
10" OF  
10" EOF  
10" OF NOTE 5, TYP  
BELLOWS, TYP

10" OF  
10" EOF  
10" EOF FROM OVERFLOW BOX ABOVE SEE 80-D-111  
10" OF FROM OVERFLOW BOX ABOVE SEE 80-D-111  
10" OF FROM OVERFLOW BOX ABOVE SEE 80-D-111  
10" OF FROM OVERFLOW BOX ABOVE SEE 80-D-111  
10" OF FROM OVERFLOW BOX ABOVE SEE 80-D-111

10" OF FROM OVERFLOW BOX ABOVE SEE 80-D-111  
10" OF FROM OVERFLOW BOX ABOVE SEE 80-D-111

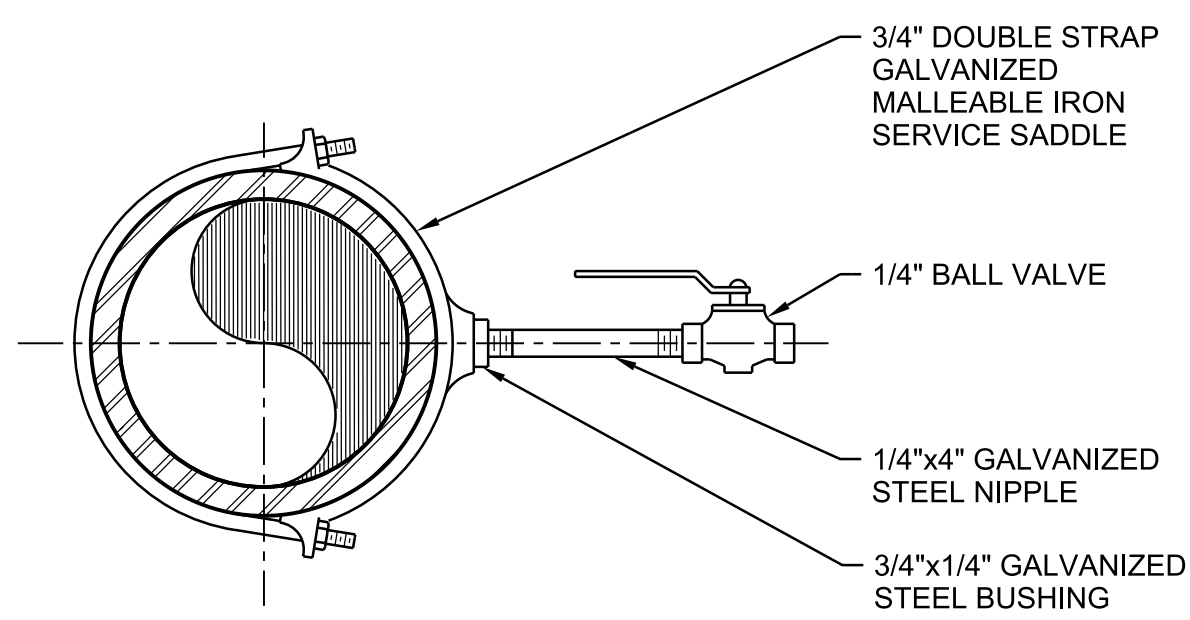
- NOTES
- INSTALL NEW 6" TSL IN EXISTING CONCRETE PIPE GALLERY. PIPE GALLERY BACKGROUND IS FROM RECORD DRAWINGS. EXISTING SITE CONDITIONS MAY VARY FROM WHAT IS SHOWN ON THIS SHEET. FIELD VERIFY PROPOSED PIPE ROUTE PRIOR TO CONSTRUCTION.
  - PIPE SUPPORTS NOT SHOWN. CONTRACTOR TO ADD / MODIFY PIPE SUPPORTS AND HANGERS AS SPECIFIED.
  - FIELD VERIFY PIPE ROUTE FROM 6" TSL HEADER TO DIGESTER MIXING PUMP.
  - DEMOLISH 4" TSL. INSTALL 6" TSL LINE IN SAME LOCATION AS DEMOLISHED 4" TSL. FOR CONSTRUCTION SEQUENCING OF NEW 6" TSL LINES, SEE SPECIFICATIONS.
  - DEMOLISH 6" EOF AND 6" OF. INSTALL 10" EOF AND 10" OF IN SAME LOCATION AS DEMOLISHED OVERFLOW PIPES.

PLAN  
1/4"=1'-0"



CONSULTANT		SAN DIEGO MBC IMPROVEMENTS YARD PIPING THICKENED SLUDGE PIPELINE PLAN - 5	
		CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 38 OF 381 SHEETS	
DATE: 2/05/2019		WBS: S-17013/B-17006	
APPROVED: [Signature]		DATE: 12/30/2020	
FOR CITY ENGINEER: [Signature]		DATE: 07/31/21	
PRINT DCE NAME: [Signature]		DATE: 07/31/21	
DESCRIPTION	BY	APPROVED	DATE
ORIGINAL	JACOBS	[Signature]	2/5/20
ADDENDUM C	JACOBS	[Signature]	3/24/21
PROJECT MANAGER: MONIKA SMOCZYNSKI		PROJECT ENGINEER: MONIKA SMOCZYNSKI	
382 - 457		1888 - 6280	
DATE STARTED		DATE COMPLETED	
41198-1038-D		41198-1038-D	





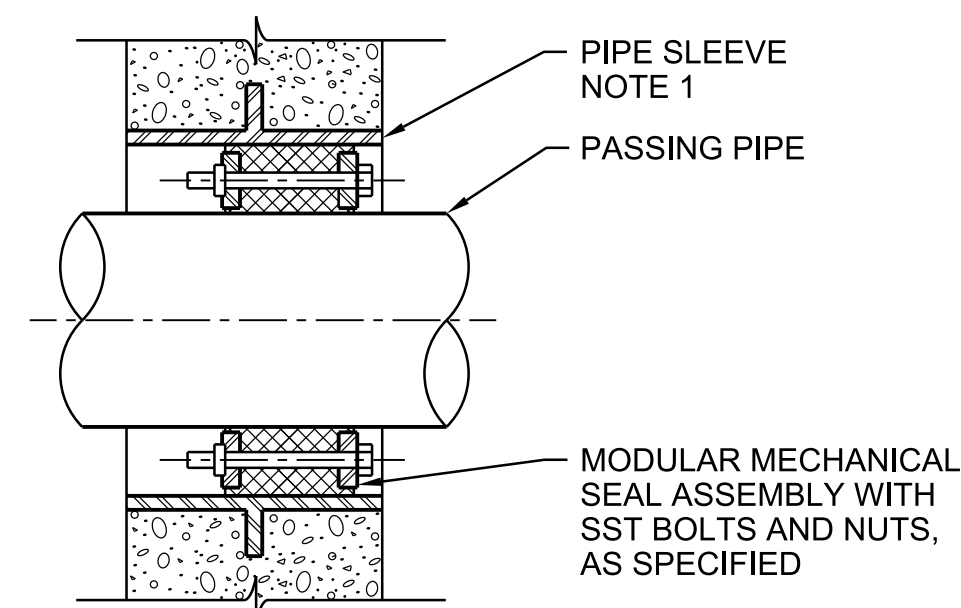
**NOTES:**

- SERVICE SADDLES SHALL NOT BE USED ON EXPOSED PIPES, UNLESS OTHERWISE APPROVED BY THE ENGINEER. USE TAPPING BOSS FOR DUCTILE IRON PIPE, OR THREAD-O-LET WELDED TO STEEL OR STAINLESS STEEL PIPE, OR SCHEDULE 80 PVC FITTINGS FOR PVC PIPE.

**PRESSURE TEST POINT**

NTS

4027-194



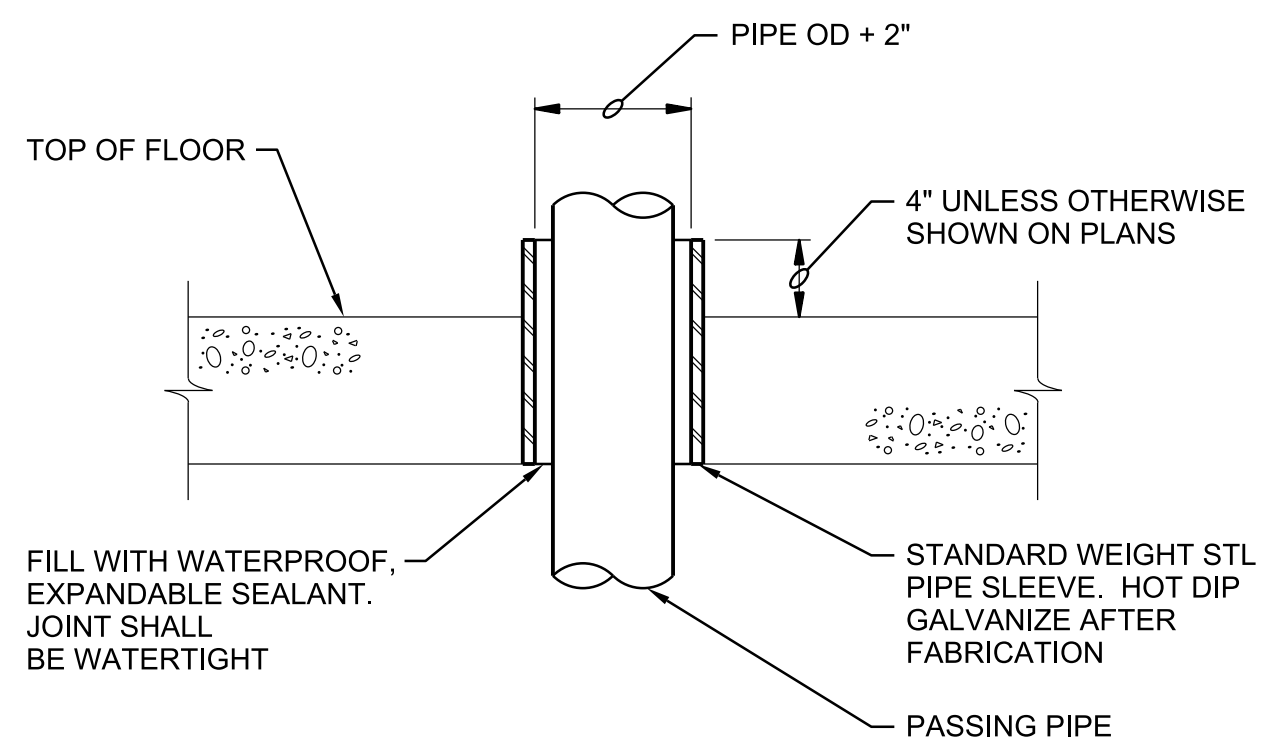
**NOTES:**

- CORE DRILL ON EXISTING CONCRETE WALL, DOES NOT REQUIRE PIPE SLEEVE.

**WALL PIPE PENETRATION SEAL**

NTS

4027-607



**NOTE:**

- COAT FLOOR SLEEVE WITH SPECIFIED PAINT SYSTEM BEFORE CONCRETE PLACEMENT.

**FLOOR SLEEVE**

NTS

4027-620

SD-009

SAN DIEGO MBC IMPROVEMENTS  
GENERAL

**STANDARD DETAILS 9**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC UTILITIES DEPARTMENT  
SHEET 249 OF 381 SHEETS

WBS S-17013/B-17006

APPROVED: <i>[Signature]</i> FOR CITY ENGINEER PRINT DCE NAME: <i>Andrea Demich</i>	DATE: 12/30/2020 RCE# C70321	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER															
<table border="1"> <thead> <tr> <th>DESCRIPTION</th> <th>BY</th> <th>APPROVED</th> <th>DATE</th> <th>FILM</th> </tr> </thead> <tbody> <tr> <td>ORIGINAL</td> <td>JACOBS</td> <td></td> <td>2/5/20</td> <td></td> </tr> <tr> <td>ADDENDUM C</td> <td>JACOBS</td> <td><i>[Signature]</i></td> <td>3/24/21</td> <td></td> </tr> </tbody> </table>		DESCRIPTION	BY	APPROVED	DATE	FILM	ORIGINAL	JACOBS		2/5/20		ADDENDUM C	JACOBS	<i>[Signature]</i>	3/24/21		PROJECT ENGINEER <b>MONIKA SMOCZYNSKI</b> 382 - 457 CCS27 COORDINATE 1888 - 6280 CCS83 COORDINATE
DESCRIPTION	BY	APPROVED	DATE	FILM													
ORIGINAL	JACOBS		2/5/20														
ADDENDUM C	JACOBS	<i>[Signature]</i>	3/24/21														

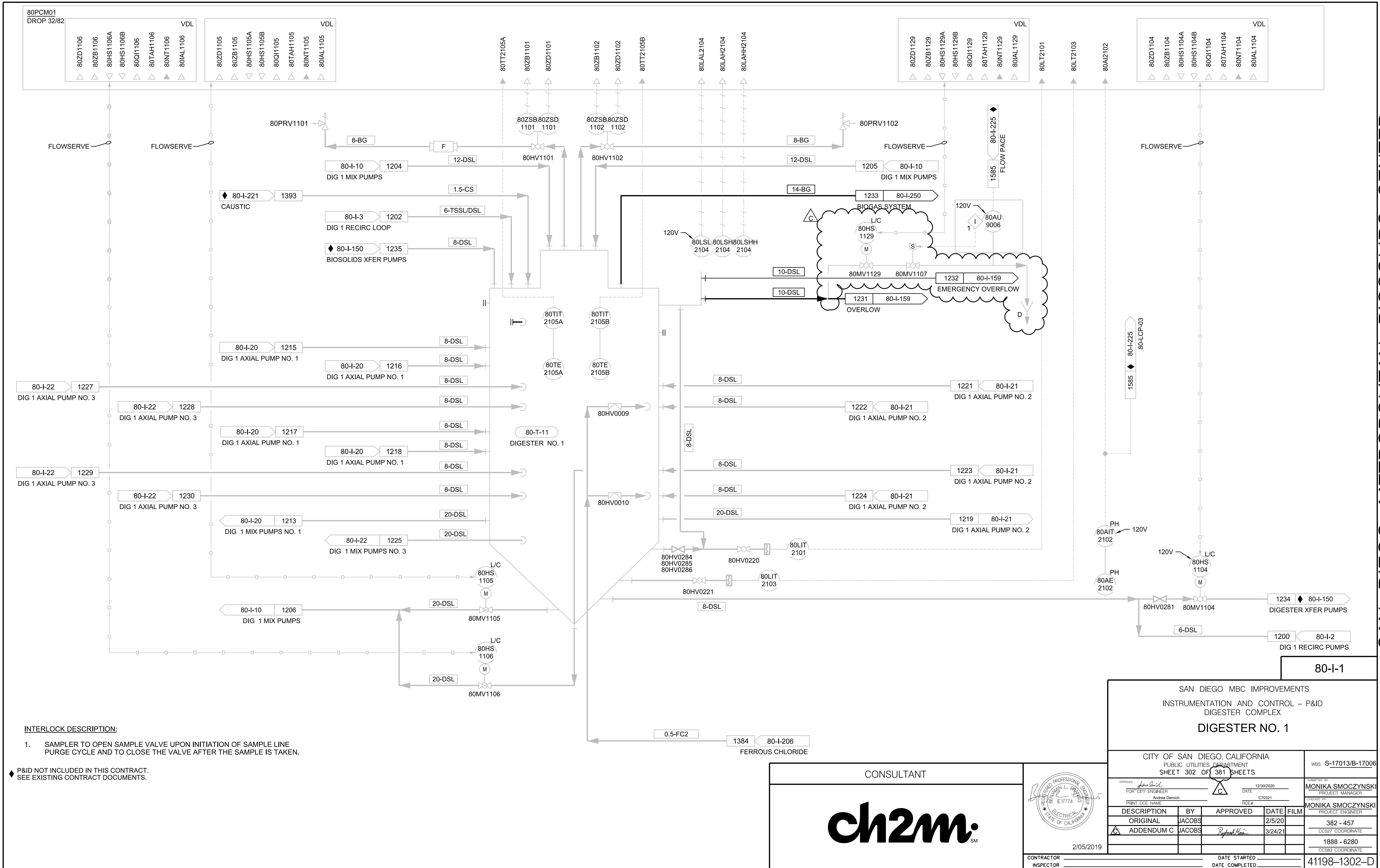


2/05/2019

CONTRACTOR \_\_\_\_\_ DATE STARTED \_\_\_\_\_  
INSPECTOR \_\_\_\_\_ DATE COMPLETED \_\_\_\_\_

41198-1249-D

CONSULTANT



**INTERLOCK DESCRIPTION:**

- SAMPLER TO OPEN SAMPLE VALVE UPON INITIATION OF SAMPLE LINE PURGE CYCLE AND TO CLOSE THE VALVE AFTER THE SAMPLE IS TAKEN.

◆ P&ID NOT INCLUDED IN THIS CONTRACT. SEE EXISTING CONTRACT DOCUMENTS.

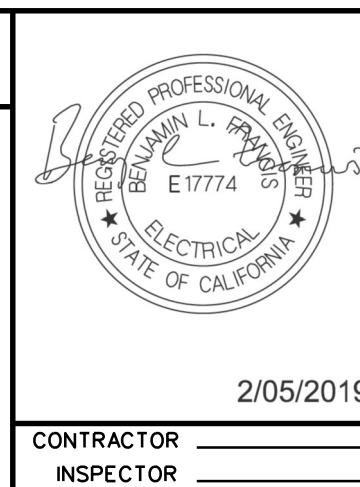
**80-I-1**

SAN DIEGO MBC IMPROVEMENTS  
INSTRUMENTATION AND CONTROL - P&ID  
DIGESTER COMPLEX  
**DIGESTER NO. 1**

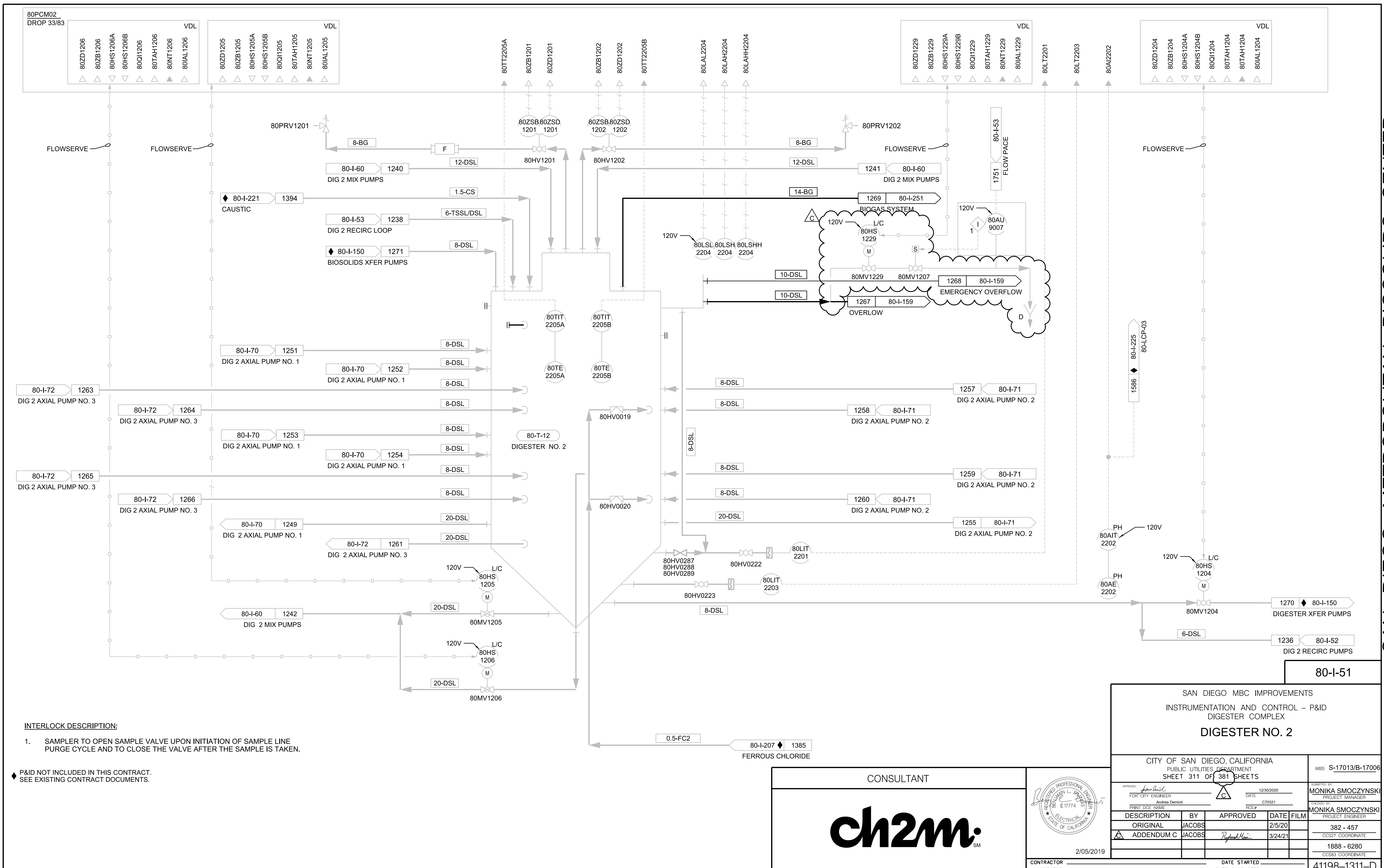
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 302 OF 381 SHEETS		WBS S-17013/B-17006
APPROVED: <i>[Signature]</i> FOR CITY ENGINEER Andreas Demich PRINT DCE NAME	DATE: 12/30/2020 RCE# C70321	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER
DESCRIPTION	BY	APPROVED
ORIGINAL	JACOBS	<i>[Signature]</i>
ADDENDUM C	JACOBS	<i>[Signature]</i>
DATE		DATE
2/5/20		3/24/21
FILM		FILM
382 - 457		1888 - 6280
CCS27 COORDINATE		CCS83 COORDINATE
		41198-1302-D

CONSULTANT

2/05/2019







**INTERLOCK DESCRIPTION:**  
 1. SAMPLER TO OPEN SAMPLE VALVE UPON INITIATION OF SAMPLE LINE PURGE CYCLE AND TO CLOSE THE VALVE AFTER THE SAMPLE IS TAKEN.

◆ P&ID NOT INCLUDED IN THIS CONTRACT. SEE EXISTING CONTRACT DOCUMENTS.

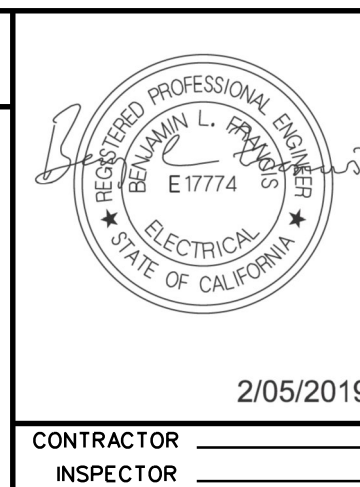
SAN DIEGO MBC IMPROVEMENTS INSTRUMENTATION AND CONTROL - P&ID DIGESTER COMPLEX <b>DIGESTER NO. 2</b>	
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 311 OF 381 SHEETS	
WBS S-17013/B-17006	APPROVED: <i>[Signature]</i> FOR CITY ENGINEER: <i>[Signature]</i> PRINT DCE NAME: <i>[Signature]</i>
DATE: 12/30/2020 RCE#: C70321	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER DESIGNED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT ENGINEER
DATE: 2/5/20 DATE: 3/24/21	DESCRIPTION: ORIGINAL BY: JACOBS APPROVED: <i>[Signature]</i> DATE: 2/5/20 FILE: 382 - 457 ADDENDUM C: JACOBS DATE: 3/24/21 FILE: 1888 - 6280
DATE STARTED: _____ DATE COMPLETED: _____	CONTRACTOR: _____ INSPECTOR: _____ 41198-1311-D

CONSULTANT

ch2m

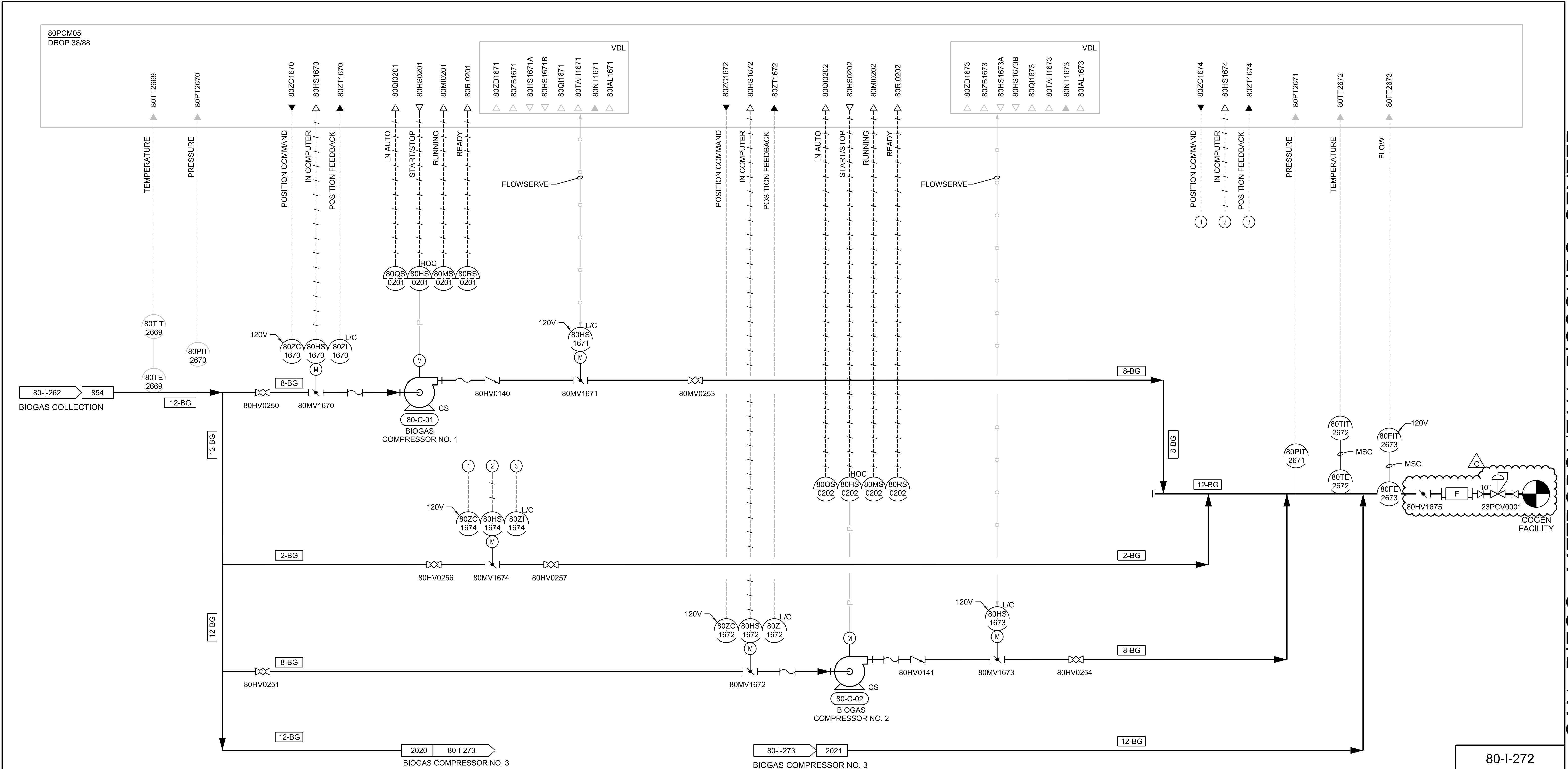
SM

2/05/2019









80PCM05 DROP 38/88		VDL	
80TT2669	80PT2670	80ZD1671	80ZB1673
80ZC1670	80HS1670	80HS1671A	80HS1673A
80HS1670	80ZT1670	80HS1671B	80HS1673B
80QI0201	80QI0202	80QI1671	80QI1673
80HS0201	80HS0202	80TAH1671	80TAH1673
80MI0201	80MI0202	80NT1671	80NT1673
80RI0201	80RI0202	80JAL1671	80JAL1673

SAN DIEGO MBC IMPROVEMENTS  
INSTRUMENTATION AND CONTROL - P&ID  
DIGESTER COMPLEX  
**BIOGAS COMPRESSORS**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC UTILITIES DEPARTMENT  
SHEET 338 OF 381 SHEETS

WBS S-17013/B-17006

APPROVED: <i>[Signature]</i> FOR CITY ENGINEER PRINT DCE NAME: <i>Andrea Demich</i>	DATE: 12/30/2020 RCE# C70321	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER
DESCRIPTION	BY	APPROVED
ORIGINAL	JACOBS	<i>[Signature]</i>
ADDENDUM C	JACOBS	<i>[Signature]</i>

DATE FILM	382 - 457
DATE	2/5/20
DATE	3/24/21
DATE	1888 - 6280
DATE	41198-1338-D

CONTRACTOR: \_\_\_\_\_ DATE STARTED: \_\_\_\_\_  
INSPECTOR: \_\_\_\_\_ DATE COMPLETED: \_\_\_\_\_

CONSULTANT

**ch2m**<sup>SM</sup>

2/05/2019



# City of San Diego

**CITY CONTACT:** Rosa Riego, Senior Contract Specialist, Email: [RRiego@sandiego.gov](mailto:RRiego@sandiego.gov)  
Phone No. (619) 533-3426

---

## ADDENDUM D



**FOR**

## **PURE WATER PROGRAM: METRO BIOSOLIDS CENTER IMPROVEMENTS**

BID NO.:	<b>K-21-1867 DBB-3</b>
SAP NO. (WBS/IO/CC):	<b>B-17006, S-17013</b>
CLIENT DEPARTMENT:	<b>2000</b>
COUNCIL DISTRICT:	<b>6</b>
PROJECT TYPE:	<b>BO</b>

---

### **BID DUE DATE:**

**2:00 PM  
APRIL 20, 2021**

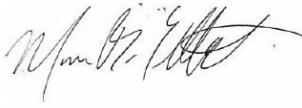
**CITY OF SAN DIEGO'S ELECTRONIC BIDDING SITE, PLANETBIDS**

<http://www.sandiego.gov/cip/bidopps/index.shtml>



## ENGINEER OF WORK

The Engineering Specifications and Special Provisions contained herein have been prepared by or under the direction of the following Registered Engineer:



---


1) Registered Engineer

4/8/2021

---

Date

Seal:



---

2) For City Engineer

4/8/2021

---

Date

Seal:



## **A. CHANGES TO CONTRACT DOCUMENTS**

The following changes to the Contract Documents are hereby made effective as though originally issued with the bid package. Bidders are reminded that all previous requirements to this solicitation remain in full force and effect.

## **B. BIDDER'S QUESTIONS**

Q1. Refer to Drawing Y-120, Sheet 34 of 364.

General Note 3 on drawing Y-120 states to refer to construction sequencing of the new 6" TSL lines in the specifications. Could not locate this, please advise.

A1. See modification to Specification Section 01 31 13 in this Addendum.

Q2. Spec 40 90 00 (73PI20XXB-RSL discharge) are all listed as 8", however the plans (SHT 73-D-101) indicate 6". P&IDs also indicate 6". The specifications for these pumps (44 42 56.09 – data sht) also calls for the discharge to be 6". I have listed a few examples of the conflicts found so far. (Unless I am reading this incorrectly), there appear to be additional conflicts. Please have a look at this section.

i. Please confirm that annular seal 73PI2023B is to be 6".

Please also clarify the sizes for 76PI1104C, 09C14C & 26C as these all (appear) to be on 2" lines and yet, they are called out as 10".

Please also clarify the sizes for 76PI12505A (and the others for Dewatering-suction) as these all appear to follow the bellows on the plan SHT 76-D-320, which would make them 8". P&ID SHTs (76-1-101 – 108) isn't entirely clear where reduction takes place.

A2. See modification to Specification Section 40 90 00 in this Addendum.

Q3. I would like to confirm that the plug valve (currently labeled 76MV1157) on SHT 76-D131 is actually supposed to be 76HV1156.

i. Please confirm valve type and tag as noted above.

A3. Plug valve 75MV1157 as shown on 76-D-131 is the correct tag name. See G-110 MBC-Power Operated Valve Schedule for valve type. 75HV1157 shown on 76-D-331 should be 75MV1157.

Q4. Detail 4 / 76S-515 shows a Stud / Machine Bolt config for Grating attachment. In our past projects, this config has been difficult to shop weld to ensure the studs will be centered between the Grating Bars. They often

need to be cut off in the field for re-welding or shipped loose for field welding. Is it acceptable to use Self-drilling screws? If not, Struct-Fast ([www.structfast.com](http://www.structfast.com)) offers alternative types of grating clips that eliminate the need for field welding. If either of these alternative config is acceptable, it will save the cost for field welding of studs in between bearing bars.

- A4. Struct-fast grating clips or approved equal would be acceptable.
- Q5. SHT 76-I-41 – 45 show motorized valves for UWLP (76MV0101A – 105A), which appears to fall outside of the package being provided. I see no asterisk indicating that the unit or pump supplier will provide it however, it is not listed on the valve schedule provided on plan SHT G110. The P&ID sheet also indicates that this valve is a ball valve, however (per the valve schedule) I can find only 2" and small ball valves.
- a. Additionally, the 2" solenoid valves are shown on the P&ID sheets as gate valves however, the plans list them as V301 (ball valve). These valves are also not included on valve schedule.
    - 1. Please also provide/confirm 4" valve type (ball, globe, etc).
      - a. Please confirm 2" solenoid valve type and whether it is "normally closed" or open?
- A5. Refer to Addendum C for valve schedule revisions. Solenoid valves are to be Normally Closed. See drawing modification in this Addendum.
- Q6. PRW materials less than 4" – not listed on pipe schedule. My inclination is to quote CPVC as SHTs 76-I-31 - 35 show a ball check valve, which per the valve schedule (in this size range) is CPVC.
- i. Additionally, plan SHT 76-D-330 calls out PRW to be 1" (with 1" service saddle), whereas as P&ID SHTs 76-I-31 - 35 call out for 1-1/2". Can we also assume that the existing PRW to which we are connecting is 4" as shown on 76-D-131? (Or is there a tap or stub of the appropriate size that we are connection to?)
  - ii. Please provide materials less than 4" for PRW.
    - 1. Please confirm size and POC for PRW from existing to 10" RSL suction.
- A6. See updated pipe schedule and drawing modification in this Addendum.

Q7. I would like to clarify the scope or extent of the DR 13.5 HDPE. Spec section 33 05 01, 2.01 A, 1 states, "...where shown on Drawing 41198-1192D." based on this statement alone, it would suggest that only the transition, riser pipe and 90 are to be DR 13.5 and the rest of the buried pipe will be DR 17 per spec section 33 05 01.10; is this correct?

i. Please confirm complete scope/extent of DR 13.5 HDPE for biogas.

A7. Confirmed. See 80-D-320 for details.

Q8. Section 44 46 20 Paragraph 2.02.B.1 states the unit should be sized with a 1/2" WC pressure drop. This is normally how open flares are sized, not enclosed. Please provide us with an operating pressure range at the inlet to the flare, or at an inlet to the flame arrester.

A8. See 40 90 00 Supplement 4 Control Strategies Digester Complex for operating pressures.

Q9. There appears to be a discrepancy (relating to the axial mixing pumps) between SHT 80-D-113 and SHT 80-D-311, Sect E. SHT 113 shows a filler flange and a bellows-type expansion joint with an instrument tap in the 90, whereas 311 shows a spool with a centered tap for instrumentation. P&ID SHTs 80-I-20 – 22, 70 – 72 & 120 – 122 offer no additional information that would clarify this issue. (I am aware that 3 of the pumps are noted to be different than the others). Is SHT 311, Sect E supposed to be a general representation of all pumps with the specifics are shown in the enlarged plans?

Please confirm materials required for/at digester axial mixing pumps.

A9. Yes, Section E is a general representation of the axial mixing pumps. See pipe schedule for DSL service.

Q10. Referencing Specification Section 44 46 23 Digester Cleaning and Specification Section 01 29 00 pages 7 thru 11. There does not appear to be a bid item associated with the Digester Cleaning. Please confirm which bid item the Digester Cleaning is to go in.

A10. Digester cleaning is included in lump sum Bid Item 11. See modification to Specification Section 01 29 00 in this Addendum.

Q11. Per our previous emails and conversations, we are looking to find out how to get our Andritz Centrifuges approved as an "Or-Equal" in the bid documents, and the "Whitebook" cites or equal and alternates to be addressed after award of project.

Can you please direct me here on how to go about getting our products evaluated for this bid?

- A11. Alpha Laval centrifuges have been sole sourced by the City and no proposed "or equals" will be accepted.
- Q12. Please provide a specification for the dole valves shown on drawings 76-I-41 thru 76-I-45.
- A12. Valve type is V960 as called out on Drawing 76-D-630.
- Q13. Please confirm that valve type for valves 80HV0260, 80HV0261, and 80HV062 shown on drawing 80-I-159, these valves are not shown on the valve schedule.
- A13. Per Drawing Y-124 Valves are on overflow service. See Manual Operated Valves schedule on Drawing G-111.
- Q14. For the BG pipe system, please provide the plug valve type to use for 2" and smaller. For reference 80HV0256 and 80HV257 are shown on 80-I-272.
- A14. See drawing modification in this addendum.
- Q15. Assuming that the contract time will be measured in working days, the Milestone No. 1 for Intermediate Substantial Completion of 619 Working Days, excluding weekends and holidays, converts to about 126 weeks (about 29 months or 882 calendar days). The longest lead time equipment items on this project are the five (5) new thickening centrifuges. Alfa-Laval, Inc. is listed as the centrifuge manufacturer, and we have contacted them in order to understand their procurement and submittal process as well as their fabrication and shipment time frame. Alfa-Laval, Inc. has provided the estimated time frames listed below.

According to the submittal process listed on page 233 of the Attachment E – Technicals, item F, the following are the anticipated submittal preparation and review times:

- Alfa-Laval prepare first submittal after NTP – 3 Months.
- Design Engineer (review #1) – 1 Month.
- Alfa-Laval, Inc. (revise & resubmit #1) – 1 Month.
- Design Engineer (review #2) – 1 Month.
- AHJ submittal review after Design Engineer approval – 1.5 Months.
- Submittal Review and Approval Total Duration – 7.5 Months.



The fabrication and delivery times of the Alfa-Laval equipment after final approval of submittals is estimated as follows:

- Fabrication/factory testing of the first 2 units: 9 Months.
- Shipment: 2 Months
- Alfa-Laval Total Delivery time after approved submittals: 11 Months.

