

# City of San Diego

**CONTRACTOR'S NAME:** CSI Electrical Contractors, Inc.  
**ADDRESS:** 10623 Fulton Wells Ave., Santa Fe Springs, CA 90670  
**TELEPHONE NO.:** (562) 946-0700 Ext. 422 **FAX NO.:** \_\_\_\_\_  
**CITY CONTACT:** Celina Suarez, Contract Specialist, Email: [CSuarez@sandiego.gov](mailto:CSuarez@sandiego.gov)  
Phone No. (619) 533-6678  
I. Hoffman / A. Jaro / R. Dinjotian

## BIDDING DOCUMENTS



**FOR**

## SBWRP VARIABLE FREQUENCY DRIVE REPL

**BID NO.:** K-20-1807-DBB-3  
**SAP NO. (WBS/IO/CC):** B-19066  
**CLIENT DEPARTMENT:** 2000  
**COUNCIL DISTRICT:** 8  
**PROJECT TYPE:** HA

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

- THE CITY'S SUBCONTRACTING PARTICIPATION REQUIREMENTS FOR SLBE PROGRAM
- BID DISCOUNT PROGRAM (The WHITEBOOK, Part 10, EOCP SECTION B, ITEM 4.2)
- PREVAILING WAGE RATES: STATE  FEDERAL
- APPRENTICESHIP

**BID DUE DATE:**

**2:00 PM**  
**MAY 5, 2020**

**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:

PARITA AMMERLAIN  
For City Engineer

9/1/2020  
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>

| <b>ITEM</b> | <b>DOCUMENT TO BE SUBMITTED</b>  | <b>WHEN DUE</b>   | <b>FROM</b>            |
|-------------|--|---|------------------------|
| 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.          | Debarment and Suspension Certification for Prime Contractors   | At Time of Bid  | ALL BIDDERS            |
| 5.          | Debarment and Suspension Certification for Subcontractors, Suppliers & Mfgrs   | At Time of Bid  | ALL BIDDERS            |
| 6.          | Bid Bond (Original)  | By 5PM Next Business Day After Bid Opening                                      | 5 APPARENT LOW BIDDERS |
| 7.          | SLBE Good Faith Effort Documentation   | Within 3 working days of bid opening  | ALL BIDDERS            |
| 8.          | Form AA60 – List of Work Made Available  | Within 3 working days of bid opening with Good Faith Effort (GFE) documentation | ALL BIDDERS            |
| 9.          | Technical submittal requirements   | At Time of Bid  | ALL BIDDERS            |
| 10.         | 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                   | APPARENT LOW BIDDER    |
| 11.         | Payment & Performance Bond; Certificates of Insurance & Endorsements; and Signed Contract Agreement Page   | Within 10 working days of receipt by bidder of contract forms and NOI           | APPARENT LOW BIDDER    |
| 12.         | Listing of "Other Than First Tier" Subcontractors  | Within 10 working days of receipt by bidder of contract forms                   | APPARENT LOW BIDDER    |

## NOTICE INVITING BIDS

1. **SUMMARY OF WORK:** This is the City of San Diego's (City) solicitation process to acquire Construction services for **SBWRP Variable Frequency Drive Repl.** 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 **\$632,000.**
4. **BID DUE DATE AND TIME ARE: MAY 5, 2020 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: **C-10**
7. **SUBCONTRACTING PARTICIPATION PERCENTAGES:** Subcontracting participation percentages apply to this contract.
  - 7.1. The City has incorporated **mandatory** SLBE-ELBE subcontractor participation percentages to enhance competition and maximize subcontracting opportunities. For the purpose of achieving the mandatory subcontractor participation percentages, a recommended breakdown of the SLBE and ELBE subcontractor participation percentages based upon certified SLBE and ELBE firms has also been provided to achieve the mandatory subcontractor participation percentages:

|                                  |              |
|----------------------------------|--------------|
| 1. SLBE participation            | <b>8.6%</b>  |
| 2. ELBE participation            | <b>13.7%</b> |
| 3. Total mandatory participation | <b>22.3%</b> |
  - 7.2. The Bid may be declared non-responsive if the Bidder fails to meet the following requirements:
    - 7.2.1. Include SLBE-ELBE certified subcontractors at the overall mandatory participation percentage identified in this document; **OR**
    - 7.2.2. Submit Good Faith Effort (GFE) documentation, saved in searchable Portable Document Format (PDF) and stored on a Universal Serial Bus (USB) Type-A, Compact Disc (CD) or Digital Video Disc (DVD), demonstrating the Bidder made a good faith effort to outreach to and include SLBE-ELBE Subcontractors required in this document within 3 Working Days of the Bid opening if the overall mandatory participation percentage is not met.

GFE shall be submitted to:  
Public Works Contracts  
525 B Street, Suite 750 (7th Floor)  
San Diego, California, 92101  
Attention: Celina Suarez

**8. AWARD PROCESS:**

- 8.1. 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.
- 8.2. 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.
- 8.3. 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.
- 8.4. The low Bid will be determined by the Base Bid alone.
- 8.5. Once the low bid has been determined, the City may, at its sole discretion, award the contract for the Base Bid alone.

**9. SUBMISSION OF QUESTIONS:**

- 9.1. The Director (or Designee) of Public Works 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:

Public Works Contracts  
525 B Street, Suite 750 (7<sup>th</sup> Floor)  
San Diego, California, 92101  
Attention: Celina Suarez

OR:

[CSuarez@sandiego.gov](mailto:CSuarez@sandiego.gov)

- 9.2. Questions received less than 14 days prior to the date for opening of Bids may not be considered.
- 9.3. 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.
- 9.4. 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.

## 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™](#).

3. **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.
- 3.1. **BIDDERS MUST BE PRE-REGISTERED** with the City's bidding system and possess a system-assigned Digital ID in order to submit an electronic bid.
- 3.2. 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.
- 3.3. 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.
- 3.4. **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.
- 3.5. **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, EOCB compliance and other issues. The City may require any Bidder to furnish statement of experience, financial responsibility, technical ability, equipment, and references.
- 3.6. **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.



**3.8. BIDS MAY BE WITHDRAWN** by the Bidder only up to the bid due date and time.

**3.8.1. 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.

**3.9. ACCESSIBILITY AND AMERICANS WITH DISABILITIES ACT (ADA) COMPLIANCE:** To request a copy of this solicitation in an alternative format, contact the Public Works 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.

**4. ELECTRONIC BID SUBMISSIONS CARRY FULL FORCE AND EFFECT:**

**4.1.** 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.

**4.2.** 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.

**4.3.** 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.

**4.4.** 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.

**5. 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.

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

**6.1. 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>

**6.2.** 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.

**7. 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.

**8. INSURANCE REQUIREMENTS:**

**8.1.** 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.

**9. 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”) *<br><a href="https://www.sandiego.gov/publicworks/edocref/greenbook">https://www.sandiego.gov/publicworks/edocref/greenbook</a>      | 2018    | PWPI010119-02   |
| City of San Diego Standard Drawings*<br><a href="https://www.sandiego.gov/publicworks/edocref/standarddraw">https://www.sandiego.gov/publicworks/edocref/standarddraw</a>   | 2018    | PWPI010119-03   |
| Citywide Computer Aided Design and Drafting (CADD) Standards<br><a href="https://www.sandiego.gov/publicworks/edocref/drawings">https://www.sandiego.gov/publicworks/edocref/drawings</a>                                       | 2018    | PWPI010119-04   |
| California Department of Transportation (CALTRANS) Standard Specifications<br><a href="http://www.dot.ca.gov/des/oe/construction-contract-standards.html">http://www.dot.ca.gov/des/oe/construction-contract-standards.html</a> | 2018    | PWPI030119-05   |
| CALTRANS Standard Plans<br><a href="http://www.dot.ca.gov/des/oe/construction-contract-standards.html">http://www.dot.ca.gov/des/oe/construction-contract-standards.html</a>  | 2018    | PWPI030119-06   |
| California Manual on Uniform Traffic Control Devices Revision 4 (CA MUTCD Rev 4) <a href="http://www.dot.ca.gov/trafficops/camutcd/">http://www.dot.ca.gov/trafficops/camutcd/</a>  | 2014    | PWPI030119-08   |

| Title   | Edition | Document Number |
|---|---------|-----------------|
| <p><b>NOTE:</b>           *Available online under Engineering Documents and References at:<br/> <a href="http://www.sandiego.gov/publicworks/edocref/index.shtml">http://www.sandiego.gov/publicworks/edocref/index.shtml</a></p> <p>*Electronic updates to the Standard Drawings may also be found in the link above</p> |         |                 |

- 10. 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.
- 11. 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.
- 12. 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.
- 13. SUBCONTRACTOR INFORMATION:**
- 13.1. 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 – Section 3-2, "SELF- PERFORMANCE", 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.

- 13.2. 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.
- 13.3. 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.
- 14. SUBMITTAL OF "OR EQUAL" ITEMS:** See Section 4-6, "Trade Names" in The WHITEBOOK and as amended in the SSP.
- 15. AWARD:**

  - 15.1.** The Award of this contract is contingent upon the Contractor's compliance with all conditions precedent to Award.
  - 15.2.** 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.
  - 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 the City Attorney's Office.
- 16. 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.

17. **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 Public Works Contracts.
18. **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.
19. **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.
20. **BIDDER'S GUARANTEE OF GOOD FAITH (BID SECURITY) FOR DESIGN-BID-BUILD CONTRACTS:**
  - 20.1. 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.
  - 20.2. 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.
  - 20.3. 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.
  - 20.4. 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 the next business day after the bid opening date, the first five apparent low 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 the next business day after bid opening date shall cause the bid to be rejected and deemed **non-responsive**.

Original Bid Bond shall be submitted to:  
Public Works Contracts  
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.

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

- 21.1.** This contract may be awarded to the lowest responsible and reliable Bidder.
- 21.2.** Bidders shall complete ALL eBid forms as required by this solicitation. Incomplete eBids will not be accepted.
- 21.3.** 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.
- 21.4.** 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.
- 21.5.** 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.
- 21.6.** 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.
- 21.7.** 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.
- 21.8.** 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.

**22. BID RESULTS:**

- 22.1.** 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.
- 22.2.** 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.

**23. THE CONTRACT:**

- 23.1.** 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.
- 23.2.** 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.
- 23.3.** 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.
- 23.4.** 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.
- 23.5.** 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 in the herein and in the Notice of 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:

CSI Electrical Contractors, Inc., a corporation, as principal, and  
Great American 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  
**Five Hundred Eight Thousand Two Hundred Ninety Two Dollars and Nine Cents (\$508,292.09)**  
for the faithful performance of the annexed contract, and in the sum of **Five Hundred Eight  
Thousand Two Hundred Ninety Two Dollars and Nine Cents (\$508,292.09)** 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 shall pay reasonable attorney's fees should suit be brought to enforce the  
provisions of this bond.

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 Principal in completing the improvements and work specified in  
the Agreement, nor shall Surety accept a bid from Principal for completion of the improvements and  
work specified in the Agreement. If the City of San Diego, when declaring the Principal in default,  
notifies Surety of the City of San Diego's objection to Principal's further participation in the completion  
of the improvements and work specified in the Agreement.


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

Dated July 2, 2020

Approved as to Form

CSI Electrical Contractors, Inc.

Principal

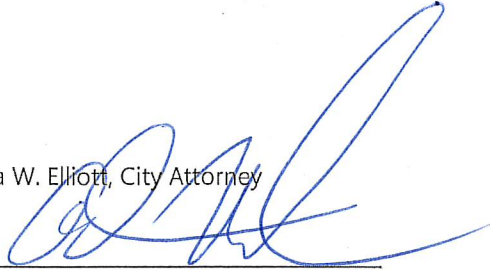
By 

Richard L. Yauney

Printed Name of Person Signing for Principal



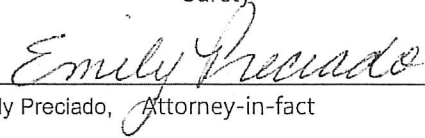
Mara W. Elliott, City Attorney

By 


Deputy City Attorney

Great American Insurance Company

Surety

By   
Emily Preciado, Attorney-in-fact

Approved:

By 

Stephen Samara  
Principal Contract Specialist  
Engineering & Capital Projects

750 The City Drive South, Suite 470

Local Address of Surety

Orange, CA 92868

Local Address (City, State) of Surety

(714)740-3362 Kathy Wittler

Local Telephone No. of Surety

Premium \$ 5,716.00

Bond No. 3224927

**CALIFORNIA ACKNOWLEDGMENT**

CIVIL CODE § 1189

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.

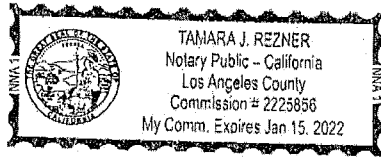
State of California

County of Los Angeles }

On July 7<sup>th</sup> 2020 before me, Tamara J. Reznor, Notary Public  
Date Here Insert Name and Title of the Officer

personally appeared Richard Yauney  
Name(s) of Signer(s)

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 Tamara J. Reznor  
Signature of Notary Public

Place Notary Seal and/or Stamp Above

**OPTIONAL**

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

**Description of Attached Document**

Title or Type of Document: Performance & Maintenance Bond

Document Date: 7/2/2020 Number of Pages: 1

Signer(s) Other Than Named Above: Emily Preciado, Marc Elliott, Stephen Samara

**Capacity(ies) Claimed by Signer(s)**

Signer's Name: Richard Yauney  
 Corporate Officer - Title(s): CEO  
 Partner -  Limited  General  
 Individual  Attorney in Fact  
 Trustee  Guardian or Conservator  
 Other: \_\_\_\_\_

Signer is Representing: CSI Electrical Contractors Inc.

~~Signer's Name: \_\_\_\_\_  
 Corporate Officer - Title(s): \_\_\_\_\_  
 Partner -  Limited  General  
 Individual  Attorney in Fact  
 Trustee  Guardian or Conservator  
 Other: \_\_\_\_\_~~

~~Signer is Representing: \_\_\_\_\_~~

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT**

**CIVIL CODE § 1189**

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 California )  
County of Los Angeles )

On July 2, 2020 before me, Mary Smith, Notary Public

*Date Here Insert Name and Title of the Officer*

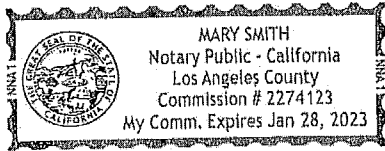
personally appeared Emily Preciado

*Name(s) of Signer(s)*

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 Mary Smith  
*Signature of Notary Public*

*Place Notary Seal Above*

**OPTIONAL**

*Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: \_\_\_\_\_ Document Date: \_\_\_\_\_

Number of Pages: \_\_\_\_\_ Signer(s) Other Than Named Above: \_\_\_\_\_

**Capacity(ies) Claimed by Signer(s)**

Signer's Name: \_\_\_\_\_

Corporate Officer — Title(s): \_\_\_\_\_

Partner —  Limited  General

Individual  Attorney in Fact

Trustee  Guardian or Conservator

Other: \_\_\_\_\_

Signer Is Representing: \_\_\_\_\_

Signer's Name: \_\_\_\_\_

Corporate Officer — Title(s): \_\_\_\_\_

Partner —  Limited  General

Individual  Attorney in Fact

Trustee  Guardian or Conservator

Other: \_\_\_\_\_

Signer Is Representing: \_\_\_\_\_

**GREAT AMERICAN INSURANCE COMPANY®**

Administrative Office: 301 E 4TH STREET • CINCINNATI, OHIO 45202 • 513-369-5000 • FAX 513-723-2740

The number of persons authorized by this power of attorney is not more than **FOUR**

No. 0 13798

**POWER OF ATTORNEY**

**KNOW ALL MEN BY THESE PRESENTS:** That the GREAT AMERICAN INSURANCE COMPANY, a corporation organized and existing under and by virtue of the laws of the State of Ohio, does hereby nominate, constitute and appoint the person or persons named below, each individually if more than one is named, its true and lawful attorney-in-fact, for it and in its name, place and stead to execute on behalf of the said Company, as surety, any and all bonds, undertakings and contracts of suretyship, or other written obligations in the nature thereof; provided that the liability of the said Company on any such bond, undertaking or contract of suretyship executed under this authority shall not exceed the limit stated below.

| Name                 | Address      | Limit of Power |
|----------------------|--------------|----------------|
| STEVEN L. BROCKMEYER | ALL OF       | ALL            |
| MARY SMITH           | PASADENA, CA | \$100,000,000  |
| EMILY PRECIADO       |              |                |
| RONALD C. WANGLIN    |              |                |

This Power of Attorney revokes all previous powers issued on behalf of the attorney(s)-in-fact named above.

IN WITNESS WHEREOF the GREAT AMERICAN INSURANCE COMPANY has caused these presents to be signed and attested by its appropriate officers and its corporate seal hereunto affixed this 16TH day of SEPTEMBER 2019

Attest

GREAT AMERICAN INSURANCE COMPANY



*Atty L C B*

Assistant Secretary

*Mark V Vicario*

Divisional Senior Vice President

MARK VICARIO (877-377-2405)

STATE OF OHIO, COUNTY OF HAMILTON - ss:

On this 16TH day of SEPTEMBER

2019, before me personally appeared MARK VICARIO, to me known,

being duly sworn, deposes and says that he resides in Cincinnati, Ohio, that he is a Divisional Senior Vice President of the Bond Division of Great American Insurance Company, the Company described in and which executed the above instrument; that he knows the seal of the said Company; that the seal affixed to the said instrument is such corporate seal; that it was so affixed by authority of his office under the By-Laws of said Company, and that he signed his name thereto by like authority.



**Susan A. Kohorst**  
Notary Public, State of Ohio  
My Commission Expires 05-18-2020

*Susan A Kohorst*

This Power of Attorney is granted by authority of the following resolutions adopted by the Board of Directors of Great American Insurance Company by unanimous written consent dated June 9, 2008.

*RESOLVED: That the Divisional President, the several Divisional Senior Vice Presidents, Divisional Vice Presidents and Divisional Assistant Vice Presidents, or any one of them, be and hereby is authorized, from time to time, to appoint one or more Attorneys-in-Fact to execute on behalf of the Company, as surety, any and all bonds; undertakings and contracts of suretyship, or other written obligations in the nature thereof; to prescribe their respective duties and the respective limits of their authority; and to revoke any such appointment at any time.*

*RESOLVED FURTHER: That the Company seal and the signature of any of the aforesaid officers and any Secretary or Assistant Secretary of the Company may be affixed by facsimile to any power of attorney or certificate of either given for the execution of any bond, undertaking, contract of suretyship, or other written obligation in the nature thereof, such signature and seal when so used being hereby adopted by the Company as the original signature of such officer and the original seal of the Company, to be valid and binding upon the Company with the same force and effect as though manually affixed.*

**CERTIFICATION**

I, STEPHEN C. BERAHA, Assistant Secretary of Great American Insurance Company, do hereby certify that the foregoing Power of Attorney and the Resolutions of the Board of Directors of June 9, 2008 have not been revoked and are now in full force and effect.

Signed and sealed this 2nd day of July, 2020



*Atty L C B*

Assistant Secretary

## ATTACHMENTS

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

## SCOPE OF WORK

1. **SCOPE OF WORK:** South South Bay Water Reclamation Plant (SBWRP) is seeking to remove and replace 3 variable frequency drives (VFDs). There are two Toshiba 600HP variable frequency drives for the reclaiming pumps and one 200 HP. One is used for normal operation and the other one is for a back-up. The 200HP VFD, is not working and needed to be replaced. Upon replacing the VFDs the contractor shall assess the condition of the existing wiring and ensure they are usable and have no damages that would otherwise reduce their life expectancy or operations; if they are found to be deficient they shall be replaced with VFD rated cable. The installation of the new VFDs shall include the existing Data collection and possible new parameters that should be coordinated with facility upon the start of the project. Data collection shall use Modbus/Ethernet data collection that is compatible with the City's DCS system. The contractor should also verify that the existing motors are rated for the new VFDs and are in optimal condition for continual use. All plans and work should be fully coordinated with a professional electrical engineer to include a full set of updated electrical drawings and should also include fault and arc flash mitigation where required.
  - 1.1. The Work shall be performed in accordance with:
    - 1.1.1. The Notice Inviting Bids and **Attachment E, Technicals**, inclusive.
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 **203 Calendar Days**.



**ATTACHMENT B**

**RESERVED**

**ATTACHMENT C**

**RESERVED**

**ATTACHMENT D**  
**PREVAILING WAGE**

## PREVAILING WAGE

1. **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.
  - 1.1. **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.
    - 1.1.1. 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.
    - 1.1.2. 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.
  - 1.2. **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.

- 1.3. 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.
- 1.3.1.** Contractor and 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.
- 1.4. 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.
- 1.5. 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.
- 1.6. 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.
- 1.7. 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."
- 1.8. 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.