Our understanding of the contract documents and specifications testing, and commissioning requirements needed for the Centrifuge System is as follow:

- Mechanical/Equipment/Electrical Functional Testing (as required) – Assume 1 Month
- PIC Readiness/Auxiliary Systems/Facility Commissioning (as required) – Assume 1 Month
- Facility Commissioning-(Functional testing of Unit Processes) – 1 Month
- Testing and Commissioning Total Duration for each set of centrifuges– 3 Months

There are a total of 5 thickening centrifuges to be demolished and replaced in this contract. Our interpretation and understanding of the testing/integration requirements and Alfa-Laval's, Inc. submittal process, fabrication time frame, and shipment, we believe that there will not be enough time in the contract to install and commission the 5 thickening centrifuge units.

If we follow the contract specification, sequencing of MOPO's and Alfa-Laval's Inc. schedule; the contract duration will over run the 619 working days allowed for Milestone 1 by several months due to the following schedule sequence:

- Submittal Review Process – 7.5 Months.
- Alfa-Laval, Inc. First Delivery to MBC – 11 Months.
- Unit 1 and 2 go Offline (demolish centrifuge system and install new system) – 3 Months.
- Testing, Commissioning, and Integration – 3 Months.
- Unit 3 and 4 go Offline (demolish centrifuge system and install new system) – 3 Months.
- Testing, Commissioning, and Integration – 3 Months.

- Unit 5 go Offline (demolish centrifuge system and install new system) – 3 Months.
- Testing, Commissioning, and Integration – 3 Months.
- Total duration for the replacement and commissioning of 5 new Thickening Centrifuges – 36.5 Months.

The total estimated time from Notice to Proceed to installation and commissioning of all 5 centrifuges is 36.5 months. Assuming an average of 21 working days per month, we will need at least 767 working days to achieve Intermediate Substantial Completion. Therefore, we request that the duration for Milestone 1 be increased by 151 working days from 619 working days to 770 working days, and that the 3 subsequent Milestone Durations each be increased by 151 calendar days, and that the overall time for completion of the work is increased from 889 working days to 1040 working days.

- A15. See modification to Supplementary Special Provisions Section 6-9 in this Addendum.
- Q16. Attachment E - Supplementary Special Provision, Section 6-9, lists Milestone 1 - Intermediate Substantial Completion, as 619 working days after NTP, and Milestone 2 - Start of Integration Period, as 736 Working Days after NTP. The time between the completion of Milestone 1 and the start of the Milestone 2 is 117 working days, which is about 23 weeks or 5 months. It appears that this gap in time is driven by the completion of the North City Pure Water Facility (NCPWF), which is the last of the eight (8) Pure Water projects scheduled to be completed before the Integration Period can start. Does the contractor need to maintain staff on site during this 5-month down time period if we have already attained Intermediate Substantial Completion?
- A16. The Contractor is not required to maintain staff on site between Intermediate Substantial Completion and the start of Integration Period, except as may be required for maintenance, troubleshooting, corrections and repairs.
- Q17. Attachment E - Supplementary Special Provision, Section 6-9, lists Milestone 2 - Start of Integration Period, as 736 Working Days after NTP and Milestone 3 - Substantial Completion as 838 working days after NTP. The time between the start of Milestone 2 and the completion of the Milestone 3 is 102 working days, which is about 20 weeks. During the period between Milestone 2 and Milestone 3 we are required to participate in the 120-Day Integration Period followed by a 30-Day Facility Acceptance Test period, a total of 150 calendar days, which is 21 weeks plus 3 days. Therefore, we

request that the working day duration between Milestones 2 and 3 be increased to at least 110 working days, which is equivalent to 22 weeks.

- A17. See modification to Supplementary Special Provisions Section 6-9 in this Addendum.
- Q18. Section 01 50 00 - 3.01.A requires that we make the Construction Manager's Field Office available for use prior to start of work on the site but does not specify how far in advance of the work on site. Since this project involves submittal review and procurement of major process equipment with long lead times, it will likely be several months after NTP before we mobilize to the site to begin construction. We plan to install the CM Field Office about 30 days before start of construction. Please confirm that this is acceptable to the City and that we will not be required to provide the CM Field Office any sooner.
- A18. See modification to Section 01 50 00 in this Addendum.
- Q19. Section 01 29 00 does not describe which bid item is to include the Digester Cleaning as specified in Section 44 46 23. We assume these costs should be included in Bid Item 11 – Digester Complex Facility 80. Please confirm.
- A19. Digester cleaning is included in lump sum Bid Item 11. See modification to Specification Section 01 29 00 in this Addendum.
- Q20. Section 01 91 14 -1.02. O states that the Owner will perform the Digester Stress Testing concurrent with the Integration Period. Section 01 91 14 - 3.12 - Digester Stress Testing, does not specifically describe what is entailed in the Digester Stress Test and what will be used as the benchmark for "successful completion". Please provide this information. Also, since the Owner will be performing the Digester Stress Testing, please advise what, if any, support will be required of the Contractor.
- A20. The Contractor shall provide the support services specified for the Integration Period and Acceptance Testing.
- Q21. Bidding Documents, Performance Bond, Labor and Materialmen's Bond Form. It would appear that a new sentence has been added to the existing bond form that automatically eliminates the ability of the Surety to consider using the Principal as its completion contractor. While we understand that the preceding sentence provides the City with the ability to reject any contractor proposed by the Surety, specifically eliminating the ability of the Surety to utilize the Principal may be prejudicial to the Surety and to the completion of the project itself. When a Surety makes the decision to utilize its Principal to complete the project, it does so after an independent investigation of, among other things, the most cost effective and

expeditious means of completing the work. Effectively, the Surety becomes the intermediary between the Principal and the City and the City's future communication regarding project completion is directly with the Surety, as opposed to having to maintain a direct relationship with the Principal. As a result, it may be in the best interests of the City and the Surety to discuss the use of a particular completion contractor during the course of the Surety's investigation, as opposed to foreclosing the option at the outset. Accordingly, please consider the below revision:

~~"The Surety shall not utilize the Principal in completing the improvements and work specified in the Agreement in the event the City terminates the Principal for default."~~

- A21. Bid as specified.
- Q22. Specification Section 40 94 24 Supplement 1 DCS Input/Output List states 3rd party devices being connected to Drops via ELC, but does not indicate the number of soft I/O. Please, confirm the total number of new soft I/O coming into Ovation.
- A22. The total number of new soft IO coming into Ovation will be confirmed during construction, per 40 98 00 3.05.B.
- Q23. Specification section 40 90 03 – 15 subsection 3.02 A. 4. states DCSP shall "Execute field verification and documentation of all conditions and develop installation drawings and accurate as-constructed documents to successfully complete the Work." Please, clarify the extent of details and scope required for the installation design. For example, does the installation package include demo drawings, new loop drawings, panel installation details, and/or cable schedules for all loops coming into Ovation?
- A23. See 40.90.03 1.01.B.4 Table 3 and subsection 1.05 for details.
- Q24. Volume 7 Drawing N-003 and N-005 show new FLRs. Please, confirm if these FLRs should be provided as redundant pairs.
- A24. Redundant pairs are not required.
- Q25. Specification Section 40 96 00 – 3 subsection 1.06 E. states the DCSP shall ensure that new graphics development conforms with existing COMNET DCS standards. Please, confirm if the existing standards or the City's new COMNET DCS High Performance Graphics standards should be used.
- A25. The graphics should be done in accordance with the current COMNET standards.

- Q26. Specification Section 40 98 00 – 6 Subsection 3.5 E. states Maintenance Phase requirements. Please, confirm the DCS maintenance will be conducted under a separate contract with the City.
- A26. There will be no need for "maintenance" requirements under this Contract. See modification to Specification Section 40 98 00 in this Addendum.
- Q27. The following instruments are shown on the Instrumentation and Control Drawings.
- a. 76PI0101 shown on Dwg. 76-I-41
  - b. 76PI0102 shown on Dwg. 76-I-42
  - c. 76PI0103 shown on Dwg. 76-I-43
  - d. 76PI0104 shown on Dwg. 76-I-44
  - e. 76PI0105 shown on Dwg. 76-I-45
- They are not listed on the Instrument list provided in the specifications. Please confirm if they are needed and, if so, please provide the associated Data Sheets.
- A27. Pressure gauges are not needed and have been removed from P&ID Drawings in this Addendum.
- Q28. Raceway tags 80/015 80/016 80/017 80/020 80/021 80/022 80/025 80/026 80/027 80/030 indicate they are running to/from series 80 panels (80IP1-80IP6A). The panel schedule states that these panels are located in the Gallery. When looking at the Gallery Plans (pg 80-E-129), there are series 73 panels but no indication of the series 80 panels. Please provide the location of the series 80 panels on the plans.
- A28. See drawing modification for added and revised panel locations in this Addendum.
- Q29. On drawing C-101, please provide existing fence height for removal and new fence to be installed.
- A29. Height of existing chain link fence may vary and will be determined during construction.
- Q30. On drawing C-100, please provide quantities for tree and irrigation bubblers removal for estimating purposes.
- A30. Approximately six irrigation bubblers are anticipated. Trees shall be protected as specified in Specification Sections 01 50 00 and 01 56 39 and any removals coordinated during construction.

- Q31. On drawing C-100, please provide existing height of trees to be removed for estimating purposes.
- A31. Trees shall be protected as specified in Specification Sections 01 50 00 and 01 56 39 and any removals coordinated during construction.
- Q32. On drawing C-101, please verify if the existing curb and gutter will be removed for the construction of the new driveway.
- A32. Yes, see modification to Addendum C, see Specification Section 01 29 00 as part of this Addendum.
- Q33. Please confirm which milestone the Construction Manager Filed Offices supplied by the contractor per Specification 01 50 00 can be demobilized from the site. Please note there will be a long down time between Milestone 1 (619/working days) Intermediate Substantial and Milestone 4 (889/working days) Final Acceptance.
- A33. The Construction Manager's Field Office is to remain on site for a minimum of 60 days after final acceptance of the Work (Milestone 4) per Specification Section 01 50 00, 3.01.A.
- Q34. Per specification 44 46 23-1.07 Digester Cleaning Quantities have been provided as an estimated quantity of 410,300/gal per digester. Due to that this quantity could vary would the owner consider changing this scope of work to a Unit Price per Gal or TN bid item? Or would the owner consider if the actual quantity varies more than 10% higher or lower it would be consider a change of condition.
- A34. Bid as specified.
- Q35. Drawing Y-113, Volume 5 shows the profile of the 20" BG line. Station 50+83.28 shows an unknown concrete utility that requires relocation. Please verify the Identity of the concrete utility and if the line is active or abandoned.
- A35. Utility is unknown.
- Q36. Standard detail 3123-110 on sheet SD-006 shows typical trench. Trench Stabilization material is mentioned and is being used where required. Nothing in the drawings or the specifications call out trench stabilization material being used. Please confirm if there is to be trench stabilization material for trenches or if there will be an allowance issued.
- A36. Refer to Specification Section 31 23 23.15 - 2.03.

- Q37. Confirm specification valve type for 76MV0101A,02A,03A,04A & 05A.
- A37. See Addendum C.
- Q38. Future connection BG valve shown on Y-111 is not shown on PIDs, Confirm specification valve type for this location.
- A38. See manual-operated valves schedule on Drawing G-111.
- Q39. Confirm Expansion bellows in SS biogas and Digester Gas applications is Rubber/Flexible EPDM and not a Stainless-Steel Expansion Bellows.
- A39. Refer to Specification Section 40 27 01 - 2.02.A.
- Q40. There is significant Mechanical work at the Overflow connections in the gallery between the Biosolids tank and Emergency Storage Tank on Sheet Y-123 as well as the Raw Solids Feed Pump area, the site visit videos do not address these areas in detail, and the video through the gallery for the new TSR dual run appears sped up and it's challenging to get details on existing utilities and supports. Can we receive photos and / or additional videos of these areas?
- A40. No additional video is available.
- Q41. Specifications suggest all new Pipe support material is galvanized material or Stainless for exposed process areas – is galvanized material acceptable for stainless steel biogas systems supports or are stainless steel supports required?
- A41. Refer to Specification Section 40 05 15 - Table 1.
- Q42. Drawings 80-D-120 and 80-D-121 show that the existing underground 6" and 12" BG lines are to be plugged and abandoned. Please confirm whether the pipe is to be slurry filled also or only be plugged and abandoned.
- A42. Refer to Addendum B, Answer 9.
- Q43. Refer to Drawing 80-X-320 Note 2.
- a. Note 2 in reference to the underground abandoned pipe states to "plug abandoned in place pipe with mass concrete below grade". Please confirm this is just for the vertical riser of the pipe and that the entire pipe below grade does not need to be filled with concrete.
  - b. Also, please confirm that the concrete used shall not be Mass Concrete as defined by Caltrans Standard Specs 2018, Section 49-3.01B (2).

- A43. a. Refer to Addendum B, Answer 9.  
b. Concrete shall be as specified.

Q44. Refer to Drawing 80-D-111.

Note 1 states to install gas flow meter in accordance with manufacturer's instructions. No Note 1 or gas meter is shown in the plan view. Please advise whether any flow meters need to be installed.

A44. See Project P&IDs Volume 7 and Specification 40.90.00 Supplement 1 - Instrument list, for quantity of instruments to be installed.

Q45. Drawing 76-X-131 calls for demo of the 4" PRW line, can this line be shut down for demo and install of the new line.

A45. Yes, limited shutdown will be permitted for demolition and connection to existing line.

Q46. Refer to Drawing 76-D-110, 76-D-111.

There is a 14"x8" tee to be installed on the common RSL header to the Grit Separators. Specification 01 31 13 1.07.H.1.b states that two grit separators and one grit clarifier must remain in service at all times. The issue is that in order to install the 14"x8" tee shown the whole 14" RSL line needs to be taken down which would shut down inlet line to all the Grit Separators trains at the same time. Is this allowable and if so what is the time limit on this shutdown. The same is true of the 14"x8" Tee on the discharge line as shown on 76-D-111. Please advise.

A46. See Spec 01 31 13 SUPPLEMENT 1. Any additional limited shutdowns required will be considered and coordinated during construction.

Q47. Refer to Drawing 76-D-131.

There is a note on this drawings which states to install a 10"x6" Tee at the tie in of each 6" DSL lines to the main 10" DSL line. Specification 01 31 13 1.07.H.1.g states that only one dewatering centrifuge may be taken out of service at a time for feed pump and polymer pump replacement. The issue is that in order to install the 10"x6" tee shown the whole 10" DSL line needs to be taken down which would shut down multiple dewatering trains at one time. Is this allowable and if so what is the time limit on this shutdown. Please advise.

A47. See Spec 01 31 13 SUPPLEMENT 1. Any additional limited shutdowns required will be considered and coordinated during construction.



- Q48. Specification 01 31 13 1.07.H.1 does not indicate how many Thickened Solids Transfer Pumps must be online at all times. Please advise.
- A48. See Spec 01 31 13 SUPPLEMENT 1. Any additional limited shutdowns required will be considered and coordinated during construction.
- Q49. Drawing 76-D-130 shows installation of a new cross on the common header to the Thickened Solids Transfer Pumps. Please advise if a full shutdown of all three pumps can be taken to install this cross and if so, how long is allowed during this shutdown.
- A49. See Spec 01 31 13 SUPPLEMENT 1. Any additional limited shutdowns required will be considered and coordinated during construction.
- Q50. Drawing 76-D-131 shows the 4" HUWLP and 4"UWLP feeding up to the Thickening Centrifuges. Are these lines looped (i.e. feed from both directions) or rather are the fed from a single service point.
- A50. The lines that go to each thickening centrifuge are fed from a single line but have isolation valves at each centrifuge.
- Q51. Specification 01 31 13 1.07.H.1 is detailed about how many service trains need to remain in service at all times. In order to achieve this the removal and install of pumps and pipes will need to be sequenced such that only isolated service trains will have to be taken down separately at different times. In order to isolate the service trains isolation valves are needed to cut off flow. In many of the lines servicing the train there are no isolation valves present. In general, is it acceptable to install insertion valves into existing line as an isolation valve in order to isolate service trains to complete the work according to the required sequencing.
- A51. Yes, installation of isolation valves to perform the Work will be acceptable. Valves and couplings shall meet the Specifications requirements as applicable.
- Q52. Drawing Y-123 shows the new EOF and OF piping at Digester 2 tying into the existing OF and EOF pipe and drawing Y-124 shows the new OF and EOF piping from Digesters 1 and 3 tying into the existing OF and EOF pipe. Please confirm it is acceptable to shut down the common OF and EOF headers in order to install the new OF and EOF pipe all the way to the new isolation valves on the new OF and EOF pipes. If so, how long is allowed for this shutdown.
- A52. Either the EOF or OF piping must be in service at all times. The Contractor shall isolate as necessary to keep one in service while the other is being installed. As long as this requirement is met, there is no required outage duration.

- Q53. Drawing Y-123 shows the new EOF and OF piping between the Emergency Storage Tank and the Biosolids Storage Tank. The new OF and EOF pipe is in the footprint of the existing OF and EOF pipe. Please confirm it is acceptable shutdown the EOF line while the new EOF line is installed and then when the new EOF line is back online to shut down the OF line to install the new OF line.
- A53. Either the EOF or OF piping must be in service at all times. The Contractor shall isolate as necessary to keep one in service while the other is being installed. As long as this requirement is met, there is no required outage duration.
- Q54. Drawing 76-D-330 calls out a 1" PRW line at the suction to the Thickening Centrifuge Feed Pumps. In the pipe schedule on Drawing G-100 there is no line item for PRW < 4" so we cannot determine what type of pipe this is. Please advise.
- A54. See updated pipe schedule in this Addendum.
- Q55. Specification 01 29 00 1.10.Q states that the Integration Period Services are to be calculated based on a factor of the Controls, System Integration bid item above. The factor is based on the number of days beyond the specified 120-day integration period. In order to level the playing field between all bidding Contractors can the City specify how many extra days we are to include? If not, then is the Contractor entitled to this full lump sum amount regardless of whether the system integration is delayed? Should the City make this bid item an allowance and provide all Contractors with a lump sum amount that will be billed to if the project is delayed?
- A55. Integration Period Services Lump Sum Bid Item is for the planned systemwide 120-Day Integration Period that precedes the 30-Day Facility Acceptance Test, as specified in Section 01 91 14. Payment for the Integration Period Services will be made at the lump sum price named in the Bid Schedule for the 120-Day Integration Period. No allowance will be provided, bid as specified.

The example calculation shown in 01 29 00 1.10.Q.c would be the amount to be paid (on a per day basis) in the event the 120-Day Integration Period is extended due to other related Pure Water Projects not being ready. This would not apply to any delay or extension of the Integration Period due to the Contractor's own delay on the MBC Improvements Project for which they are responsible.

Q56. Refer to Addendum A, Part F, Paragraph 5.

Confirm that the intent is to delete the existing Process Inputs/Outputs (I/O), Supplement 1 and replace with the Supplement 1 document included in this Addendum.

A56. Confirmed.

Q57. RFI - Clarification of Scope Regarding the Distributed Control System Provider (DCSP).

Question: Please confirm that all scope designated as "DCSP" in the project specifications Table 1: Matrix of Responsibilities – Equipment/ Devices/ Materials in section 40 94 00 - 5 D.4 on page 1107 will be provided by The City as described in section 40 90 00 Part 1 - 1.02 C and is not to be included in the Contractors scope of work.

Detail: Section 40 90 00 of the project specifications states the following:

"A distributed control system (DCS), when applicable, as specified in section 40 90 03, General Requirements, will be provided by the City's DCS provider, Emerson Process Management (EPM). The Contractor shall be responsible for terminating and integrating all I&C equipment with the EPM DCS systems."

Section 40 94 00 of the project specifications clarifies the distributed control system provider (DCSP) as a separate entity from the general contractor (GC). The scope split between these two entities is further defined in Table 1 – Matrix of Responsibilities beginning in section 40 94 00 - 5 D.4 on page 1107 of the project specifications.

These two sections combined elude to the fact that the DCSP is procured and managed by The City separately.

A57. DCSP is procured and managed by the General Contractor.

Q58. Refer to Specification Section 01 31 13.

Section 01 31 13, Part 1, 1.01, A states, "Surveying will be performed by a surveyor contracted with the City or Construction Manager. The Contractor will not be responsible for performing surveying."

Section 01 31 13, Part 1, 1.11, B provides a list of contractor responsibilities including, "Retain professional land surveyor or civil engineer registered in California who shall perform or supervise engineering surveying necessary for construction staking and layout."

Please clarify who is responsible for construction surveying on the project.

A58. Survey services provided by the City, via City Consultant Surveyor, are specified in Supplementary Special Provisions Section 3-10.2. The Contractor shall provide any additional survey work required per Supplementary Special Provisions Section 3-10.1.

Q59. Refer to Section 5-15.1 from the Notice Inviting Bids.

This section says that if construction activities encounter flammable liquids the contractor shall provide HAZWOPER training for all Construction Staff including; City Engineers, City Laboratory Technicians, and City Staff that perform onsite inspections.

Please clarify if this is intended to include working around process systems such as the biogas system and/or working around fuels that are typical on a construction site?

Please also clarify the number of City Staff that the contractor should expect to train.

A59. You shall be responsible for submitting verification to the Engineer that construction staff have the required HAZWOPER certification before the Notice to Proceed (NTP) has been issued. Prior to beginning Work in that area, you shall coordinate with the Construction Manager in implementing and training assigned construction staff who do not possess the HAZWOPER certification.

See modification to Bid Sheets in this Addendum.

Q60. Refer to Addendum A and Specification Section 01 29 00.

Addendum A added Bid Items Number 18 to 24. However, no language was added to Specification Section 01 29 00, 1.1- Bid Items to describe the payment terms for these added Bid Items. Please provide the payment terms for these items. (Measurement, Scope, Etc.).

A60. Refer to WHITEBOOK References listed for measurement and payment terms.

Q61. Can you please advise the make & model of the existing centrate pumps? Tag numbers for the pumps in question are 94-P-01, -02 & -03.

A61. The make and model of the centrate pumps are Yeomans Model #108518-4A.

- Q62. In review of the above listed specification section 44 42 56.16 – Peristaltic Hose Pumps, I have found that the specification has some generalized contradictions.

The entirety of the specification EXCEPT the pump supplemental sheet is written around a peristaltic hose pump, but the supplemental pump sheets explicitly name the 620 DUN/RE model peristaltic pump which is NOT a hose pump.

This model pump does not comply with some of the features with the specification and materials of construction listed in the supplemental sheets. In addition, the explicitly named 620 DUN/RE model peristaltic pump is not capable of pumping against the explicit requirement of 100psi discharge pressure.

Watson-Marlow kindly requests clarification on the application details of this specification section to ensure an accurate scope of supply. Most importantly, Watson-Marlow must know if the listed capacity (0.5 GPM) and discharge pressure (100 PSI) are accurate.

- A62. The record listed capacity and discharge pressure is 0.5 GPM and 100 PSI.
- Q63. The Centrate Pumps specified in spec section 44 42 56.10 - tag #'s 94-P-01, -02 & -03 requires a flywheel to be provided by the pump manufacturer. We are trying to source pump manufacturers who furnish a flywheel for this type of pump. No manufacturer(s) is listed in the specification. Please provide sources for this pump. Also, please provide nameplate information for the pumps currently installed, and we will try to contact that manufacturer.
- A63. Manufacturers are listed in the Data Sheet attached at the end of Section 44 42 56.10.

The make and model of the centrate pumps are Yeomans Model # 108518-4A.

- Q64. Attachment D – Funding Agency Provisions, Section 9.1.2, states that the published DIR wage rates with predetermined wages beyond the current expiration dates shall be in effect for the life of this Contract. The current Operator, Laborer, and Carpenter wage rates listed in the DIR wage determination will expire on June 30, 2021, and there are predetermined wage increases listed for each of these trades that will take effect on July 1, 2021. There are no predetermined wage increases listed beyond July 1, 2021. Therefore, we assume that the current DIR wage rates plus the predetermined wage increases on July 1, 2021 will remain in effect for the entire duration of this contract for Operators, Laborers, and Carpenters. Please confirm.

- A64. Pursuant to sections 1720 through 1861 of the California Labor Code, applicable wage determinations are based on call for bids (bid advertisement date) of the contract and they will stay in effect for the life of the project. All predetermined increases for the specific trades referenced will be included and go into effect on the DIR issued dates. No further increases will be applicable to the determinations after that.
- Q65. The response to Question 20 in Addendum B states that Digesters 2 and 3 are not in service and that they have previously been cleaned. This statement conflicts with Section 44 46 23 - 1.01, which states that all three (3) digesters are to be cleaned. Please confirm that only the cleaning of Digester 1 is included in the scope of this contract.
- A65. Perform digester cleaning, as specified.
- Q66. Section 44 46 23 -1.07 A.4. states that the total amount of residuals to be removed from the digesters is estimated to be 410,300 gallons. Assuming that only Digester 1 is to be cleaned, please confirm that this is the estimated volume of residuals contained in Digester 1 alone.
- A66. Assume total volume of digester residuals, as specified.
- Q67. Section 01 31 13 -1.07. H.1.d. states that only one digester system may be taken out of service at a time. Since two digesters are currently not in service, can we work on Digesters 2 and 3 concurrently and complete their improvements before taking Digester 1 out of service to clean it and construct its improvements?
- A67. No, bid as specified.
- Q68. Question Q3 in Addendum C asked two questions, the first about the tie-in to the existing 12" biogas piping and the second about the reinstatement of the concrete slab at the Gas Flare facility. Answer A3 responded to the question about the demolition and reinstatement of the concrete slab but did not respond to the first question about the biogas piping tie-in. Please provide a response this question: "Sheet 27, 187 and 193 show the civil, mechanical and section view for the new BG pipe system installation and tie-ins. There is no clear shut off shown in order to facilitate the tie-in. Please confirm this system will be shut down and purged by the City prior to tie-in of the new 18x12" reducer/spool as shown in section B on sheet 193."
- A68. The Contractor is responsible for all work related to the installation of the biogas piping including shutdown and purging of the biogas piping.

- Q69. On drawing 76-S-322 (added in Addendum A) please verify if installed grating is to be aluminum or STL and what specification we should adhere to.
- A69. The grating shall be aluminum and conform to specification Section 05 53 00 Metal Gratings.
- Q70. Refer to drawing 76-S-312. Please provide a connection detail for the Extren Fiberglass Reinforced plates to HSS partition wall beams.
- A70. Attach with #10 SST self-drilling screws at 12-inches on center.
- Q71. Drawing 80-E-122. The added Dewatering Centrifuge details are unclear. Please provide section cut of platform and dimensions.
- A71. For section cuts of Dewatering Centrifuges see Addendum A, 76-S-322, 76-D-124, and 76-D-322.
- Q72. Please provide a standard detail for the ductbank run shown on 80-E-122.
- A72. No duct bank is called out, see Detail 2605-423C for trench and conduit placement details.
- Q73. Please verify if circuits 73/005 and 73/006 on drawing 73-E-615 will be installed with ductbanks, and if so, please provide a routing layout for estimating purposes.
- A73. No ductbanks will be installed, conduit to be surface routed along side existing raceway.
- Q74. Sheet 80-X-313 Section B shows the 8" BG SST pipe being demoed down to the underground pipe. Drawing 80-D-313, Section B shows the new pipe connecting at the existing valve 80HV0110. Please clarify.
- A74. See Drawing 80-X-313 modification in this Addendum.
- Q75. Per drawing 80-D-321, please provide a pipe encasement standard detail for the new biogas pipe under the existing pad.
- A75. No pipe encasement under slab is required.
- Q76. Refer to section 01 91 14, parts 3.11.F, 3.12.E and 3.14.F. The parts mention that the Contractor is to provide resources for 24-hour standby. Please clarify by providing the minimum amount of personnel, the amount of shifts and days per week required. Do the personnel need to be properly trained, experienced and qualified to operate and maintain the Work?

- A76. Bid as specified.
- Q77. Note 2 on drawing 76-X-132 states there is a 20-ton traveling bridge crane in the Centrifuge Building to assist with the demo work there. When was the last time this crane was certified? Will the Contractor be responsible for recertification, if necessary?
- A77. The Contractor will not be responsible for recertification of the traveling bridge crane.
- Q78. Who will be responsible for seeding the digesters, if necessary? Please provide specification requirements if the Contractor is responsible.
- A78. The Contractor shall support City operations staff.
- Q79. Regarding addendum A, raceway schedule 76-E-634. Please provide the quantity and size of wire for each raceway item containing note 2 or note 3 in the remarks section. The following are the raceway numbers: 76DC1-11, 76DC8-11, 76C-115, 76C-99, 76C-136, 76S-152, 76S-196, 76S-79, 76S-38, 76S-93, 76S-129, 76S-145, 76S-299, 76C-92, 76C-108, 76S-190.
- A79. Quantity and size of wire for each existing raceway containing Note 2 or Note 3 is unknown.
- Q80. Per spec section 09 90 00 3.07 F, we are to paint galvanized metals with an epoxy primer. Per section F, "after application of System No. 10, apply System No. 4 as a finish coat." Per section C, System No. 4 requires a SP 10, Near-White Blast Cleaning. Is it the owner's intent that:
- a. we are to blast-clean off the galvanized coating of the metal
  - b. we are to epoxy-coat galvanized metals

Please clarify the painting and coating instructions for galvanized metals.

- A80. In addition to references provided in the question, refer to Specification section 09 90 00 PAINTING AND COATING, paragraph 3.06 B. for information about coating of galvanized metal, copper and nonferrous metal alloys.
- Q81. Specification section 40 94 24 – 4 3.01 C. Valve Network Communications, states convert communications protocol from Serial to Modbus/TCP where existing wiring infrastructure supports this change. From review of 40 94 24 Supplement 1 and the P&IDs it is not clear if any valve communications will need converted from serial to Ethernet between the valve head stations (Pakscan 3 controller or Flowserve controller) and Ovation DCS. Please



confirm the number of valve datalinks that need to be converted from serial to Ethernet.

A81. If during detailed design of the PCM upgrade it is determined that the existing serial cables are too short, repull conductors as CAT6 and Modbus TCP.

Q82. For valve datalinks that need to be converted from serial to Ethernet please confirm if the number and type of signals that Ovation DCS reads from and writes to for each valve via the valve head stations will remain identical to the existing configuration.

A82. Yes, the number and type of signals that Ovation DCS reads from and writes to for each valve via the valve head stations will remain identical to the existing configuration.

Q83. Section 26 29 23.

Paragraph 2.01 and Section 44 22 24, paragraph 2.06.E.

We ask deviation to supply ACS-880-34 (main drive) in lieu of ACS-880-37 to comply to the panel enclosure seismic requirements.

A83. Yes, ACS-880-34 is acceptable.

Q84. Section 40 99 90.

a. Paragraph 2.03.B. We ask exception on the 120V IO signals for safety reasons. We are considering 24VDC signals, as approved by section 40 94 43, 2.02.B.

b. Paragraph 2.01.A.1.a and Section 44 22 23 paragraph 2.23.I. We ask exception to supply ABB ACS880-34, in order to comply 2 the section 44 22 23 that requires only 2 distinct enclosures: control panel (PLC + HMI) and VFD panel (main and back drive VFDs).

A84. a. Yes, 24VDC signals, as approved by Section 40 94 43, 2.02.B are acceptable.

b. Yes, ACS-880-34 is acceptable.

Q85. Section 40 94 43.

a. Paragraph 2.02.B.3.a.5, b.4, c8, and d.5 Section 40 94 24, Paragraph 2.01.A We ask deviation to supply 1734 Point IO cards, with isolation of 1,250V rms/V ac.

- b. Paragraph 2.02.B.3.h.2, For safety reasons, the centrifuge software provided is blocked for editing. The torque calculation routine and few AOIs are blocked for visualization as well. Please note this has been accepted in the Dewatering Centrifuge spec.
  - c. Paragraph 2.02.C, We ask exception on PLC programmed by the Contractor. Alfa Laval as the centrifuge manufacturer reserves the right on the centrifuge PLC source code programming.
- A85.
- a. Yes, 1734 Point IO cards are acceptable. Engineer would recommend the use of Compact 5000 I/O modules.
  - c. Yes, this is acceptable.
  - d. Yes, it is expected that Alfa Laval will program the centrifuges they provide.
- Q86. Section 40 91 13.
- a. Paragraph 1.01.C.3, We ask deviation to provide tubular ferrules in lieu of spade lugs because the IEC screw clamp terminals does not fit spade lugs.
  - b. Paragraph 2.01.L, We ask exception on supplying door limit switches on the panels since it is not supposed to be open while energized due safety reasons.
  - c. Paragraph 2.01.T.3, We ask deviation to keep the internal wiring numbering according to the schematics line number.
  - d. Paragraph 2.02.B.1, No redundant devices are considered since the centrifuge source code is fail-safe programmed.
  - e. Paragraph 2.01.T.15, We ask deviation to apply UL 1059 rated IEC type screw clamp terminal blocks (600V insulated, 15A) because the internal limited space in the enclosure and because the better protection against exposed live contacts.
- A86.
- a. Yes, tubular ferrules installed in compliance with UL 508 are acceptable.
  - b. Ok.
  - c. Schematics line numbers are acceptable, all wires must be labeled.
  - d. Redundant devices not required.

- e. Yes, UL 1059 rated IEC type screw clamp terminal blocks (600V insulated, 15A) are acceptable.

Q87. Section 40 99 90

- a. Paragraph 1.01.E.11.d It is the intent to comply the spec, but the logical sequence steps may vary according to Alfa Laval recommendation.
- b. Paragraph 1.01.E.12 We ask a deviation to consider the modes "Local Mode" (DCS cannot operate the centrifuge) and "Remote Mode" (Local cannot operate the centrifuge) in lieu of "Out of Service" and "In Service" functions because they basically perform the same task.

A87. a. OK. The centrifuge manufacturer operational sequence recommendations are acceptable.

- b. Modes "Local Mode" (DCS cannot operate the centrifuge) and "Remote Mode" (Local cannot operate the centrifuge) are acceptable.

Q88. Section 44 22 23.

- a. Paragraph 1.04.B.1.i.3 Main drive sheave and belt design data sizing is not provided. Please note this requirement was removed from the Dewatering Centrifuge spec, section 44 22 24.

- b. Paragraph 1.04.B.1.i.5 Main bearing design data sizing is not provided. Please note this requirement was removed from the Dewatering Centrifuge spec, section 44 22 24.

- c. Paragraph 1.04.B.1.i.7 Alfa Laval will provide heat calculations for control panels only as accepted in Dewatering Centrifuge spec, section 44 22 24.

- d. Paragraph 1.04.C.1.c.1 Please note this requirement has been removed from the Dewatering Centrifuge spec. We request that it be removed here as well.

- e. Paragraph 1.04.C.1.c.5, 2.06.A.4, 2.06.A.13, 2.08.E., 2.10.E., 2.25.E Historical abrasion test report shall be provided as it has been accepted in the Dewatering Centrifuge spec, section 44 22 24, paragraph 2.10.E.2.

A88. a. OK. No need to provide main drive sheave and belt design data and thickening centrifuge submittal requirements shall be similar to dewatering centrifuge submittal requirements.

- b. OK. No need to provide main drive sheave and belt design data and thickening centrifuge submittal requirements shall be similar to dewatering centrifuge submittal requirements.
- c. OK. No need to provide heat calculations for control panels and thickening centrifuge submittal requirements shall be similar to dewatering centrifuge submittal requirements.
- d. OK. No need to provide data and thickening centrifuge submittal requirements shall be similar to dewatering centrifuge submittal requirements.
- e. OK to provide historical abrasion test report and thickening centrifuge submittal requirements shall be similar to dewatering centrifuge submittal requirements.

Q89. Section 44 22 23.

- a. Paragraph 1.04.C.5.b.5 Vibration will be monitored on the HMI during testing; readings will be included in the field test report as this was accepted in the Dewatering Centrifuge Spec, Section 44 22 24.
- b. Paragraph 2.07.A.4. – Operating speed range is 1,700-2,000 rpm.
- c. Paragraph 2.07.A.5, 2.07.A.8, We use eddy-current method for testing in lieu of liquid dye penetrant as accepted in Dewatering Centrifuge spec.
- d. Paragraph 2.09.A. We noticed the specifications require a casing top to be bolted in place; however, we recommend utilizing hinges to readily access and maintain the unit as the cover is heavy and requires an overhead crane to lift.
- e. Paragraph 2.10.C.6, 2.25.B.6 Factory test shall be 2 hours with water, not 4 as accepted in the Dewatering Centrifuge spec.

- A89.
- a. OK that vibration will be monitored on the HMI during testing and the readings will be included in the field test report and make thickening centrifuge submittal requirements similar to dewatering centrifuge submittal requirements.
  - b. OK. Operating speed range of 1,700-2,000 rpm is acceptable.
  - c. OK. Eddy-current method for testing is acceptable and make thickening centrifuge submittal requirements similar to dewatering centrifuge submittal requirements.

- d. OK. Hinges on the cover are acceptable, should be provided and preferred to readily access and maintain the top of the centrifuge instead of the originally specified casing top that must be bolted in place.
- e. OK. 2-hour water factory test is acceptable and make thickening centrifuge requirements similar to dewatering centrifuge requirements.

Q90. Section 44 22 23.

Paragraph 2.22.B and Section 26 05 05 Paragraph 2.02.D, Section 44 22 24, paragraph 2.06.B.

- a. We ask exception for the instrumentation cable between the centrifuge junction box and the centrifuge panel. The Alfa Laval recommended multi-vias instrumentation cable between the centrifuge panel and the centrifuge junction box is Belden 1477A (12 Pr #18+22 Str BC, PVC Ins E1, IS/OS, Blk PVC Jkt, 300V PLTC-ER ITC-ER CMG). Despite the 300V insulation, the power circuit protection applied is rated to Class1/Div2, in accordance with UL requirements.

Paragraph 2.23.I and Section 44 22 24, paragraph 2.06.G.

- b. We ask deviation to split the VFD panel in two distinct enclosures, to comply the Seismic Zone 4 requirements of up to 1000 pounds equally distributed loads. We propose one distinct enclosure to the ULH main drive VFD and the other enclosure to the Back drive VFD and additional components.

A90. a. Contractor to bid as specified in the raceway schedule.

- b. Ok. Coordinate during construction if equipment pad sizes change.

Q91. Section 44 22 23.

Paragraph 2.23.A.4 and Section 44 22 24, paragraph 2.07.A.3.

- a. We ask deviation to provide the Control Panel enclosure rated to Nema 12 in lieu Nema 4X because we could not find an enclosure supplier that could provide Nema 4X enclosures rated to Seismic Zone 4 requirements (Section 40 95 13, item 2.01.H).
- b. Paragraph 2.23.B.2, The operational sequence may vary according to the centrifuge manufacturer recommendations.
- c. Paragraph 2.25.B.3, Factory control panels will be used for the factory (functional) test as accepted in the Dewatering Centrifuge spec.