- 1.9. 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.
- 1.9.1.** 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.
- 1.9.2.** 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.
- 1.10. 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.
- 1.11. List of all Subcontractors.** The Contractor shall provide the list of subcontractors (regardless of tier), along with their DIR registration numbers, utilized on this Contract prior to any work being performed; and the Contractor shall provide a complete list of all subcontractors with each invoice. Additionally, Contractor shall provide the City with a complete list of all subcontractors (regardless of tier) utilized on this contract within ten working days of the completion of the contract, along with their DIR registration numbers. The City shall withhold final payment to Construction Management Professional until at least thirty (30) days after this information is provided to the City.
- 1.12. 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:
- 1.12.1.** Registration. The Contractor will not be required to register with the DIR for small projects. (Labor Code section 1771.1).

- 1.12.2.** 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).
- 1.12.3.** 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 1.11 above. (Labor code section 1773.3).

**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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### 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 its 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.
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** - The procedure the City uses to evaluate the status of the Project or the 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 **7:00 AM to 5:00 PM**.

To the "WHITEBOOK", ADD the following:

108. **Substantial Completion** – When all Contract Work is deemed complete by the Contractor in writing, and as verified by the Owner. Substantial Completion may be completed in phases if defined in the Contract.
109. **Acceptance of Work** – When all of the Contract work is deemed officially complete, including all Punchlist items, by the Owner.

110. **Occupancy** – When the Owner deems a building is ready for use, the Owner will issue a certificate of Occupancy in writing.

### 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.

## 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 30% of the base Bid.

**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.

**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) 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 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 until 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  |
| 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. 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.

## SECTION 4 - CONTROL OF MATERIALS

**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 LESS THAN 15 WORKING DAYS PRIOR TO THE BID DUE DATE** and on the City's Product Submittal Form available at:

<http://www.sandiego.gov/publicworks/edocref/index.shtml>

## SECTION 5 – LEGAL RELATIONS AND RESPONSIBILITIES

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

**5-4 INSURANCE.**

1. The insurance provisions herein shall not be construed to limit your indemnity obligations contained in the Contract.

**5-4.1 Policies and Procedures.**

1. You shall procure the insurance described below, at its sole cost and expense, to provide coverage against claims for loss including injuries to persons or damage to property, which may arise out of or in connection with the performance of the Work by you, your agents, representatives, officers, employees or Subcontractors.
2. Insurance coverage for property damage resulting from your operations is on a replacement cost valuation. The market value will not be accepted.
3. You shall maintain this insurance for the duration of this Contract and at all times thereafter when you are correcting, removing, or replacing Work in accordance with this Contract. Your liabilities under the Contract, e.g., your indemnity obligations, is not deemed limited to the insurance coverage required by this Contract.
4. The payment for insurance shall be included in the Contract Price as bid by you. Except as specifically agreed to by the City in writing, you are not entitled to any additional payment. Do not begin any Work under this Contract until you have provided and the City has approved all required insurance.
5. Policies of insurance shall provide that the City is entitled to 30 Days (10 Days for cancellation due to non-payment of premium) prior written notice of cancellation or non-renewal of the policy. Maintenance of specified insurance coverage is a material element of the Contract. Your failure to maintain or renew coverage or to provide evidence of renewal during the term of the Contract may be treated by the City as a material breach of the Contract.

**5-4.2 Types of Insurance.**

**5-4.2.1 Commercial General Liability Insurance.**

1. Commercial General Liability Insurance shall be written on the current version of the ISO Occurrence form CG 00 01 07 98 or an equivalent form providing coverage at least as broad.
2. The policy shall cover liability arising from premises and operations, XCU (explosions, underground, and collapse), independent contractors, products/completed operations, personal injury and advertising injury, bodily injury, property damage, and liability assumed under an insured's contract (including the tort liability of another assumed in a business contract).
3. There shall be no endorsement or modification limiting the scope of coverage for either "insured vs. insured" claims or contractual liability. You shall maintain the same or equivalent insurance for at least 10 years following completion of the Work.
4. All costs of defense shall be outside the policy limits. Policy coverage shall be in liability limits of not less than the following:

| <u>General Annual Aggregate Limit</u>         | <u>Limits of Liability</u> |
|---|----------------------------|
| Other than Products/Completed Operations      | \$2,000,000                |
| Products/Completed Operations Aggregate Limit | \$2,000,000                |
| Personal Injury Limit                         | \$1,000,000                |
| Each Occurrence                               | \$1,000,000                |

**5-4.2.2 Commercial Automobile Liability Insurance.**

1. You shall provide a policy or policies of Commercial Automobile Liability Insurance written on the current version of the ISO form CA 00 01 12 90 or later version or equivalent form providing coverage at least as broad in the amount of \$1,000,000 combined single limit per accident, covering bodily injury and property damage for owned, non-owned, and hired automobiles ("Any Auto").
2. All costs of defense shall be outside the limits of the policy.

**5-4.2.5 Contractors Builders Risk Property Insurance.**

1. You shall provide at your expense, and maintain until Final Acceptance of the Work, a Special Form Builders Risk Policy or Policies. This insurance shall be in an amount equal to the replacement cost of the completed Work (without deduction for depreciation) including the cost of excavations, grading, and filling. The policy or policies limits shall be 100% of this Contract value of the Work plus 15% to cover administrative costs, design costs, and the costs of inspections and construction management.
2. Insured property shall include material or portions of the Work located away from the Site but intended for use at the Site and shall cover material or portions of the Work in transit. The policy or policies shall include as insured property scaffolding, falsework, and temporary buildings located at the Site. The policy or policies shall cover the cost of removing debris, including demolition.



3. The policy or policies shall provide that all proceeds thereunder shall be payable to the City as Trustee for the insured, and shall name the City, the Contractor, Subcontractors, and Suppliers of all tiers as named insured. The City, as Trustee, will collect, adjust, and receive all monies which may become due and payable under the policy or policies, may compromise any and all claims thereunder, and will apply the proceeds of such insurance to the repair, reconstruction, or replacement of the Work.
4. Any deductible applicable to the insurance shall be identified in the policy or policies documents and responsibility for paying the part of any loss not covered because of the application of such deductibles shall be apportioned among the parties except for the City as follows: if there is more than one claimant for a single occurrence, then each claimant shall pay a pro-rata share of the per occurrence deductible based upon the percentage of their paid claim to the total paid for insured. The City shall be entitled to 100% of its loss. You shall pay the City any portion of that loss not covered because of a deductible at the same time the proceeds of the insurance are paid to the City as trustee.
5. Any insured, other than the City, making claim to which a deductible applies shall be responsible for 100% of the loss not insured because of the deductible. Except as provided for under California law, the policy or policies shall provide that the City is entitled to 30 Days prior written notice (10 Days for cancellation due to non-payment of premium) of cancellation or non-renewal of the policy or policies.

**5-4.3 Rating Requirements.** Except for the State Compensation Insurance Fund, all insurance required by this Contract as described herein shall be carried only by responsible insurance companies with a rating of, or equivalent to, at least "A-, VI" by A.M. Best Company, that are authorized by the California Insurance Commissioner to do business in the State, and that have been approved by the City.

**5-4.3.1 Non-Admitted Carriers.** The City will accept insurance provided by non-admitted, "surplus lines" carriers only if the carrier is authorized to do business in the State and is included on the List of Approved Surplus Lines Insurers (LASLI list).

All policies of insurance carried by non-admitted carriers shall be subject to all of the requirements for policies of insurance provided by admitted carriers described herein.

**5-4.4 Evidence of Insurance.** Furnish to the City documents e.g., certificates of insurance and endorsements evidencing the insurance required herein, and furnish renewal documentation prior to expiration of this insurance. Each required document shall be signed by the insurer or a person authorized by the insurer to bind coverage on its behalf. We reserve the right to require complete, certified copies of all insurance policies required herein.

**5-4.5 Policy Endorsements.**

**5-4.5.1 Commercial General Liability Insurance.**

**5-4.5.1.1 Additional Insured.**

1. You shall provide at your expense policy endorsement written on the current version of the ISO Occurrence form CG 20 10 11 85 or an equivalent form providing coverage at least as broad.

2. To the fullest extent allowed by law e.g., California Insurance Code §11580.04, the policy shall be endorsed to include the City and its respective elected officials, officers, employees, agents, and representatives as additional insured.
3. The additional insured coverage for projects for which the Engineer's Estimate is \$1,000,000 or more shall include liability arising out of:
  - a) Ongoing operations performed by you or on your behalf,
  - b) your products,
  - c) your Work, e.g., your completed operations performed by you or on your behalf, or
  - d) premises owned, leased, controlled, or used by you.
4. The additional insured coverage for projects for which the Engineer's Estimate is less than \$1,000,000 shall include liability arising out of:
  - a) Ongoing operations performed by you or on your behalf,
  - b) your products, or
  - c) premises owned, leased, controlled, or used by you.

**5-4.5.1.2 Primary and Non-Contributory Coverage.** The policy shall be endorsed to provide that the coverage with respect to operations, including the completed operations, if appropriate, of the Named Insured is primary to any insurance or self-insurance of the City and its elected officials, officers, employees, agents and representatives. Further, it shall provide that any insurance maintained by the City and its elected officials, officers, employees, agents and representatives shall be in excess of your insurance and shall not contribute to it.

**5-4.5.1.3 Project General Aggregate Limit.** The policy or policies shall be endorsed to provide a Designated Construction Project General Aggregate Limit that will apply only to the Work. Only claims payments which arise from the Work shall reduce the Designated Construction Project General Aggregate Limit. The Designated Construction Project General Aggregate Limit shall be in addition to the aggregate limit provided for the products-completed operations hazard.

**5-4.5.2 Commercial Automobile Liability Insurance.**

**5-4.5.2.1 Additional Insured.** Unless the policy or policies of Commercial Auto Liability Insurance are written on an ISO form CA 00 01 12 90 or a later version of this form or equivalent form providing coverage at least as broad, the policy shall be endorsed to include the City and its respective elected officials, officers, employees, agents, and representatives as additional insured, with respect to liability arising out of automobiles owned, leased, hired or borrowed by you or on your behalf. This endorsement is limited to the obligations permitted by California Insurance Code §11580.04.

**5-4.5.5 Builders Risk Endorsements.**

**5-4.5.5.1 Waiver of Subrogation.** The policy or policies shall be endorsed to provide that the insurer will waive all rights of subrogation against the City, and its respective elected officials,

officers, employees, agents, and representatives for losses paid under the terms of the policy or policies and which arise from Work performed by the Named Insured for the City.

**5-4.5.5.2 Builders Risk – Partial Utilization.** If the City desires to occupy or use a portion or portions of the Work prior to Acceptance in accordance with this Contract, the City will notify you and you shall immediately notify your Builder's Risk insurer and obtain an endorsement that the policy or policies shall not be cancelled or lapse on account of any such partial use or occupancy. You shall obtain the endorsement prior to the City's occupation and use.

**5-4.6 Deductibles and Self-Insured Retentions.** You shall pay for all deductibles and self-insured retentions. You shall disclose deductibles and self-insured retentions to the City at the time the evidence of insurance is provided.

**5-4.7 Reservation of Rights.** The City reserves the right, from time to time, to review your insurance coverage, limits, deductibles and self-insured retentions to determine if they are acceptable to the City. The City will reimburse you, without overhead, profit, or any other markup, for the cost of additional premium for any coverage requested by the Engineer but not required by this Contract.

**5-4.8 Notice of Changes to Insurance.** You shall notify the City 30 Days prior to any material change to the policies of insurance provided under this Contract.

**5-4.9 Excess Insurance.** Policies providing excess coverage shall follow the form of the primary policy or policies e.g., all endorsements.

**5-4.10 Architects and Engineers Professional Insurance (Errors and Omissions Insurance).**

1. For Contracts with required engineering services (e.g., Design-Build, preparation of engineered Traffic Control Plans (TCP), and etc) by you, you shall keep or require all of your employees or Subcontractors, who provide professional engineering services under this contract, Professional Liability coverage with a limit of **\$1,000,000** per claim and **\$2,000,000** annual aggregate in full force and effect.
2. You shall ensure the following:
  - a) The policy retroactive date is on or before the date of commencement of the Project.
  - b) The policy will be maintained in force for a period of 3 years after completion of the Project or termination of this Contract, whichever occurs last. You agree that for the time period specified above, there will be no changes or endorsements to the policy that affect the specified coverage.
3. If professional engineering services are to be provided solely by the Subcontractor, you shall:
  - a) Certify this to the City in writing and
  - b) Agree in writing to require the Subcontractor to procure Professional Liability coverage in accordance with the requirements set forth above.

**5-4.11 Workers' Compensation Insurance and Employers Liability Insurance.**

1. In accordance with the provisions of §3700 of the California Labor Code, you shall provide at your expense Workers' Compensation Insurance and Employers Liability

Insurance to protect you against all claims under applicable state workers compensation laws. The City, its elected officials, and employees will not be responsible for any claims in law or equity occasioned by your failure to comply with the requirements of this section.

2. Limits for this insurance shall be not less than the following:

| <u>Workers' Compensation</u> | <u>Statutory Employers Liability</u> |
|------------------------------|--------------------------------------|
| Bodily Injury by Accident    | \$1,000,000 each accident            |
| Bodily Injury by Disease     | \$1,000,000 each employee            |
| Bodily Injury by Disease     | \$1,000,000 policy limit             |

3. By signing and returning the Contract you certify that you are aware of the provisions of §3700 of the Labor Code which requires every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that code and you shall comply with such provisions before commencing the Work as required by §1861 of the California Labor Code.

**5-4.11.1 Waiver of Subrogation.** The policy or policies shall be endorsed to provide that the insurer will waive all rights of subrogation against the City and its respective elected officials, officers, employees, agents, and representatives for losses paid under the terms of the policy or policies and which arise from Work performed by the Named Insured for the City.

**5-10.2.1 Public Notice by Contractor.** To the "WHITEBOOK", items 2 and 3, DELETE in its 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. Virtual Project Manager shall be used on this Contract.
2. You shall post all communications addressed to the Engineer concerning construction including RFIs, submittals, daily logs including the Weekly Statement of Working Days (WSWD), Storm Water, and transmittals to the Virtual Project Manager (VPM) website established for the Projects. This shall not supersede any Federal requirements.
3. Maintain a list of scheduled activities including planned and actual execution dates for all major construction activities and milestones defined in the approved Schedule.
4. Review and act on all communications addressed to you in the VPM project website.
5. A user's guide to the VPM system is available on the City's website and shall be provided to you at the Pre-construction Meeting. Refer to the VPM training videos and forms at the location below:  
<https://www.sandiego.gov/publicworks/edocref>
6. Submit the Sensitive Information Authorization Acknowledgement Form and VPM User Agreement located in the VPM user's guide at the Pre-construction Meeting.

**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 "s", DELETE in its entirety and SUBSTITUTE with the following:

- 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/publicworks/edocreff>

**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 a **Notice of Exemption** for **South Bay Wastewater Treatment Plant Variable Frequency Drive Replacement, Project No. B-19066.02.06** as referenced in the Contract Appendix. You shall comply with all requirements of the **Notice of Exemption** as set forth in **Appendix A**.
- 2. Compliance with the City's environmental document shall be included in the Contract Price, unless separate bid items have been provided.

## **SECTION 7 – MEASUREMENT AND PAYMENT**

**7-3.1 General.** To the "WHITEBOOK" ADD the following:

- 3. The payment for actual work of removing and replacing, providing and installing new VFDs in accordance with Attachment A, Scope of Work shall be included in the Bid Item for "600Hp Variable Frequency Drive for Reclamation Pump" and "200HP Variable Frequency Drive for Blended Sludge Pump". Work shall include, but not limited to furnishing all materials, labor, equipment, and tools that are necessary for complete functional VFDs.

**7-3.2 Partial and Final Payment.** To the "GREENBOOK", paragraph (3), DELETE in its entirety and SUBSTITUTE with the following:

Upon commencement of the Work, an escrow account shall be established in a financial institution chosen by you and approved by the City. Documentation for an escrow

payment shall have an escrow agreement signed by you, the City, and the escrow agent. From each progress payment, no less than 5% will be deducted and deposited by the City into the escrow account. Upon completion of the Contract, the City will notify the Escrow agent in writing to release the funds to you. Only the designated representative of the City shall sign the request for the release of Escrow funds.

**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**

| <b>Contract Price</b>        | <b>Maximum Field Order Work Amount</b> |
|------------------------------|--|
| 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.



## TECHNICALS

# City of San Diego

## Technical Specifications for

### South Bay Water Reclamation Plant - VFD Replacement

VOLUME 01

MASTER TECHNICAL SPECIFICATIONS – DIVISION 11 and DIVISION 16

SPECIFICATION NO. 1807

WBS NO. B-19066

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### **Appendix A**

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## SECTION 11033 - VARIABLE FREQUENCY DRIVES

### PART 1 GENERAL

#### 1.1 WORK OF THIS SECTION

- A. The WORK of this Section includes providing variable frequency drive (VFD) units, or called adjustable speed drive (ASD) units, with motors, controls, and accessories.

#### 1.2 RELATED SECTIONS

- A. The WORK of the following Sections applies to the WORK of this Section. Other technical specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.

- 1. Division 16 Electrical Specifications

#### 1.3 CODES

- A. The 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. NFPA 70, National Electrical Code (NEC), 2020

#### 1.4 SPECIFICATIONS AND STANDARDS

- A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

- 1. IEEE Standard 519            IEEE Recommended Practice and Requirements for Harmonic Control in Electrical Power Systems
- 2. NEMA ICS 7                Industrial Control and Systems - Adjustable Speed Drives
- 3. NEMA MG1                 Motors and Generators
- 4. UL 508A and 508C        The VFD shall be UL listed and carry the UL mark.

#### 1.5 CONTRACTORS SUBMITTALS

- A. Submittals shall be made in accordance with the Section 16050 Basic Electrical Materials and Methods. The submittals shall include the following:

- 1. Shop Drawings
  - a. Layout Drawings

- (1) Layout drawings of the variable frequency drive system that include all cabinet or enclosure dimensions, access details, and weights.
  - (2) Layout drawings of panels or enclosures showing size, arrangement, color, and nameplates. Drawings shall include the physical arrangement of door-mounted devices located on the variable frequency drive enclosure. Sufficient detail shall be provided for locating conduit stub-ups. General "catalog data sheet" layout drawings which are not specific to the systems specified herein are not acceptable.
- b. Single Line Diagrams: Complete single line diagrams indicating all devices comprising the variable frequency drive system including, but not limited to, circuit breakers, motor circuit protectors, contactors, instrument transformers, meters, relays, timers, control devices, and other equipment comprising the complete system. Electrical ratings of all equipment and devices shall be clearly indicated on these single line diagrams.
- c. Control Diagrams
- (1) Schematic and interconnection wiring diagrams of all electrical work, including terminal blocks and identification numbers, wire numbers and wire colors. These drawings shall be circuit specific for each motor-load combination.
  - (2) Logic diagrams identifying system control logic.
  - (3) Indicate all devices, regardless of their physical location, on these diagrams. The specific device location symbols and their respective legend shall also appear on these diagrams.
  - (4) Specific equipment names consistent with the Drawings shall appear on each respective diagram.
  - (5) Functional diagrams that identify major system functional blocks and interfaces. The diagrams shall note any special requirements or restrictions of the motor-load combination and shall show all interface wiring and points of connection to the VFD enclosure.
- d. Calculations and Sketch
- (1) Calculation of VFD/motor efficiencies at minimum, 1/3, 2/3, and 100 percent of the speeds required to meet the specified operating conditions. The system efficiency shall include power losses from the cooling system (if any), controls, contactors, line reactors, and filters.
  - (2) Continuous and fault ratings of drive and disconnecting means.
  - (3) Description of proposed factory test procedure and sketch of test setup.

- (4) Manufacturer's statement that motor conforms to NEMA MG1, Part 31.
    - (5) Output reactor analysis per paragraph 2.4C.
  - e. Manufacturers Drawings
    - (1) Drawings submitted by the manufacturer shall be complete and documented to provide the OWNER with operations and maintenance capabilities.
    - (2) Relay and timer coil and respective contact identification numbers shall match those indicated on the Drawings.
  - f. Bill of Material: Complete Bills of Material with catalog data sheets and manuals for all equipment and devices comprising the variable frequency drive system. Where catalog cuts and other brochures depicting product characteristics are supplied, annotate to show product to be used on this project.
  - g. List of Spare Parts: A complete list of recommended spare parts. Include item descriptions, recommended quantities, and unit costs. The recommended list should be based on a maintenance plan where the OWNER will remove and replace failed items to the lowest replaceable module/component level.
- 2. Test Reports
  - a. Submit certified copies of manufacturer's test reports.
  - b. Submit factory bench-test data to indicate that the manufacturer's proposed equipment has been tested in the specified arrangement and found to achieve specified accuracy.
- 3. Operation, Maintenance and Installation Instructions: Furnish with the equipment at delivery Operation and Maintenance Manuals, installation instructions, and other documentation necessary for the installation, start-up, operation and maintenance of the system.
- 4. Programming Guides and Manuals: If the variable frequency drive systems require computer software or configuration, provide 4 copies of all programming guides/manuals. Flow charts and listings of software developed shall be submitted to the ENGINEER. Submit final flow charts and program listings no later than 6 weeks prior to factory testing of the system.
- 5. Record Drawings: Drawings of each of the above types representing the as-built condition of the equipment and software shall be delivered with the equipment at the jobsite. Final or corrected as-built drawings shall be delivered 4 weeks after field system acceptance. See General Requirements-As Built Drawings for further details.