- d. Paragraph 2.26.C.3, Section 40 98 03 Paragraph 3.02.  
Control panels are tested at the panel builder's facilities, not at the centrifuge factory with the centrifuge.
- A91.
- a. Yes, NEMA 12 is acceptable.
  - b. OK. The centrifuge manufacturer operational sequence recommendations are acceptable.
  - c. OK. The use of factory control panels for the factory functional tests are acceptable and make thickening centrifuge requirements similar to dewatering centrifuge requirements.
  - d. OK. It is acceptable to test the control panels at the panel builder's facilities not at the centrifuge factory with the centrifuge.
- Q92. Section 44 22 24.
- a. Paragraph 1.04.C.1.c.4, Historical abrasion test report can be provided as accepted in paragraph 2.10.E.2.
  - b. Paragraph 1.04.C.1.f, Test results of controls interface with PCS to be provided by owner's software integrator.
  - c. Paragraph 2.05.M, The feed tube on the G3-125 is a 3" hose connection not a 150# ANSI flange. The polymer connection is a 1" ISO 226-G connection.
  - d. Paragraph 2.06.F, Since the Back Drive VFD is fed by the ULH Main Drive VFD DC- Link, we ask deviation to provide ACS880-01 drive to the Back Drive motor.
  - e. Paragraph 3.03.A, Since the motors will be provided with their factory test reports already, the megger test is basically testing the electrical installation. We are not considering this procedure in Alfa Laval's scope of supply.
  - f. Drawing 76-D-123-124 and D-322.  
Existing lube oil slab/piping can be removed. We are supplying a frame mounted auto- grease system, not a lube oil system with piping.
  - g. Drawing 76-E-638-639 Lube oil pump motor power is not applicable and replaced by 120V power for the auto-greasing system.
- A92.
- a. The historical abrasion test report as required in Section 2.10.E.2 is acceptable.
  - b. Paragraph 1.04.C.1.f to be deleted from specification.

- c. OK. See drawing modification this Addendum. Revise the 2.05.M specification section to show the more updated 3" hose feed tube connection and the 1" ISO 226-G polymer connection.
  - d. Yes. ACS-880-01 is acceptable.
  - e. Ok. Contractor to conduct test.
  - f. OK. See drawing modification in this Addendum.
  - g. OK. See drawing modification in this Addendum.
- Q93. Electrical demo drawings 76-X-132, notes 1 and 3 state to pull conductors to disconnect, protect and reuse; this note is applicable to power, comm and signal wires. However, Note 2 on Drawing 76-E-619 states to re-use conduit but install new wires for power and control, Note 2 is in line with raceway schedule requirements. Please clarify the conflict.
- A93. Follow the Raceway Schedule.
- Q94. Please provide a complete/overall plan view drawing that shows the process centrifuge building or area that allows to measure distances from the equipment to electrical rooms being replaced. The overall location of equipment and electrical rooms do not allow proper measurement of distances between these work elements.
- A94. See Drawing modification in this Addendum.
- Q95. Raceway schedule in drawing 76-E-633 calls for new conduit and wiring for Circuit ID's: 76/285 to 76/289. Is there existing conduit and wiring for Thickening Centrifuges to be demolished for these circuits?
- A95. Circuit ID's: 76/285 to 76/289 are new.
- Q96. With reference to drawings 80-E-127, 80-E-128 and 80-E-129, please provide ductbank detail with reinforcement requirements, if needed, for conduits; 80/038, 80/039, 80/040 & 80/118 feeding to gas flare #3 from panel 73RPI. Also, please advise if the conduit run will make a transition from ductbank/direct buried to sublevel electrical area.
- A96. No duct bank is called out, see detail 2605-423C for trench and conduit placement details.
- Q97. With reference to drawing 80-E-122, please provide installation detail 2605-005a, not shown in the plans.
- A97. Drawing 80-E-122 Note 3 should read "Detail 2605-005b".

- Q98. Please specify if new upsized electrical gear items will require electrical pads to be extended or demo'd and rebuilt. If electrical pads are needed to be rebuilt, please provide equipment pad details for newly installed electrical equipment.
- A98. The Contractor shall be responsible for design of all concrete 'house-keeping pads' required by the cabinets.
- Q99. Drawing 76-E-121. Please provide dimensions of new VFD panels and new dewatering centrifuge panels #1 & #8 in Addendum A so we can size a proper equipment pad for these four units.
- A99. See drawing modification in this addendum. Sheets Y-122, Y-123 and Y-124 have been revised.
- Q100. Unable to properly quantify length of wire/conduit being installed or demolished in Addenda A. Please provide scaled drawing of Addenda A, drawing 76-E-121. Also, please provide locations of all electrically powered valves and FIT's shown in raceway schedule of addendum A.
- A100. See drawing modification in this Addendum. Sheets Y-122, Y-123 and Y-124 have been revised.
- Q101. Drawing 73-E-101, Notes 3, 5 & 6 states to use existing conductors and raceways between JB and VFD. This is in conflict with raceway schedule in drawing 73-E-615 which calls for new feeder and new conduit for control circuits 73/005 and 73/006. Also, circuit 73/004 states to put new and existing control feeders in existing raceway. Please Clarify. If new conductors are required, we would have to demo and replace the existing circuits. If we need to add a new raceway, we will require details for the routing, such as ductbank details for underground or above ground routing.
- A101. Follow Raceway Schedule.
- Q102. On drawings Y-110, Y-111, and per Addendum B question 25, please provide record drawings showing the pavement section detail for contractor to install. Please also provide detail for new PCC pavement/sidewalk detail for contractor to install.
- A102. Pavement thickness provided in Addendum B answer.  
See Addendum A drawings for sidewalk detail callout.
- Q103. On drawings 80-E-122, 127, 128, 129, please provide record drawings showing existing utilities crossing the ductbank runs for estimating purposes.



A103. Record drawings will be provided during construction.

Q104. Specification 01 31 13 MBC Operations During Construction Criteria supplement states short "shutdowns will be required..." for several process facilities. Please clarify the amount of a short shutdown and how much time each shutdown is given to demo & install new pumps & process systems.

A104. Demo and installation of equipment will follow Specification 01 31 13.

Duration of shutdowns will be coordinated during construction.

Q105. Specification 01 31 13 Supplement MBC Operation During Construction Criteria states "...brief shutdowns to tie into new equipment and facilities" for the Grit Building Facility. Please clarify how much time is a "brief shutdown" and if a full shutdown is acceptable to install new equipment & piping at this facility.

A105. As stated, brief facility shutdowns will be acceptable and coordinated during construction.

Q106. Specification 01 31 13 Supplement MBC Operation During Construction Criteria states "Three solids thickening centrifuges and one thickened sludge pump need to remain in service at all times, except for a short duration tie-in.." Please clarify how much time is a "short duration" and if a full shutdown is acceptable to install new equipment & piping at this facility.

A106. As stated, brief facility shutdowns will be acceptable and coordinated during construction.

Q107. Specification 01 31 13 Supplement MBC Operation During Construction Criteria states "The digester improvement should rotate through the three digesters one-by-one. Short shutdowns will be required..." Please clarify the duration of a "short shutdown" and if a full shutdown is acceptable to install new equipment & piping at this facility.

A107. As stated, brief facility shutdowns will be acceptable and coordinated during construction.

Q108. Sheet 80-X-120 shows the demolition of 2 Biogas Compressors.

Sheet 80-D-121 shows the Installation of one new compressor. Please confirm if it is acceptable to run the Biogas System on only one compressor in order to Install a bypass system with only one compressor running in order to proceed with the demolition of the existing compressors.

A108. Confirmed. It is acceptable to run one compressor to proceed with demolition of the existing compressor.

Q109. Refer to Sheet Y-123, Y-124, 80-X-111, & 80-X-313. Please confirm if one 6" OF/EOF line can be demolished at a time for the Biosolids storage tank & emergency storage tank. Please clarify what is the duration of the shutdown at this location?

A109. Either the EOF or OF piping must be in service at all times. The Contractor shall isolate as necessary to keep one in service while the other is being installed. As long as this requirement is met, there is no required outage duration.

Brief facility shutdowns will be coordinated during construction.

Q110. Please confirm that Isolation valves can be shutoff for each pump & pipe to be demolished & replaced.

A110. Condition of all isolation valves for each pump and pipe are unknown.

Q111. Will the contractor be required to have staff on site 24 hours a day during the 120 Day Integration Period?

A111. No, the Contractor shall keep resources on 24-hour standby and provide services Specified in Section 01 91 14 – 3.11 Integration Period Testing.

Q112. Per the BIOGAS Compressor layout shown on Sheet 186 and Demo on Sheet 162 the construction cannot be concurrent or done in a 8 Hr. Shutdown of the Bio Gas Facility due to the new and existing equipment and pipe occupying the same location. Please confirm all biogas shall be flared during new compressor & 12" BG System replacement if not temporary compressors and piping will be required to maintain compressed BG to COGEN Facility.

A112. Confirmed. All biogas may be flared during system cutovers.

Q113. Unit Price Bid Items 18-24 were added per addendum. The curb and sidewalk quantities provided are close to the quantities identified in the yard pipe drawings. Please confirm Bid Items 18-24 shall be used for the yard pipe curb and sidewalk remediation and no curb and sidewalk remediation shall be carried in other bid items.

A113. Unit Price Bid Items 18 through 24 are intended to be used for the 12-inch diameter biogas pipeline construction. Curb and gutter removal and replacement under Bid Item 5 Site Civil Grading is intended to be used for the biogas flare area construction.

Q114. Drawing 80-X-111, note 1 states to pull conductors from Motor of axial mixing pumps to disconnect and protect in place for reuse and termination. However, drawing 80-E-113, note 1 states to reuse existing raceway only; new conductors are to be installed per the raceway schedule. Please clarify if we need to pull old conductors from the existing raceway for the axial mixing pumps to the MCC and install new conductors.

A114. Follow the Raceway Schedule.

Q115. Drawing 76-D-122 Note 2 refers to a drawing 76-M-121, please provide 76-M-121.

A115. Reference to Drawing 76-M-121 means Record Drawing 76-M-121 that will be made available during construction.

Q116. Drawing 76-S-312 on Elevation D & E refers to 76-D-112, please provide 76-D-112.

A116. Reference to Drawing 76-D-112 means Drawing 76-D-110.

Q117. Refer to Specification Section 01 50 00, Part 2.01, B.

There is a reference made to a, "Supplement Temporary Construction Facilities General Arrangement." This document appears to be missing from the bid documents. Please provide this supplemental document.

A117. No general arrange drawing is provided. The Contractor shall provide facilities in an arrangement coordinated with the Construction Manager and Owner as specified in Specification Section 01 50 00 – 2.01.B.

Q118. Refer to Specification Section 01 50 00, Part 2.01, K & P.

Per section K the CMs Field Office shall include 4 private offices, however desks are included in the list of Office Equipment.

Please review the office equipment and ensure that Section P includes all Office Equipment that will be required.

A118. Contractor shall provide office desks for private offices specified in Part 2.01, K.

Q119. Refer to Specification Section 01 31 13, Par1 1.10, E, "Time Lapse Construction Video."

The specified camera is capable of continuous video monitoring; however, this requires a monthly service agreement. Will the contractor be required to provide continuous video monitoring to the City?

A119. Bid as specified.

Q120. Refer to Addendum B Q&A 20

The answer to Question 20 in Addendum B was: "Digester 2 is clean, empty and has been out of service for over 15 years. Digester 3 was cleaned in June 2020 and is empty and out of service."

Please confirm we are to include no cost at all for Digester Cleaning of Digesters 2 and 3.

A120. Bid as specified.

Q121. Refer to drawing G-100.

The table on G-100 provides test pressures for pipelines. Is it acceptable to test up against existing valves and/or fittings/connections?

A121. See specification section 40 80 01 PROCESS PIPING LEAKAGE TESTING for testing requirements.

Q122. Refer to Specification Section 01 50 00, Part 2.01, Q.

- a. Per section Q part 2; the contractor shall supply one power supply surge protector per computer. However, no computers are listed as required to be supplied. Please confirm that no computers shall be supplied and clarify the number of surge protectors that are required.
  - b. Per section Q part 3, confirm that only one UPS is required.
  - c. Per section Q part 4, confirm that only one printer is required.
  - d. Per section Q part 6, please clarify what hardware is required.
  - e. Per section Q part 7, please confirm that only one P6 license is required.
- A122.
- a. A total of four computers, HP Workstation Z2 G5 or approved equal, with dual 24-inch flat screen monitors shall be provided.
  - b. Yes.
  - c. Yes.
  - d.
  - e. Four total. One for each computer.

Q123. Refer to specification 10 14 00 2.02 B for Equipment Labels.

The specification refers to Aluminum or stainless steel in section B.4 and then Fiberglass material in B.5. Please clarify material type. Spec B.6 indicated the size is to be 14"-18" long which seems more like a sign rather than a label. Please clarify if this is really the size intended.

A123. Fiberglass equipment labels are acceptable.

Q124. Refer to Alfa Laval Shop Drawing for Centrifuges

The Alfa Laval manufacturer drawing for the centrifuges call for a minimum pick height from the crane hook to the base plate of the centrifuges of 141.73". Adding in the height of the centrifuge concrete pads the crane hook would need to have a clearance height of at least 13' above finish floor in order to lift and set the centrifuges. Please confirm the overhead crane in the centrifuge room has at least 13' clearance height from the crane hook to the finish floor.

A124. Confirmed.

## C. ADDENDUM

1. To Addendum C, Section C SUPPLEMENTARY SPECIAL PROVISIONS, Item 1, page 9, **DELETE** in its entirety and **SUBSTITUTE** with the following:
  1. To Technicals, Section 01 29 00 Payment Procedures, Part 1, General, Section 1.10 Bid Items, Subsection E Site Civil Grading – Lump Sum, Item 3, Page 174, **DELETE** in its entirety and **SUBSTITUTE** with the following:
    3. Payment is made for this item for the following:
      - a. Civil demolition work and grading as shown on Drawings and as specified, including protection of existing facilities, excavation, grading, erosion control, tree trimming and protection, tree removal and replacement, fencing removal and replacement, driveway, curb and gutter removal and replacement at flare area, irrigation system removal and replacement, and all appurtenant work, completed.
      - b. Payment under this Bid Item shall be made as the lump sum price named in the Bid Schedule.
2. To Addendum A, Section 44 22 24 DEWATERING CENTRIFUGES, PART 1, GENERAL, Section 1.04, SUBMITTALS, Sub-section C, Informational Submittals, Item 1, Subitem F, page 194, **DELETE** in its entirety.

3. To Addendum A, Section 44 22 24 DEWATERING CENTRIFUGES, PART 2, PRODUCTS, Section 2.05, CENTRIFUGE EQUIPMENT, page 210, **ADD** the following:
  - R. Provide all materials and supports, construct and install a permanent maintenance platform around the dewatering centrifuges that will provide operators with safe and reliable access to the main body of the centrifuge including the top of the hinged case and back drive motor as shown on Sheet 76-S-322. Ensure that field measurements are performed and summarized and submitted in the shop drawing for approval prior to manufacture and installation so that the platform does not interfere with centrifuge equipment. The platform will be accessed by a permanent ships ladder and be fully surrounded on the outside by a railing and kickplate. The platform is not to be anchored in any way to the centrifuge. Match materials shown for the Thickening Centrifuge platforms.

#### **D. NOTICE INVITING BIDS**

1. To Item 3, **ESTIMATED CONSTRUCTION COST**, page 7, **DELETE** in its entirety and **SUBSTITUTE** with the following:
  3. **ESTIMATED CONSTRUCTION COST:** The City's estimated total construction cost for this project is **\$40,820,000**.

#### **E. SUPPLEMENTARY SPECIAL PROVISIONS**

1. To Section 2, SCOPE OF THE WORK, Subsection 2-10.1.4, City's Final Determination, page 110, **DELETE** in its entirety and **SUBSTITUTE** with the following:
  - 2-10.1.4 City's Final Determination.** To the "WHITEBOOK", item 2, **DELETE** in its entirety and **SUBSTITUTE** with the following
    2. If you disagree with the City's Final Determination, notify the Engineer in writing of your objection within 15 Working Days after receipt of the written determination in accordance with 2-10.2.1.4, "DRB Traditional Dispute Meeting".
2. To Section 2, SCOPE OF THE WORK, Subsection 2-10.2 and its subsections, DISPUTE RESOLUTION PROCESS, pages 111 through 115, **DELETE** in its entirety and **SUBSTITUTE** with the following:
  - 2-10.2 Dispute Resolution Process.** To the "WHITEBOOK", **DELETE** all sections and subsections in their entirety and **SUBSTITUTE** with the following:

## **2-10.2 Dispute Resolution Process**

1. A mandatory Dispute Resolution Board process shall be established in accordance with 2-10.2.1, "Dispute Resolution Board (DRB)" prior to the mandatory mediation as described in 2-10.2.2, "Mandatory Non-binding Mediation".

### **2-10.2.1 Dispute Resolution Board (DRB).**

1. The DRB is a 3-member board that you and the City establish prior to beginning work.

#### **2-10.2.1.1 DRB Member Selection.** Within 45 Working Days of Contract approval, you and the City shall select DRB members and establish the DRB using the following procedure:

1. You and the City will each nominate one DRB member candidate to participate on the DRB. The City has approved the use of the Caltrans DRB members list for this Project. Before being nominated to the project DRB, the prospective candidates will be contacted and provided with all available project details by the City. The candidate will then need to confirm intent to participate in the DRB prior to nomination for the project board.

You can find Caltrans' approved DRB member's list at Caltrans' website:

<https://dot.ca.gov/programs/construction/drb-information-and-candidate-list/drb-candidates-list>

2. If you or the City nominates someone who is not on the Caltrans DRB list, the candidate shall:
  - a) Be knowledgeable in the type of construction and contract documents anticipated by the Contract.
  - b) Have completed training by the Dispute Resolution Board Foundation.
  - c) Have no prior direct involvement on this Contract.

- d) Have no financial interest in the Contract or with the parties, subcontractors, suppliers, consultants, or associated legal or business services within 6 months before award and during the Contract, except for payments for City DRA or DRB services, or payments for retirement or pensions from either party not tied to, dependent on, or affected by the net worth of the party.
3. You and the City shall request a disclosure statement from each nominated DRB member candidate and must each furnish it to the other party. The statement shall include:
- a) Resume of the candidate's experience.
  - b) Declaration statement that describes past, present, anticipated, and planned professional or personal relationships with each of the following:
    - i. Parties involved in the Contract
    - ii. Parties' principals
    - iii. Parties' counsel
    - iv. Associated subcontractors and suppliers
4. You and the City are allowed:
- a) One-time objection to the other's candidate without stating a reason.
  - b) Objection to any of the other's subsequent candidates based on a specific breach of the candidate's responsibilities or qualifications under items 1 and 3 of this section.
5. If you or the City objects to the other's candidate, the party whose candidate was objected to must nominate another DRB candidate within 15 Working Days.
6. The 1st candidate from a party that receives no objection becomes that party's DRB member.



7. You and the City each provide written notification to your selected DRB member.
8. Within 15 Working Days of their notifications, the selected DRB members recommend to you and the City the 3rd DRB member candidate and provide that candidate's disclosure statement.
9. Within 15 Working Days of the recommendation, you and the City must each notify the first 2 DRB members whether you approve or disapprove of the recommended 3rd DRB member candidate.
10. If the 2 DRB members cannot agree on the 3rd DRB candidate, they will submit a list of candidates to you and the City for final selection and approval.
11. If the 2 DRB members do not recommend a 3rd DRB candidate within 15 Working Days of notification of their selections, or if you and the City do not agree on the 3rd DRB member candidate within 15 Working Days of the recommendation, or if you and the City do not agree on any of the candidates on the list provided by the first 2 selected DRB members, you and the City each must select 3 candidates from the current list of arbitrators certified by the Public Works Contract Arbitration Committee established by Pub Cont Code § 10245 et seq. who will be willing to serve as a DRB member. The first 2 selected  
  
DRB members must select the 3rd member in a blind draw of these 6 candidates.
12. The 3 DRB members then decide which of the three will act as the DRB chairman. If you and the City do not agree with the selected chairman, the 3rd member will act as the DRB chairman.

#### **2-10.2.1.2 DRB Member Replacement.**

1. The service of a DRB member may end at any time with a notice of at least 15 Working Days if any of the following occurs:
  - a) A member resigns

- b) The City replaces its selected member
  - c) You replace your selected member
  - d) The City's and your selected members replace the 3rd member
2. Either you or the City replace any member for failing to comply with the required employment or financial disclosure conditions of DRB membership as described in the Contract and in the Dispute Resolution Board Agreement form.
  3. Replacing any DRB member shall be accomplished by written notification to the DRB and the other party with substantiation for replacing the member.
  4. A replacement DRB member is selected the same way as the original DRB member. Selecting a replacement must start upon determination of the need for a replacement and must be completed within 15 Working Days. The Dispute Resolution Board Agreement form shall be amended to reflect the change to the DRB.

#### **2-10.2.1.3 DRB Progress Meetings.**

1. You and the City shall periodically meet with the DRB and visit the job site so the DRB members can keep abreast of construction activities and develop familiarity with the work in progress.
2. The progress meetings shall occur at the start of the project and at least once every 4 months after that.
3. Both parties shall attend each progress meeting.
4. You and the City may agree to waive scheduled progress meetings when the only work remaining is plant establishment.

#### **2-10.2.1.4 DRB Traditional Dispute Meeting.**

1. If you disagree with the City's Final Determination, notify the Engineer and DRB in writing of your objection within 15 Working Days after receipt of the determination.

2. A DRB dispute meeting shall be held no sooner than 30 Calendar Days and no later than 60 Calendar Days after the DRB receives your written notice unless you and the City otherwise agree.
3. At least 15 Calendar Days before the scheduled dispute meeting, each party shall furnish the DRB documentation that supports its position and any additional information requested by the DRB.
4. If the DRB requests additional information within 10 Calendar Days after the dispute meeting, the party receiving the request shall furnish this information within 10 Calendar Days of receiving the request.
5. The DRB shall provide a written recommendation report within 30 Calendar Days of the dispute meeting unless you and the City agree to allow more time.
6. Within 10 Calendar Days of receiving the DRB's recommendation report, either you or the City may request clarification of any part of the report. Only one request for clarification from each party is allowed per dispute.
7. Within 30 Calendar Days after receiving the DRB's recommendation, each party shall furnish a written response to the DRB indicating acceptance or rejection of the recommendation. If a party rejects the recommendation and has new information that supports its position, the party may request reconsideration. The reconsideration request shall be made within 30 Calendar Days after receiving the DRB's recommendation. Only one request for reconsideration from each party is allowed per dispute.
8. If both you and the City accept the DRB's recommendation but cannot agree on the time or payment adjustment within 60 Calendar Days of accepting the recommendation, either party may request that the DRB recommend an adjustment.
9. If you reject the DRB's recommendation, notify the Resident Engineer and DRB in writing of your objection within 15 Working Days after receipt of the DRB's

recommendation and file a "Request for Mediation" in accordance with 2-10.2.2, "Mandatory Non-binding Mediation".

### **2-10.2.2 Mandatory Non-binding Mediation.**

1. If a dispute arises out of or relates to the Contract, or the breach thereof, and if said dispute cannot be settled through contract provisions provided for the Dispute Resolution Board process, claim settlement, or negotiations, the parties agree to first endeavor to settle the dispute in an amicable manner, using mandatory mediation under the Construction Industry Mediation Rules of the American Arbitration Association or any other neutral organization agreed upon before having recourse in a court of law.

#### **2-10.2.2.1 Mandatory Mediation Costs.**

1. The expenses of witnesses for either side shall be paid by the party producing such witnesses. All other expenses of the mediation, including required traveling and other expenses of the mediator and the cost of any proofs or expert advice produced at the direct request of the mediator, shall be borne equally by the parties, unless they agree otherwise.

#### **2-10.2.2.2 Selection of Mediator.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. A single mediator, knowledgeable in construction aspects and acceptable to both parties, shall be used to mediate the dispute.
2. To initiate mediation, the initiating party shall serve a Request for Mediation at the American Arbitration Association (AAA) on the opposing party.
3. If AAA is used, the initiating party shall concurrently file with AAA a "Request for Mediation" along with the appropriate fees, a copy of requested mediators marked in preference order, and a preference for available dates.
4. If AAA is selected to coordinate the mediation (Administrator), within 10 Working Days from the

receipt of the initiating party's Request for Mediation, the opposing party shall file the following:

- a) A copy of the list of the preferred mediators listed in preference order after striking any mediators to which they have any objection.
  - b) A preference for available dates.
  - c) Appropriate fees.
5. If the parties cannot agree on a mediator, then each party shall select a mediator and those mediators shall select the neutral third party to mediate the matter.

#### **2-10.2.2.3 Conduct of Mediation Sessions.**

1. Mediation hearings shall be conducted in an informal manner and discovery shall not be allowed.
2. Discussions, statements, and/or admissions shall be confidential to the proceedings and shall not be used for any other purpose as it relates to the party's legal position. The parties may agree to exchange any information they deem necessary.
3. Both parties shall have an authorized representative attend the mediation. Each representative shall have the authority to recommend entering into a settlement. Either party may have attorney(s), witnesses, or expert(s) present. Either party may request a list of witnesses and notifications of whether attorney(s) shall be present.
4. Any resulting agreements from mediation shall be documented in writing. Mediation results and documentation, by themselves, shall be "non-binding" and inadmissible for any purpose in any legal proceeding, unless such admission is otherwise agreed upon in writing by both parties. Mediators shall not be subject to any subpoena or liability and their actions shall not be subject to discovery.

### **2-10.2.3 Payment.**

1. Pay each DRB member \$2,000 per day for DRB's participation at each on-site meeting
  - a) If a DRB member serves on more than one DRB, the \$2,000 shall be divided evenly among the contracts.
2. On-site meetings include:
  - a) Initial project meeting
  - b) Scheduled progress meetings for a project with a DRB
  - c) Dispute meetings
3. This payment includes full compensation for on-site time, travel expenses, transportation, lodging, travel time, and incidentals for each day or portion thereof that the DRB member is at a DRB meeting.
4. Before a DRB member spends any time reviewing plans and specifications, evaluating positions, preparing recommendations, or performs any other off- site DRB-related tasks, you and the City shall agree to pay for the tasks. Pay the DRB member \$200 per hour for these tasks. This payment includes full compensation for incidentals such as expenses for telephone, fax, and computer services.
5. The City shall reimburse you for 1/2 of the invoiced costs to the DRB and 1/2 of the costs of any technical services agreed to. Submit a change order bill and associated invoices with the original supporting documents in the form of a canceled check or bank statement to receive reimbursement. Do not add mark-ups to the change order bill.
6. The City will not pay for any DRB-related work performed after Contract acceptance.
7. The City will not pay your cost of preparing for and attending a dispute resolution meeting.

3. To Section 6 – PROSECUTION AND PROGRESS OF WORK, Subsection 6-9 LIQUIDATED DAMAGES, Page 148, **DELETE** table in its entirety and **SUBSTITUTE** with the following:

Milestone No.	Milestone Description	Required Completion Date	Amount of Liquidated Damages
Milestone 1	Intermediate Substantial Completion	660 Working Days after Notice to Proceed	\$4,600/Calendar Day
Milestone 2	Start of Integration Period	774 Working Days after Notice to Proceed	\$4,600/Calendar Day
Milestone 3	Substantial Completion	875 Working Days after Notice to Proceed	\$4,600/Calendar Day
Milestone 4	Final Acceptance and Completion	926 Working Days after Notice to Proceed	\$4,600/Calendar Day

4. To Technicals, Section 01 29 00, Payment Procedures, Part 1 General, Section 1.10 Bid Items, Subsection K, item 3, subitem f, Page 176, **DELETE** in its entirety and **SUBSTITUTE** with the following:

f. Digesters cleaning and addition of nozzles to digester mixing system.

5. To Technicals, Section 01 29 00, PAYMENT PROCEDURES, PART 1, GENERAL, Section 1.10, BID ITEMS, Page 177, **ADD** the following:

R. HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE (HAZWOPER) CERTIFICATION – Allowance:

1. No measurement shall be made for this Item.
2. Payment is made for this Item as an allowance towards 40-hour HAZWOPER training and 8-hour annual refresher training for City and Construction Manager staff.

6. To Technicals, Section 01 31 13, Project Coordination, Supplement MBC Operations During Construction Criteria table, Solids Thickening row, Page 192, **DELETE** in its entirety and **SUBSTITUTE** with the following:

<b>Description</b>	<b>Criteria</b>	<b>MOPO Considerations</b>
Solids Thickening	Three solids thickening centrifuges and one thickened sludge pump and one TSL pipeline need to remain in service at all times, except for a short duration tie-in for MBC to maintain solids handling.	Modifications to the thickened sludge pump suction and discharge piping may remove multiple pumps out of service.

7. To Technicals, Section 01 50 00, Temporary Facilities and Controls, Part 3 Execution, Item 3.01, Construction Manager’s and Engineer’s Field Office, Sub-item A, Page 274, **DELETE** in its entirety and **SUBSTITUTE** with the following:
- A. Make available for Construction Manager’s use within 30 Calendar Days after Construction Notice to Proceed. The Construction Manager’s Field Office shall remain on Site for minimum of 60 Calendar Days after final acceptance of the Work.
8. To Technicals, Section 40 90 00, INSTRUMENTATION AND CONTROL, Supplement 02d P04 Pressure Gauge, Pages 812 through 905, **DELETE** in their entirety and **SUBSTITUTE** with Supplement 02d P04 Pressure Gauge on pages 48 through 141 of this Addendum.
9. To Technicals, Section 40 98 00, PROJECT MANAGEMENT SERVICES, Part 3, Execution, Section 3.05, PROJECT IMPLEMENTATION, Subsection E, Maintenance Phase, Page 1297, **DELETE** in its entirety.



**F. ADDITIONAL CHANGES**

- The following are additional changes to the Line Items in the PlanetBids Tab:

For clarity where applicable, **ADDITIONS**, if any, have been **Underlined** and **DELETIONS**, if any, have been **~~Stricken-out~~**.

Section	Item Code	Description	UoM	Quantity	Payment Reference	Extension
Main Bid	541820	DISPUTE RESOLUTION BOARD (EOC Type I)	AL	1	2-10.2.3	<del>51000</del> <u>68000</u>
<u>Main Bid</u>	<u>237110</u>	<u>Hazardous Waste Operations and Emergency Response (HAZWOPER) Certification (EOC Type I)</u>	<u>AL</u>	<u>1</u>	<u>Section 01 29 00</u>	<u>5160</u>

**G. PLANS**

- To Drawing Numbers 44198-1001-D, 44198-1024-D, 44198-1038-D, 44198-1106B-D, 44198-1106C-D, 44198-1115B-D, 44198-1126A-D, 44198-1158A-D, 44198-1159C-D, 44198-1159D-D, 44198-1165-D, 44198-1186-D, 44198-1192-D, 44198-1264-D, 44198-1265-D, 44198-1266-D, 44198-1267-D, 44198-1268-D, 44198-1269-D, 44198-1270-D, 44198-1271-D, 44198-1272-D, 44198-1273-D, and 44198-1338-D **DELETE** in their entirety and **REPLACE** with pages 142 through 165 of this Addendum.

James Nagelvoort, Director  
Engineering & Capital Projects Department

Dated: *April 9, 2021*  
San Diego, California

JN/AJ/rd

# P04 PRESSURE GAUGE

GENERAL	1	Tag Number	P&ID	73PI2021A	73-I-32
	2	Loop Title		Raw Solids Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Pressure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>73PI2021A</b>		

GENERAL	1	Tag Number	P&ID	73PI2021B	73-I-32
	2	Loop Title		Raw Solids Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	40 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50			Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>73PI2021B</b>		



GENERAL	1	Tag Number	P&ID	73PI2022A	73-I-32
	2	Loop Title		Raw Solids Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>73PI2022A</b>		

GENERAL	1	Tag Number	P&ID	73PI2022B	73-I-32
	2	Loop Title		Raw Solids Pump No. 2 Discharge Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	40 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>73PI2022B</b>		



GENERAL	1	Tag Number	P&ID	73PI2023A	73-I-33
	2	Loop Title		Raw Solids Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		6 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>73PI2023A</b>		

GENERAL	1	Tag Number	P&ID	73PI2023B	73-I-33	
	2	Loop Title		Raw Solids Pump No. 3 Discharge Pressure		
	3					
	4	Area Classification		Unclassified		
	5	Line Number	Equipment Number			
	6	Line Size	Line Schedule	6 inch	Ductile Iron	
	7					
PROCESS CONDITIONS	8	Fluid		Raw Solids		
	9	Min Pressure	Max Pressure	0 psi	40 psi	
	10	Temperature		Ambient		
	11	Specific Gravity	Viscosity	1.0		
	12	Conductivity	Density			
	13	Vapor Pressure	Critical Prssure			
	14					
INDICATOR	15	Type		Bourdon Tube		
	16	Range		0-60 psig		
	17	Dial Size	Dial Color	4.5 Inches	White	
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem	
	19	Movement Dampening		Glycerin		
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic	
	21					
	22	Blowout Protection		Case Back		
23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel		
24						
TRANSMITTER	25	Mounting				
	26	Enclosure NEMA Rating				
	27	Power Supply	Voltage			
	28	Output Signal				
	29	Communication Protocol				
	30	Range				
	31					
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal		
	33	Process Connection		6 inch Class 150 ANSI Flange		
	34	Body Material		Carbon Steel		
	35	Diaphragm / Sleeve Material		Viton		
	36	Capillary Material				
	37	Capillary Length				
	38	Fill Fluid		Glycerin		
	39	Flushing Connection		No		
	40					
	41	Manufacturer		Ashcroft		
42	Model Number		81			
CALIBRATION	43	Calibrated Range		0-60 psig		
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate		
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range		
	46					
OPTIONS	47	Tagging		Stainless steel tag with Tag Number		
	48					
	49					
PURCHASE	50	Manufacturer		Ashcroft	WIKA	
	51	Model Number		1279	233.34	
	52	Purchase Note		1 year warranty		
	53					
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>			
<b>PRESSURE GAUGE</b>			<b>73PI2023B</b>			





GENERAL	1	Tag Number	P&ID	76PI1104C	76-I-11
	2	Loop Title		Grit Separator No. 1 Utility Water	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2 inch	Copper
	7				
PROCESS CONDITIONS	8	Fluid		Utility Water Low Pressure	
	9	Min Pressure	Max Pressure	0 psi	75 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-100 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type			
	33	Process Connection			
	34	Body Material			
	35	Diaphragm / Sleeve Material			
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid			
	39	Flushing Connection			
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-100 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI1104C</b>		



GENERAL	1	Tag Number	P&ID	76PI1109C	76-I-12
	2	Loop Title		Grit Separator No. 2 Utility Water	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2 inch	Copper
	7				
PROCESS CONDITIONS	8	Fluid		Utility Water Low Pressure	
	9	Min Pressure	Max Pressure	0 psi	75 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-100 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type			
	33	Process Connection			
	34	Body Material			
	35	Diaphragm / Sleeve Material			
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid			
	39	Flushing Connection			
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-100 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI1109C</b>		



GENERAL	1	Tag Number	P&ID	76PI1114C	76-I-13	
	2	Loop Title		Grit Separator No. 3 Utility Water		
	3					
	4	Area Classification		Unclassified		
	5	Line Number	Equipment Number			
	6	Line Size	Line Schedule	2 inch	Copper	
	7					
PROCESS CONDITIONS	8	Fluid		Utility Water Low Pressure		
	9	Min Pressure	Max Pressure	0 psi	75 psi	
	10	Temperature		Ambient		
	11	Specific Gravity	Viscosity	1.0		
	12	Conductivity	Density			
	13	Vapor Pressure	Critical Prssure			
	14					
INDICATOR	15	Type		Bourdon Tube		
	16	Range		0-100 psig		
	17	Dial Size	Dial Color	4.5 Inches	White	
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem	
	19	Movement Dampening		Glycerine		
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic	
	21					
	22	Blowout Protection		Case Back		
23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel		
24						
TRANSMITTER	25	Mounting				
	26	Enclosure NEMA Rating				
	27	Power Supply	Voltage			
	28	Output Signal				
	29	Communication Protocol				
	30	Range				
	31					
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type				
	33	Process Connection				
	34	Body Material				
	35	Diaphragm / Sleeve Material				
	36	Capillary Material				
	37	Capillary Length				
	38	Fill Fluid				
	39	Flushing Connection				
	40					
	41	Manufacturer		Ashcroft		
42	Model Number		81			
CALIBRATION	43	Calibrated Range		0-100 psig		
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate		
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range		
	46					
OPTIONS	47	Tagging		Stainless steel tag with Tag Number		
	48					
	49					
PURCHASE	50	Manufacturer		Ashcroft	WIKA	
	51	Model Number		1279	233.34	
	52	Purchase Note		1 year warranty		
	53					
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>			
<b>PRESSURE GAUGE</b>			<b>76PI1114C</b>			



GENERAL	1	Tag Number	P&ID	76PI2126C	76-I-14
	2	Loop Title		Grit Separator No. 4 Utility Water	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2 inch	Copper
	7				
PROCESS CONDITIONS	8	Fluid		Utility Water Low Pressure	
	9	Min Pressure	Max Pressure	0 psi	75 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-100 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type			
	33	Process Connection			
	34	Body Material			
	35	Diaphragm / Sleeve Material			
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid			
	39	Flushing Connection			
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-100 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2126C</b>		



GENERAL	1	Tag Number	P&ID	76PI2151A	76-I-31
	2	Loop Title		Thickening Centrifuge Feed Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
CALIBRATION	42	Model Number		81	
	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2151A</b>		

GENERAL	1	Tag Number	P&ID	76PI2155A	76-I-32
	2	Loop Title		Thickening Centrifuge Feed Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
CALIBRATION	42	Model Number		81	
	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2155A</b>		

GENERAL	1	Tag Number	P&ID	76PI2160A	76-I-33
	2	Loop Title		Thickening Centrifuge Feed Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
CALIBRATION	42	Model Number		81	
	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2160A</b>		

GENERAL	1	Tag Number	P&ID	76PI2165A	76-I-34
	2	Loop Title		Thickening Centrifuge Feed Pump No. 4 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
CALIBRATION	42	Model Number		81	
	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2165A</b>		



GENERAL	1	Tag Number	P&ID	76PI2170A	76-I-35
	2	Loop Title		Thickening Centrifuge Feed Pump No. 5 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron
	7				
PROCESS CONDITIONS	8	Fluid		Raw Solids	
	9	Min Pressure	Max Pressure	0 psi	45 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerin	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
CALIBRATION	42	Model Number		81	
	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2170A</b>		

GENERAL	1	Tag Number	P&ID	76PI2287A	76-I-52
	2	Loop Title		Thickened Solids Transfer Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Thickened Solids	
	9	Min Pressure	Max Pressure	0 psi	7.5 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2287A</b>		

GENERAL	1	Tag Number	P&ID	76PI2292A	76-I-53
	2	Loop Title		Thickened Solids Transfer Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Thickened Solids	
	9	Min Pressure	Max Pressure	0 psi	7.5 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2292A</b>		

GENERAL	1	Tag Number	P&ID	76PI2297A	76-I-54
	2	Loop Title		Thickened Solids Transfer Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Thickened Solids	
	9	Min Pressure	Max Pressure	0 psi	7.5 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		10 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2297A</b>		