1.6 SERVICES OF MANUFACTURER

A. Services of the manufacturer shall be provided as follows:

- 1. **Inspection, Startup and Field Adjustment:** An authorized service representative of the manufacturer shall visit the site for not less than one day per drive system to check the installation, supervise start-up, and supervise testing and adjustment of VFDs.
- 2. **Instruction of OWNER'S Personnel:** The authorized service representative shall instruct the OWNER'S personnel in the skills required for each Trade Group indicated and the duration indicated. This includes all aspects of drive operation and maintenance, including step-by-step troubleshooting procedures with necessary test equipment. Instruction of the OWNERS personnel shall be conducted separate from the start-up and testing activities. Each of the OWNERS Trade Groups will be instructed individually, and no more than six hours will be scheduled in one day. Durations of instruction are:

| Trade Group                                  | Class Hours | Field Hours |
|--|-------------|-------------|
| Electricians and Electronics Technicians     | 4           | 4           |
| Operations and Plant Maintenance Technicians | 4           | 4           |

1.7 FACTORY TESTING

A. **Component Tests:** All components shall be 100 percent tested. Components shall be burned-in for 168 hours at 125 degrees C and retested to detect any drift. All printed circuit boards shall be burned-in continuously for 168 hours at 65 degrees C. The printed circuit boards shall be tested after burn-in to insure they are functioning within specification. Every transistor shall have the following critical parameters tested at rated current: gating, turn-on, turn-off, high temperature, forward blocking, reverse blocking and waveform characteristics. All assembled phase cells shall be tested for cell balance at rated voltage, maximum current, maximum dV/dT and maximum dI/dT.

Control power shall be applied to microprocessors, printed circuit boards, diagnostic boards and similar devices including software to test for proper operation, sequencing, logic and diagnostics.

All wiring shall be checked for continuity and for compliance with the wiring diagrams.

All terminations and devices in the VFD unit shall be scanned with an infrared sensor while the VFD is energized at 100 percent power, to assure proper connections and satisfactory devices. A copy of the infrared scan results shall be furnished to the CONSTRUCTION MANAGER.

B. **System Tests:** Testing shall proceed in the order given below. For the combined drive and motor test, the motor available from VFD manufacturer that is similar to actual motor specified for this project and may be used for testing. The CONTRACTOR shall submit a sketch of the proposed test setup, along with a description of the proposed testing procedure to the CONSTRUCTION MANAGER for acceptance at least 10 weeks in advance of the proposed testing date. No tests shall be performed until the test procedure meets with the CONSTRUCTION MANAGER's approval. In addition, the CONTRACTOR shall furnish the CONSTRUCTION MANAGER with at least 4 weeks advance written notice of the date and location of the system tests. The

OWNER and the CONSTRUCTION MANAGER (at the option of either or both) reserve the right to witness the system tests.

1. The VFD shall be load-tested in a heat room maintained at 40 degrees C for 24 hours. The motor shall be cyclically loaded via the dynamometer as follows:

75 percent full load current for 6 hours  
 50 percent full load current for 6 hours  
 100 percent full load current for 6 hours

Failure of any major components during this test requires repair and commencement of a new test. Motor and dynamometer need not be in the elevated temperature room with the VFD.

- C. **Harmonic Analysis:** Harmonic analysis shall be calculated at unit full load in accordance with Section 8 of IEEE 519. Computer model shall be based on single line diagram shown with source impedance delineated in terms of noncontributing short circuit amperes as tabulated below. Analysis shall be performed at the point of common coupling (PCC), determined from the plant single line diagram and accessible for field verification (see paragraph 11033-3.2A). Analysis shall show that sufficient filtering has been provided to limit the total harmonic distortion (THD) to limits set by IEEE 519. Results shall be either in table or graphic form.

| <u>Driven Equipment Name</u>                         | <u>Short Circuit Amps</u> |
|--|---------------------------|
| Reclaimed Water Pump 34-P-501, 34-P-502 and 10-P-901 | Per short circuit study   |

1.8 VFD FEATURES:

- A. The VFDs shall be provided with the following features:
  1. Fused control circuit transformer and microprocessor for system logic sequencing and fault annunciation functions.
  2. 4 to 20 mA process follower for input speed reference signal.
  3. Adjustable minimum/maximum frequency limits. The minimum and maximum frequency limits shall be selected to match the entire operating speed range for each specific type of driven equipment. The minimum and maximum frequency limits shall be independently adjustable within the ranges selected. The maximum frequency shall be 66 hertz.
  4. Independent timed linear acceleration and deceleration functions, adjustable as indicated.
  5. Adjustable motor slip compensation based on motor current.
  6. Terminal blocks for control and signal wires entering and leaving the controller.
  7. All fuses shall be provided with blown fuse indicator lamps.
  8. Current limit adjustable from 50 to 110 percent of motor rating.
  9. Automatic re-start with defeat selector.
  10. Capability of picking up a spinning load.
  11. 4 to 20 mA isolated output signal for VFD speed.



## 1.9 FUNCTIONAL REQUIREMENTS

- A. **Supply Power:** The VFD shall remain on line and operate without damage to either the VFD or its connected load during a supply power variation of plus 50 percent lasting for a period of up to 0.01 seconds and minus 100 percent lasting for a period of up to 0.5 seconds.
- B. **Load:** The VFD system shall be capable of continuously driving the specified maximum motor load under the conditions specified herein. Variable-torque (VT) units shall be capable of delivering 115 percent of the specified load for up to 60 seconds in any one incident and up to 240 seconds per hour.
- C. **Power Factor:** VFDs shall have a power factor (kW/kVA), at rated base speed and full load, of not less than 0.95 for 18 pulse systems, and of not less than 0.90 for systems with less than 18 pulses.
- D. **Frequency and Voltage Regulation:** VFD inverter output frequency shall be regulated to within 0.6 hertz of the specified instrumentation signal/output frequency relationship. VFD inverter output voltage shall be regulated to within 1.0 percent of that value which will produce minimum motor heating at any operating frequency within the specified range.
- E. **Frequency Range:** VFD shall be capable of satisfactory continuous operation with the specified load at any frequency between the frequency corresponding to minimum speed and 60 hertz.
- F. **Ambient Noise:** Free field noise generated by the VFD shall not exceed 85 dBA at 3 feet out from any point on the VFD cabinet under any normal operating condition.
- G. **dV/dt:** The peak voltage at the motor terminals shall be  $\neq 1.6$  kV, and the rise time shall be 0.1s. Contractor shall be responsible for providing any filtering required to conform to this criteria. Filter losses shall be included in the efficiency calculation specified in paragraph 11033-2.1C.

## 1.10 PROTECTION:

- A. **Overcurrent Protection:** The VFD system shall provide adjustable electronic current limit. Current limit shall be accurate to within 1.0 percent and shall smoothly limit motor speed at whatever value is necessary to limit motor current to that value.

The VFD shall also provide motor running overcurrent protection in compliance with NFPA 70. This function may be included in the electronic overload circuitry if suitably UL labeled.

- B. **Short Circuit Protection:** The VFD shall be fully protected against load faults. Phase to phase, or phase to ground faults shall not damage the unit. Fault protection shall be based on a power source short circuit but no less than capacity of 65,000 amperes RMS symmetrical at the VFD power input terminals. Any impedance or other current limiting necessary to meet this requirement shall be provided as part of the VFD system, and any losses caused by current limiting devices shall be included in efficiency calculation for the VFD system.
- C. **Line Voltage:** The VFD shall be protected against high and low line voltage on one or more phases.

- D. **Internal Faults:** The VFD shall incorporate an internal fault monitoring system to detect malfunctions. This system shall be designed to protect the VFD from transient and sustained faults and to limit damage that may be caused by these faults.
- E. **Motor Over-Temperature:** The VFD shall interface to the motor temperature switches and shall shut down if the motor becomes overheated. The VFD shall include all components necessary to sense a contact opening and disconnect the affected motor if the motor winding temperature exceeds maximum rated operating temperature.

**PART 2 PRODUCTS**

2.1 PUMP VFDs

**A. General:**

- 1. Number of drive units - 3
- 2. Driven equipment - Pump
- 3. Driven equipment Specifications reference - N/A
- 4. Drive voltage - 480 volts

**B. Service Conditions:**

The VFD shall be designed and constructed to operate continuously within the following service conditions:

- 1. Elevation - zero to 3300 feet
- 2. Ambient Temperature Range - 5°C to 45°C
- 3. Atmosphere - Non-condensing relative humidity to 95%
- 4. AC Line Voltage Variation - 480 volts plus or minus 10%
- 5. AC Line Frequency Variation - 60 hertz plus or minus 3 Hz

**C. Operating Conditions:**

- 1. Efficiency of VFD systems shall be not less than 95 percent at 60 hertz output driving the specified maximum load at 100 percent speed and 100 percent torque. Efficiency shall be defined as follows:

$$Efficiency = \frac{POWER IN(watts) - LOSSES(watts)}{POWER IN(watts)} 100\% \quad (1)$$

where losses include input line reactor, rectifier, intermediate circuit, inverter, and output filter.

- 2. Distribution voltage shall be 480 volts, three phase, three wire, 60 Hz as indicated.
- 3. Rectifier input line current harmonics shall not exceed the values tabulated in IEEE 519.

4. The VFD shall be specifically designed for use with variable torque equipment or pumping loads, fully capable of at least a 10:1 infinitely adjustable speedrange.
5. The control shall vary the output frequency between the frequency corresponding to minimum speed and 66 Hz. Soft-start control circuitry shall limit inrush current, not to exceed 110 percent of motor full load current, under all manual and automatic operating conditions. When power outage occurs, the drive system shall shut down in an orderly manner. Upon restoration of ac power, the motor shall restart automatically and run at a rate depending upon the reference requirements, by the sequencing logic controller.

## 2.2 GENERAL

### A. Basic Description:

1. The VFD shall be solid state AC to AC inverter controlled device utilizing the latest isolated gate bipolar transistor (IGBT) technology.
2. The drive shall be an Ultra-Low Harmonic Adjustable Speed AC Drive that is designed to comply with standard IEEE 519-1992 when installed into system that already is in compliance with the standard.

### B. Harmonics

1. The Ultra-Low Harmonic construction of the VFD shall not contribute any significant harmonics at the input terminals of the VFD, and shall maintain harmonics levels at the VFD's input terminals to levels at or below those listed in "Harmonic Control in Electrical Power Systems, IEEE Std. 519-1992." in the system that already is in compliance with the said standard.
2. All harmonic management devices must be internal to the VFD enclosure and supplied as a complete solution.
3. The VFD 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.
4. Each input phase of the VFD 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 VFD.
5. The input current to the VFD shall have a total harmonic content less than 5% of full rated capability at the input terminals of the VFD on power system sized according to IEEE 519-1992 at line voltage unbalance up to 3% and under all motor load conditions.
6. The VFD shall operate at fundamental power factor 1.0 on the supply side under all motor load conditions.