GENERAL	1	Tag Number	P&ID	76PI2505A	76-I-101
	2	Loop Title	Dewatering Centrifuge Feed Pump No. 1 Suction Pressure		
	3				
	4	Area Classification	Unclassified		
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid	Digested Sludge		
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature	Ambient		
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type	Bourdon Tube		
	16	Range	0-30 psig		
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening	Glycerine		
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection	Case Back		
TRANSMITTER	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
DIAPHRAGM SEAL - ANNULAR SEAL	31				
	32	Type	Annular Seal		
	33	Process Connection	8 inch Class 150 ANSI Flange		
	34	Body Material	Carbon Steel		
	35	Diaphragm / Sleeve Material	Viton		
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid	Glycerin		
	39	Flushing Connection	No		
	40				
CALIBRATION	41	Manufacturer	Ashcroft		
	42	Model Number	81		
	43	Calibrated Range	0-30 psig		
	44	Vendor Calibration	Factory calibrate - Provide calibration certificate		
OPTIONS	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
	47	Tagging	Stainless steel tag with Tag Number		
PURCHASE	48				
	49				
	50	Manufacturer	Ashcroft	WIKA	
	51	Model Number	1279	233.34	
	52	Purchase Note	1 year warranty		
	53				
<b>P04</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>	
<b>PRESSURE GAUGE</b>				<b>76PI2505A</b>	



GENERAL	1	Tag Number	P&ID	76PI2510A	76-I-102
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		8 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>	
<b>PRESSURE GAUGE</b>				<b>76PI2510A</b>	



GENERAL	1	Tag Number	P&ID	76PI2515A	76-I-103
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		8 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>	
<b>PRESSURE GAUGE</b>				<b>76PI2515A</b>	



GENERAL	1	Tag Number	P&ID	76PI2520A	76-I-104
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 4 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
TRANSMITTER	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
DIAPHRAGM SEAL - ANNULAR SEAL	31				
	32	Type		Annular Seal	
	33	Process Connection		8 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
CALIBRATION	41	Manufacturer		Ashcroft	
	42	Model Number		81	
	43	Calibrated Range		0-30 psig	
OPTIONS	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
PURCHASE	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
53					
P04  PRESSURE GAUGE				City of San Diego Metropolitan Biosolids Center Improvements	
				76PI2520A	





GENERAL	1	Tag Number	P&ID	76PI2525A	76-I-105
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 5 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		8 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>	
<b>PRESSURE GAUGE</b>				<b>76PI2525A</b>	



GENERAL	1	Tag Number	P&ID	76PI2530A	76-I-106
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 6 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		8 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>	
<b>PRESSURE GAUGE</b>				<b>76PI2530A</b>	



GENERAL	1	Tag Number	P&ID	76PI2535A	76-I-107
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 7 Suction Pressure	
	3	Area Classification		Unclassified	
	4	Line Number	Equipment Number		
	5	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	6	Fluid		Digested Sludge	
	7	Min Pressure	Max Pressure	0 psi	30 psi
PROCESS CONDITIONS	8	Temperature		Ambient	
	9	Specific Gravity	Viscosity	1.0	
	10	Conductivity	Density		
	11	Vapor Pressure	Critical Prssure		
	12	Type		Bourdon Tube	
	13	Range		0-30 psig	
INDICATOR	14	Dial Size	Dial Color	4.5 Inches	White
	15	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	16	Movement Dampening		Glycerine	
	17	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	18	Blowout Protection		Case Back	
	19	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	20	Mounting			
	21	Enclosure NEMA Rating			
TRANSMITTER	22	Power Supply	Voltage		
	23	Output Signal			
	24	Communication Protocol			
	25	Range			
	26	Type		Annular Seal	
	27	Process Connection		8 inch Class 150 ANSI Flange	
DIAPHRAGM SEAL - ANNULAR SEAL	28	Body Material		Carbon Steel	
	29	Diaphragm / Sleeve Material		Viton	
	30	Capillary Material			
	31	Capillary Length			
	32	Fill Fluid		Glycerin	
	33	Flushing Connection		No	
	34	Manufacturer		Ashcroft	
	35	Model Number		81	
CALIBRATION	36	Calibrated Range		0-30 psig	
	37	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	38	Accuracy	Repeatability	+/- 0.5 Pct of Range	
OPTIONS	39	Tagging		Stainless steel tag with Tag Number	
	40	Manufacturer		Ashcroft	WIKA
	41	Model Number		1279	233.34
PURCHASE	42	Purchase Note		1 year warranty	
	43				
<b>P04</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>	
<b>PRESSURE GAUGE</b>				<b>76PI2535A</b>	



GENERAL	1	Tag Number	P&ID	76PI2540A	76-I-108
	2	Loop Title		Dewatering Centrifuge Feed Pump No. 8 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Glass Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		8 inch Class 150 ANSI Flange	
	34	Body Material		Carbon Steel	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>	
<b>PRESSURE GAUGE</b>				<b>76PI2540A</b>	



GENERAL	1	Tag Number	P&ID	76PI2737A	76-I-211
	2	Loop Title		Thickening Centrifuge Polymer Feed Pump No. 1 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		1.5 inch Class 150 ANSI Flange	
	34	Body Material		CPVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2737A</b>		

GENERAL	1	Tag Number	P&ID	76PI2742A	76-I-212
	2	Loop Title		Thickening Centrifuge Polymer Feed Pump No. 2 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	5.5 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		1.5 inch Class 150 ANSI Flange	
	34	Body Material		CPVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2742A</b>		

GENERAL	1	Tag Number	P&ID	76PI2747A	76-I-213
	2	Loop Title		Thickening Centrifuge Polymer Feed Pump No. 3 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		1.5 inch Class 150 ANSI Flange	
	34	Body Material		CPVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2747A</b>		

GENERAL	1	Tag Number	P&ID	76PI2752A	76-I-214
	2	Loop Title		Thickening Centrifuge Polymer Feed Pump No. 4 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	5.5 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		1.5 inch Class 150 ANSI Flange	
	34	Body Material		CPVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2752A</b>		



GENERAL	1	Tag Number	P&ID	76PI2757A	76-I-215
	2	Loop Title		Thickening Centrifuge Polymer Feed Pump No. 5 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	1.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		1.5 inch Class 150 ANSI Flange	
	34	Body Material		CPVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerin	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		81		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2757A</b>		

GENERAL	1	Tag Number	P&ID	76PI2772A	76-I-221
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 1 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	5.5 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		2.5 inch Class 150 ANSI Flange	
	34	Body Material		PVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		RedValve	
42	Model Number		Series 40		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2772A</b>		

GENERAL	1	Tag Number	P&ID	76PI2777A	76-I-222
	2	Loop Title	Dewatering Centrifuge Polymer Feed Pump No. 2 Suction Pressure		
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid	Polymer		
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature	Ambient		
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type	Bourdon Tube		
	16	Range	0 - 15 psig		
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening	Glycerine		
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection	Case Back		
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type	Annular Seal		
	33	Process Connection	2.5 inch Class 150 ANSI Flange		
	34	Body Material	PVC		
	35	Diaphragm / Sleeve Material	Viton		
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid	Glycerine		
	39	Flushing Connection	No		
	40				
	41	Manufacturer	RedValve		
42	Model Number	Series 40			
CALIBRATION	43	Calibrated Range	0 - 15 psig		
	44	Vendor Calibration	Factory calibrate - Provide calibration certificate		
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging	Stainless steel tag with Tag Number		
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	WIKA	
	51	Model Number	1279	233.34	
	52	Purchase Note	1 year warranty		
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2777A</b>		

GENERAL	1	Tag Number	P&ID	76PI2782A	76-I-223
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 3 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	5.5 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		2.5 inch Class 150 ANSI Flange	
	34	Body Material		PVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		RedValve	
42	Model Number		Series 40		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2782A</b>		

GENERAL	1	Tag Number	P&ID	76PI2787A	76-I-224
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 4 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		2.5 inch Class 150 ANSI Flange	
	34	Body Material		PVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		RedValve	
42	Model Number		Series 40		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2787A</b>		

GENERAL	1	Tag Number	P&ID	76PI2792A	76-I-225
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 5 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	6 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		2.5 inch Class 150 ANSI Flange	
	34	Body Material		PVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		RedValve	
42	Model Number		Series 40		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2792A</b>		

GENERAL	1	Tag Number	P&ID	76PI2797A	76-I-226
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 6 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	5.5 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		2.5 inch Class 150 ANSI Flange	
	34	Body Material		PVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		RedValve	
42	Model Number		Series 40		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2797A</b>		

GENERAL	1	Tag Number	P&ID	76PI2802A	76-I-227
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 7 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	5.5 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		2.5 inch Class 150 ANSI Flange	
	34	Body Material		PVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		RedValve	
42	Model Number		Series 40		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2802A</b>		



GENERAL	1	Tag Number	P&ID	76PI2807A	76-I-228
	2	Loop Title		Dewatering Centrifuge Polymer Feed Pump No. 8 Suction Pressure	
	3				
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	2.5 inch	CPVC
	7				
PROCESS CONDITIONS	8	Fluid		Polymer	
	9	Min Pressure	Max Pressure	0	5.5 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Annular Seal	
	33	Process Connection		2.5 inch Class 150 ANSI Flange	
	34	Body Material		PVC	
	35	Diaphragm / Sleeve Material		Viton	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		No	
	40				
	41	Manufacturer		RedValve	
42	Model Number		Series 40		
CALIBRATION	43	Calibrated Range		0 - 15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>76PI2807A</b>		

GENERAL	1	Tag Number	P&ID	80PI2110A	80-I-2
	2	Loop Title		Digester No. 1 Recirculation Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0 - 30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2110A</b>		

GENERAL	1	Tag Number	P&ID	80PI2110B	80-I-2
	2	Loop Title		Digester No. 1 Recirculation Pump No. 1 Discharge Pressure	
	3			As Noted	
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
DIAPHRAGM SEAL - ANNULAR SEAL	31				
	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
CALIBRATION	41	Manufacturer		Ashcroft	
	42	Model Number		101	
	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
	47	Tagging		Stainless steel tag with Tag Number	
	48				
PURCHASE	49				
	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
53					
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2110B</b>		

GENERAL	1	Tag Number	P&ID	80PI2110C	80-I-2
	2	Loop Title		Digester No. 1 Recirculation Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0 - 30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2110C</b>		

GENERAL	1	Tag Number	P&ID	80PI2110D	80-I-2
	2	Loop Title		Digester No. 1 Recirculation Pump No. 2 Discharge Pressure	
	3			As Noted	
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
DIAPHRAGM SEAL - ANNULAR SEAL	31				
	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
CALIBRATION	41	Manufacturer		Ashcroft	
	42	Model Number		101	
	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
	47	Tagging		Stainless steel tag with Tag Number	
	48				
PURCHASE	49				
	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2110D</b>		

GENERAL	1	Tag Number	P&ID	80PI2141A	80-I-11
	2	Loop Title		Digester No. 1 Mix Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
DIAPHRAGM SEAL - ANNULAR SEAL	31				
	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
CALIBRATION	41	Manufacturer		Ashcroft	
	42	Model Number		101	
	43	Calibrated Range		0 - 30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48				
	49				
	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2141A</b>		

GENERAL	1	Tag Number	P&ID	80PI2141B	80-I-11
	2	Loop Title		Digester No. 1 Mix Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2141B</b>		

GENERAL	1	Tag Number	P&ID	80PI2142A	80-I-11
	2	Loop Title		Digester No. 1 Mix Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0 - 30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2142A</b>		



GENERAL	1	Tag Number	P&ID	80PI2142B	80-I-11
	2	Loop Title		Digester No. 1 Mix Pump No. 2 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
DIAPHRAGM SEAL - ANNULAR SEAL	31				
	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
CALIBRATION	41	Manufacturer		Ashcroft	
	42	Model Number		101	
	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48				
	49				
	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2142B</b>		

GENERAL	1	Tag Number	P&ID	80PI2143A	80-I-12
	2	Loop Title		Digester No. 1 Mix Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0 - 30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
DIAPHRAGM SEAL - ANNULAR SEAL	31				
	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
CALIBRATION	41	Manufacturer		Ashcroft	
	42	Model Number		101	
	43	Calibrated Range		0 - 30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
	47	Tagging		Stainless steel tag with Tag Number	
	48				
PURCHASE	49				
	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2143A</b>		

GENERAL	1	Tag Number	P&ID	80PI2143B	80-I-12
	2	Loop Title		Digester No. 1 Mix Pump No. 3 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2143B</b>		

GENERAL	1	Tag Number	P&ID	80PI2150A	80-I-20
	2	Loop Title		Digester No. 1 Axial Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2150A</b>		

GENERAL	1	Tag Number	P&ID	80PI2150B	80-I-20
	2	Loop Title		Digester No. 1 Axial Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2150B</b>		

GENERAL	1	Tag Number	P&ID	80PI2160A	80-I-21
	2	Loop Title		Digester No. 1 Axial Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2160A</b>		

GENERAL	1	Tag Number	P&ID	80PI2160B	80-I-21
	2	Loop Title		Digester No. 1 Axial Pump No. 2 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
CALIBRATION	42	Model Number		101	
	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2160B</b>		

GENERAL	1	Tag Number	P&ID	80PI2170A	80-I-22
	2	Loop Title		Digester No. 1 Axial Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2170A</b>		



GENERAL	1	Tag Number	P&ID	80PI2170B	80-I-22
	2	Loop Title		Digester No. 1 Axial Pump No. 3 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
CALIBRATION	42	Model Number		101	
	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2170B</b>		

GENERAL	1	Tag Number	P&ID	80PI2210A	80-I-52
	2	Loop Title		Digester No. 2 Recirculation Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2210A</b>		

GENERAL	1	Tag Number	P&ID	80PI2210B	80-I-52
	2	Loop Title		Digester No. 2 Recirculation Pump No. 1 Discharge Pressure	
	3			As Noted	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
DIAPHRAGM SEAL - ANNULAR SEAL	31				
	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
CALIBRATION	41	Manufacturer		Ashcroft	
	42	Model Number		101	
	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
	47	Tagging		Stainless steel tag with Tag Number	
	48				
PURCHASE	49				
	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
53					
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2210B</b>		

GENERAL	1	Tag Number	P&ID	80PI2210C	80-I-52
	2	Loop Title		Digester No. 2 Recirculation Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2210C</b>		

GENERAL	1	Tag Number	P&ID	80PI2210D	80-I-52
	2	Loop Title		Digester No. 2 Recirculation Pump No. 2 Discharge Pressure	
	3			As Noted	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
DIAPHRAGM SEAL - ANNULAR SEAL	31				
	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
CALIBRATION	41	Manufacturer		Ashcroft	
	42	Model Number		101	
	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
	47	Tagging		Stainless steel tag with Tag Number	
	48				
PURCHASE	49				
	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2210D</b>		

GENERAL	1	Tag Number	P&ID	80PI2241A	80-I-61
	2	Loop Title		Digester No. 2 Mix Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
CALIBRATION	42	Model Number		101	
	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2241A</b>		

GENERAL	1	Tag Number	P&ID	80PI2241B	80-I-61
	2	Loop Title		Digester No. 2 Mix Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
DIAPHRAGM SEAL - ANNULAR SEAL	31				
	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
CALIBRATION	41	Manufacturer		Ashcroft	
	42	Model Number		101	
	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48				
	49				
	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2241B</b>		

GENERAL	1	Tag Number	P&ID	80PI2242A	80-I-61
	2	Loop Title		Digester No. 2 Mix Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
CALIBRATION	42	Model Number		101	
	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2242A</b>		



GENERAL	1	Tag Number	P&ID	80PI2242B	80-I-61
	2	Loop Title		Digester No. 2 Mix Pump No. 2 Pressure Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
DIAPHRAGM SEAL - ANNULAR SEAL	31				
	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
CALIBRATION	41	Manufacturer		Ashcroft	
	42	Model Number		101	
	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
	47	Tagging		Stainless steel tag with Tag Number	
PURCHASE	48				
	49				
	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2242B</b>		

GENERAL	1	Tag Number	P&ID	80PI2243A	80-I-62
	2	Loop Title		Digester No. 2 Mix Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2243A</b>		

GENERAL	1	Tag Number	P&ID	80PI2243B	80-I-62
	2	Loop Title		Digester No. 2 Mix Pump No. 3 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-60 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2243B</b>		

GENERAL	1	Tag Number	P&ID	80PI2250A	80-I-70
	2	Loop Title		Digester No. 2 Axial Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2250A</b>		

GENERAL	1	Tag Number	P&ID	80PI2250B	80-I-70
	2	Loop Title		Digester No. 2 Axial Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2250B</b>		

GENERAL	1	Tag Number	P&ID	80PI2260A	80-I-71
	2	Loop Title		Digester No. 2 Axial Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2260A</b>		

GENERAL	1	Tag Number	P&ID	80PI2260B	80-I-71
	2	Loop Title		Digester No. 2 Axial Pump No. 2 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2260B</b>		

GENERAL	1	Tag Number	P&ID	80PI2270A	80-I-72
	2	Loop Title		Digester No. 2 Axial Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2270A</b>		



GENERAL	1	Tag Number	P&ID	80PI2270B	80-I-72
	2	Loop Title		Digester No. 2 Axial Pump No. 3 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2270B</b>		

GENERAL	1	Tag Number	P&ID	80PI2310A	80-I-102
	2	Loop Title		Digester No.3 Recirculation Pump No.1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2310A</b>		

GENERAL	1	Tag Number	P&ID	80PI2310B	80-I-102	
	2	Loop Title		Digester No.3 Recirculation Pump No.1 Discharge Pressure		
	3			As Noted		
	4	Area Classification				
	5	Line Number	Equipment Number			
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined	
	7					
PROCESS CONDITIONS	8	Fluid		Digested Sludge		
	9	Min Pressure	Max Pressure	0 psi	30 psi	
	10	Temperature		Ambient		
	11	Specific Gravity	Viscosity	1.0		
	12	Conductivity	Density			
	13	Vapor Pressure	Critical Prssure			
	14					
INDICATOR	15	Type		Bourdon Tube		
	16	Range		0-60 psig		
	17	Dial Size	Dial Color	4.5 Inches	White	
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem	
	19	Movement Dampening		Glycerine		
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic	
	21					
	22	Blowout Protection		Case Back		
TRANSMITTER	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel	
	24					
	25	Mounting				
	26	Enclosure NEMA Rating				
	27	Power Supply	Voltage			
	28	Output Signal				
	29	Communication Protocol				
	30	Range				
DIAPHRAGM SEAL - ANNULAR SEAL	31					
	32	Type		Diaphragm		
	33	Process Connection		0.75 Inch NPT		
	34	Body Material		316L Stainless Steel		
	35	Diaphragm / Sleeve Material		316L Stainless Steel		
	36	Capillary Material				
	37	Capillary Length				
	38	Fill Fluid		Glycerine		
	39	Flushing Connection		Yes		
	40					
CALIBRATION	41	Manufacturer		Ashcroft		
	42	Model Number		101		
	43	Calibrated Range		0-60 psig		
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate		
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range		
	46					
OPTIONS	47	Tagging		Stainless steel tag with Tag Number		
	48					
	49					
PURCHASE	50	Manufacturer		Ashcroft	WIKA	
	51	Model Number		1279	233.34	
	52	Purchase Note		1 year warranty		
	53					
<b>P04</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>				<b>80PI2310B</b>		

GENERAL	1	Tag Number	P&ID	80PI2310C	80-I-102
	2	Loop Title		Digester No.3 Recirculation Pump No.2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
DIAPHRAGM SEAL - ANNULAR SEAL	31				
	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
CALIBRATION	41	Manufacturer		Ashcroft	
	42	Model Number		101	
	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
OPTIONS	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
	47	Tagging		Stainless steel tag with Tag Number	
	48				
PURCHASE	49				
	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2310C</b>		

GENERAL	1	Tag Number	P&ID	80PI2310D	80-I-102
	2	Loop Title		Digester No.3 Recirculation Pump No.2 Discharge Pressure	
	3			As Noted	
	4	Area Classification			
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	6 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	30 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-60 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
TRANSMITTER	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
	24				
	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
DIAPHRAGM SEAL - ANNULAR SEAL	30	Range			
	31				
	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
CALIBRATION	40				
	41	Manufacturer		Ashcroft	
	42	Model Number		101	
	43	Calibrated Range		0-60 psig	
OPTIONS	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
PURCHASE	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
53					
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2310D</b>		

GENERAL	1	Tag Number	P&ID	80PI2341A	80-I-111
	2	Loop Title		Digester No. 3 Mix Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2341A</b>		

GENERAL	1	Tag Number	P&ID	80PI2341B	80-I-111
	2	Loop Title		Digester No. 3 Mix Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density	q	
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2341B</b>		

GENERAL	1	Tag Number	P&ID	80PI2342A	80-I-111
	2	Loop Title		Digester No. 3 Mix Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
CALIBRATION	42	Model Number		101	
	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2342A</b>		



GENERAL	1	Tag Number	P&ID	80PI2342B	80-I-111
	2	Loop Title		Digester No. 3 Mix Pump No. 2 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2342B</b>		

GENERAL	1	Tag Number	P&ID	80PI2343A	80-I-112
	2	Loop Title		Digester No. 3 Mix Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
31					
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2343A</b>		

GENERAL	1	Tag Number	P&ID	80PI2343B	80-I-112
	2	Loop Title		Digester No. 3 Mix Pump No. 3 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	12 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Sludge	
	9	Min Pressure	Max Pressure	0 psi	25 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2343B</b>		

GENERAL	1	Tag Number	P&ID	80PI2350A	80-I-120
	2	Loop Title		Digester No. 3 Axial Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
CALIBRATION	42	Model Number		101	
	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2350A</b>		

GENERAL	1	Tag Number	P&ID	80PI2350B	80-I-120
	2	Loop Title		Digester No. 3 Axial Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
CALIBRATION	42	Model Number		101	
	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2350B</b>		

GENERAL	1	Tag Number	P&ID	80PI2360A	80-I-121
	2	Loop Title		Digester No. 3 Axial Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
CALIBRATION	42	Model Number		101	
	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	WIKA	
	51	Model Number	1279	233.34	
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2360A</b>		

GENERAL	1	Tag Number	P&ID	80PI2360B	80-I-121
	2	Loop Title		Digester No. 3 Axial Pump No. 2 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2360B</b>		

GENERAL	1	Tag Number	P&ID	80PI2370A	80-I-122
	2	Loop Title		Digester No. 3 Axial Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-15 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
CALIBRATION	42	Model Number		101	
	43	Calibrated Range		0-15 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer	Ashcroft	WIKA	
	51	Model Number	1279	233.34	
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2370A</b>		



GENERAL	1	Tag Number	P&ID	80PI2370B	80-I-122
	2	Loop Title		Digester No. 3 Axial Pump No. 3 Discharge Pressure	
	3				
	4	Area Classification		As Noted	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	20 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0 psi	15 psi
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-30 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
CALIBRATION	42	Model Number		101	
	43	Calibrated Range		0-30 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>80PI2370B</b>		

GENERAL	1	Tag Number	P&ID	94PI2025A	94-I-15
	2	Loop Title		Centrate Pump No. 1 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0	78 psig
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-100 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-100 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>94PI2025A</b>		

GENERAL	1	Tag Number	P&ID	94PI2025B	94-I-15
	2	Loop Title		Centrate Pump No. 1 Discharge Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0	78 psig
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-100 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-100 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>	
<b>PRESSURE GAUGE</b>				<b>94PI2025B</b>	

GENERAL	1	Tag Number	P&ID	94PI2030A	94-I-16
	2	Loop Title		Centrate Pump No. 2 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0	78 psig
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-100 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-100 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>94PI2030A</b>		

GENERAL	1	Tag Number	P&ID	94PI2130B	94-I-16
	2	Loop Title		Centrate Pump No. 2 Discharge Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0	78 psig
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-100 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-100 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>				<b>City of San Diego Metropolitan Biosolids Center Improvements</b>	
<b>PRESSURE GAUGE</b>				<b>94PI2130B</b>	

GENERAL	1	Tag Number	P&ID	94PI2035A	94-I-17
	2	Loop Title		Centrate Pump No. 3 Suction Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	10 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0	78 psig
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-100 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
24					
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-100 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
	46				
OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
	48				
	49				
PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>94PI2035A</b>		

GENERAL	1	Tag Number	P&ID	94PI2035B	94-I-17
	2	Loop Title		Centrate Pump No. 3 Discharge Pressure	
	3				
	4	Area Classification		Unclassified	
	5	Line Number	Equipment Number		
	6	Line Size	Line Schedule	8 inch	Ductile Iron Cement Lined
	7				
PROCESS CONDITIONS	8	Fluid		Digested Solids	
	9	Min Pressure	Max Pressure	0	78 psig
	10	Temperature		Ambient	
	11	Specific Gravity	Viscosity	1.0	
	12	Conductivity	Density		
	13	Vapor Pressure	Critical Prssure		
	14				
INDICATOR	15	Type		Bourdon Tube	
	16	Range		0-100 psig	
	17	Dial Size	Dial Color	4.5 Inches	White
	18	Process Connection	Mounting	0.5-inch MNPT	Lower Stem
	19	Movement Dampening		Glycerine	
	20	Case Material	Window Material	Black Thermoplastic	Glass or Acrylic
	21				
	22	Blowout Protection		Case Back	
	23	Wetted Parts	Socket Material	Stainless Steel	Stainless Steel
TRANSMITTER	25	Mounting			
	26	Enclosure NEMA Rating			
	27	Power Supply	Voltage		
	28	Output Signal			
	29	Communication Protocol			
	30	Range			
	31				
DIAPHRAGM SEAL - ANNULAR SEAL	32	Type		Diaphragm	
	33	Process Connection		0.75 Inch NPT	
	34	Body Material		316L Stainless Steel	
	35	Diaphragm / Sleeve Material		316L Stainless Steel	
	36	Capillary Material			
	37	Capillary Length			
	38	Fill Fluid		Glycerine	
	39	Flushing Connection		Yes	
	40				
	41	Manufacturer		Ashcroft	
42	Model Number		101		
CALIBRATION	43	Calibrated Range		0-100 psig	
	44	Vendor Calibration		Factory calibrate - Provide calibration certificate	
	45	Accuracy	Repeatability	+/- 0.5 Pct of Range	
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OPTIONS	47	Tagging		Stainless steel tag with Tag Number	
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PURCHASE	50	Manufacturer		Ashcroft	WIKA
	51	Model Number		1279	233.34
	52	Purchase Note		1 year warranty	
	53				
<b>P04</b>			<b>City of San Diego Metropolitan Biosolids Center Improvements</b>		
<b>PRESSURE GAUGE</b>			<b>94PI2035B</b>		





**PIPING SCHEDULE**

LEGEND	SERVICE	SIZE (IN.) (NOTE 1)	SPEC SECTION (NOTE 2)	MATERIAL (NOTE 3)	INSTALLATION	TEST PRESSURE, TYPE (PSIG, X) (NOTE 4)	ALLOWABLE LEAKAGE (NOTE 8)	MAXIMUM OPERATING PRESSURE (PSIG)	MAXIMUM OPERATING TEMP. (DEG. F)	LINING / COATING	COLOR CODE	REMARKS
BG	BIOGAS	ALL	40 27 00.08	SST	EXPOSED	25, P	A	7	170	NONE / NONE	MATCH EXST	DRAIN AND DRY BIOGAS PIPES AFTER PRESSURE TESTING
		ALL	33 05 01.10	HDPE	BURIED	25, H	A	7	170	NONE / NONE		
CN	CENTRATE	>=4	40 27 00.01	CLDI	EXPOSED	210, H	A	135	70	CEMENT / SYSTEM NO. 4	MATCH EXST	
DSL	DIGESTED SLUDGE	>=4	40 27 00.01	GLDI	EXPOSED	75, H	A	45	105	GLASS / SYSTEM NO. 4	MATCH EXST	
		<4	40 27 00.08	SST	EXPOSED	75, H	A	45	105	NONE / NONE	MATCH EXST	
DSL/D	DIGESTED SLUDGE/DRAIN	<4	40 27 00.08	SST	EXPOSED	75, H	A	45	105	NONE / NONE	MATCH EXST	
EOF	EMERGENCY DIGESTER OVERFLOW	>=4	40 27 00.01	GLDI	EXPOSED	25, H	A	30	105	GLASS / SYSTEM NO. 4	MATCH EXST	
G	GRIT	>=4	40 27 00.01	GLDI	EXPOSED	50, H	A	30	85	GLASS / SYSTEM NO. 4	MATCH EXST	
HUWLP	HOT UTILITY WATER LOW PRESSURE	<=3	40 27 00.13	CU	EXPOSED	150, H	A	SEE REMARKS	SEE REMARKS	NONE / NONE	MATCH EXST	CONTRACTOR TO FIELD VERIFY
		>3	40 27 00.01	CLDI	EXPOSED	150, H	A	SEE REMARKS	SEE REMARKS	CEMENT / SYSTEM NO. 4	MATCH EXST	CONTRACTOR TO FIELD VERIFY
NG	NATURAL GAS	<4	40 27 00.02	CS	EXPOSED	60, P	A	40	65	NONE / SYSTEM NO. 4	MATCH EXST	
OF	DIGESTER OVERFLOW	>=4	40 27 00.01	GLDI	EXPOSED	25, H	A	30	105	GLASS / SYSTEM NO. 4	MATCH EXST	
POL	POLYMER	<=3	40 27 00.11	GRVG	EXPOSED	90, H	A	60	70	NONE / SYSTEM NO. 25	MATCH EXST	
PRW	PROCESS WATER	<=3	40 27 00.13	CU	EXPOSED	150, H	A	75	90	NONE / NONE	MATCH EXST	ADDED BY ADDENDUM D
		>=4	40 27 00.01	CLDI	EXPOSED	150, H	A	100	90	CEMENT / SYSTEM NO. 4	MATCH EXST	
UWHP	UTILITY WATER HIGH PRESSURE	<=3	40 27 00.13	CU	EXPOSED	150, H	A	75	90	NONE / NONE	MATCH EXST	
		>3	40 27 00.01	CLDI	EXPOSED	150, H	A	75	90	CEMENT / SYSTEM NO. 4	MATCH EXST	
UWLP	UTILITY WATER LOW PRESSURE	<=3	40 27 00.13	CU	EXPOSED	150, H	A	75	90	NONE / NONE	MATCH EXST	
		>3	40 27 00.01	CLDI	EXPOSED	150, H	A	75	90	CEMENT / SYSTEM NO. 4	MATCH EXST	
RSL	RAW SOLIDS	>=4	40 27 00.01	GLDI	EXPOSED	210, H	A	135	70	GLASS / SYSTEM NO. 4	MATCH EXST	
		<4	40 27 00.08	SST	EXPOSED	210, H	A	135	70	NONE / NONE	MATCH EXST	
TSL	THICKENED SOLIDS	>=4	40 27 00.01	GLDI	EXPOSED	150, H	A	100	85	GLASS / SYSTEM NO. 4	MATCH EXST	
		<4	40 27 00.08	SST	EXPOSED	150, H	A	100	85	NONE / NONE	MATCH EXST	

**NOTES:**

1. SYMBOLS: < : LESS THAN  
> : GREATER THAN  
<= : LESS THAN OR EQUAL TO  
>= : GREATER THAN OR EQUAL TO
2. PIPE SPECIFICATIONS: SEE SPECIFICATION SECTIONS FOR THEIR REFERENCED DATA SHEETS.
3. PIPE MATERIALS: ANY DEVIATIONS FROM THE DESIGNATED MATERIALS IN THIS SCHEDULE SHALL BE NOTED ON THE DRAWINGS. NOT ALL MATERIALS LISTED WILL BE USED IN THIS PACKAGE.
- |      |                                 |
|------|---------------------------------|
| CLDI | CEMENT-LINED DUCTILE IRON       |
| CPVC | CHLORINATED POLYVINYL CHLORIDE  |
| CS   | CARBON STEEL                    |
| CU   | COPPER                          |
| GLDI | GLASS-LINED DUCTILE IRON        |
| GSP  | GALVANIZED STEEL                |
| HDPE | HIGH DENSITY POLYETHYLENE       |
| PLDI | POLYETHYLENE LINED DUCTILE IRON |
| PP   | POLYPROPYLENE                   |
| PPLS | POLYPROPYLENE LINED STEEL       |
| PVC  | POLYVINYL CHLORIDE              |
| SST  | STAINLESS STEEL                 |
| STL  | MILL TYPE STEEL                 |
| WS   | FABRICATED WELDED STEEL         |
4. TESTING TYPE: X=H : HYDROSTATIC TEST  
X=P : PNEUMATIC TEST

5. INSPECTION AND TESTING SHALL BE IN ACCORDANCE WITH THE CALIFORNIA PLUMBING CODE.
6. VENT, OVERFLOW, AND DRAIN PIPING FOR PROCESS SERVICES SHALL BE THE SAME MATERIAL AS THE ASSOCIATED SERVICE PIPING. THIS PIPING IS IDENTIFIED BY A TWO SYMBOL DESIGNATION. THE FIRST SYMBOL SHALL INDICATE THE PIPING MATERIALS TO BE USED.
7. HYDROSTATIC TEST WITH WATER SURFACE 5 FEET ABOVE MAXIMUM OPERATING PRESSURE SHOWN. GRAVITY SURFACES SHALL BE TESTED WITH WATER SURFACE 5 FEET ABOVE THE INSIDE TOP OF PIPE.
8. ALLOWABLE LEAKAGE SHALL BE AS FOLLOWS:  
(A) PIPES SO DESIGNATED SHALL SHOW ZERO LEAKAGE.  
(B) PIPES SO DESIGNATED SHALL SHOW ZERO LEAKAGE, EXCEPT NOT MORE THAN 0.02 GALLONS PER HOUR PER INCH DIAMETER PER 100 FEET OF BURIED PIPE.  
(C) PIPES SO DESIGNATED SHALL SHOW A LOSS OF PRESSURE NOT MORE THAN 5 PERCENT OVER A PERIOD OF 2 HOURS.  
(D) PIPES SO DESIGNATED SHALL SHOW A LOSS OF VACUUM NOT MORE THAN 4 INCHES MERCURY COLUMN OVER A PERIOD OF 2 HOURS.
9. TEST PIPING SYSTEM TO TEST PRESSURE INDICATED WITH EXPANSION JOINTS ISOLATED FROM THE PIPING SYSTEM TO AVOID THEIR EXPOSURE TO OVERPRESSURE. EXPANSION JOINTS SHALL BE INITIAL SERVICE LEAK TESTED AT THE OPERATING PRESSURES SHOWN.

**PIPING FLOWSTREAM IDENTIFICATION**

LEGEND	SERVICE
BG	BIOGAS
CN	CENTRATE
DSL	DIGESTED SLUDGE
EOF	EMERGENCY DIGESTER OVERFLOW
FA	FOUL AIR
FPW	FIRE PROTECTION WATER
G	GRIT
HPNG	HIGH PRESSURE NATURAL GAS
HUWLP	HOT UTILITY WATER LOW PRESSURE
LFG	LANDFILL GAS
NG	NATURAL GAS
OF	DIGESTER OVERFLOW
POL	POLYMER
PRW	PROCESS WATER
RW	RECLAIMED WATER
UWHP	UTILITY WATER HIGH PRESSURE
UWLP	UTILITY WATER LOW PRESSURE
RSL	RAW SOLIDS
TSL	THICKENED SOLIDS
TSSL	THICKENED SCREENED SOLIDS

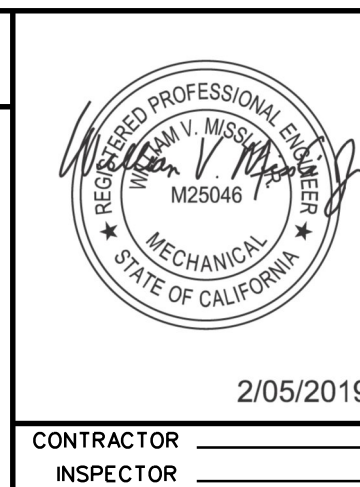
G-100

SAN DIEGO MBC IMPROVEMENTS GENERAL	
<b>PIPING SCHEDULE</b>	
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 24 OF 381 SHEETS	WBS S-17013/B-17006
APPROVED: <i>Andreas Demich</i> FOR CITY ENGINEER PRINT DCE NAME: Andreas Demich	DATE: 12/30/2020 C70321
DESIGNATION	BY
ORIGINAL	JACOBS
ADDENDUM D	JACOBS
APPROVED	DATE
	2/5/20
	4/7/21
FILED	FILM
	382 - 457
	1888 - 6280
	41198-1024-D

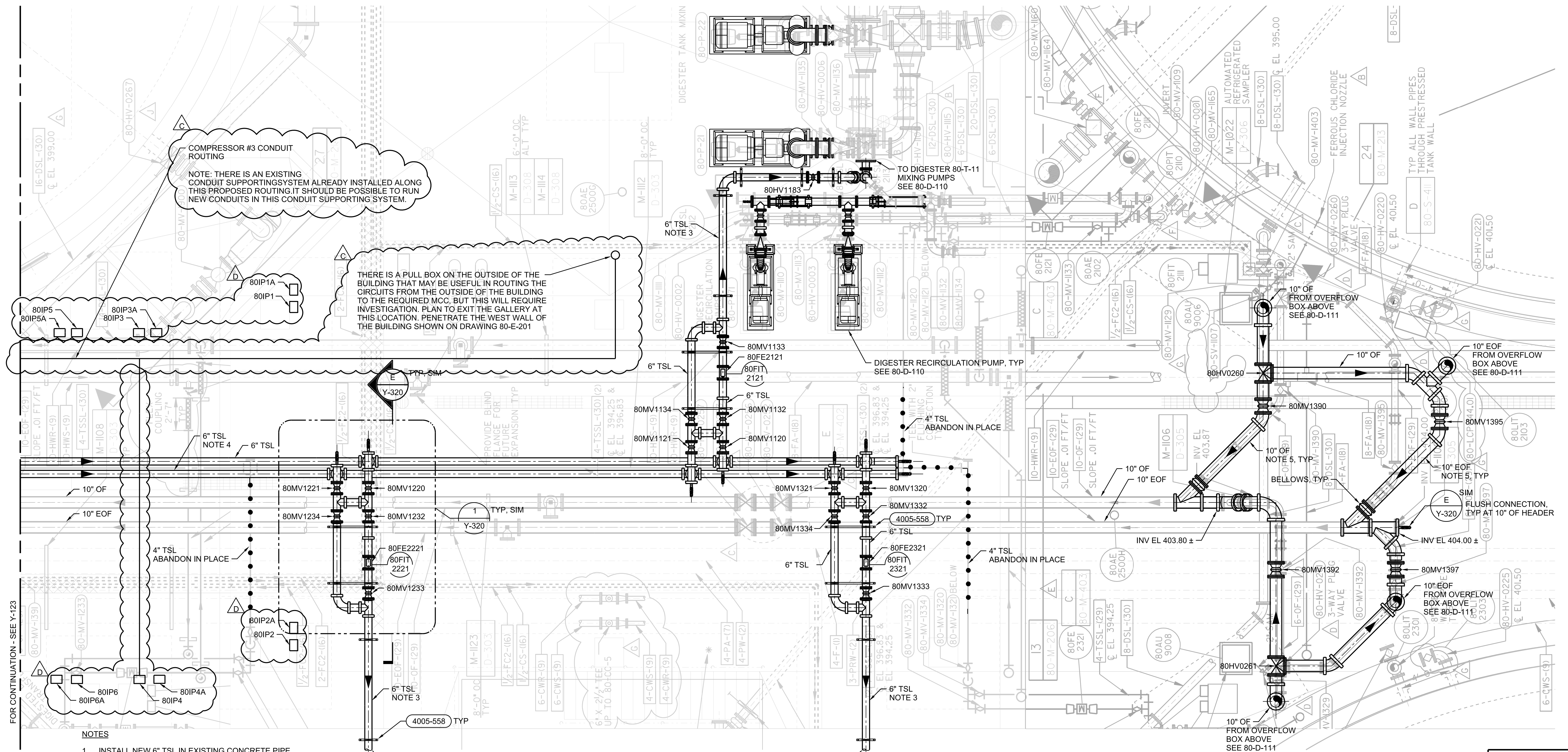
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2/05/2019







**COMPRESSOR #3 CONDUIT ROUTING**  
 NOTE: THERE IS AN EXISTING CONDUIT SUPPORTING SYSTEM ALREADY INSTALLED ALONG THIS PROPOSED ROUTING. IT SHOULD BE POSSIBLE TO RUN NEW CONDUITS IN THIS CONDUIT SUPPORTING SYSTEM.

THERE IS A PULL BOX ON THE OUTSIDE OF THE BUILDING THAT MAY BE USEFUL IN ROUTING THE CIRCUITS FROM THE OUTSIDE OF THE BUILDING TO THE REQUIRED MCC. BUT THIS WILL REQUIRE INVESTIGATION. PLAN TO EXIT THE GALLERY AT THIS LOCATION. PENETRATE THE WEST WALL OF THE BUILDING SHOWN ON DRAWING 80-E-201

6" TSL NOTE 4  
 6" TSL  
 4" TSL ABANDON IN PLACE

6" TSL NOTE 3

TO DIGESTER 80-T-11 MIXING PUMPS SEE 80-D-110

DIGESTER RECIRCULATION PUMP, TYP SEE 80-D-110

4" TSL ABANDON IN PLACE

4" TSL ABANDON IN PLACE

10" OF FROM OVERFLOW BOX ABOVE SEE 80-D-111

10" OF

10" OF FROM OVERFLOW BOX ABOVE SEE 80-D-111

10" OF FROM OVERFLOW BOX ABOVE SEE 80-D-111

10" OF FROM OVERFLOW BOX ABOVE SEE 80-D-111

10" OF FROM OVERFLOW BOX ABOVE SEE 80-D-111

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10" OF FROM OVERFLOW BOX ABOVE SEE 80-D-111

10" OF FROM OVERFLOW BOX ABOVE SEE 80-D-111

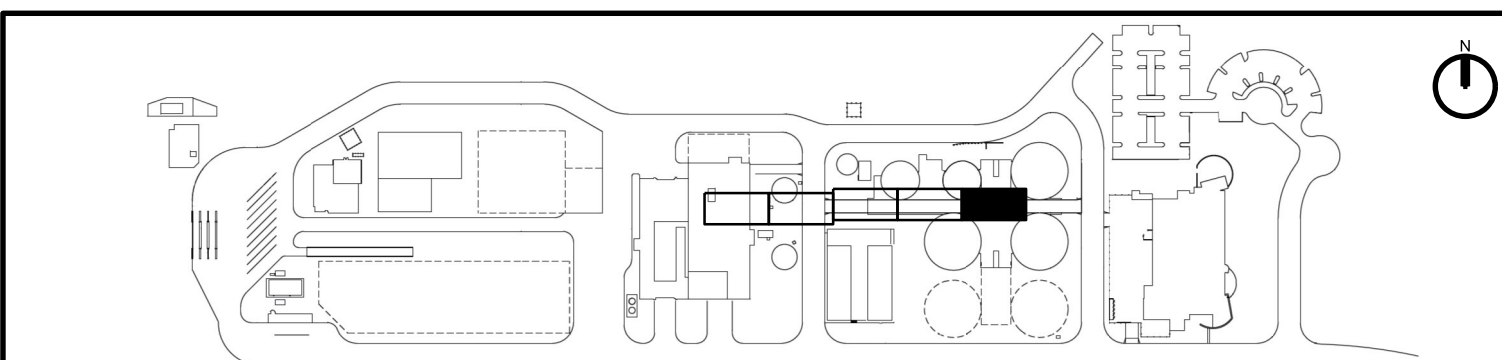
10" OF FROM OVERFLOW BOX ABOVE SEE 80-D-111

- NOTES**
- INSTALL NEW 6" TSL IN EXISTING CONCRETE PIPE GALLERY. PIPE GALLERY BACKGROUND IS FROM RECORD DRAWINGS. EXISTING SITE CONDITIONS MAY VARY FROM WHAT IS SHOWN ON THIS SHEET. FIELD VERIFY PROPOSED PIPE ROUTE PRIOR TO CONSTRUCTION.
  - PIPE SUPPORTS NOT SHOWN. CONTRACTOR TO ADD / MODIFY PIPE SUPPORTS AND HANGERS AS SPECIFIED.
  - FIELD VERIFY PIPE ROUTE FROM 6" TSL HEADER TO DIGESTER MIXING PUMP.
  - DEMOLISH 4" TSL. INSTALL 6" TSL LINE IN SAME LOCATION AS DEMOLISHED 4" TSL. FOR CONSTRUCTION SEQUENCING OF NEW 6" TSL LINES, SEE SPECIFICATIONS.
  - DEMOLISH 6" EOF AND 6" OF. INSTALL 10" EOF AND 10" OF IN SAME LOCATION AS DEMOLISHED OVERFLOW PIPES.

TO DIGESTER 80-T-12 MIXING PUMPS FOR CONT SEE 80-D-110

TO DIGESTER 80-T-13 MIXING PUMPS FOR CONT SEE 80-D-110

**PLAN**  
 1/4"=1'-0"

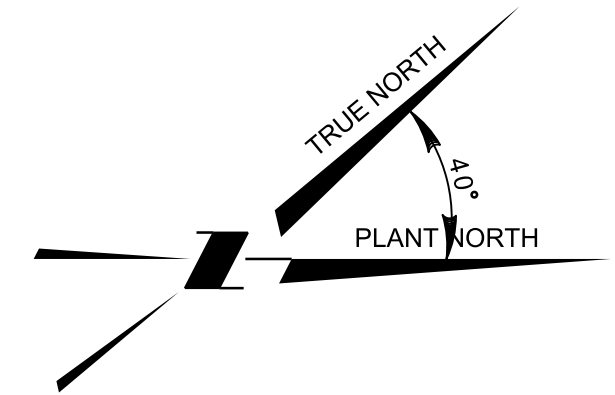


CONSULTANT

SAN DIEGO MBC IMPROVEMENTS		YARD PIPING	
<b>THICKENED SLUDGE PIPELINE</b>			
<b>PLAN - 5</b>			
CITY OF SAN DIEGO, CALIFORNIA		PUBLIC UTILITIES DEPARTMENT	
SHEET 38 OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: <i>Andrea Demich</i>	DATE: 12/30/2020	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b>	
PRINT DCE NAME: <i>Andrea Demich</i>	RCE#: C70321	PROJECT MANAGER	
DESCRIPTION	BY	APPROVED	DATE
ORIGINAL	JACOBS	<i>Richard H...</i>	2/5/20
ADDENDUM C	JACOBS	<i>Richard H...</i>	3/24/21
ADDENDUM D	JACOBS	<i>Richard H...</i>	4/7/21
PROJECT ENGINEER		382 - 457	
PROJECT ENGINEER		1888 - 6280	
PROJECT ENGINEER		CCS33 COORDINATE	
CONTRACTOR		DATE STARTED	41198-1038-D
INSPECTOR		DATE COMPLETED	

Y-124

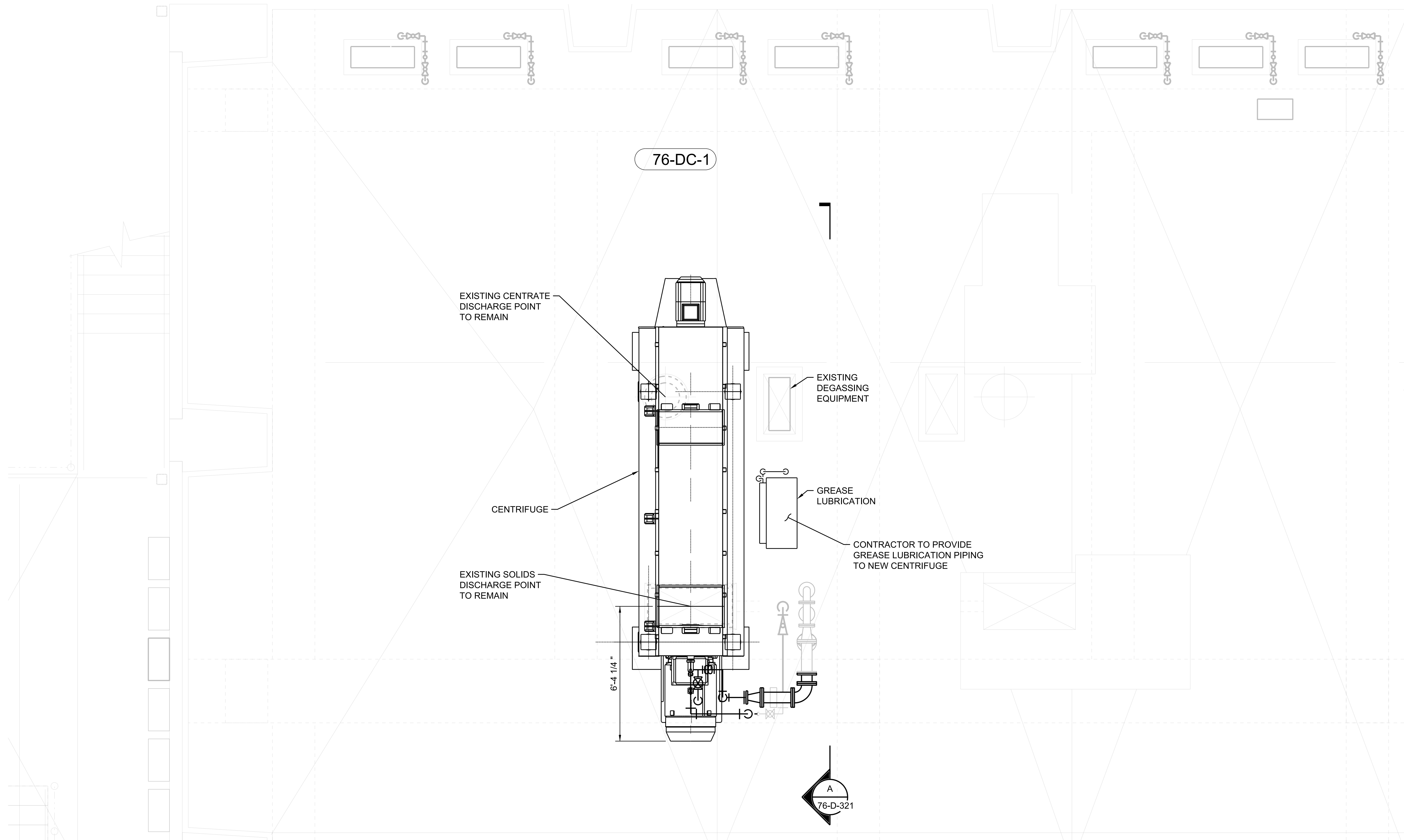




**NOTES:**

1. DIMENSION ARE SHOWN TO THE CENTER OF THE CENTRIFUGE CHUTE. CONTRACTOR TO CONFIRM DIMENSIONS OF FLOOR OPENINGS.
2. PROVIDE 3" HOSE CONNECTION FOR THE CENTRIFUGE FEED TUBE AND A 1" ISO 226-G CONNECTION FOR THE POLYMER CONNECTIONS. EXISTING LUBE OIL SLAB AND PIPING TO BE REMOVED. A NEW FRAME-MOUNTED AUTO-GREASE SYSTEM TO BE PROVIDED.

△



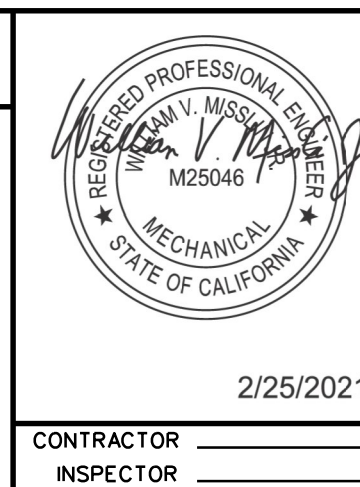
**DEWATERING CENTRIFUGE NO. 1**  
**PLAN**  
3/8"=1'-0"

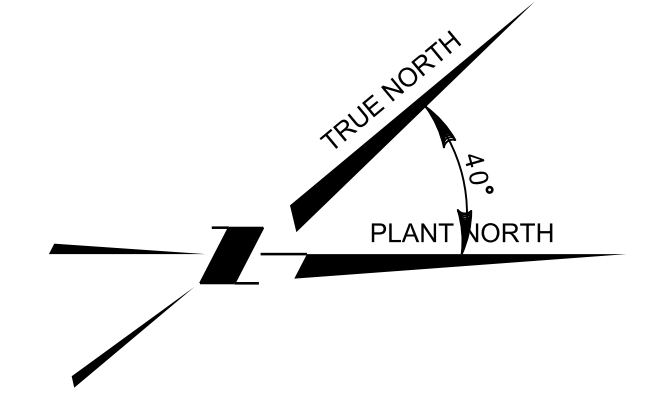
76-D-123

SAN DIEGO MBC IMPROVEMENTS PROCESS CENTRIFUGE BUILDING																												
<b>DEWATERING CENTRIFUGE NO. 1 SECOND FLOOR PLAN</b>																												
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 106B OF 381 SHEETS		WBS S-17013/B-17006																										
APPROVED: FOR CITY ENGINEER Rayhanesh Martin PRINT DCE NAME	DATE 3/9/2021 C89963 RCE#	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>DESCRIPTION</th> <th>BY</th> <th>APPROVED</th> <th>DATE</th> <th>FIRM</th> </tr> </thead> <tbody> <tr> <td>ADDENDUM A</td> <td>JACOBS</td> <td><i>Rayhanesh Martin</i></td> <td>3/9/21</td> <td>382 - 457</td> </tr> <tr> <td>ADDENDUM D</td> <td>JACOBS</td> <td><i>Rayhanesh Martin</i></td> <td>4/7/21</td> <td>CCS27 COORDINATE</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>1888 - 6280</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>CCS83 COORDINATE</td> </tr> </tbody> </table>		DESCRIPTION	BY	APPROVED	DATE	FIRM	ADDENDUM A	JACOBS	<i>Rayhanesh Martin</i>	3/9/21	382 - 457	ADDENDUM D	JACOBS	<i>Rayhanesh Martin</i>	4/7/21	CCS27 COORDINATE					1888 - 6280					CCS83 COORDINATE	PROJECT ENGINEER <b>MONIKA SMOCZYNSKI</b>	
DESCRIPTION	BY	APPROVED	DATE	FIRM																								
ADDENDUM A	JACOBS	<i>Rayhanesh Martin</i>	3/9/21	382 - 457																								
ADDENDUM D	JACOBS	<i>Rayhanesh Martin</i>	4/7/21	CCS27 COORDINATE																								
				1888 - 6280																								
				CCS83 COORDINATE																								
CONTRACTOR		DATE STARTED																										
INSPECTOR		DATE COMPLETED																										
		41198-1106B-D																										

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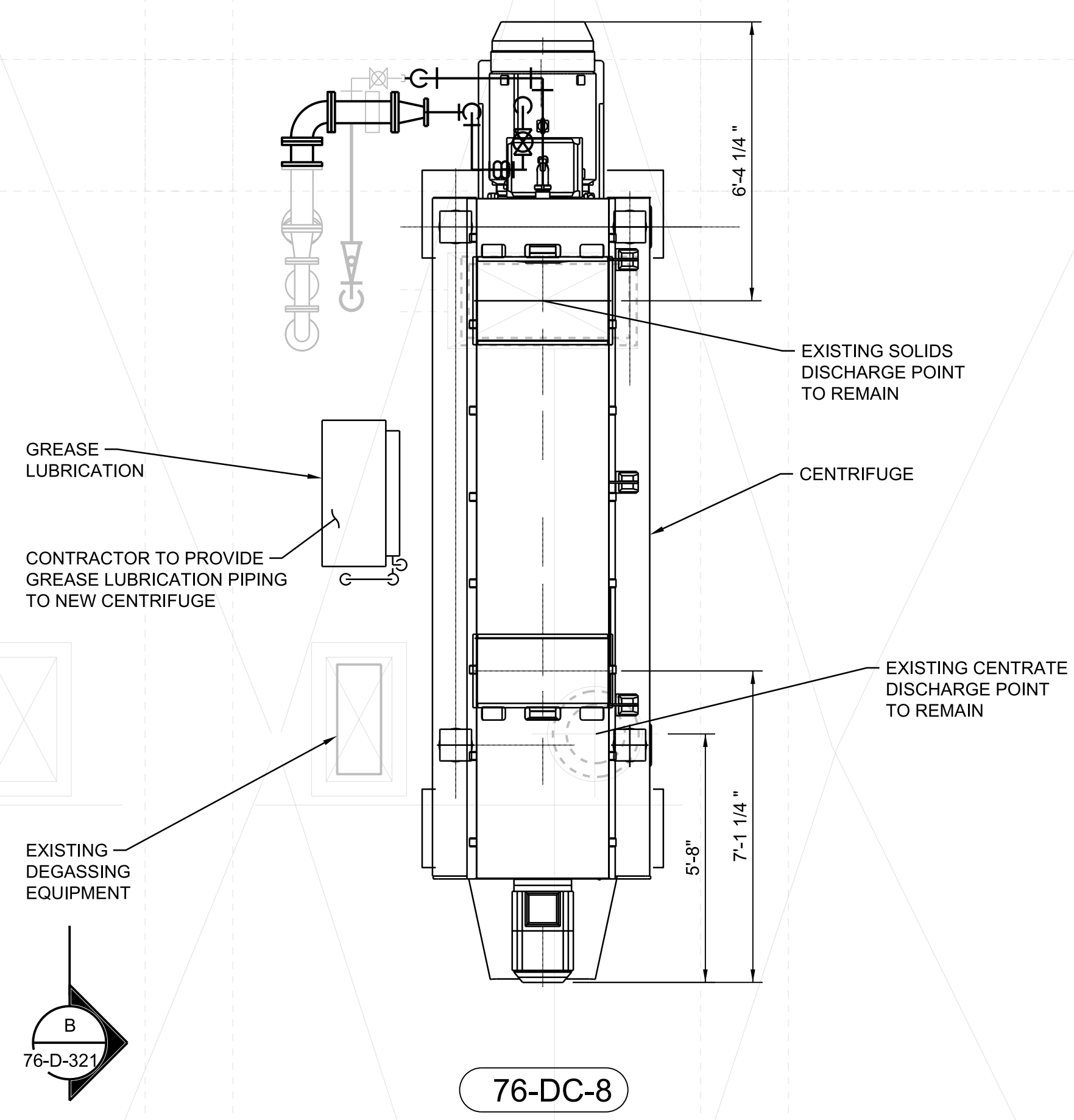
2/25/2021





**NOTES:**

1. PROVIDE 3" HOSE CONNECTION FOR THE CENTRIFUGE FEED TUBE AND A 1" ISO 226-G CONNECTION FOR THE POLYMER CONNECTIONS. EXISTING LUBE OIL SLAB AND PIPING TO BE REMOVED. A NEW FRAME-MOUNTED AUTO-GREASE SYSTEM TO BE PROVIDED.



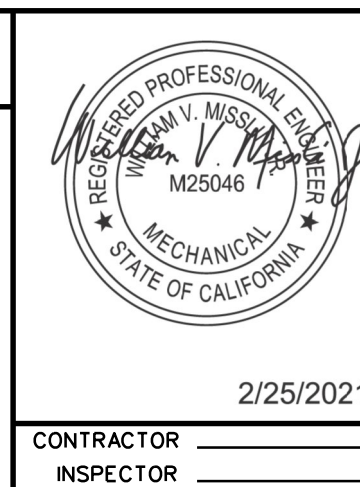
**DEWATERING CENTRIFUGE NO. 8**  
**PLAN**  
 3/8"=1'-0"

76-D-124

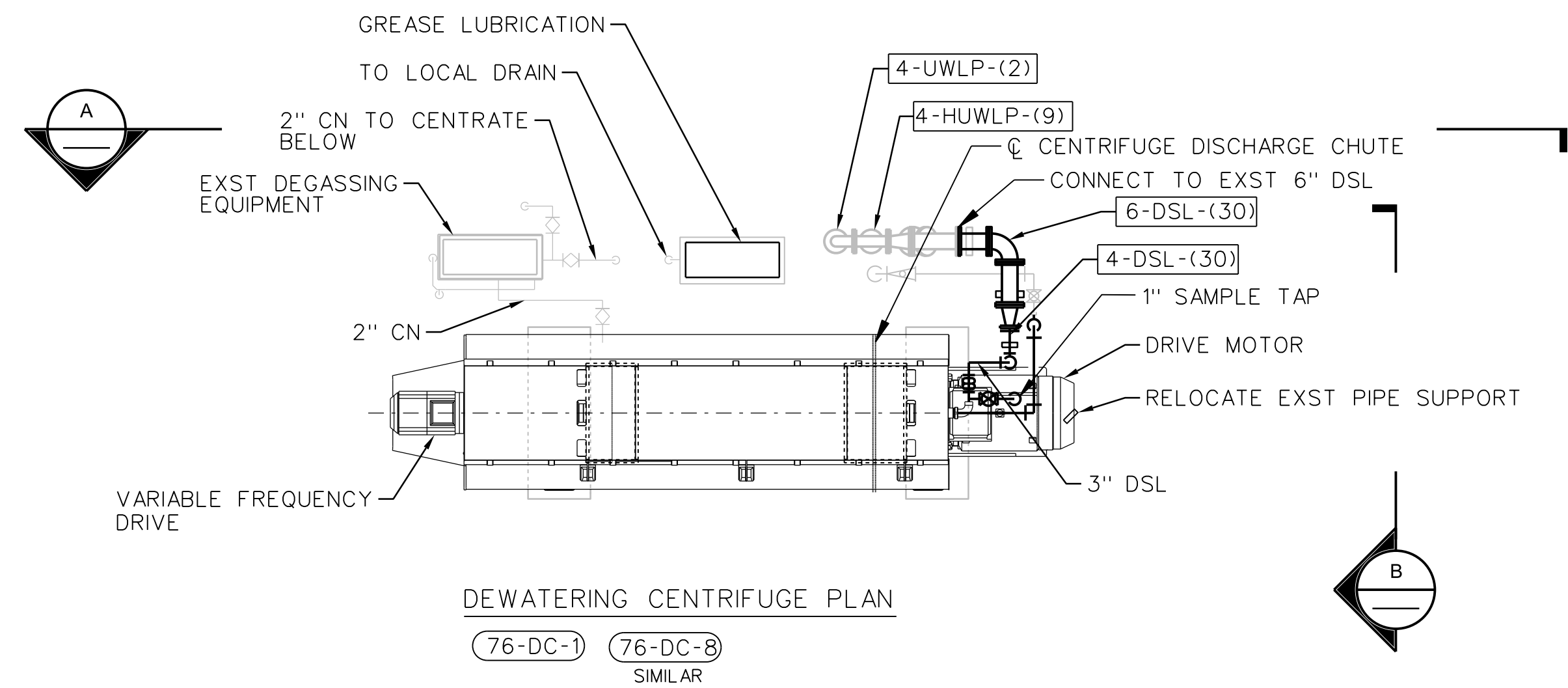
SAN DIEGO MBC IMPROVEMENTS PROCESS CENTRIFUGE BUILDING <b>DEWATERING CENTRIFUGE NO. 8 SECOND FLOOR PLAN</b>				WBS S-17013/B-17006
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 106C OF 381 SHEETS		APPROVED: <i>Raymond Martin</i> FOR CITY ENGINEER DATE 3/9/2021		
SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER		PROJECT ENGINEER		
DESCRIPTION	BY	APPROVED	DATE	FILM
ADDENDUM A	JACOBS	<i>Raymond Martin</i>	3/9/21	382 - 457
ADDENDUM D	JACOBS	<i>Raymond Martin</i>	4/7/21	1888 - 6280
CONTRACTOR				DATE STARTED
INSPECTOR				DATE COMPLETED

CONSULTANT

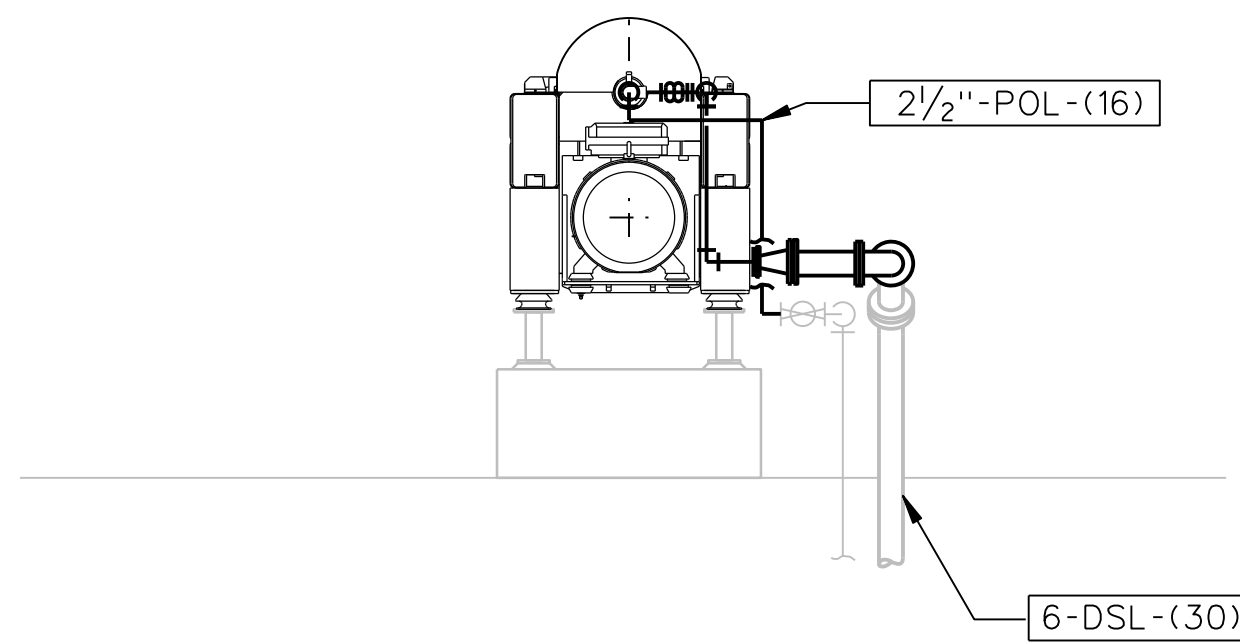
2/25/2021



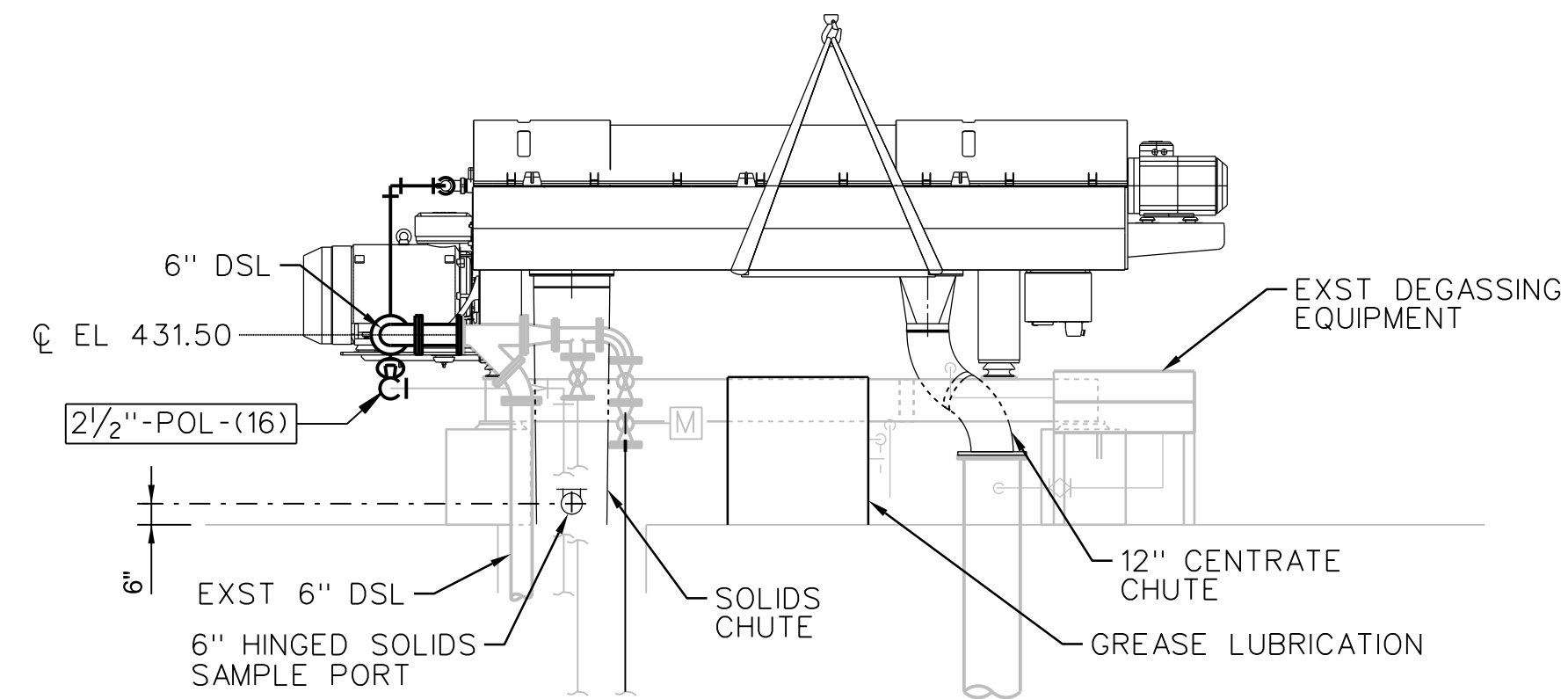
SAN DIEGO METROPOLITAN BIOSOLIDS CENTER



DEWATERING CENTRIFUGE PLAN  
 (76-DC-1) (76-DC-8)  
 SIMILAR



**B** SECTION  
 1/4"=1'-0"



**A** SECTION  
 1/4"=1'-0"

- NOTES:
1. THE CENTRIFUGE AND GREASE LUBRICATION SYSTEM WILL BE SOURED BY ALFA LAVAL.
  2. REUSE EXISTING DEGASSING EQUIPMENT.
  3. INSTALLATION OF EQUIPMENT AND ALL PIPING/INSTRUMENTATION CONNECTIONS WILL BE DONE IN THIS CONTRACT.
  3. ALL WINCH DIMENSIONS ARE APPROXIMATE, FINAL WINCH DIMENSIONS SHALL BE BASED ON STAMPED & APPROVED SHOP DRAWINGS.

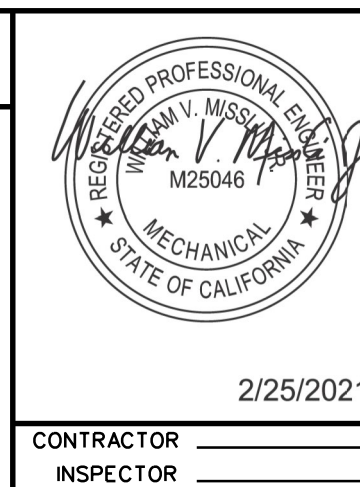
**D** 4. PROVIDE 3" HOSE CONNECTION FOR THE CENTRIFUGE FEED TUBE AND A 1" ISO 226-G CONNECTION FOR THE POLYMER CONNECTIONS. EXISTING LUBE OIL SLAB AND PIPING TO BE REMOVED. A NEW FRAME-MOUNTED AUTO-GREASE SYSTEM TO BE PROVIDED.

76-D-322

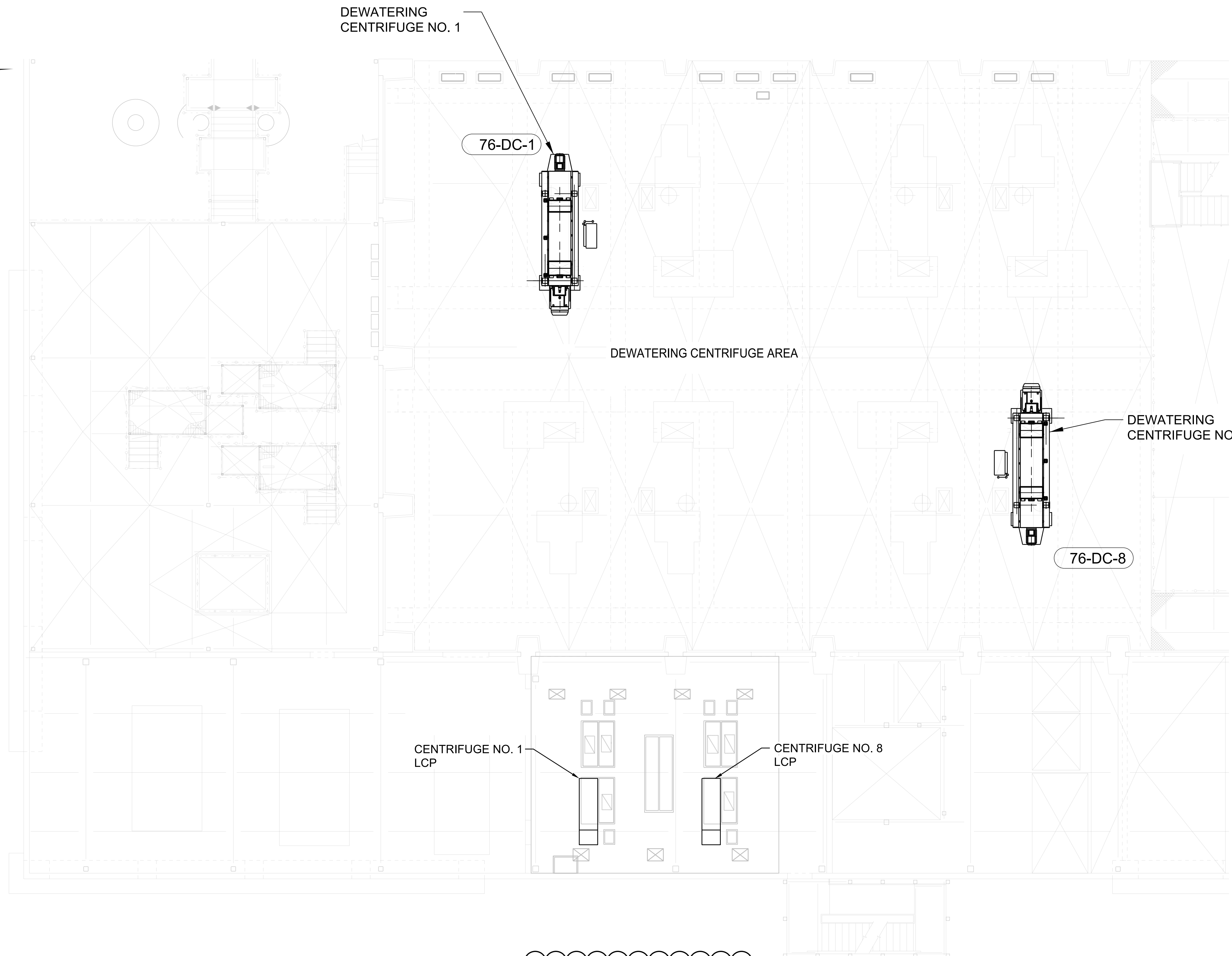
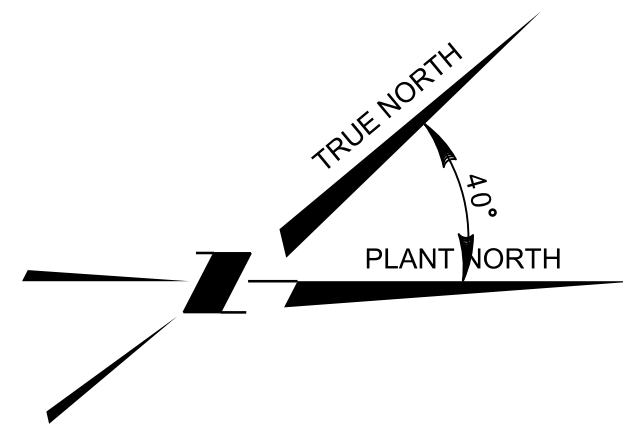
SAN DIEGO MBC IMPROVEMENTS PROCESS CENTRIFUGE BUILDING <b>DEWATERING CENTRIFUGE PLAN AND SECTIONS</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 115B OF 381 SHEETS			WBS S-17013/B-17006
APPROVED: FOR CITY ENGINEER Raymond Martin PRINT DCE NAME	DATE 3/9/2021 C89963 RCE#	SUBMITTED BY: <b>MONIKA SMO CZYNSKI</b> PROJECT MANAGER	
DESCRIPTION		BY	APPROVED
ADDENDUM A		JACOBS	Raymond Martin
ADDENDUM D		JACOBS	Raymond Martin
DATE		DATE	FILM
3/9/21		4/7/21	
1888 - 6280		CCS83 COORDINATE	
41198-1115B-D		DATE STARTED	
CONTRACTOR		DATE COMPLETED	

CONSULTANT

2/25/2021







SECOND FLOOR PLAN  
SCALE: 1/8" = 1'-0"

76-E-121

SAN DIEGO MBC IMPROVEMENTS				WBS S-17013/B-17006	
ELECTRICAL				PROJECT MANAGER	
CENTRIFUGE BUILDING				PROJECT ENGINEER	
DEWATERING CENTRIFUGE				PROJECT ENGINEER	
SECOND FLOOR PLAN				PROJECT ENGINEER	
CITY OF SAN DIEGO, CALIFORNIA				DATE 3/9/2021	
PUBLIC UTILITIES DEPARTMENT				DATE 3/9/2021	
SHEET 126A OF 381 SHEETS				DATE 4/7/21	
APPROVED: <i>Raymond Martin</i>				DATE 4/7/21	
FOR CITY ENGINEER: <i>Raymond Martin</i>				DATE 4/7/21	
PRINT DCE NAME: <i>Raymond Martin</i>				DATE 4/7/21	
RCE# C89963				DATE 4/7/21	
DESCRIPTION				DATE	
ADDENDUM A JACOBS				3/9/21	
ADDENDUM D JACOBS				4/7/21	
382 - 457				1888 - 6280	
CCS27 COORDINATE				CCS83 COORDINATE	
41198-1126A-D				DATE STARTED	
CONTRACTOR				DATE COMPLETED	
INSPECTOR				DATE COMPLETED	