7. The input power factor shall be programmable from 0.8 lagging to 0.8 leading, allowing the VFD to be used as a compensating device for installations that are excessively inductive or excessively capacitive in reactive power. The reactive power required by other loads connected to the same distribution system may be compensated for by the providing that VFD has sufficient capacity for reactive and active loads.
  8. The VFD's design shall not compensate for existing harmonic content in the distribution system.
- C. **Motor:** The motor shall be squirrel cage inverter duty type in accordance with Section 16040.
- D. **Basic Features:** The VFD controller shall have the following basic features:
1. The door of each power unit shall include:
    - a. Input disconnect handle integrally interlocked with power unit door.
    - b. One manual speed control potentiometer.
    - c. One 3-position mode selector switch marked "HAND-OFF-AUTOMATIC".
    - d. A "Power On" light.
    - e. A speed indicating meter with a range of 0 to 110 percent of full speed.
    - f. One elapsed time meter with five digits, without reset.
    - g. One VFD fault reset push-button.
    - h. One ammeter with a range of 0 to 125 percent of drive current rating.
    - i. One output voltmeter with a range of 0 - 600 volt.
    - j. VFD fault diagnostics.
    - k. Indicating lights to show running and ready status.
    - l. Refer to control diagram(s) for additional devices.
    - m. RS232 and MODBUS communication port.
  2. Switches in the door shall control the drive as follows:
    - a. With the "HAND-OFF-AUTOMATIC" switch in the "HAND" position, the drive shall be manually started and stopped by the "START-STOP" switch and the drive output speed shall be controlled by the manual potentiometer.
    - b. With the "HAND-OFF-AUTOMATIC" switch in the "AUTOMATIC" position, the drive shall start when an external isolated contact closes and its speed shall be controlled by a 4-20 mA external reference signal.
  3. The VFD shall be selectable to provide automatic restart after a trip condition resulting from overcurrent, overvoltage, under voltage, or over-temperature. For safety, the drive shall shut down and require manual reset and restart if the automatic reset/restart function is not successful within a maximum of three attempts within a short time period.
  4. Speed Profile: Individual adjustable settings for start, stop, entry, slope, and minimum and maximum speed points. Speed reference shall be from an external 4 - 20 mA DC signal.
  5. Control Circuit: Fused 120 VAC control transformer and control relays for system logic functions. For system logic, see electrical drawings.

6. Provision for an external 4 to 20 mA DC speed reference input signal. VFD manufacturer shall provide a signal current isolator to ensure signal and galvanic isolation of the grounded or ungrounded input speed reference signal. Where indicated, a frequency proportional 4-20 mA powered output signal shall be provided for external use and wired out to terminals.
7. Status control and alarm inputs and outputs, each consisting of SPDT electrically isolated auxiliary contacts rated 5 amp at 120 VAC. .

The VFD shall be provided with a fault annunciation system which shall indicate the cause of any shutdown. Annunciator shall identify the first fault in those cases where multiple faults occur between manual or automatic resets and shall be visible without opening the VFD cabinet. If an English language annunciator is not provided, an engraved nameplate shall be provided on the cabinet face with explanations of each fault code. As a minimum, the following faults shall be annunciated:

- a. External fault
- b. Input power loss
- c. DC bus undervoltage
- d. DC bus overvoltage
- e. Motor stalled
- f. Motor overload
- g. Drive overtemperature
- h. Drive overcurrent
- I. Ground fault
- j. Output short
- k. Transistor short
- l. Drive controller hardware fault
- m. Drive controller software fault
- n. Drive configuration error

VFD internal faults and motor over-temperature or failure shall latch in the trip mode and shall require operator intervention to reset the drive. External VFD faults such as input power loss shall allow for automatic re-start.

Status outputs shall consist of three separate unpowered outputs; two run status outputs, and a VFD enable output. VFD enable status contacts shall monitor the emergency (coast to a stop) circuit. Wiring shall be as required by the electrical control diagrams.

8. Automatic and safety inputs, each consisting of a remote contact closure rated 5 amp at 120 VAC maximum, complying with Section 16050.

Opening of the automatic input remote contact shall cause the motor speed to ramp down to zero speed by controlled deceleration. Opening of the safety input remote contact shall cause the motor speed to coast to a complete stop. Wiring shall be as required by the electrical control diagrams.

9. For VFDs larger than 200 horsepower, a critical frequency avoidance circuit shall be provided to allow up to three selectable bands of operating frequencies (with programmable band widths) at which the VFD will not operate continuously in order to avoid system resonant vibrations.
  10. Independent timed linear acceleration and deceleration functions, adjustable from 4 to 300 seconds.
  11. Terminal blocks for wires entering and leaving the VFD unit. Terminals shall be identified with alpha- numeric characters identical to the terminal identifiers indicated on the schematic and connection diagrams.
  12. Frequency regulator to operate within the following tolerances:
    - a. Frequency regulator span shall be 4 mA at minimum speed and 20 mA at maximum speed.
    - b. Frequency regulator accuracy shall be within 1.0 percent of span.
    - c. Frequency regulator deadband shall be within 0.5 percent of span.
    - d. Frequency regulator repeatability shall be within 0.5 percent of span.
    - e. Frequency reference signal input resistance shall not exceed 250 ohms.
  13. All integrated circuit boards shall be coated for corrosion protection. All components shall be solid state controls. All circuit boards shall be arranged for ease of removal in case of repair.
- E. **Warranty:** 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.

### 2.3 ENCLOSURE

- A. The Project will utilize existing Enclosures should there be a need for new enclosures shall be a dead-front, freestanding assembly with cabinet base and maximum dimensions as indicated. Working height shall be not greater than 74 inches. Doors shall be 12 gauge sheet steel with full length piano hinges. Removable lifting angles shall be provided.

Unless otherwise indicated the enclosure shall have gasketed doors and door openings. Enclosure shall be front or side access only, as indicated. No rear access shall be provided. Enclosure shall be suitable for either top or bottom cable entry as indicated.

Enclosure shall be NEMA Type 1 with gasket and painted ANSI 61. Inside shall be white. The exterior of stainless steel enclosures shall not be painted.

## 2.4 PROTECTIVE FEATURES

- A. The controller shall include the following protective features:
1. For each programmed warning and fault protection function, the VFD shall display a message in complete English words or Standard English abbreviations. The five (5) most recent fault messages and times shall be stored in the VFD's fault history.
  2. The VFD shall include internal MOVs for phase to phase and phase to ground line voltage transient protection.
  3. Output short circuit and ground fault protection rated for 100,000 amps without relying on line fuses shall be provided per UL508C.
  4. Motor phase loss protection shall be provided.
  5. The VFD shall provide electronic motor overload protection qualified per UL508C.
  6. Protection shall be provided for AC line or DC bus overvoltage at 130% of maximum rated voltage or undervoltage at 65% of min. rated voltage.
  7. The VFD shall protect itself against input phase loss.
  8. A power loss ride through feature shall allow the VFD to remain fully operational after losing power as long as kinetic energy can be recovered from the rotating mass of the motor and load.
  9. Stall protection shall be programmable to provide a warning or stop the VFD after the motor has operated above a programmed torque level for a programmed time limit.
  10. Underload protection shall be programmable to provide a warning or stop the VFD after the motor has operated below a selected underload curve for a programmed time limit.
  11. Over-temperature protection shall provide a warning if the power module temperature is less than 5°C below the over-temperature trip level.
  12. Input terminals shall be provided for connecting a motor thermistor (PTC type) to the VFD's protective monitoring circuitry. An input shall also be programmable to monitor an external relay or switch contact.
- B. Drive shall be provided with a main circuit breaker or input fused disconnect switch, mechanically interlocked with the drive cabinet door. Interlock shall be provided with defeater. Unless otherwise indicated, circuit breaker or fuse shall have a minimum short circuit interrupting capacity of 65,000 RMS symmetrical amps.
- C. Output reactor shall be provided as required to limit  $dv/dt$  damage to motor windings. Acceptable analysis proving reactor is not necessary, because of length of feeder cable run and switching frequency, is an acceptable alternative.
- D. Provide motor protection relay manufactured by GE Multilin 469 series or approved equals

## 2.5 CONTROL DEVICES

- A. Pilot devices and instruments shall be flush mounted on a VFD unit door. Pilot devices shall be heavy duty with contacts rated 10 amp minimum at 600 VAC. Indicating lights shall be "push-to-test" type. Door-mounted indicating lights shall be removable without removing related wiring. The control units of a given type and size shall be made interchangeable. Relays shall be hermetically sealed.

## 2.6 DIAGNOSTICS

- A. The VFD shall be provided with the following diagnostics:
  - 1. Lights to indicate failure of converter or inverter
  - 2. Lights to indicate presence of gate pulses on converter and inverter
  - 3. Indication of the following fault conditions:
    - a. No fault
    - b. Blown power fuse
    - c. Control power failure
    - d. Under-voltage
    - e. Instantaneous overcurrent
    - f. Sustained overload
    - g. Over-temperature
    - h. Output over-voltage
  - 4. Meter with switch to test the following control signals:
    - a. Frequency command
    - b. Voltage command
    - c. Motor voltage feedback
    - d. Inverter bus voltage
    - e. Current command
    - f. Current feedback
    - g. Converter command
    - h. Filtered inverter bus voltage
  - 5. Circuitry for the following test modes:
    - a. Manual operation of the inverter through each firing sequence to test power circuit and logic.
    - b. Operation of the drive open circuit.

## 2.7 NAMEPLATES, TOOLS AND SPARE PARTS

- A. **Nameplates:** Nameplates of stainless steel shall be engraved or stamped and fastened to the equipment in accessible locations. Nameplates shall contain the manufacturer's name, model, serial number, size, characteristics, and appropriate data describing the equipment performance ratings.