CONSULTANT

REGISTERED PROFESSIONAL ENGINEER  
STATE OF CALIFORNIA  
No. E17110  
Exp. 9/30/21  
ELECTRICAL

2/25/2021

SAN DIEGO METROPOLITAN BIOSOLIDS CENTER

Conduit and Wire Schedule						
Cable / Raceway #	Conduit Size	Wiring		From	To	Remarks
		Quantity	Size			
76USSC-3A	3	3	350KCM	76USSC	76DC1.LCP	POWER GROUND
76USSC-3B	3	3	350KCM	76USSC	76DC1.LCP	POWER GROUND
76USSC-3C	3	3	350KCM	76USSC	76DC1.LCP	POWER GROUND
76DC1-2A	3	3	350KCM	76DC1.LCP	MAIN DRIVE MOTOR	POWER GROUND
76DC1-2B	3	3	350KCM	76DC1.LCP	MAIN DRIVE MOTOR	POWER GROUND
76-DC1-3	3/4	4	12	76DC1.LCP	MAIN DRIVE MOTOR	MOTOR HEATER & SPARE EMERGENCY STOP. NOTE 1.
76DC1-4	1	3	12	76DC1.LCP	GREASE LUBRICATION SYSTEM	POWER & GROUND. NOTE 1.
76DC1-5	1 1/2	8	16 SHLD	76DC1.LCP	ANALOG W/X100 CONNECTOR	NOTE 1.
76DC1-7	3/4	3	14	76DC1.LCP	THERMISTOR	THERMISTOR - CONTROL
76DC1-8	3/4	7	12	76DC1.LCP	BACK DRIVE BLOWER MOTOR	POWER & GROUND BLOWER BACK DRIVE HEATER. NOTE 1.
76DC1-9	2	3	4	76DC1.LCP	BACK DRIVE MOTOR	POWER & GROUND
76DC1-10	3/4	1-2/C	16 SHLD	76DC1.LCP	BACK DRIVE MOTOR	THERMISTOR
76DC1-11	3/4	EMPTY	EMPTY	76DC1.LCP	CAP CONDUIT	BACK DRIVE MOTOR. NOTE 2.
76S-1	3/4	2-2/C	16 SHLD	76VFD61	76PCM6	SPEED CONTROL
76S-92A	3/4	2-2/C	16 SHLD.	76FIT-2776 (JUNCTION BOX)	76PCM6	NOTE 1.
76C-163	3/4	5	14	76MG-1557	76DC-1.LCP	CONTROL 76MV-1558 76MG-1551
76C-179	3/4	8	14	76MV-1628	76DC-8.LCP	CONTROL 76MV-1628 & 76MG-1627
76S-78	1 1/2	1-2/C	16 SHLD	76FIT-2541 (JUNCTION BOX)	76PCM7	76FIT-2626 NOTE 1. 76FIT-2541 . NOTE 1 76PIT-2542 . NOTE 1 76PIT-2625. NOTE 1 SPARE. NOTE 1
76S-79	3/4	EMPTY	EMPTY	76FIT-2541	76DC8.LCP	NOTE 3.
76C-148	3/4	10	14	76MV-0208	76DC-8.LCP	76MV-0208. NOTE 1.
76C-115	3/4	EMPTY	EMPTY	76DC8.LCP	76VFD58	NOTE 3
76S-46	3/4	2-2/C	16 SHLD	76VFD58	76PCM7	SPEED CONTROL
76C-38	1 1/4	14	14	76VFD58	76PCM7	CONTROL & INDICATION
76C-99	3/4	EMPTY	EMPTY	76DC8.LCP	76VFD68	SPARE
76S-136	3/4	EMPTY	EMPTY	76DC8.LCP	76VFD68	NOTE 3
76S-8	3/4	2-2/C	16 SHLD	76VFD68	76PCM7	SPEED CONTROL
76C-8	1 1/4	14	14	76VFD68	76PCM7	NOTE 1
76USSB-6A	3	3	350KCM	76USSB	76DC8.LCP	POWER GROUND
76USSB-6B	3	3	350KCM	76USSB	76DC8.LCP	POWER GROUND
76C-46	2	1	CAT 6	76DC8.LCP	76PCM7	NOTE 1
76C-179	3/4	12	14	JBOX	76DC8.LCP	NOTE 1

Conduit and Wire Schedule						
Cable / Raceway #	Conduit Size	Wiring		From	To	Remarks
		Quantity	Size			
76S-39	3/4	2-2/C	16 SHLD	76VFD51	76PCM6	SPEED CONTROL
76S-92	1 1/2	1-2/C	16 SHLD	76FIT-2506 (JUNCTION BOX)	76PCM6	76FIT-2506. NOTE 1. 76FIT-2556 . NOTE 1. 76PIT-2555 . NOTE 1. 76-PIT-2507. NOTE 1. SPARE. NOTE 1.
76S-93	3/4	EMPTY	EMPTY	76FIT-2506	76DC1.LCP	NOTE 3.
76S-129	3/4	EMPTY	EMPTY	76DC1.LCP	76VFD61	NOTE 3.
76S-145	3/4	EMPTY	EMPTY	76DC1.LCP	76VFD-51	NOTE 3.
76S-190	3/4	EMPTY	EMPTY	CENTRIFUGE	76DC-1.LCP	NOTE 1.
76S-299	3/4	EMPTY	EMPTY	76FIT-2776	76LCP.DC2 VIA JB	NOTE 3.
76C-1	1 1/4	14	14	76VFD61	76PCM6	NOTE 1.
76C-31	1 1/4	4	14	76VFD51	76PCM6	NOTE 1.
76C-39	2	1	CAT 6	76DC1.LCP	76PCM6	CONTROL & INDICATION. NOTE 1.
76C-92	3/4	EMPTY	EMPTY	76DC1.LCP	76VFD61	NOTE 3.
76C-108	3/4	EMPTY	EMPTY	76DC1.LCP	76VFD51	NOTE 3.
76C-141	3/4	10	14	76MV-0201	76DC-1.LCP	76MV-0201 NOTE 1.
-	-	3	12	76SV-0201B	-	-
76USSB-6C	3	3	350KCM	76USSB	76DC8.LCP	POWER GROUND
76S-38	2	EMPTY	EMPTY	76DC8.LCP	76PCM7	NOTE 3.
76DC8-2A	3	3	350KCM	76DC8.LCP	76DC8 MAIN DRIVE MOTOR	POWER GROUND
76DC8-2B	3	3	350KCM	76DC8.LCP	76DC8 MAIN DRIVE MOTOR	POWER GROUND
76DC8-3	3/4	4	12	76DC8.LCP	76DC8 MAIN DRIVE MOTOR	NOTE 1.
76DC8-4	1	3	12	76DC8.LCP	GREASE LUBRICATION SYSTEM	POWER AND GROUND. NOTE 1.
76DC8-5	1 1/2	16	16 SHLD	76DC8.LCP	ANALOG W/X100 CONNECTOR	NOTE 1.
76DC8-7	3/4	3	14	76DC8.LCP	THERMISTOR	THERMISTOR - CONTROL
76DC8-8	3/4	7	12	76DC8.LCP	BACK DRIVE BLOWER MOTOR	NOTE 1.
76DC8-9	2	3	4	76DC8.LCP	BACK DRIVE MOTOR	POWER & GROUND
76DC8-10	3/4	1-2/C	16 SHLD.	76DC8.LCP	BACK DRIVE MOTOR	THERMISTOR
76DC8-11	3/4	EMPTY	EMPTY	76DC8.LCP	CAP CONDUIT	BACK DRIVE MOTOR. NOTE 2.
76S-152	3/4	EMPTY	EMPTY	76DC8.LCP	76VFD-58	NOTE 3.
76S-196	3/4	EMPTY	EMPTY	CENTRIFUGE	76DC8.LCP	NOTE 3.
76S-300	3/4	1-2/C	16 SHLD.	76FIT-2781	76PCM7	NOTE 1.
76S-78A	3/4	2-2/C	16 SHLD.	76FIT-2781 (JUNCTION BOX)	76PCM7	NOTE 1.

NOTES:

- REMOVE EXISTING CONDUCTORS AND REPLACE WITH NEW CONDUCTORS PER SCHEDULE.
- REMOVE EXISTING CONDUCTORS AND CAP CONDUIT.
- REMOVE EXISTING CONDUCTORS

76-E-634

SAN DIEGO MBC IMPROVEMENTS  
ELECTRICAL  
CENTRIFUGE BUILDING  
**CABLE AND CONDUIT SCHEDULES**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC UTILITIES DEPARTMENT  
SHEET 158A OF 381 SHEETS

WBS S-17013/B-17006

APPROVED: <i>Raymond Martin</i> FOR CITY ENGINEER PRINT DCE NAME: <i>Raymond Martin</i>	DATE: 3/9/2021 C89963	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER
DESIGNER: <i>Raymond Martin</i> PROJECT ENGINEER	DATE: 3/9/21	PROJECT ENGINEER: <b>MONIKA SMOCZYNSKI</b>
DESCRIPTION: ADDENDUM A	BY: JACOBS	APPROVED: <i>Raymond Martin</i>
DESCRIPTION: ADDENDUM D	BY: JACOBS	APPROVED: <i>Raymond Martin</i>
DATE: 3/9/21	DATE: 4/7/21	DATE: 3/9/21
382 - 457	1888 - 6280	41198-1158A-D
CCS27 COORDINATE	CCS83 COORDINATE	DATE STARTED
		DATE COMPLETED

CONSULTANT

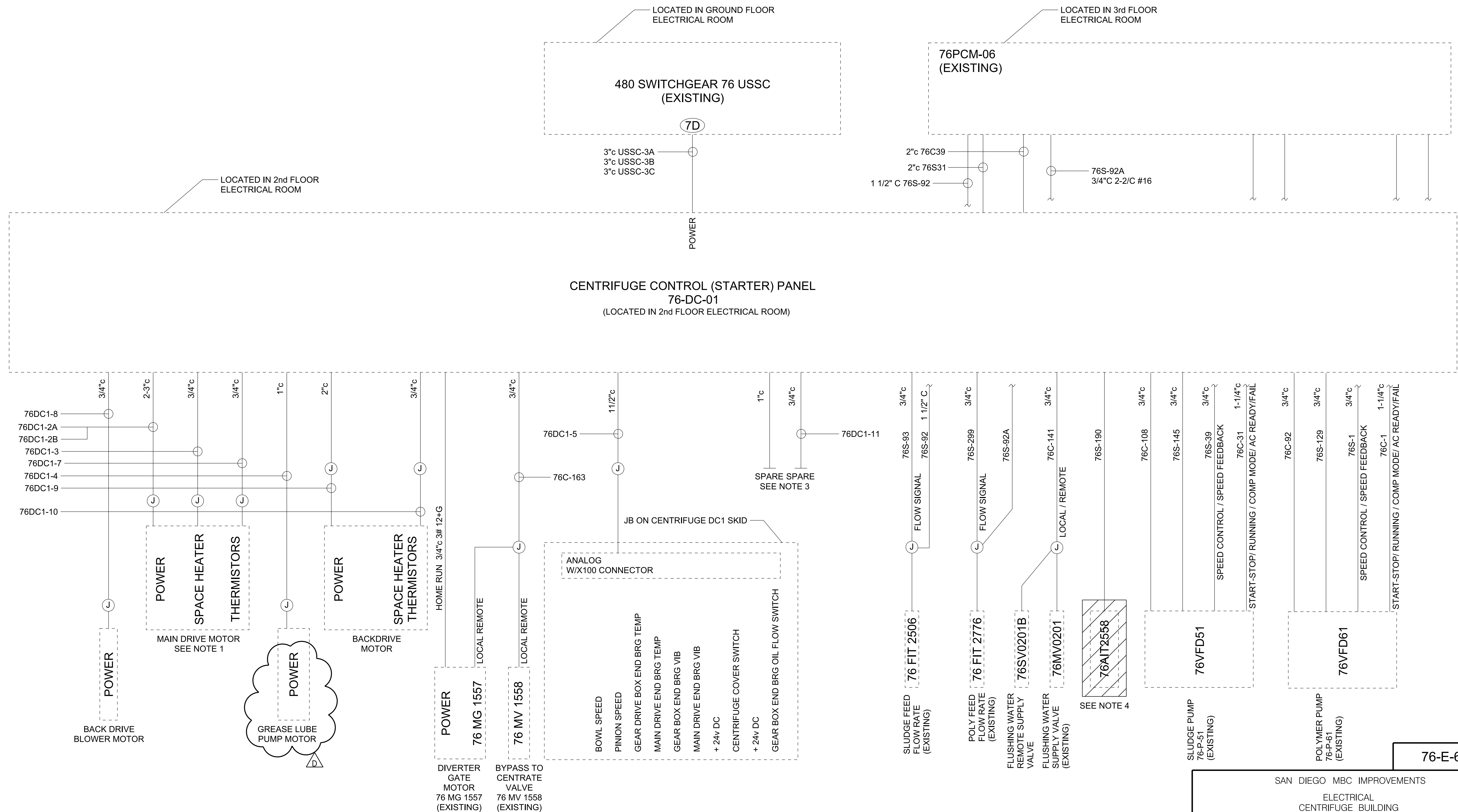
**ch2m**<sup>SM</sup>

2/25/2021

REGISTERED PROFESSIONAL ENGINEER  
STEPHEN DWAYNE PARKER  
No. E17110  
Exp. 9/30/21  
ELECTRICAL  
STATE OF CALIFORNIA

CONTRACTOR INSPECTOR





- NOTES:**
- CONDUIT 76DC1-3 CONTAINS CENTRIFUGE EMERGENCY STOP PUSH BUTTON WIRING.
  - ALL CONDUITS ARE EXISTING. PROVIDE NEW CONDUCTORS IN EXISTING CONDUITS. SEE RACEWAY SCHEDULE FOR SIZE AND COUNT.
  - EXISTING CONDUITS ARE STUBBED UP AT EXISTING CENTRIFUGE AND CAPPED.
  - DEMO AIT, REMOVE CONDUCTORS FROM SOURCE TO LOAD AND CAP CONDUITS.

SAN DIEGO MBC IMPROVEMENTS  
ELECTRICAL  
CENTRIFUGE BUILDING

**BLOCK DIAGRAM AND NOTES  
DEWATERING CENTRIFUGE NO. 1**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC UTILITIES DEPARTMENT  
SHEET 159C OF 381 SHEETS

WBS S-17013/B-17006

APPROVED: <i>Raymond Martin</i> FOR CITY ENGINEER PRINT DCE NAME: <i>Raymond Martin</i> DATE: 3/09/2021 RCE#: C89963	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER DESIGNED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT ENGINEER
DESCRIPTION ADDENDUM A JACOBS 3/9/21 382 - 457 ADDENDUM D JACOBS 4/7/21 CCS27 COORDINATE 1888 - 6280 CCS83 COORDINATE	DATE STARTED DATE COMPLETED 41198-1159C-D

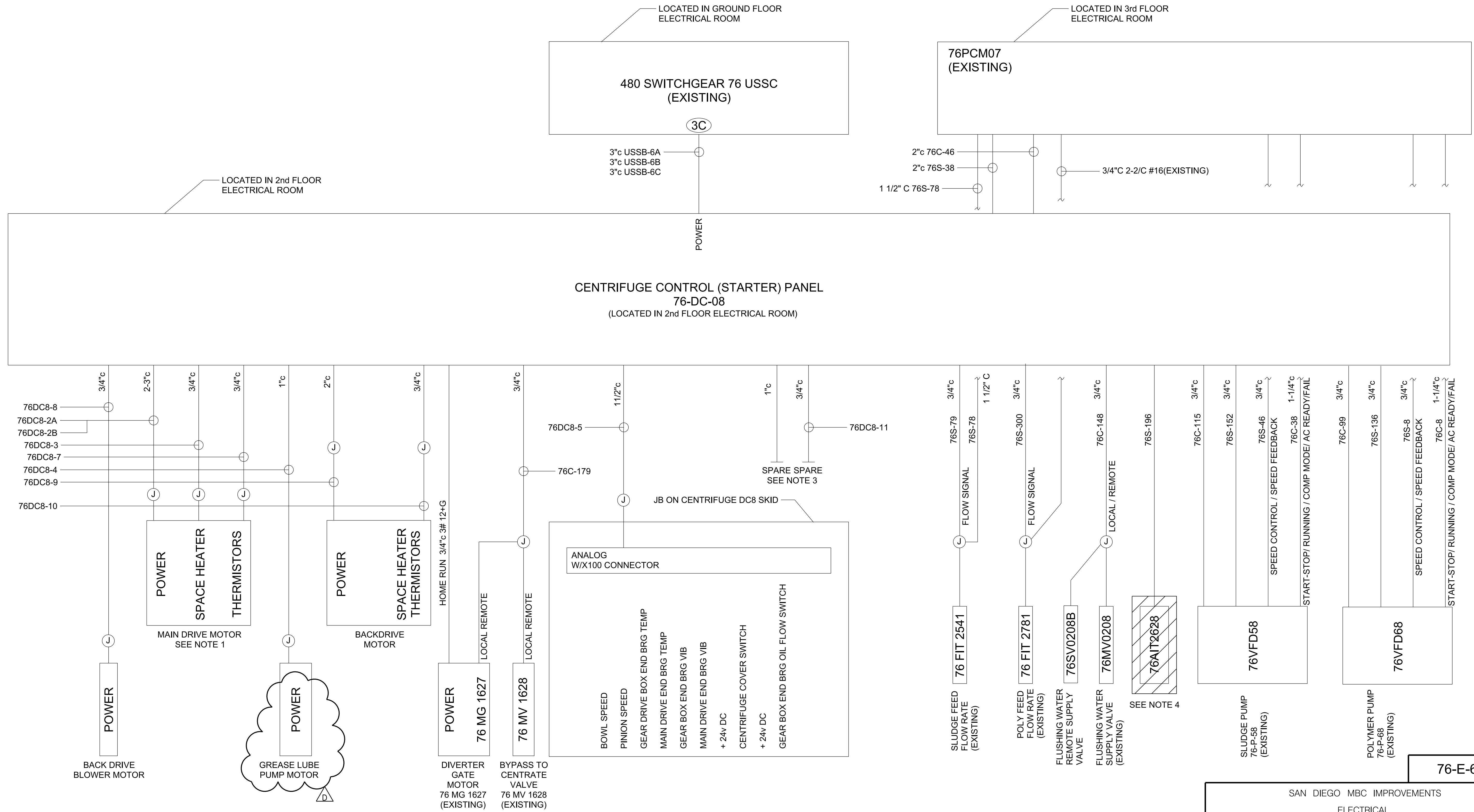
CONSULTANT

ch2m

2/25/2021







- NOTES:**
1. CONDUIT 76DC1-3 CONTAINS CENTRIFUGE EMERGENCY STOP PUSH BUTTON WIRING.
  2. ALL CONDUITS ARE EXISTING. PROVIDE NEW CONDUCTORS IN EXISTING CONDUITS. SEE RACEWAY SCHEDULE FOR SIZE AND COUNT.
  3. EXISTING CONDUITS ARE STUBBED UP AT EXISTING CENTRIFUGE AND CAPPED.
  4. DEMO AIT, REMOVE CONDUCTORS FROM SOURCE TO LOAD AND CAP CONDUITS.

76-E-639

SAN DIEGO MBC IMPROVEMENTS  
ELECTRICAL  
CENTRIFUGE BUILDING  
**BLOCK DIAGRAM AND NOTES  
DEWATERING CENTRIFUGE NO. 8**

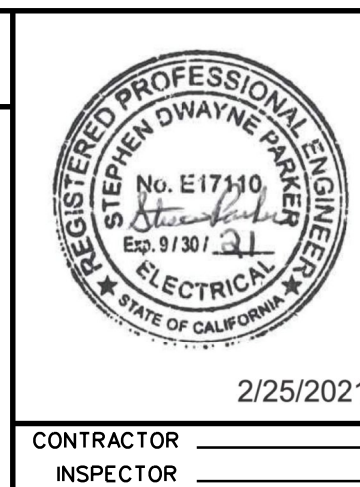
CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC UTILITIES DEPARTMENT  
SHEET 159D OF 381 SHEETS

<p>APPROVED: <i>Raymond Martin</i> FOR CITY ENGINEER PRINT DCE NAME: Raymond Martin</p>	<p>DATE: 3/9/2021 RCE#: C89963</p>
<p>PROJECT ENGINEER: <b>MONIKA SMOCZYNSKI</b></p>	<p>WBS: S-17013/B-17006</p>
<p>DESCRIPTION: ADDENDUM A</p>	<p>BY: JACOBS</p>
<p>APPROVED: <i>Raymond Martin</i></p>	<p>DATE: 3/9/21</p>
<p>DESCRIPTION: ADDENDUM D</p>	<p>BY: JACOBS</p>
<p>APPROVED: <i>Raymond Martin</i></p>	<p>DATE: 4/7/21</p>
<p>PROJECT ENGINEER: <b>MONIKA SMOCZYNSKI</b></p>	
<p>382 - 457 CCS27 COORDINATE 1888 - 6280 CCS83 COORDINATE</p>	
<p>CONTRACTOR: _____ DATE STARTED: _____ INSPECTOR: _____ DATE COMPLETED: _____</p>	

CONSULTANT

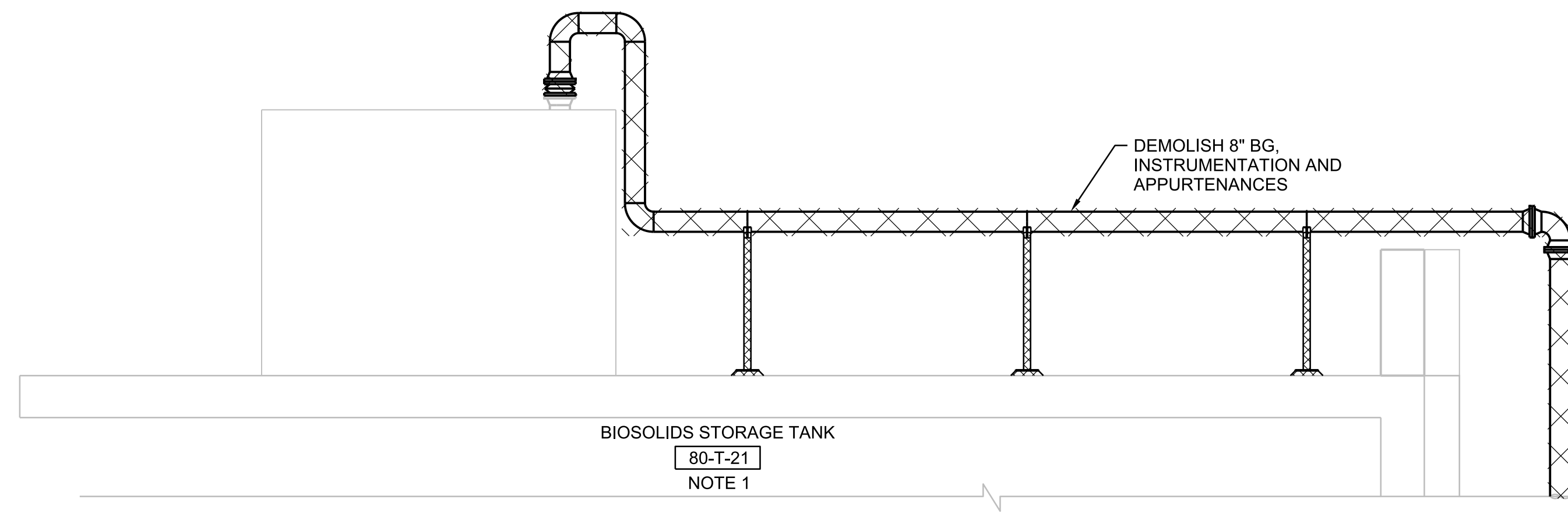
ch2m

2/25/2021

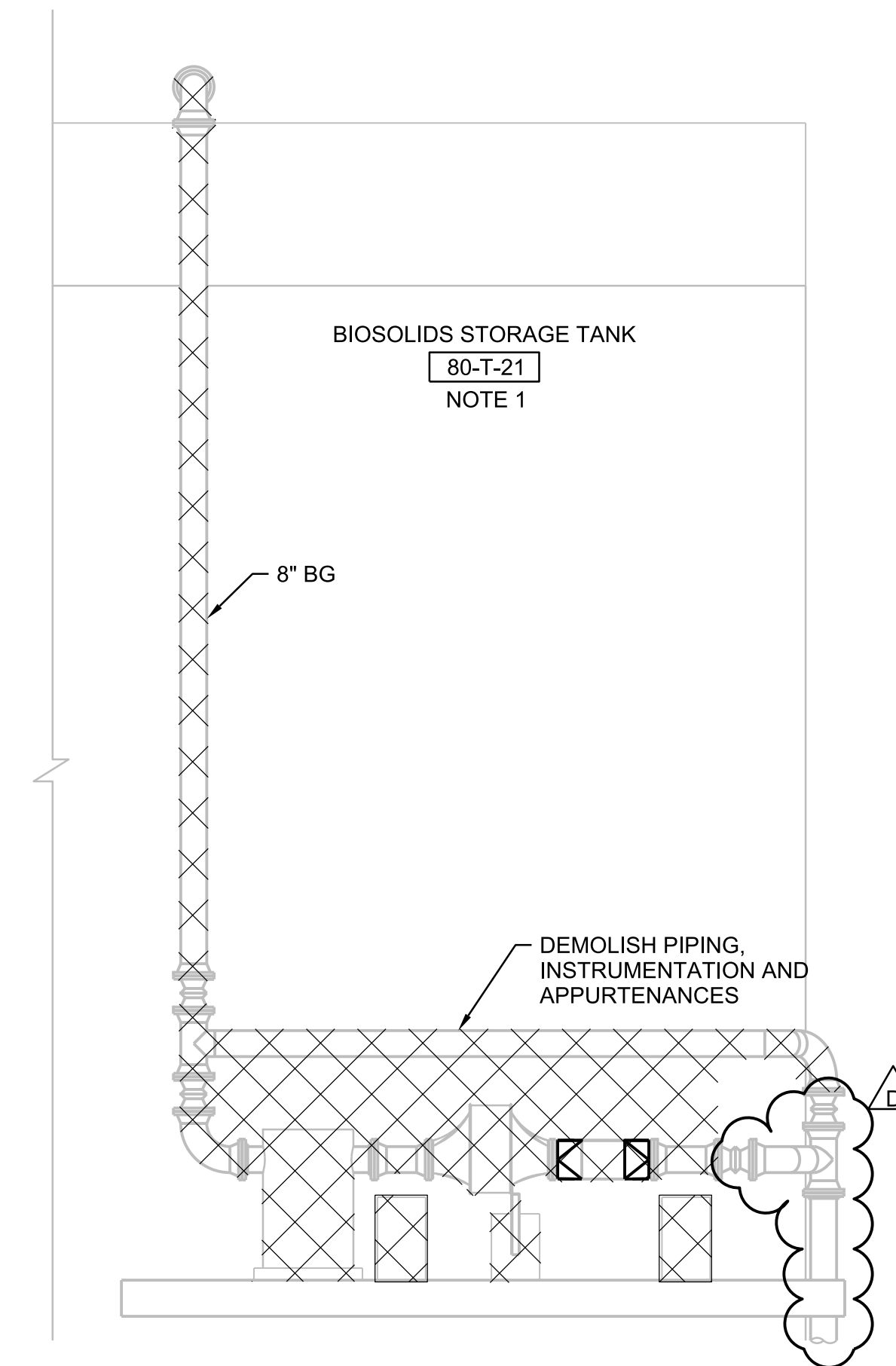


**NOTES:**

1. BG PIPE CONFIGURATION FOR EMERGENCY STORAGE TANK IS SIMILAR TO THAT OF BIOSOLIDS STORAGE TANK.



**A SECTION**  
1/4"=1'-0"  
80-X-111



**B SECTION**  
1/4"=1'-0"  
80-X-111

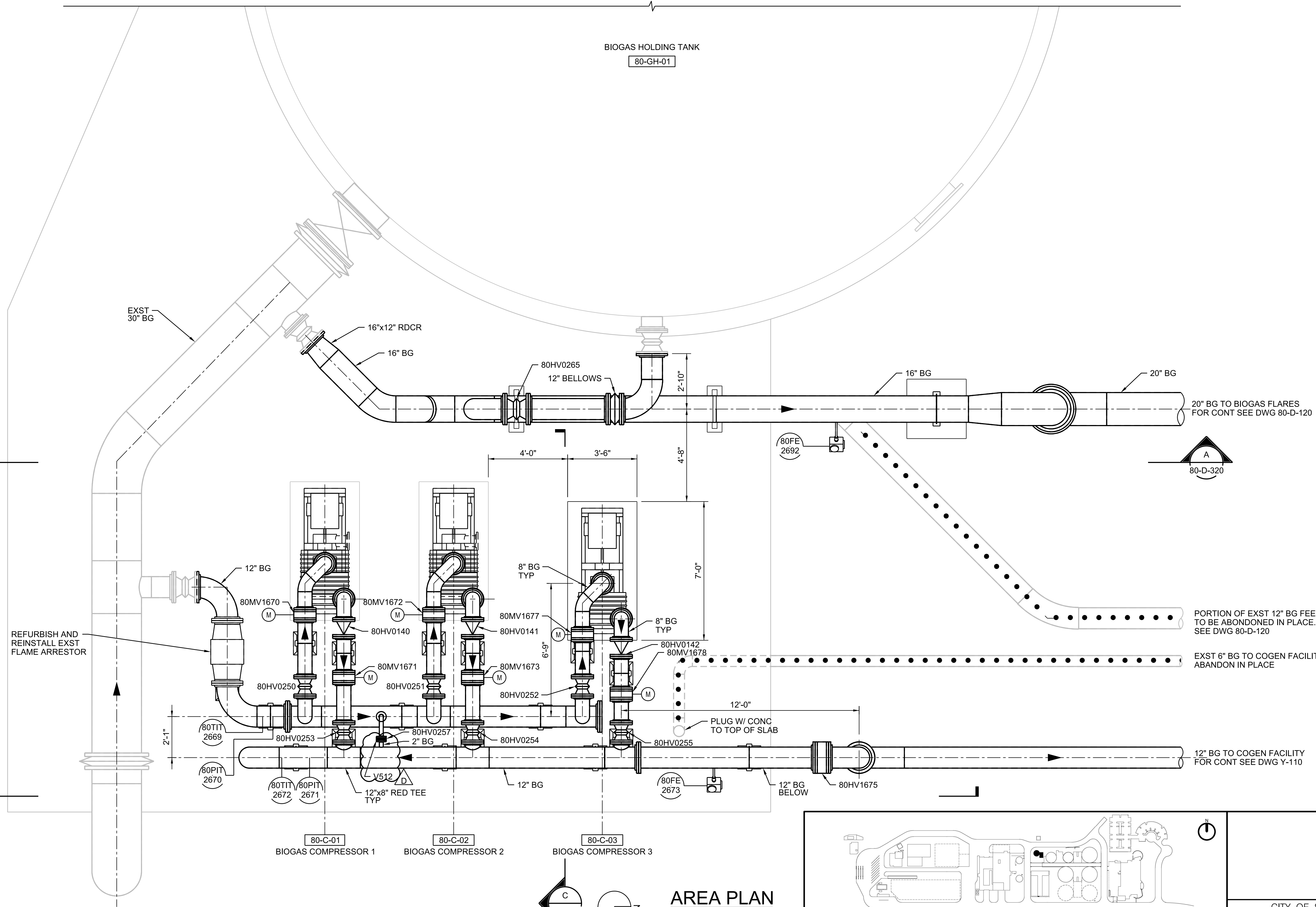
80-X-313

SAN DIEGO MBC IMPROVEMENTS  
DEMOLITION  
DIGESTER COMPLEX  
**STORAGE TANK SECTIONS DEMOLITION**

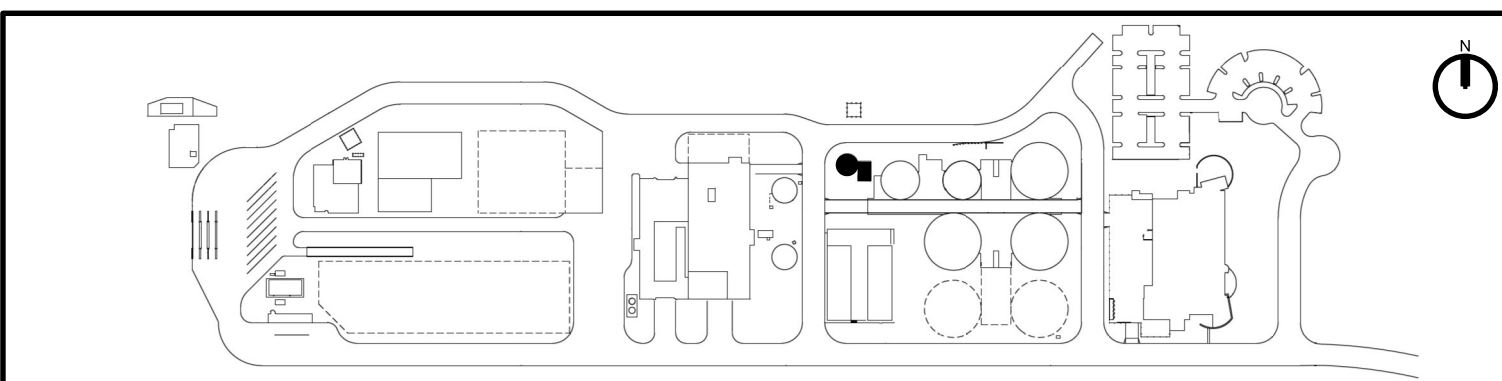
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 165 OF 381 SHEETS		WBS S-17013/B-17006
APPROVED: <i>[Signature]</i> FOR CITY ENGINEER PRINT DCE NAME: Andreea Demich	DATE: 12/30/2020 DATE: 07/03/21 RCE#	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER DESIGNED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL	JACOBS	[Signature]
ADDENDUM D	JACOBS	[Signature]
DATE	DATE	DATE
2/5/20	4/7/21	[Blank]
FILM	FILM	FILM
382 - 457	1888 - 6280	[Blank]
CCS27 COORDINATE	CCS83 COORDINATE	[Blank]
CONTRACTOR		DATE STARTED
INSPECTOR		DATE COMPLETED
[Blank]		41198-1165-D

CONSULTANT





**AREA PLAN**  
3/8"=1'-0"

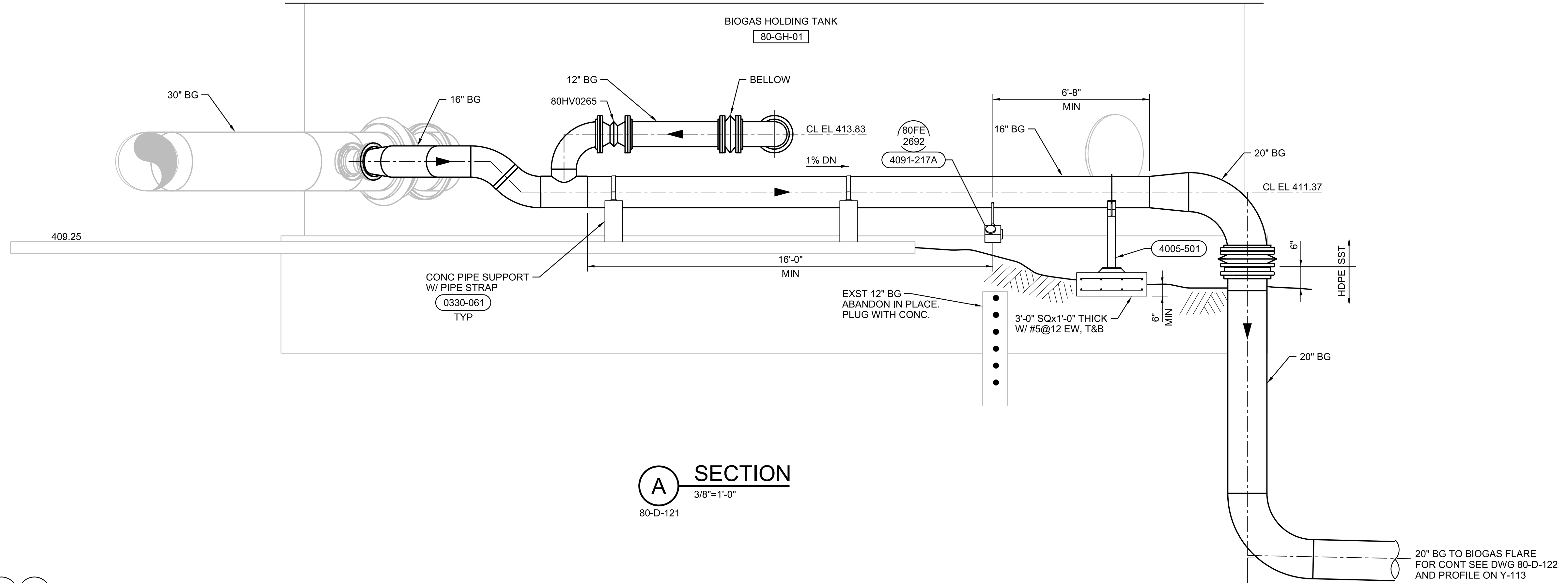


CONSULTANT

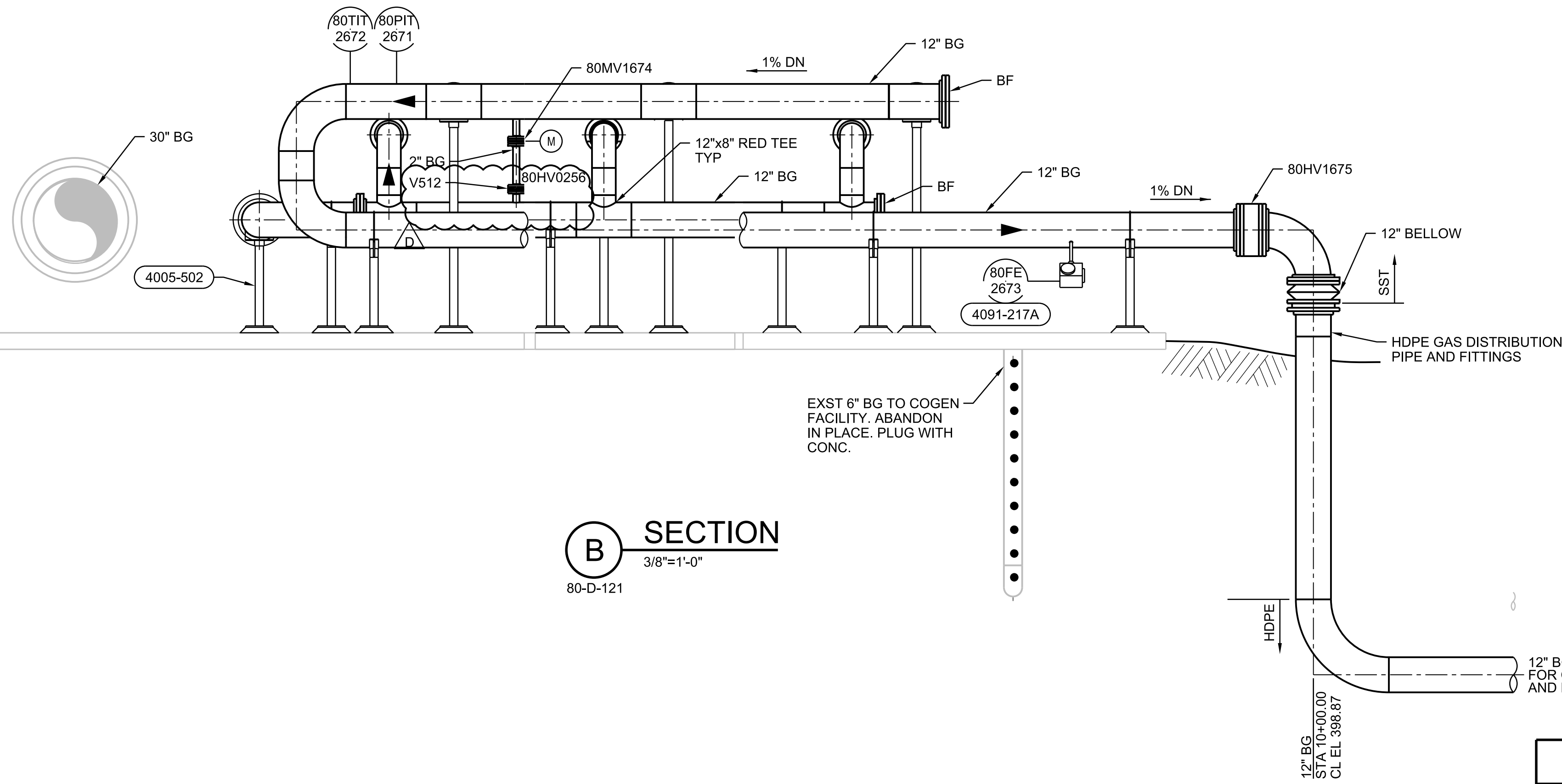


2/05/2019

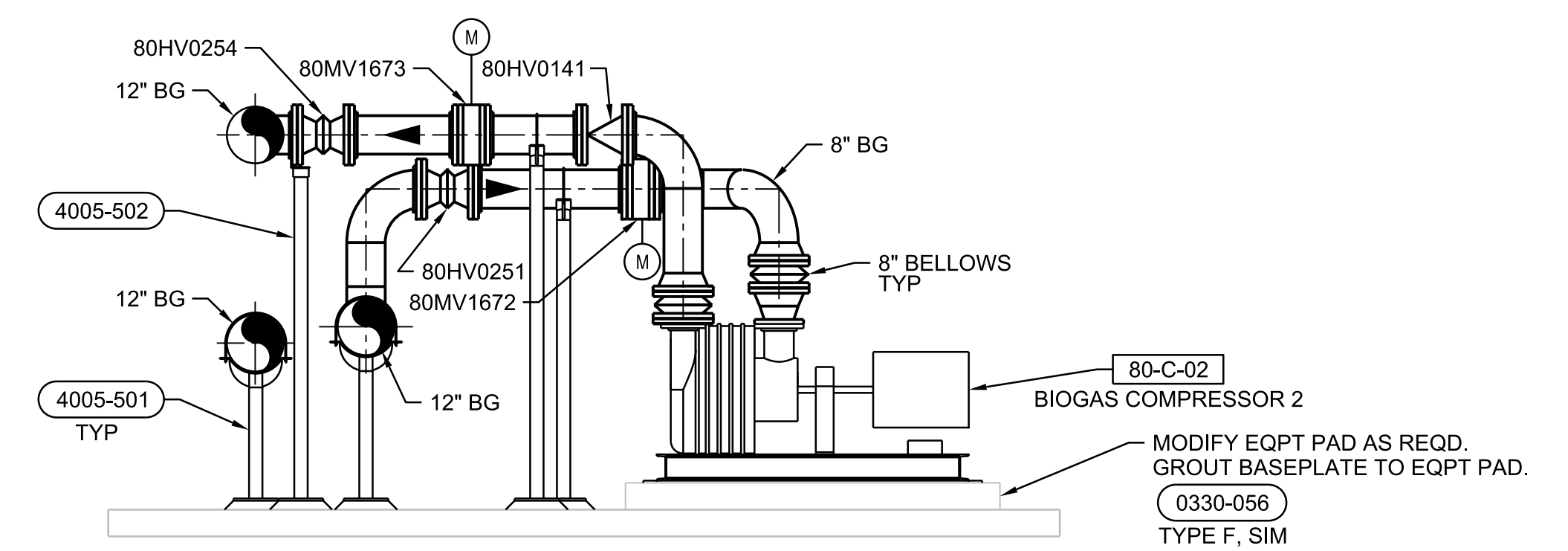
SAN DIEGO MBC IMPROVEMENTS PROCESS DIGESTER COMPLEX BIOGAS AREA PLAN			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 186 OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: <i>Andreas Demich</i> FOR CITY ENGINEER PRINT DCE NAME: Andreas Demich	DATE: 12/30/2020 C70321	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER	
DESCRIPTION	BY	APPROVED	DATE
ORIGINAL	JACOBS	<i>Richard Demich</i>	2/5/20
ADDENDUM D	JACOBS	<i>Richard Demich</i>	4/7/21
		1888 - 6280	CCS27 COORDINATE
		41198 - 1186 - D	CCS83 COORDINATE
CONTRACTOR INSPECTOR		DATE STARTED	DATE COMPLETED



**A SECTION**  
3/8"=1'-0"  
80-D-121



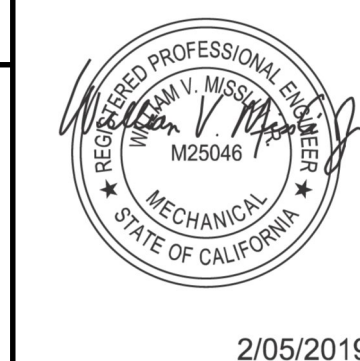
**B SECTION**  
3/8"=1'-0"  
80-D-121



**C SECTION**  
3/8"=1'-0"  
80-D-121

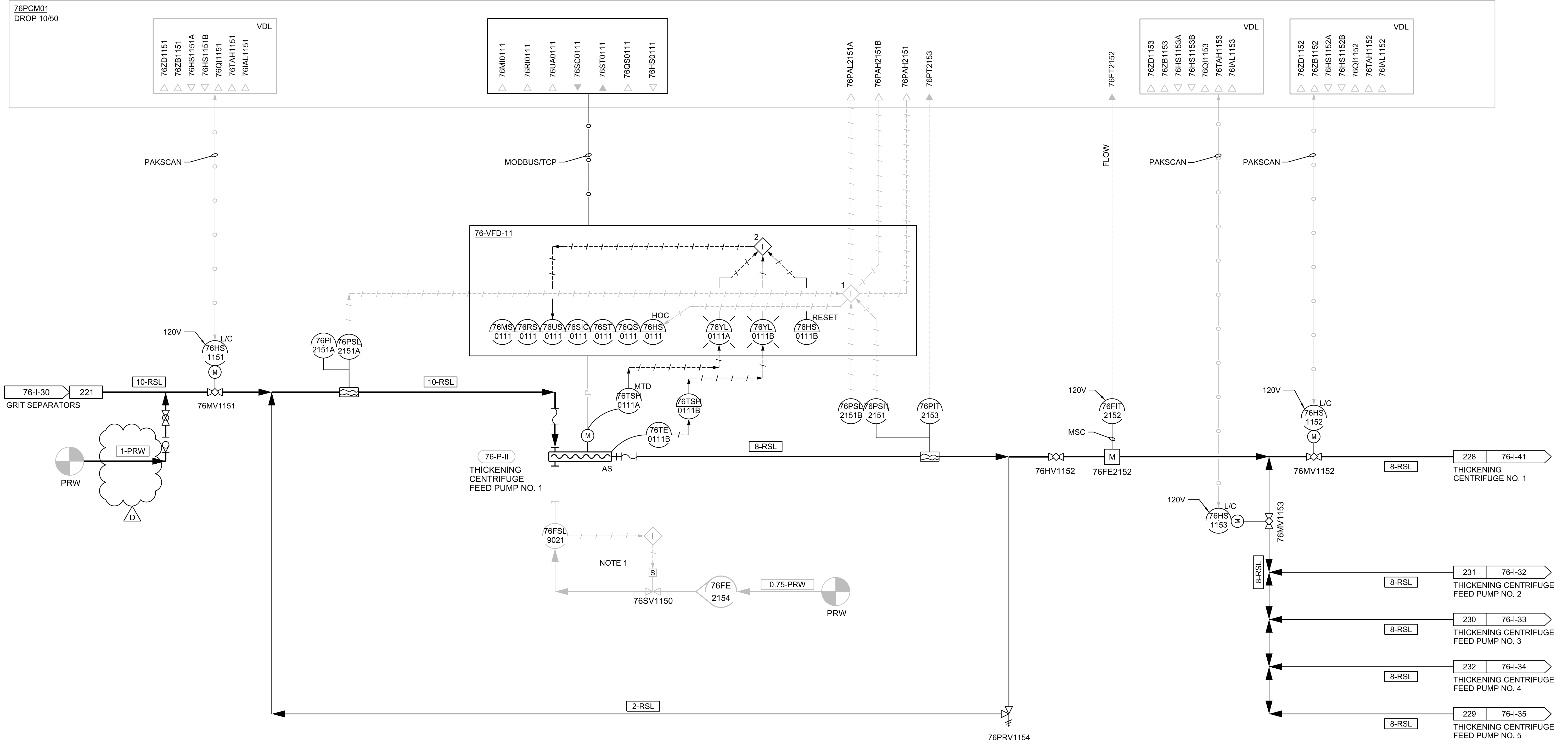
CONSULTANT

2/05/2019



SAN DIEGO MBC IMPROVEMENTS PROCESS DIGESTER COMPLEX BIOGAS SECTIONS				80-D-320
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 192 OF 381 SHEETS			WBS S-17013/B-17006	
APPROVED: <i>Andrea Demich</i>	DATE: 12/30/2020	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b>		PROJECT MANAGER
FOR CITY ENGINEER	DATE: 12/30/2020	PROJECT ENGINEER		
PRINT DCE NAME: Andrea Demich	RICE# C70321	PROJECT ENGINEER		
DESCRIPTION	BY	APPROVED	DATE	FILM
ORIGINAL	JACOBS		2/5/20	
ADDENDUM D	JACOBS	<i>Richard Klein</i>	4/7/21	
				382 - 457
				CCS27 COORDINATE
				1888 - 6280
				CCS83 COORDINATE
CONTRACTOR INSPECTOR				DATE STARTED
				DATE COMPLETED
				41198-1192-D

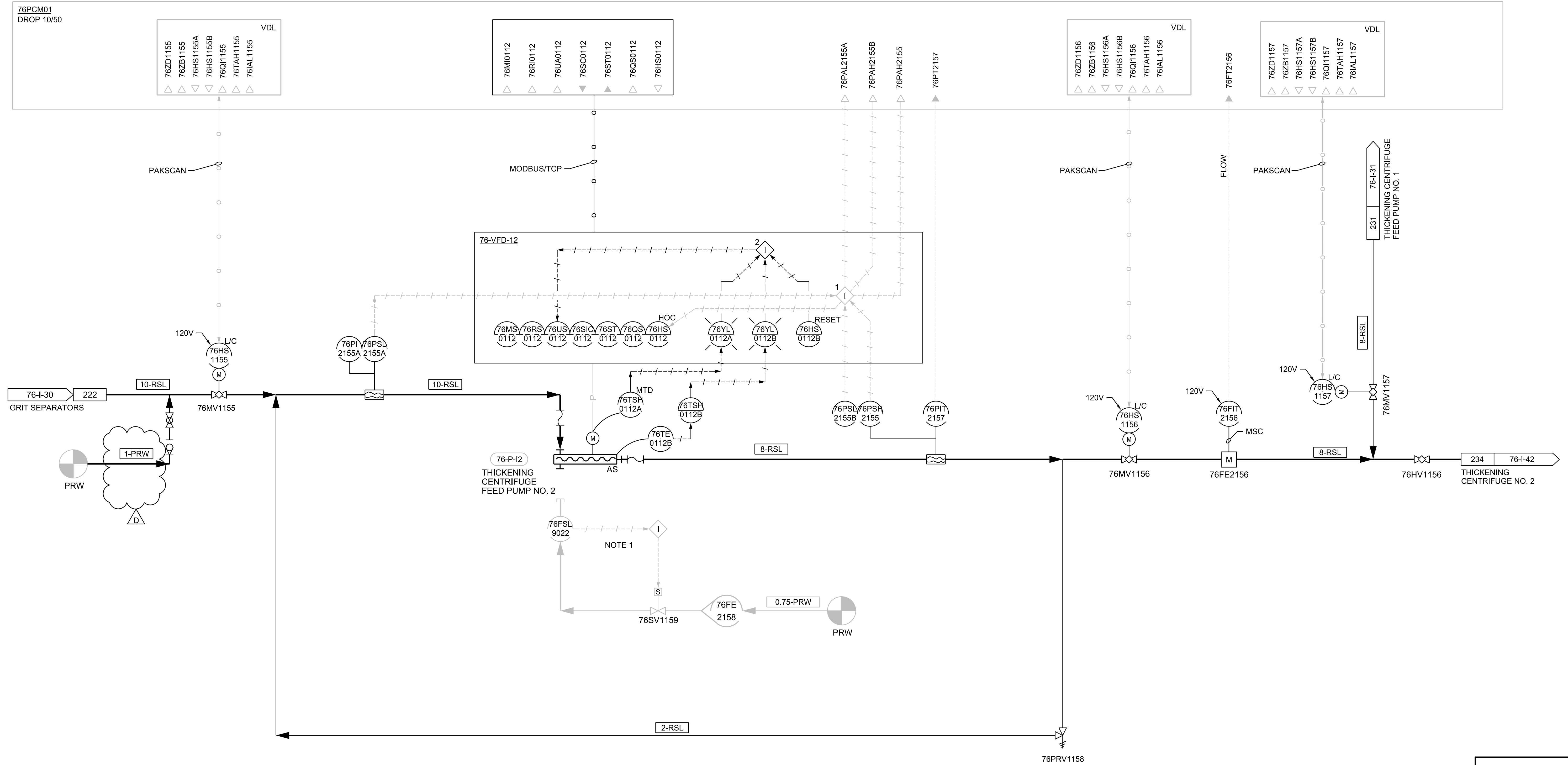




**NOTE:**  
 1. SEAL WATER SETUP WILL BE LEFT IN PLACE FOR FUTURE USE.  
**INTERLOCK DESCRIPTION:**  
 1. STOP PUMP(S) ON LOW SUCTION PRESSURE, LOW DISCHARGE PRESSURE, OR HIGH DISCHARGE PRESSURE CONDITION(S) AFTER ADJUSTABLE TIME DELAY (0-30 SEC) AND ALARM TO DCS.  
 2. STOP PUMP ON HIGH MOTOR TEMPERATURE ALARM AND HIGH PUMP TEMPERATURE ALARM AFTER ADJUSTABLE TIME DELAY (0-30 SEC) AND LOCKOUT WITH MANUAL RESET.

<b>76-I-31</b>	
SAN DIEGO MBC IMPROVEMENTS INSTRUMENTATION AND CONTROL - P&ID CENTRIFUGE BUILDING <b>THICKENING CENTRIFUGE FEED PUMP NO. 1</b>	
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 264 OF 381 SHEETS	
APPROVED: <i>Andrea Demich</i> FOR CITY ENGINEER PRINT DCE NAME: Andrea Demich DATE: 12/30/2020 RICE#: C70321	WBS: S-17013/B-17006 SUBMITTED BY: MONIKA SMOCZYNSKI PROJECT MANAGER CHECKED BY: MONIKA SMOCZYNSKI PROJECT ENGINEER DESCRIPTION: ORIGINAL BY JACOBS APPROVED DATE FILM ORIGINAL JACOBS 2/5/20 382 - 457 ADDENDUM D JACOBS 4/7/21 1888 - 6280 DATE STARTED: _____ DATE COMPLETED: _____ CONTRACTOR: _____ INSPECTOR: _____

CONSULTANT  	 2/05/2019
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**NOTE:**  
 1. SEAL WATER SETUP WILL BE LEFT IN PLACE FOR FUTURE USE.  
**INTERLOCK DESCRIPTION:**  
 1. STOP PUMP(S) ON LOW SUCTION PRESSURE, LOW DISCHARGE PRESSURE, OR HIGH DISCHARGE PRESSURE CONDITION(S) AFTER ADJUSTABLE TIME DELAY (0-30 SEC) AND ALARM TO DCS.  
 2. STOP PUMP ON HIGH MOTOR TEMPERATURE ALARM AND HIGH PUMP TEMPERATURE ALARM AFTER ADJUSTABLE TIME DELAY (0-30 SEC) AND LOCKOUT WITH MANUAL RESET.

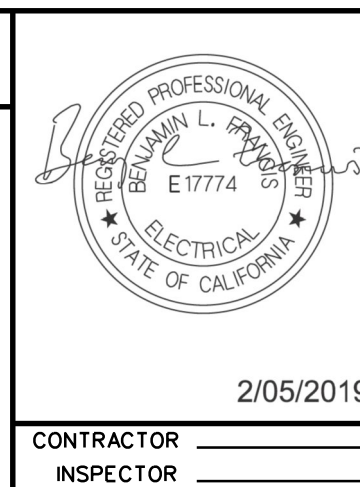
76-I-32

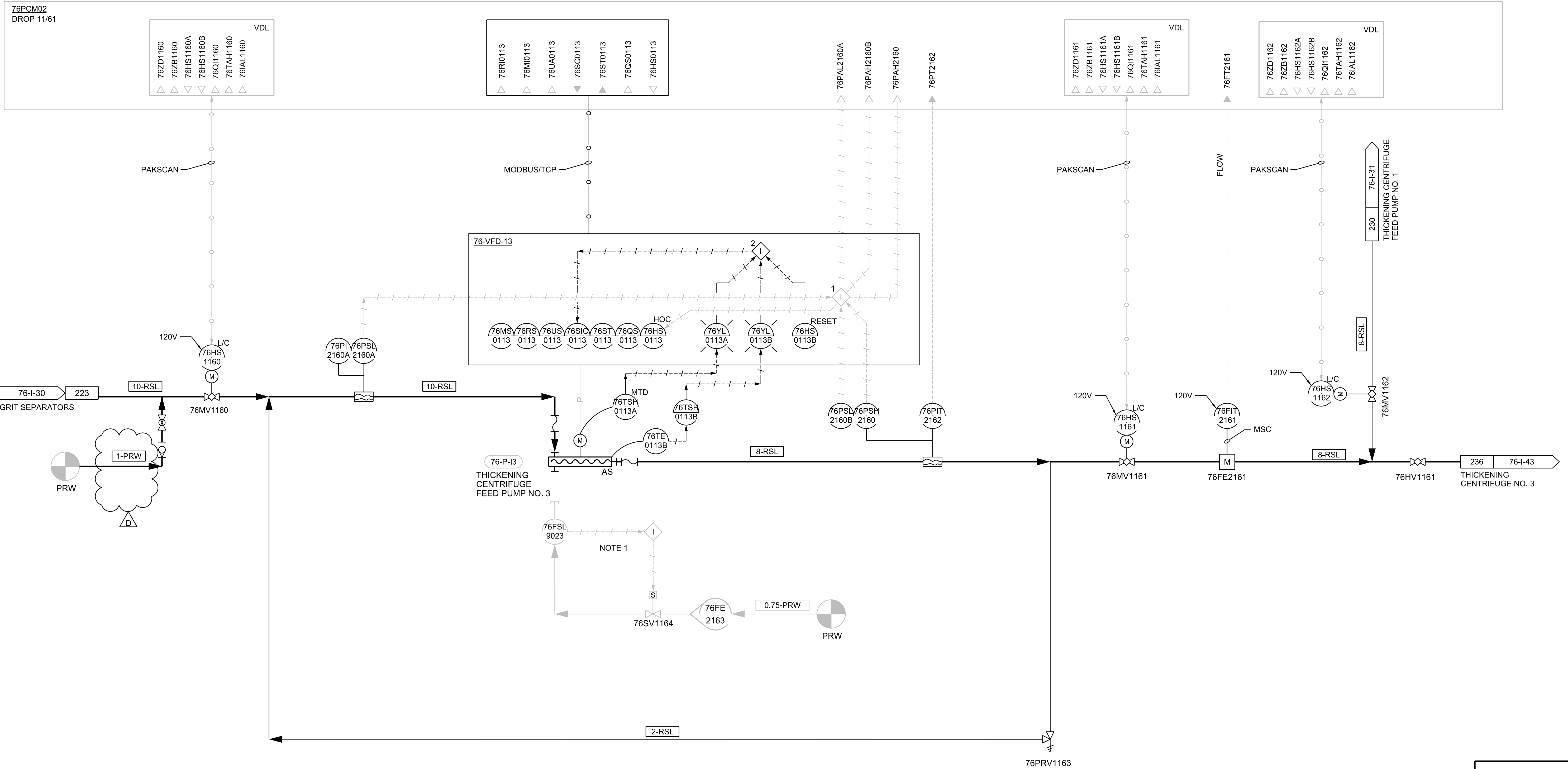
SAN DIEGO MBC IMPROVEMENTS INSTRUMENTATION AND CONTROL - P&ID CENTRIFUGE BUILDING <b>THICKENING CENTRIFUGE                  FEED PUMP NO. 2</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 265 OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: <i>[Signature]</i> FOR CITY ENGINEER PRINT DCE NAME: Andree Demich	DATE: 12/30/2020 RICE#: C70321	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER	
DESCRIPTION ORIGINAL JACOBS ADDENDUM D JACOBS	BY JACOBS JACOBS	APPROVED DATE 2/5/20 4/7/21	FILE 382 - 457 1888 - 6280 41198-1265-D
CONTRACTOR INSPECTOR		DATE STARTED DATE COMPLETED	

CONSULTANT

ch2m<sup>SM</sup>

2/05/2019





**NOTE:**  
 1. SEAL WATER SETUP WILL BE LEFT IN PLACE FOR FUTURE USE.  
**INTERLOCK DESCRIPTION:**  
 1. STOP PUMP(S) ON LOW SUCTION PRESSURE, LOW DISCHARGE PRESSURE, OR HIGH DISCHARGE PRESSURE CONDITION(S) AFTER ADJUSTABLE TIME DELAY (0-30 SEC) AND ALARM TO DCS.  
 2. STOP PUMP ON HIGH MOTOR TEMPERATURE ALARM AND HIGH PUMP TEMPERATURE ALARM AFTER ADJUSTABLE TIME DELAY (0-30 SEC) AND LOCKOUT WITH MANUAL RESET.

76-I-33

SAN DIEGO MBC IMPROVEMENTS  
 INSTRUMENTATION AND CONTROL - P&ID  
 CENTRIFUGE BUILDING  
**THICKENING CENTRIFUGE  
 FEED PUMP NO. 3**

CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 266 OF 381 SHEETS		WBS S-17013/B-17006
APPROVED: <i>[Signature]</i> FOR CITY ENGINEER Andreas Demich	DATE: 12/30/2020 C70321	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER
DESCRIPTION	BY	APPROVED
ORIGINAL	JACOBS	2/5/20
ADDENDUM D	JACOBS	4/7/21
		DATE FILM
		382 - 457
		1888 - 6280
		41198-1266-D

CONSULTANT

ch2m<sup>SM</sup>

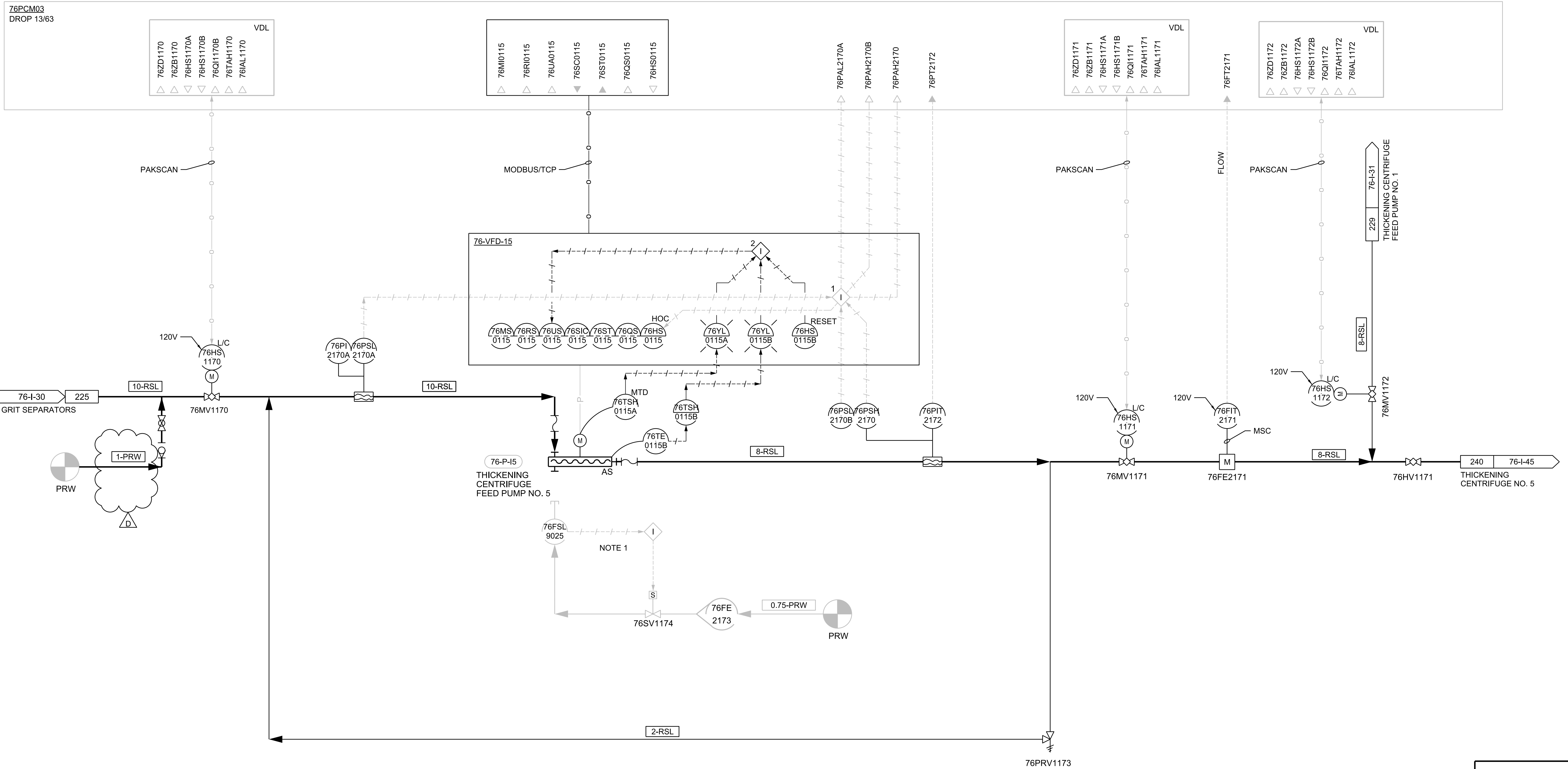
2/05/2019

CONTRACTOR	DATE STARTED
INSPECTOR	DATE COMPLETED









76-I-35

SAN DIEGO MBC IMPROVEMENTS  
 INSTRUMENTATION AND CONTROL - P&ID  
 CENTRIFUGE BUILDING

**THICKENING CENTRIFUGE  
 FEED PUMP NO. 5**

CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 268 OF 381 SHEETS		WBS S-17013/B-17006
APPROVED: <i>Andreas Demich</i> FOR CITY ENGINEER PRINT DCE NAME: Andreas Demich	DATE: 12/30/2020 C70321	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER
DESCRIPTION	BY	APPROVED
ORIGINAL	JACOBS	2/5/20
ADDENDUM D	JACOBS	4/7/21
DATE STARTED		382 - 457
DATE COMPLETED		1888 - 6280
CONTRACTOR		41198-1268-D
INSPECTOR		

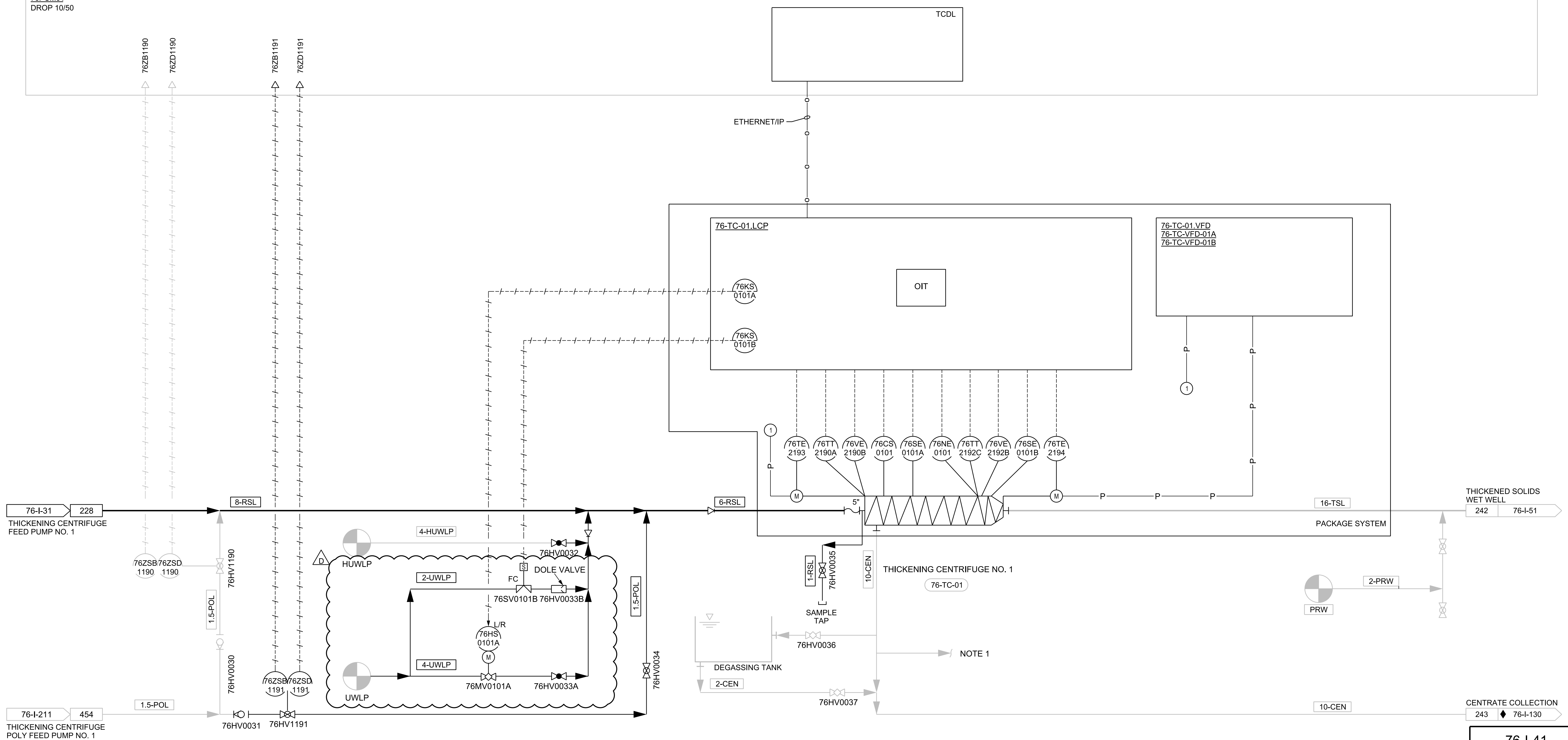
CONSULTANT

ch2m<sup>SM</sup>

2/05/2019



76PCM01  
DROP 10/50



**NOTES:**  
1. SEE DWG 76-I-311 FOR THE FOUL AIR SYSTEM.

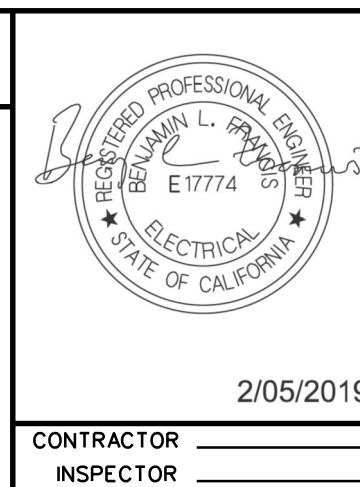
♦ P&ID NOT INCLUDED IN THIS CONTRACT.  
SEE EXISTING CONTRACT DOCUMENTS.

SAN DIEGO MBC IMPROVEMENTS  
INSTRUMENTATION AND CONTROL - P&ID  
CENTRIFUGE BUILDING  
**THICKENING CENTRIFUGE NO. 1**

CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 269 OF 381 SHEETS		WBS S-17013/B-17006
APPROVED: <i>[Signature]</i> FOR CITY ENGINEER PRINT DCE NAME: Andresa Demich	DATE: 12/30/2020 RICE#: C70321	SUBMITTED BY: <b>MONIKA SMO CZYNSKI</b> PROJECT MANAGER PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL	JACOBS	<i>[Signature]</i>
ADDENDUM D	JACOBS	<i>[Signature]</i>
DATE		FILE
2/5/20		382 - 457
4/7/21		1888 - 6280
DATE STARTED		DATE COMPLETED
41198-1269-D		

CONSULTANT

2/05/2019



CONTRACTOR  
INSPECTOR

DATE STARTED  
DATE COMPLETED

76PCM01  
DROP 10/50

TCDL

ETHERNET/IP

76-TC-01.LCP

76-TC-02.VFD  
76-TC-VFD-02A  
76-TC-VFD-02B

OIT

76KS  
0102A

76KS  
0102B

76TE  
2203

76TT  
2200A

76VE  
2200B

76CS  
0102

76SE  
0102A

76NE  
0102

76TT  
2202A

76VE  
2202B

76SE  
0102B

76TE  
2204

4-HUWLP

2-UWLP

4-UWLP

HUWLP

UWLP

FC

L/R

M

DOLE VALVE

76SV0102B

76MV0102A

76HV0042

76HV0043B

76HV0043A

1.5-POL

76HV0044

1-RSL

2-CEN

76HV0045

76HV0046

76HV0047

THICKENING CENTRIFUGE NO. 2  
76-TC-02

5"

NOTE 1

DEGASSING TANK

10-CEN

2-PRW

10-CEN

16-TSL

PACKAGE SYSTEM

THICKENED SOLIDS WET WELL

244

76-I-51

245

76-I-130

76-I-42

76-I-31  
234  
THICKENING CENTRIFUGE  
FEED PUMP NO. 2

76-I-211  
455  
THICKENING CENTRIFUGE  
POLY FEED PUMP NO. 2

NOTES:  
1. SEE DWG 76-I-311 FOR THE FOUL AIR SYSTEM.

P&ID NOT INCLUDED IN THIS CONTRACT.  
SEE EXISTING CONTRACT DOCUMENTS.