- B. **Tools:** The WORK includes special tools necessary for maintenance and repair; tools shall be stored in tool boxes, and identified with the equipment number by means of stainless steel or solid plastic name tags attached to the box.
- C. **Spare Parts:** The WORK includes the following spare parts for each VFD:
1. 1 printed circuit board of each type used
  2. 1 complete inverter bridge phase cell with snubbers
  3. 1 complete converter bridge phase cell
  4. 5 spare light bulbs (i.e. LEDs) of each type used
  5. 3 spare fuses of each type used
  6. 2 cans of aerosol spray touch-up paint

## 2.8 MANUFACTURERS

- A. The VFD manufacturing facility shall be ISO 9001 and ISO 14001 certified.
- B. VFD shall be manufactured by:
1. Allen-Bradley
  2. Eaton
  3. ABB
  4. or approved equal

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Drives shall be installed in accordance with approved procedures submitted with the shop drawings, manufacturer's recommendations, and as indicated.
- B. General installation requirements shall comply with Section 16030.
- C. **Schedule:**

#### Variable Frequency Drives

| Driven Equipment |                  | Motor Control Center |             | Horse-Power | Converter Pulses       |
|------------------|------------------|----------------------|-------------|-------------|------------------------|
| Tag No.          | Name             | Tag No.              | Circuit No. |             |                        |
| VFD-34-P-501     | 34-Pump 501 VFD  | TBD                  | N/A         | 600         | Active Front End Drive |
| VFD-34-P-502     | 34-Pump 502 VFD  | TBD                  | N/A         | 600         | Active Front End Drive |
| VFD-10-P-901     | 10- Pump 901 VFD | TBD                  | N/A         | 200         | Active Front End Drive |

VARIABLE FREQUENCY DRIVES

### 3.2 FIELD TEST

- A. Field measurement of the harmonic indices shall be performed at unit full load using a harmonic analyzer (Hewlett Packard, or equal) with CTs with rated accuracy at 400 hertz. Harmonic indices shall be measured at the PCC. Tests shall prove that sufficient filtering has been provided to limit the harmonic distortion to limits set by IEEE 519. Results shall be tabulated and included with test results required in accordance with paragraph 11000-1.6A5.
- B. Provide field testing of installed VFD per the requirements of Section 1.9 FUNCTIONAL REQUIREMENTS above.

\*\* END OF SECTION \*\*

## SECTION 16030 - ELECTRICAL TESTS

### PART 1 -- GENERAL

#### 1.1 WORK OF THIS SECTION

- A. The WORK of this Section includes testing, commissioning and demonstrating electrical WORK.
- B. The WORK of this Section includes circuit activation, equipment running and installation of temporary jumpers.
- C. The WORK of this Section includes correction of defects and retesting.

#### 1.2 RELATED SECTIONS

- A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of these Technical specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.
  - 1. Section 16050 Basic Electrical Materials and Methods

#### 1.3 CODES

- A. The WORK of this Section shall comply with the current editions, with revisions, of the following codes and City of San Diego Supplements:
  - 1. National Electrical Code

#### 1.4 SPECIFICATIONS AND STANDARDS

- A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:
  - 1. NETA National Electrical Testing Association, Latest Edition

#### 1.5 SEQUENCE AND SCHEDULING

- A. Electrical testing including functional testing of power and controls shall be completed before commencement of the 7-day test.

#### 1.6 SHOP DRAWINGS AND SAMPLES

- A. The following shall be submitted:
  - 1. Report of testing of electrical WORK.

## PART 2 -- PRODUCTS

### 2.1 TEST EQUIPMENT AND MATERIALS

- A. Test instruments shall be calibrated to references traceable to the National Bureau of Standards and shall have a current sticker showing date of calibration, deviation from standard, name of calibration laboratory and technician, and date recalibration is required.

## PART 3 -- EXECUTION

### 3.1 TESTING

- A. In addition to indicated testing requirements and acceptance criteria, testing shall include the following:
  - 1. **Lighting:** N/A
  - 2. **Power Instrumentation:** Demonstration that voltmeter and ammeter switches are functional and that meters, including kilowatt meters, are installed within catalog accuracy.
  - 3. Demonstration of mechanical and electrical interlocking by attempting to subvert the indicated sequence.
  - 4. Activation of ground fault tripping by operating test features provided with ground current protective systems and by injecting a known, and reasonable, current in the ground current sensor circuit. Where not otherwise indicated, ground fault tripping shall occur at a ground current equivalent to 20 percent of phase current. Current injection is not required of circuit 400 amperes or less.
  - 5. **Cable Testing:** 480-volt circuits shall be tested for insulation resistance with a 1000-volt megohm meter. Testing shall be done after the 480-volt equipment is terminated. Phase-to-phase A-B, B-C, A-C and phase-to-ground insulation resistance tests shall be performed on each 5 kv, 15 kv, and 25 kv cable prior to termination at equipment but subsequent to stress cone makeup. Test results shall be submitted for review 30 days prior to plant operation and any system testing. Equipment which may be damaged during this test shall be disconnected. Tests shall be performed with other equipment connected to the circuit. The cable must withstand the test high voltage without breakdown, and shall exhibit steady or decreasing leakage current during the high potential test, and have satisfactory comparable megger readings in each megger test. Test results shall identify equipment used and time of test. Cable operating at more than 2,000 volts shall be tested in accordance with ICEA publications S-68-61, S-61-402, S-19-81, and S-68-516. Cable testing and reporting shall be performed by an organization recommended by the Manufacturer of the cable to be tested. The testing organization shall have a record of at least one prior successful project of comparable size and complexity. Testing shall verify the quality of cable terminations. Test results for medium and high voltage cable shall be

submitted to the CONSTRUCTION MANAGER 30 days prior to the time schedule for equipment energization.

6. Functional test and testing of electrical components shall be performed prior to subsystem testing and commissioning. Compartments and equipment shall be cleaned before commencement of functional testing. Functional testing shall include:

Visual and physical check of cables, busswork, circuit breakers, transformers, and connections associated with new and modified equipment.

Setting of protective relays in conformance with results of the Short Circuit Study and testing of relays to assure that relays will trip at the current value and time required by the Study.

Circuit breakers which are specified with adjustable time or pick-up settings for ground current, instantaneous overcurrent, short-time overcurrent, or long-time overcurrent, shall be field adjusted by a representative of the circuit breaker Manufacturer. Time and pickup setting shall correspond to the recommendations of the Short Circuit Study. Setting shall be tabulated and proven for each circuit breaker in its installed position; test results shall be certified and 7 copies shall be submitted to the CONSTRUCTION MANAGER.

7. Complete ground testing of all grounding electrodes prior to operating the equipment utilizing a three-point ground test.

- B. Subsystem testing shall occur after the proper operation of alarm and status contacts has been demonstrated to the CONSTRUCTION MANAGER and after process control devices have been adjusted. The WORK of this Section includes adjusting limit switches, vibrations switches, RTDs, Thermocouples, Thermistors and level switches prior to testing and setting pressure switches, flow switches, vibrations switches, RTDs, Thermocouples and timing relays.
- C. After initial settings have been completed, each subsystem shall be operated in the manual mode. Once the manual mode of operation has been proven, automatic operation shall be demonstrated to verify proper start and stop sequence of pumps, proper operation of valves, proper speed control, and similar parameters. Original function of the system should be retained and in confirmed cases expanded.
- D. Subsystems, in the context discussed here, mean individual and groups of pumps, conveyor systems, chemical feeders, air conditioning units, ventilation fans, air compressors, and similar equipment.

### 3.2 COMMISSIONING

- A. Commissioning during the 7-day test shall not be attempted until all subsystems have been found to operate satisfactorily; commissioning shall only be attempted as a function of normal plant operation in which plant process flows and levels are routine and equipment operates automatically in response to flow and level parameters or computer command, as applicable. Simulation of process parameters shall be considered only upon receipt of a written request by the CONTRACTOR.

**\*\* END OF SECTION \*\***

## SECTION 16040 - ELECTRIC MOTORS

### PART 1 -- GENERAL

#### 1.1 WORK OF THIS SECTION

- A. The WORK of this Section includes providing electric motors with accessories.

#### 1.2 RELATED SECTIONS

- A. The WORK of the following Sections applies to the WORK of this Section. Other technical specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.
  - 1. Section 11033 Variable Frequency Drives
  - 2. Section 16050 Basic Electrical Materials and Methods

#### 1.3 CODES

- A. The WORK of this Section shall comply with the current editions, with revisions, of the following codes and City of San Diego Supplements:
  - 1. National Electrical Code, 2020

#### 1.4 SPECIFICATIONS AND STANDARD

- A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:
  - 1. AFBMA 9 Load Ratings and Fatigue Life for Ball Bearings.
  - 2. AFBMA 11 Load Ratings and Fatigue Life for Roller Bearings.
  - 3. ANSI/IEEE 112 Standard Test Procedure for Polyphase Induction Motors and Generators.
  - 4. IEEE 841 Standard for Petroleum and Chemical Industry—Totally Enclosed Fan-Cooled (TEFC) Squirrel Cage Induction Motors—Up to and Including 500 HP
  - 5. NEMA ICS 2 Industrial Control Devices, Controllers and Assemblies
  - 6. NEMA ICS 6 Enclosures for Industrial Controls and Systems.
  - 7. NEMA MG 1 Motors and Generators.
  - 8. UL 674 Motors and Generators, Electric, for Use in Hazardous Locations, Class I, Groups C and D, Class II, Groups E, F and G.
  - 9. UL 1004 Motors, Electric

#### 1.5 SHOP DRAWINGS AND SAMPLES

- A. The following shall be submitted:
  - 1. Machine name and submitted data on driven machine.
  - 2. Motor manufacturer.

3. Motor type, model and dimensioned drawing.
4. Nominal horsepower.
5. NEMA design.
6. Frame size.
7. Enclosure.
8. Winding insulation class and treatment.
9. Rated ambient temperature.
10. Service factor.
11. Voltage, phase, and frequency rating.
12. Full load current at rated horsepower and indicated voltage.
13. Starting code letter, or locked rotor kVA, and current.
14. Special winding configuration.
15. Rated full load speed.
16. Power Factor at full load,  $\frac{3}{4}$  load and  $\frac{1}{2}$  load.
17. Details of water cooling (if any) for thrust bearings.
18. Motor efficiencies.
19. Name plate drawing with data filled in.
20. Wiring diagram, internal and typical external connections.
21. Port and connection detail for vibration sensor where it is applicable.
22. Factory tests including sound level, SCT, CIT, vibration, polarization.

B. The following shall be submitted:

1. **Bill of Material:** Complete Bills of Material with catalog data sheets and manuals for all equipment and devices comprising the variable frequency drive system. Where catalog cuts and other brochures depicting product characteristics are supplied, annotate to show product to be used on this project.
2. **List of Spare Parts:** A complete list of recommended spare parts. Include item descriptions, recommended quantities, and unit costs. The recommended list should be based on a maintenance plan where the OWNER will remove and replace failed items to the lowest replaceable module/component level.
3. **Operation, Maintenance and Installation Instructions:** Furnish with the equipment at delivery Operation and Maintenance Manuals, installation instructions, and other documentation necessary for the installation, start-up, operation and maintenance of the system.

## PART 2 -- PRODUCTS

### 2.1 GENERAL REQUIREMENTS

- A. **Conformance:** Electric motors driving identical machines shall be identical.
- B. **Rating:** The nominal rated motor horsepower shall be adequate for the driven machine without infringing upon the indicated motor service factor, unless more restrictive motor requirements are specified for a specific equipment item.