SAN DIEGO MBC IMPROVEMENTS  
INSTRUMENTATION AND CONTROL - P&ID  
CENTRIFUGE BUILDING  
**THICKENING CENTRIFUGE NO. 2**

CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 270 OF 381 SHEETS		WBS S-17013/B-17006
APPROVED: <i>Andreas Demich</i>	DATE: 12/30/2020	SUBMITTED BY: <b>MONIKA SMO CZYNSKI</b> PROJECT MANAGER
PRINT DCE NAME: Andreas Demich	RCE#: C70321	DESIGNED BY: <b>MONIKA SMO CZYNSKI</b> PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL	JACOBS	2/5/20
ADDENDUM D	JACOBS	4/7/21
DATE STARTED		382 - 457
DATE COMPLETED		1888 - 6280
CONTRACTOR		CCS27 COORDINATE
INSPECTOR		CCS83 COORDINATE
DATE COMPLETED		41198-1270-D

CONSULTANT



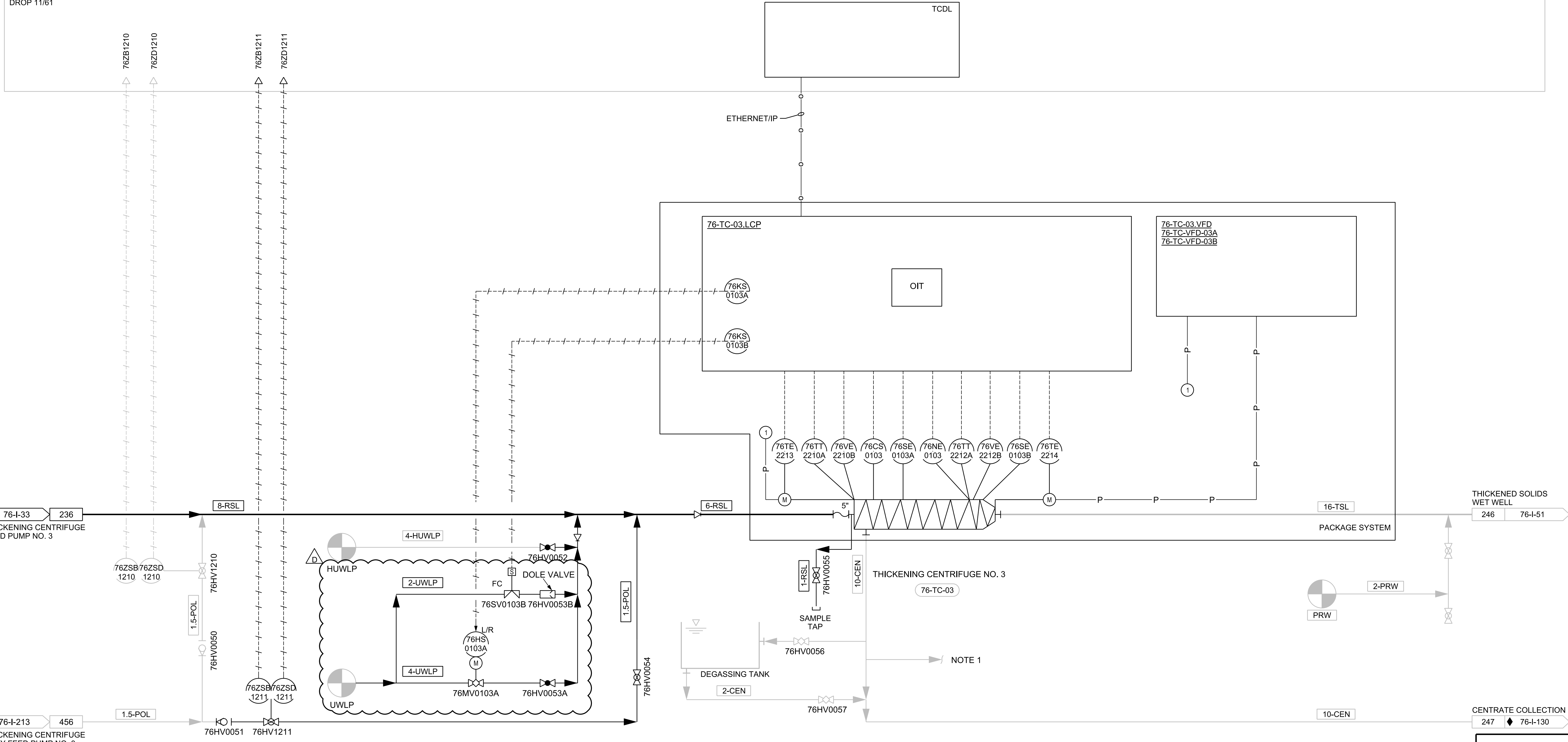
2/05/2019



CONTRACTOR: \_\_\_\_\_ DATE STARTED: \_\_\_\_\_  
INSPECTOR: \_\_\_\_\_ DATE COMPLETED: \_\_\_\_\_



76PCM02  
DROP 11/61



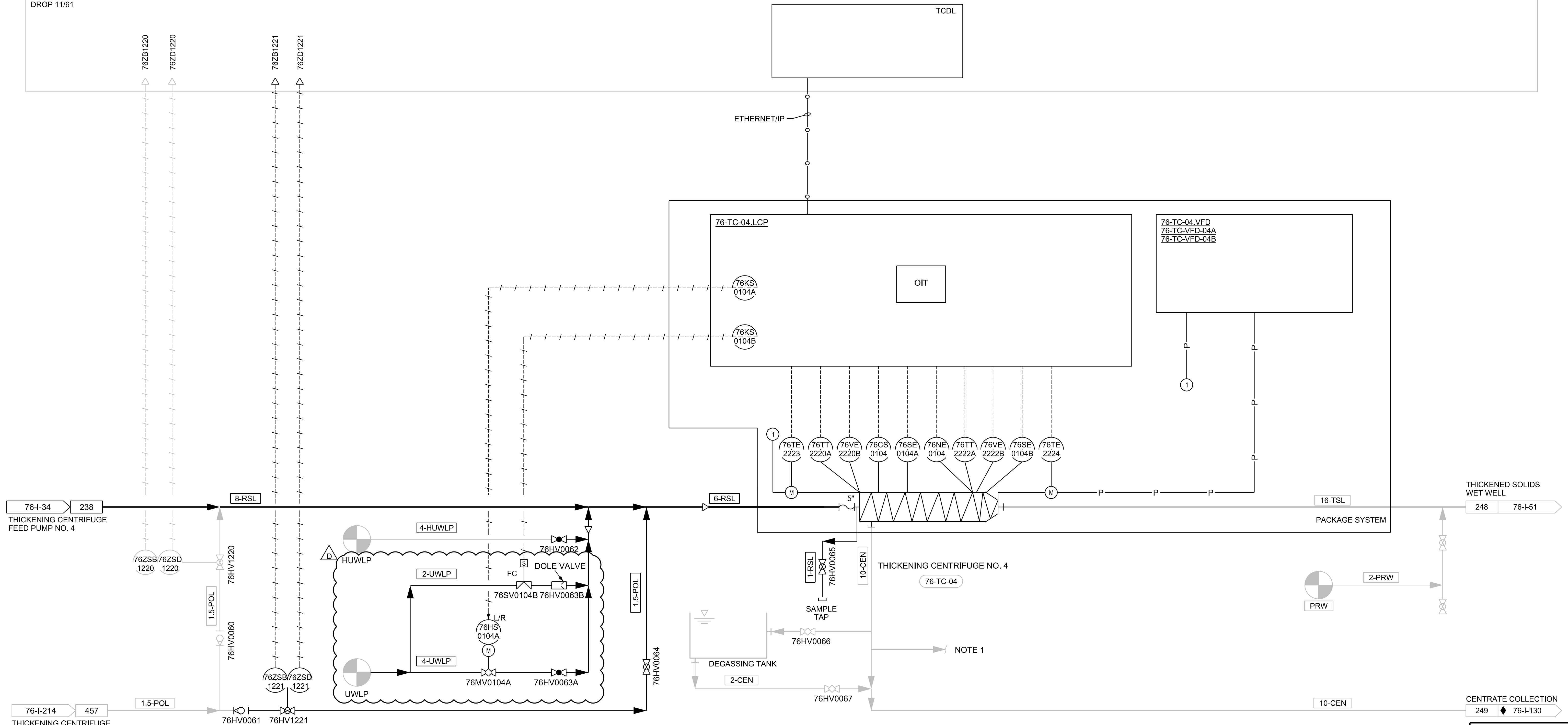
**NOTES:**  
1. SEE DWG 76-I-311 FOR THE FOUL AIR SYSTEM.

♦ P&ID NOT INCLUDED IN THIS CONTRACT.  
SEE EXISTING CONTRACT DOCUMENTS.

SAN DIEGO MBC IMPROVEMENTS INSTRUMENTATION AND CONTROL - P&ID CENTRIFUGE BUILDING <b>THICKENING CENTRIFUGE NO. 3</b>			
CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 271 OF 381 SHEETS		WBS S-17013/B-17006	
APPROVED: <i>[Signature]</i> FOR CITY ENGINEER PRINT DCE NAME: Andresa Demich	DATE: 12/30/2020 RICE#: C70321	SUBMITTED BY: MONIKA SMOCZYNSKI PROJECT MANAGER DESIGNED BY: MONIKA SMOCZYNSKI PROJECT ENGINEER	
DESCRIPTION ORIGINAL JACOBS ADDENDUM D JACOBS	BY APPROVED DATE 2/5/20 4/7/21	DATE 2/5/20 4/7/21	FILE 382 - 457 1888 - 6280
CONTRACTOR INSPECTOR		DATE STARTED DATE COMPLETED	
		41198-1271-D	

CONSULTANT  	 2/05/2019
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76PCM02  
DROP 11/61



**NOTES:**  
1. SEE DWG 76-I-311 FOR THE FOUL AIR SYSTEM.

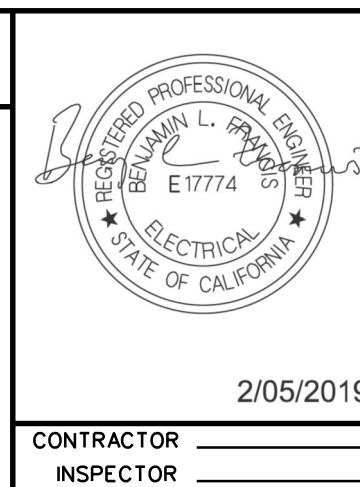
♦ P&ID NOT INCLUDED IN THIS CONTRACT.  
SEE EXISTING CONTRACT DOCUMENTS.

SAN DIEGO MBC IMPROVEMENTS  
INSTRUMENTATION AND CONTROL - P&ID  
CENTRIFUGE BUILDING  
**THICKENING CENTRIFUGE NO. 4**

CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 272 OF 381 SHEETS		WBS S-17013/B-17006
APPROVED: <i>[Signature]</i> FOR CITY ENGINEER PRINT DCE NAME: Andreea Demich	DATE: 12/30/2020 RICE#: C70321	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL	JACOBS	2/5/20
ADDENDUM D	JACOBS	4/7/21
		DATE FILM
		382 - 457
		1888 - 6280
		41198-1272-D

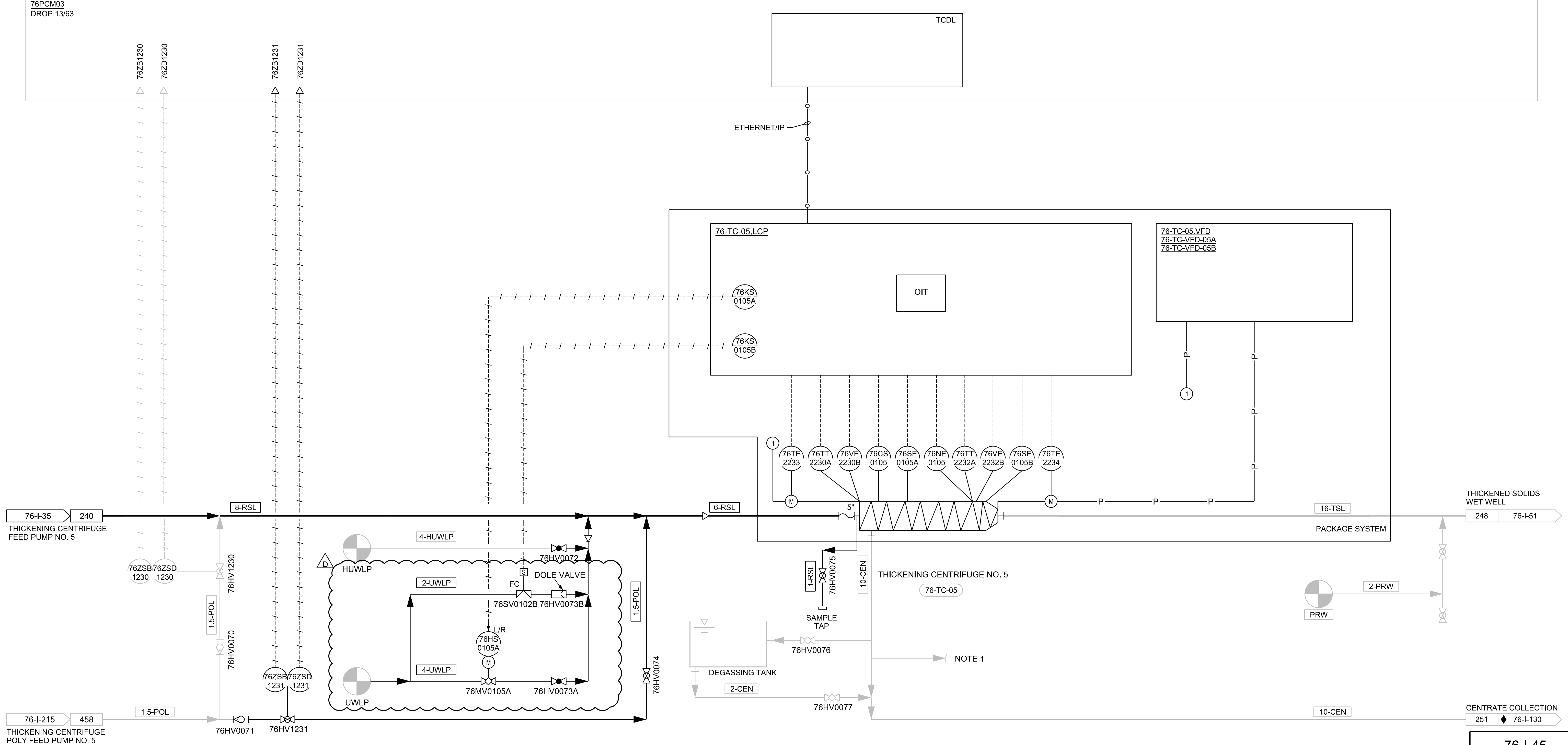
CONSULTANT

2/05/2019



CONTRACTOR: \_\_\_\_\_ DATE STARTED: \_\_\_\_\_  
INSPECTOR: \_\_\_\_\_ DATE COMPLETED: \_\_\_\_\_

76PCM03  
DROP 13/63



**NOTES:**  
1. SEE DWG 76-I-311 FOR THE FOUL AIR SYSTEM.

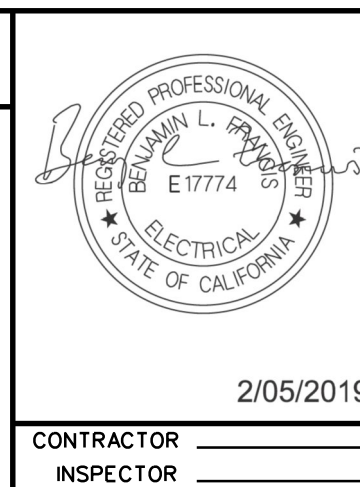
◆ P&ID NOT INCLUDED IN THIS CONTRACT. SEE EXISTING CONTRACT DOCUMENTS.

SAN DIEGO MBC IMPROVEMENTS  
INSTRUMENTATION AND CONTROL - P&ID  
CENTRIFUGE BUILDING  
**THICKENING CENTRIFUGE NO. 5**

CITY OF SAN DIEGO, CALIFORNIA PUBLIC UTILITIES DEPARTMENT SHEET 273 OF 381 SHEETS		WBS S-17013/B-17006
APPROVED: <i>Andreas Demich</i>	DATE: 12/30/2020	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER
PRINT DCE NAME: Andreas Demich	RCE#: C70321	DESIGNED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL	JACOBS	<i>Richard Klein</i>
ADDENDUM D	JACOBS	<i>Richard Klein</i>
		DATE FILM
		2/5/20
		4/7/21
		382 - 457
		1888 - 6280
		41198-1273-D

CONSULTANT

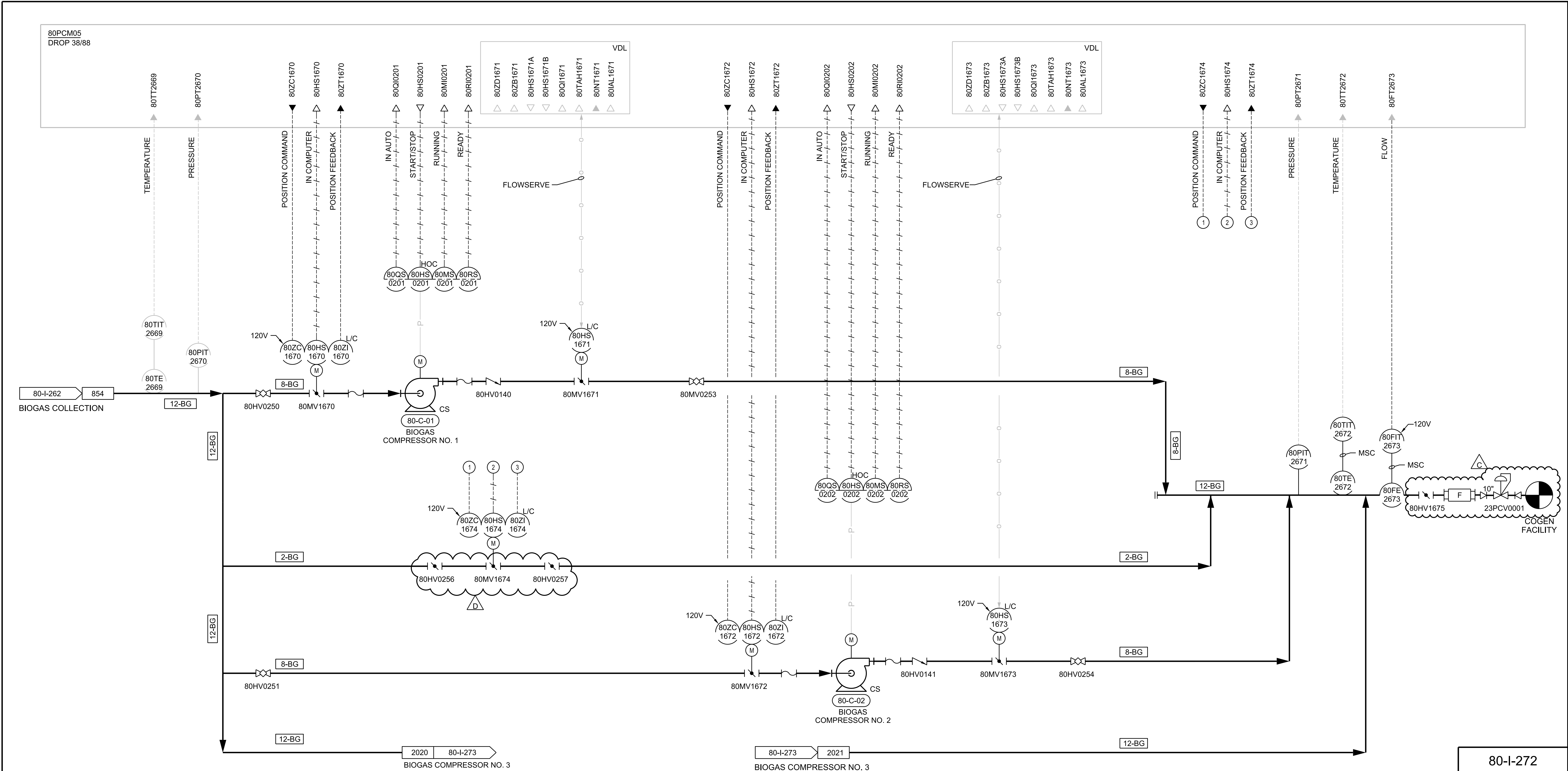
2/05/2019



CONTRACTOR  
INSPECTOR

DATE STARTED  
DATE COMPLETED





SAN DIEGO MBC IMPROVEMENTS  
INSTRUMENTATION AND CONTROL - P&ID  
DIGESTER COMPLEX  
**BIOGAS COMPRESSORS**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC UTILITIES DEPARTMENT  
SHEET 338 OF 381 SHEETS

WBS S-17013/B-17006

APPROVED: <i>Andrea Demich</i> FOR CITY ENGINEER PRINT DCE NAME: Andrea Demich DATE: 12/30/2020 RICE#: C70321	SUBMITTED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT MANAGER DESIGNED BY: <b>MONIKA SMOCZYNSKI</b> PROJECT ENGINEER
DESCRIPTION ORIGINAL JACOBS 2/5/20 ADDENDUM C JACOBS 3/24/21 ADDENDUM D JACOBS 4/7/21	BY: <i>Rafael Marin</i> APPROVED: <i>Rafael Marin</i> DATE FILM: 382 - 457 CCS27 COORDINATE: 1888 - 6280 CCS83 COORDINATE:

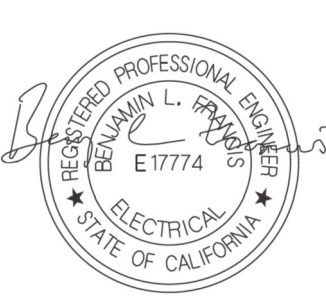
CONTRACTOR: \_\_\_\_\_ DATE STARTED: \_\_\_\_\_  
 INSPECTOR: \_\_\_\_\_ DATE COMPLETED: \_\_\_\_\_

41198-1338-D

CONSULTANT

ch2m

2/05/2019







## ENGINEER OF WORK

The Engineering Specifications and Special Provisions contained herein have been prepared by or under the direction of the following Registered Engineer:



4/14/2021

Seal:



1) Registered Engineer

Date



4/14/2021

Seal:



2) For City Engineer

Date

## **A. CHANGES TO CONTRACT DOCUMENTS**

The following changes to the Contract Documents are hereby made effective as though originally issued with the bid package. Bidders are reminded that all previous requirements to this solicitation remain in full force and effect.

## **B. BIDDER'S QUESTIONS**

Q1. Currently there is no bid item for the Digester cleaning. How much estimated volume of existing digester contents should we as the Contractor expect in each Digester for cleaning? This is needed for the basis of estimate. What is the expected volume quantity in the active digester? What is the expected volume quantity in the digesters that are offline?

A1. Digester cleaning is included in lump sum Bid Item 11. See modification to Specification Section 01 29 00 in Addendum D. Assume total volume of digester residuals, as specified.

Q2. Specification 44 46 23 states "The total amount of residuals to be removed is estimated to be 410,300 gallons." Please confirm if this is per digester for a total of 1,230,900 gallons. Or this is total quantity for all three digesters.

A2. Assume total volume of digester residuals, as specified.

Q3. After my review of addendum "D" (#4), Q&A #3 – regarding a plug valve labeling issue.

1. I am not able to find any "75" series valve on SHT G-110 (even from addendum 3/C).

a. Do you mean "76"?

b. Also, please correct SHT 76-D-331, Sect B as it reflects that this valve is 76HV1157

A3. The response for Addendum D Question 3 should be:

A3. Plug valve 76MV1157 as shown on 76-D-131 is the correct tag name. See G-110 MBC-Power Operated Valve Schedule for valve type. 76HV1157 shown on 76-D-331 should be 76MV1157.

a. There is no 75 series in this project. 76 is correct.

b. Section B/Sheet 76-D-331 is corrected by this Addendum Answer.

- Q4. Please confirm performance and payment bonds shall be valid for one year after final acceptance.
- A4. Per the Whitebook, Section 1-7.2 Contract Bonds, the bond shall be in full force and effect until acceptance and until all claims for materials and labor are paid and shall otherwise comply with the Government Code.
- Q5. Please confirm that builders risk policy covering contractor and subcontractors under OCIP includes off-site and in-transit coverage. Please confirm sub-limits of such coverage.
- A5. Confirmed. \$10M sub-limit for each per Occurrence.
- Q6. Please confirm that builders risk policy covering contractor and subcontractors under OCIP provides for replacement cost coverage.
- A6. Confirmed, unless the property is not replaced and then the loss shall be settled on ACV.
- Q7. Please confirm that builders risk policy covering contractor and subcontractors under OCIP provides for terrorism coverage.
- A7. No Terrorism Coverage.
- Q8. Attachment E, section 7-4.9 OCIP Builder's Risk Insurance – states that the builders risk policy under the OCIP does not provide for earthquake coverage. Please confirm that Owner is responsible for all losses as related to earthquake.
- A8. No earthquake coverage and owner is not responsible for all losses related to earthquake or earth movement.
- Q9. Would Owner furnish Contractor with a builder's risk policy for review?
- A9. Yes.
- Q10. Please confirm that OCIP builder's risk policy is DE5 or LEG3 level of coverage?
- A10. LEG3 coverage.
- Q11. In an effort to adequately quantify risk would the Owner consider a total limit of liability for Contractor.
- A11. No.

- Q12. In an effort to provide the best possible price to the Owner and adequately quantify risk would the Owner consider a mutual waiver of consequential damages on this project.
- A12. No.
- Q13. Can Owner confirm whether or not all funding is in place for this project?
- A13. Project is Phase Funded. Funding for Phase 1 is in place. Funding for subsequent phases is expected to be available the fiscal year in which it will be used.
- Q14. Please confirm that a San Diego Business Tax certificate is not required until project award.
- A14. Yes, confirmed.
- Q15. Will the owner furnish the contractor with the Workers Compensation, General Liability, and Excess Liability Insurance for review?
- A15. Yes.
- Q16. Please confirm that the General Liability policy covering the contractor and subcontractors under the OCIP will amend Damage to Your Work Exclusion will be deleted in its entirety or amended to clarify that the exclusion only applies to that particular part of your work which must be restored, repaired or replaced.
- A16. Yes, Exclusion L – Damage to Your Work is deleted in its entirety.
- Q17. Please confirm that the General Liability policy covering the contractor and subcontractors under the OCIP the Damage to your Product exclusion will be deleted in its entirety.
- A17. Yes, Exclusion K – Damage to Your Product is deleted in its entirety.
- Q18. Please confirm that the General Liability policy covering the contractor and subcontractors under the OCIP will be endorsed to modify the professional liability exclusion to the Contractors Professional Liability Limited Exclusion coverage provided by ISO endorsement CG 22 80.
- A18. No, the policy contains the CG 22 79 Professional Liability Exclusion.
- Q19. Please confirm that builders risk policy covering contractor and subcontractors under OCIP will not exclude resultant property damage caused by wind driven precipitation.

- A19. Confirmed.
- Q20. Please confirm that builders risk policy covering contractor and subcontractors under OCIP will not exclude resultant water damage to property that is not enclosed by a building envelope (i.e, Blue Tarp).
- A20. Confirmed.
- Q21. Please confirm that builders risk policy covering contractor and subcontractors under OCIP will provide for limits in an equal amount to the full contract value plus any additional soft costs or delay in startup values as it relates to Water Damage.
- A21. Each project is scheduled with separate total project value limit applicable to that project. \$250,000 sublimit for soft costs.
- Q22. Please confirm that builders risk policy covering contractor and subcontractors under OCIP will provide for limits in an equal amount to the full contract value plus any additional soft costs or delay in startup values for the perils of Flood and Named Windstorm.
- A22. \$250,000 sublimit for soft costs. Flood sublimit is \$200,000,000 per Occurrence and in the Annual Aggregate per project and in all projects combined except Flood for Insured Property located in Flood Zone A including any sub zones is \$25,000,000.
- Q23. Please confirm that builders risk policy covering contractor and subcontractors under OCIP will provide for limits in an equal amount to the full contract value plus any additional soft costs or delay in startup values as it relates to Water Damage, perils of flood, named windstorm or any other peril.
- A23. Sub limits include:
- Water Damage Included (to declared project total project value).
  - Flood Sublimit: \$200,000,000 per Occurrence and in the Annual Aggregate per project and in all projects combined except for Insured Property located in Flood Zone A including any sub zones \$25,000,000.
  - Flood Zone V is excluded.
  - Named Windstorm Included (to declared project total project value).
  - Delay/Soft Costs sublimit \$250,000 per occurrence.
- Q24. Please confirm the following are not listed as exclusions under the OCIP builders risk policy. Piling, Serial Loss, Micro cracking, Unsealed Road, HDD,

Wet Works, Underground tunneling, Boiler and Machinery Explosion Exclusion, and Frost and Freezing Exclusion.

A24. The Builders Risk Policy contains the following:

Frost and Freezing sublimit of 10%.

There is not a microcracking exclusion but there is the typical exclusion for normal settling, shrinkage and/or expansion of buildings and/or foundations.

Trench Limitation: It is hereby understood and agreed that the Company shall not be liable for loss of or damage to more than 2,000 feet of open trench, partially or completely excavated.

Tunnel Clause:

This Policy will not indemnify the Insured in respect of expenses incurred for:

- (i) Alterations in the construction method or due to unforeseen ground conditions or obstructions,
- (ii) Measures which become necessary to improve or stabilize ground conditions or to seal against water ingress unless necessary to reinstate otherwise insured loss or damage,
- (iii) Removing material which has been excavated, or due to overbreak in excess of the design profile and/or for refilling cavities resulting therefrom,
- (iv) Dewatering unless necessary to reinstate otherwise insured loss or damage,
- (v) Loss or damage due to breakdown of the dewatering system if such loss or damage could have been avoided by use of standby facilities,
- (vi) The abandonment or recovery of tunnel-boring machines,
- (vii) Loss or damage to existing road surface, roadbed, paving, curbs, medians, signage, sidewalks, or above ground structures,
- (viii) The loss of bentonite, suspensions, or any media or substance used for excavation support or as a ground-conditioning agent.

In the event of otherwise insured loss or damage to Insured Property, the maximum amount payable under this Policy shall be limited to the expenses incurred to reinstate the Insured Property to a standard or condition technically equivalent to that which existed immediately before the Occurrence of loss or damage but not in excess 115% (percent) of the original average dollar-per-linear foot construction cost of the immediate damaged area.

Exclusions: in addition to the exclusions in the form, the policy will also exclude with respect to Wet Work, expenses incurred for:

- (i) Loss or damage to the Insured Property due to normal action of the sea and/or river which could have reasonably be foreseen to occur based on its previous meteorological and/or in the case of the sea its oceanographical history;
- (ii) Loss of or damage to fill underwater excavations, excavated material, bedding material or other underwater fill rock or protection unless accompanied by indemnifiable damage to other Insured Property;
- (iii) The cost of redredging, retro filling, trenching, or retrenching any dredged trench or area unless necessitated by indemnifiable damage to other parts of the Insured Property;

Q25. It is unclear if limits for General Liability insurance are exclusive for the project for product-completed operations (PCO). Limits could be diluted by other projects if the PCO extension is shared between all projects. Please confirm PCO limit is available exclusively for the project.

A25. No, there is one Products-Completed Operations aggregate limit for all projects contemplated under the Pure Water OCIP.

Q26. Section F, 80-D-311 shows the 10" EOF and 10" OF penetrating the pipe gallery deck. What are the elevations of the pipe gallery deck at the penetration points?

A26. Ground level is EL 411'.

Q27. What is the elevation the 10" OF and 10" EOF at the point of where they meet the pipe gallery piping shown on Y-123?

A27. EL 404' see Y-123.

James Nagelvoort, Director  
Engineering & Capital Projects Department

Dated: *April 15, 2021*  
San Diego, California

JN/AJ/rd

## Bid Results

### Bidder Details

Vendor Name PCL Construction Inc  
Address 3750 Schaufele Ave Ste 270  
Long Beach, California 90808  
United States  
Respondee Mike McKinney  
Respondee Title Vice President & District Manager  
Phone 480-829-6333  
Email cyakubow@pcl.com  
Vendor Type CADIR, PQUAL  
License # 913592  
CADIR 1000000753

### Bid Detail

Bid Format Electronic  
Submitted 04/20/2021 1:58 PM (PDT)  
Delivery Method  
Bid Responsive  
Bid Status Submitted  
Confirmation # 250165  
Ranking 0

### Respondee Comment

### Buyer Comment

### Attachments

File Title	File Name	File Type
sub debarment.pdf	sub debarment.pdf	General Attachments
Skilled and Trained Workforce.pdf	Skilled and Trained Workforce.pdf	General Attachments
Pending Actions.pdf	Pending Actions.pdf	General Attachments
Bid Bond.pdf	Bid Bond.pdf	Bid Bond
45003.pdf	45003.pdf	General Attachments
45004.pdf	45004.pdf	General Attachments
Disclosure of Lobbying.pdf	Disclosure of Lobbying.pdf	General Attachments
Prime Debarment and Suspension.pdf	Prime Debarment and Suspension.pdf	General Attachments
Business Interest Form.pdf	Business Interest Form.pdf	General Attachments



## Subcontractors

Showing 4 Subcontractors

Name & Address	Desc	License Num	CADIR	Amount	Type
Emerson Process Management Pov 200 Beta Drive Pittsburgh, Pennsylvania 15238	Control Systems	965251	1000041224	\$5,077,799.00	
GTE Metals PO Box 877 Canby, Oregon 97013	Structural & Misc Metals	668344	1000005201	\$557,065.00	
MP Environmental Services Inc. 3400 Manor St. Bakersfield, California 93308	Digester Cleaning	613706	1000014231	\$968,439.00	CAU, FEM, PQUAL, WBE
National Electric Works, Inc. 4440 Rainer Ave., Ste. 101 San Diego, California 92120	Electrical	591191	1000003595	\$2,050,000.00	NAT, MALE, MBE, CADIR, PQUAL

## Line Items

Discount Terms No Discount

Item #	Item Code	Type	Item Description	UOM	QTY	Unit Price	Line Total	Response	Comment
Main Bid							\$40,086,690.00		
1	524126		BONDS (PAYMENT AND PERFORMANCE)	LS	1	\$215,000.00	\$215,000.00	Yes	
2	237110		MOBILIZATION	LS	1	\$900,000.00	\$900,000.00	Yes	
3	541820		DISPUTE RESOLUTION BOARD (EOC Type I)	AL	1	\$68,000.00	\$68,000.00	Yes	
4	237110		SHEETING, SHORING, AND BRACING	LS	1	\$25,000.00	\$25,000.00	Yes	
5	238910		SITE CIVIL GRADING	LS	1	\$270,000.00	\$270,000.00	Yes	
6	237110		YARD PIPING	LS	1	\$1,700,000.00	\$1,700,000.00	Yes	
7	237110		RECEIVING TANK COMPLEX FACILITY 73	LS	1	\$815,000.00	\$815,000.00	Yes	
8	237110		CENTRIFUGE BUILDING FACILITY 76 - New Grit Separator	LS	1	\$1,200,000.00	\$1,200,000.00	Yes	
9	237110		CENTRIFUGE BUILDING FACILITY 76 - Centrifuge Buliding Improvements	LS	1	\$12,948,000.00	\$12,948,000.00	Yes	
10	237110		CENTRIFUGE BUILDING FACILITY 76 - Dewatering	LS	1	\$4,500,000.00	\$4,500,000.00	Yes	
11	237110		DIGESTER COMPLEX FACILITY 80	LS	1	\$7,300,000.00	\$7,300,000.00	Yes	
12	237110		BIOGAS FLARE FACILITY 10	LS	1	\$800,000.00	\$800,000.00	Yes	
13	237110		BIOGAS HOLDING TANK AND COMPRESSORS FACILITY 11	LS	1	\$940,000.00	\$940,000.00	Yes	
14	237110		WASTEWATER PUMP STATION AND ODOR CONTROL SYSTEM FACILITY 94	LS	1	\$680,000.00	\$680,000.00	Yes	
15	237110		CONTROLS, SYSTEM INTEGRATION	LS	1	\$5,800,000.00	\$5,800,000.00	Yes	
16			FIELD ORDERS (EOC Type II)	AL	1	\$1,600,000.00	\$1,600,000.00	Yes	
17	237110		INTEGRATION PERIOD SERVICES	LS	1	\$125,000.00	\$125,000.00	Yes	
18	237310		Curb Ramp Type A with Detectable Warning Tiles	EA	4	\$7,250.00	\$29,000.00	Yes	
19	237310		Curb Ramp Type B with Detectable Warning Tiles	EA	1	\$9,050.00	\$9,050.00	Yes	
20	237310		Curb Ramp Type D with Detectable Warning Tiles	EA	1	\$6,400.00	\$6,400.00	Yes	
21	237310		Additional Curb	LF	80	\$140.00	\$11,200.00	Yes	
22	237310		Additional Sidewalk	SF	320	\$25.00	\$8,000.00	Yes	
23	237310		Remove and Replace Existing Curb and Gutter	LF	280	\$127.00	\$35,560.00	Yes	
24	237310		Remove and Replace Existing Sidewalk	SF	1120	\$86.00	\$96,320.00	Yes	
25	237110		Hazardous Waste Operations and Emergency Response (HAZWOPER) Certification (EOC Type I)	AL	1	\$5,160.00	\$5,160.00	Yes	

## Line Item Subtotals

Section Title	Line Total
Main Bid	\$40,086,690.00
Grand Total	\$40,086,690.00

Line Totals (Unit Price * Quantity)								
Item Num	Section	Item Code	Description	Reference	Unit of Measure	Quantity	PCL Construction Inc - Unit Price	PCL Construction Inc - Line Total
1	Main Bid	524126	BONDS (PAYMENT AND PERFORMANCE)	1-7.2.1	LS	1	\$215,000.00	\$215,000.00
2	Main Bid	237110	MOBILIZATION	7-3.4.1	LS	1	\$900,000.00	\$900,000.00
3	Main Bid	541820	DISPUTE RESOLUTION BOARD (EOC Type I)	2-10.2.3	AL	1	\$68,000.00	\$68,000.00
4	Main Bid	237110	SHEETING, SHORING, AND BRACING	Section 01 29 00	LS	1	\$25,000.00	\$25,000.00
5	Main Bid	238910	SITE CIVIL GRADING	Section 01 29 00	LS	1	\$270,000.00	\$270,000.00
6	Main Bid	237110	YARD PIPING	Section 01 29 00	LS	1	\$1,700,000.00	\$1,700,000.00
7	Main Bid	237110	RECEIVING TANK COMPLEX FACILITY 73	Section 01 29 00	LS	1	\$815,000.00	\$815,000.00
8	Main Bid	237110	CENTRIFUGE BUILDING FACILITY 76 - New Grit Separator	Section 01 29 00	LS	1	\$1,200,000.00	\$1,200,000.00
9	Main Bid	237110	CENTRIFUGE BUILDING FACILITY 76 - Centrifuge Buliding Improvements	Section 01 29 00	LS	1	\$12,948,000.00	\$12,948,000.00

10	Main Bid	237110	CENTRIFUGE BUILDING FACILITY 76 - Dewatering	Section 01 29 00	LS	1	\$4,500,000.00	\$4,500,000.00
11	Main Bid	237110	DIGESTER COMPLEX FACILITY 80	Section 01 29 00	LS	1	\$7,300,000.00	\$7,300,000.00
12	Main Bid	237110	BIOGAS FLARE FACILITY 10	Section 01 29 00	LS	1	\$800,000.00	\$800,000.00
13	Main Bid	237110	BIOGAS HOLDING TANK AND COMPRESSORS FACILITY 11	Section 01 29 00	LS	1	\$940,000.00	\$940,000.00
14	Main Bid	237110	WASTEWATER PUMP STATION AND ODOR CONTROL SYSTEM FACILITY 94	Section 01 29 00	LS	1	\$680,000.00	\$680,000.00
15	Main Bid	237110	CONTROLS, SYSTEM INTEGRATION	Section 01 29 00	LS	1	\$5,800,000.00	\$5,800,000.00
16	Main Bid		FIELD ORDERS (EOC Type II)	7-3.9	AL	1	\$1,600,000.00	\$1,600,000.00
17	Main Bid	237110	INTEGRATION PERIOD SERVICES	Section 01 29 00	LS	1	\$125,000.00	\$125,000.00
18	Main Bid	237310	Curb Ramp Type A with Detectable Warning Tiles	303-5.10.2	EA	4	\$7,250.00	\$29,000.00
19	Main Bid	237310	Curb Ramp Type B with Detectable Warning Tiles	303-5.10.2	EA	1	\$9,050.00	\$9,050.00

20	Main Bid	237310	Curb Ramp Type D with Detectable Warning Tiles	303-5.10.2	EA	1	\$6,400.00	\$6,400.00
21	Main Bid	237310	Additional Curb	303-5.10.2	LF	80	\$140.00	\$11,200.00
22	Main Bid	237310	Additional Sidewalk	303-5.10.2	SF	320	\$25.00	\$8,000.00
23	Main Bid	237310	Remove and Replace Existing Curb and Gutter	303-5.9	LF	280	\$127.00	\$35,560.00
24	Main Bid	237310	Remove and Replace Existing Sidewalk	303-5.9	SF	1120	\$86.00	\$96,320.00
25	Main Bid	237110	Hazardous Waste Operations and Emergency Response (HAZWOPER) Certification (EOC Type I)	Section 01 29 00	AL	1	\$5,160.00	\$5,160.00
							Subtotal	\$40,086,690.00
							Total	\$40,086,690.00

**SUBCONTRACTOR LISTING**

**(OTHER THAN FIRST TIER)**

Pursuant to California Senate Bill 96 and in accordance with the requirements of Labor Code sections 1771.1 and 1725.5, by submitting a bid or proposal to the City, Contractor is certifying that he or she has verified that all subcontractors used on this public work project are registered with the California Department of Industrial Relations (DIR). **The Bidder is to list below the name, address, license number, DIR registration number of any (known tiered subcontractor) - who will perform work, labor, render services or specially fabricate and install a portion [type] of the work or improvement pursuant to the contract. If none are known at this time, mark the table below with non-applicable (N/A).**

NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	DIR REGISTRATION NUMBER	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK
Name: <u>    N/A    </u> Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____				
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____				
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____				
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____				

**\*\* USE ADDITIONAL FORMS AS NECESSARY \*\***