- C. **Minimum Motor HP:** The motor horsepower shall be not less than the minimum indicated for each driven machine. If the minimum horsepower is not adequate, the motor with the next larger horsepower, circuit breakers, magnetic starters, motor feeder conductors and conduit shall be provided.

## 2.2 DESIGN REQUIREMENTS

- A. **General:** Electric motors shall comply with ANSI/NEMA MG 1.
- B. **NEMA Design:** Except as otherwise indicated, electric motors shall be NEMA Design B, constant speed squirrel-cage induction motors designed for normal starting torque with low starting current. In no case shall starting torque or breakdown torque be less than the value indicated in ANSI/NEMA MG 1.
- C. **Motor Voltage Ratings:** Motors shall be rated 460 volts, 3-phase, 60-HZ.
- E. **Insulation (Heavy Duty Motors):** Motors shall include Class F insulation, rated to operate at an ambient temperature of 50 degrees C without exceeding Class B temperature rise limits at the motor's nominal rating
- F. **Motor Type:** Except as otherwise indicated, all motors shall be totally enclosed, fan cooled (TEFC) with a service factor of 1.15.
- G. **High Efficiency Motors:** Motors with a nameplate rating of 5 HP and above shall be "high efficiency" units with efficiencies determined by the test set forth in ANSI/IEEE 112, Method B with stray load loss adjustment as modified by NEMA MG 1-12.53(a) and (b).
- H. **Efficiency Index:** Efficiency index, nominal efficiency, and minimum efficiency shall be defined in accordance with ANSI/NEMA MG 1-12.53.b. Motor nameplate data shall include the nominal efficiency value.
- I. **Motors for VFD Drives:** Motors for variable frequency drives (VFD) shall be specifically rated for inverter duty, NEMA MG 1 design A or B, high efficiency, totally enclosed fan cooled (TEFC) with Class F insulation. Winding temperature rise shall be limited to Class B rise when operating over the speed range specified in VFD with ENGINEER approved specified load speed/torque characteristic. Six 100-ohm platinum resistance temperature detectors (RTDs) shall be provided in the stator windings for motors 100 HP and larger. Motor insulation shall be designed to meet NEMA MG 1, Part 31 (1600-volt peak at a minimum of 0.1 microsecond rise time). Motors shall conform to IEEE 841. All internal surfaces shall be coated with epoxy paint.

Inverter duty motors shall be specifically certified by the motor manufacturer to be compatible with the VFD to be used with the motor. Inverter duty motors shall be designed to operate over the speed or frequency range specified. Inverter duty motors shall be provided with Type 2 thermal protection as specified in NEMA MG 1-12.53.2.

Inverter duty motors shall be equipped with ceramic coated bearings to insulate them from VFD induced current.

- K. **Stator Windings and Resistance Temperature Detectors:** Stator windings shall be copper. Except as otherwise indicated, six 100-ohm platinum resistance temperature detectors (RTDs) shall be provided in the stator windings for motors greater than 250 HP.
- L. **Thrust Value:** The motor supplier shall be responsible to provide motors that comply with system thrust value from pumps. System thrust value shall be obtained from pump manufacturer.
- M. **Space Heaters:** 120-volt space heaters shall be provided on all 15 HP and larger motors.

### 2.3 MOTOR BEARINGS

- A. **General:** Bearings shall comply with ANSI/NEMA MG.
- B. **Bearing Life:** Except as otherwise indicated, motors shall be heavy duty and shall include bearings with a minimum L-10 life of 100,000 hours.
- C. **Vertical Motors Over 2 HP:** Vertical motors larger than 2 HP shall be furnished with relubricatable ball, spherical, roller, or plate type thrust bearings. Lubrication shall comply with the manufacturer's recommendations.
- D. **Temperature Detectors:** Except as otherwise indicated, one 3 wire, 100 ohm platinum RTD per bearing shall be provided for motors greater than 250 HP.

### 2.4 ACCESSORY REQUIREMENTS

- A. **General:** Horizontal motors 3 HP and larger, and all vertical motors, shall have split-type cast metal conduit boxes. Motors other than open drip-proof shall include gaskets.
- B. **Lifting Devices:** All motors weighing 50 lbs or more shall include lifting devices designed for installation and removal.
- C. **Terminal Boxes:** Motors shall have extra-large terminal boxes to accommodate stress cone terminations as recommended by cable manufacturers.
- D. **Nameplate:** Motors shall include a permanent, non-corrosive nameplate indelibly stamped or engraved with NEMA Standard motor data, including bearing description and lubrication instructions, insulation class, ambient temperature, and power factor at full load.

## 2.5 MANUFACTURER

- A. Inverter duty motors shall be manufactured by U.S. Motors, Inverter Grade or OWNER approved equal.

## **PART 3 -- EXECUTION**

### 3.1 INSTALLATION

- A. Motors shall be installed in accordance with the manufacturer's installation instructions and written requirements of the manufacturer of the driven equipment. The supplied equipment shall be fully compatible with the pump, variable frequency drive and other equipment at the job site. The motor manufacturer representative and contractor shall provide a pre-service test plan and operation of the motor in all normal modes of operation to test start, stop, acceleration, and acceleration of motor and sustained operation at full and minimum speed. OWNER will accept the installation only after functional test indicates compliance with these specifications.

### 3.2 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.

**\*\* END OF SECTION \*\***

## SECTION 16050 - BASIC ELECTRICAL MATERIALS AND METHODS

### PART 1 -- GENERAL

#### 1.1 WORK OF THIS SECTION

- A. The WORK of this Section includes providing the following:
1. Raceways, Fittings and Supports
  2. Concrete Pads, Underground Ducts, Manholes and Pull-Boxes
  3. Conductors, Wire and Cable
  4. Wiring Devices
  5. Disconnect Switches
  6. Electrical Identification
  7. Pushbuttons
  8. Cabinets and Enclosures
  9. Process Control Devices

#### 1.2 RELATED SECTIONS

- A. The WORK of the following Sections applies to the WORK of this Section. Other technical specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.
1. Section 16030 Electrical Tests
  2. Section 16431 Short Circuit and Coordination Report

#### 1.3 STANDARD SPECIFICATIONS

- A. Except as otherwise indicated in this Section of the Specifications, the CONTRACTOR shall comply with the Standard Specifications for Public Works Construction (SSPWC), City of San Diego Whitebook, Green Book, and all listed City Standard Drawings.

#### 1.4 CODES

- A. The 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. California Building Code - 2019
  2. National Electrical Code - 2020

## 1.5 SPECIFICATIONS AND STANDARDS

A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

1. Federal Specifications:

FS W-C-596E/GEN(1) Connector, Plug, Receptacle and Cable Outlet, Electrical Power

FS W-S-896E/GEN(1) Switches, Toggle (Toggle and Lode), Flush Mounted (ac)

FS WW-C-581E Conduit, Metal, Rigid, and Intermediate; And Coupling, Elbow, and Nipple, Electrical Conduit: Steel, Zinc Coated

WW-C-581E Intermediate; and Coupling, Elbow, and Nipple, Electrical Conduit; Zinc Coated

2. Commercial Standards:

ANSI C80.1 Rigid Steel Conduit, Zinc Coated, Specification For

ANSI/IEEE 386 Separable Insulated Connector Systems for Power Distribution Systems Above 600V

ANSI C37.46 Specifications for Power Fuses and Fused Disconnecting Switches

NEMA TC2 Electrical Plastic Tubing (EPT) and Conduit (EPC 40 and EPC 80)

NEMA ICS 6 Enclosures for Industrial Controls and Systems

NEMA 250 Enclosures for Electrical Equipment (1000 volts maximum)

NEMA WC7 Cross-Linked-Thermosetting Insulated Wire and Cable for the Transmission and Distribution of Electric Energy

ASTM B3 Soft or Annealed Copper Wire

ASTM B8 Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

ASTM B33 Tinned Soft or Annealed Copper Wire for Electrical Purposes

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|               |   |
|---------------|---|
| ASTM B189     | Lead Coated and Lead-Alloy-Coated Soft Copper Wire for Electrical Purposes                                  |
| ICEA S-68-516 | Ethylene-Propylene-Rubber-Insulated Wire  |
| IEEE 383      | Type Test of Class IE Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations |
| UL 44         | Rubber-Insulated Wires and Cable  |
| UL 83         | Thermoplastic-Insulated Wires and Cable   |
| UL 67         | Underwriters Laboratories, Electric Panelboards   |
| UL 489        | Molded-Case Circuit Breakers and Circuit Breaker Enclosures   |
| UL 50         | Cabinets and Boxes  |

## 1.6 SHOP DRAWINGS AND SAMPLES

### A. The following shall be submitted:

#### 1. General

Shop drawings including the following:

Complete material list stating manufacturer and name of each item or class of material.

Front, side, and rear elevations and top views.

Location of conduit entrances and access plates.

Identification of conductors not indicated on drawings.

Identification numbers of conductors.

Manufacturers' equipment drawings.

Details of shielded power cable termination.

Component data.

Connection, terminal and internal wiring diagrams, and conductor sizes.

Layout drawings indicating arrangement, dimensions and weights.

Methods of anchoring.

Finish.

Nameplates.

Temperature limitations, as applicable.

Manufacturer's product data including the following:

Catalogue cuts, bulletins, brochures, or photocopies of applicable pages for mass produced, non-custom manufactured products stamped to indicate the project name, applicable Specification section and paragraph, model number, ratings and options.

Lists of the following:

Materials, equipment, apparatus and fixtures proposed for use; with the list including sizes, names of manufacturers, catalog numbers, and such other information required to identify the items.

Test reports of the following:

Factory-fabricated products.  
Currents resulting from DC high potential testing.

2. Lighting and Power Distribution Panelboards

Manufacturer's data as follows:

Manufacturer's certification that bus bracing is capable of withstanding the specified short circuit condition.

Quantity and rating of circuit breakers provided with each panelboard.

B. General Requirement

1. All equipment furnished by the contractor shall be listed by and shall bear the label of Underwriters' Laboratories, Incorporated (UL).
2. The construction and installation of all electrical equipment and materials shall comply with all applicable provisions of the Cal/OSHA Safety Orders (Title 8, CCR), State Building Standards, and Applicable local codes and regulations.

1.7 OWNER'S MANUAL

A. The following shall be included in the OWNER'S MANUAL:

1. Manufacturer's installation instructions.
2. Manufacturer's maintenance procedures.

1.8 PROJECT RECORD DRAWINGS

A. The following shall be included in the PROJECT RECORD DRAWINGS:

1. Accurate location of conductors including depths and routing of concealed below-grade electrical WORK.
2. Accurate location of electrical WORK (raceway and conductors) where the location differs substantially from the locations indicated.

## 1.9 AREA DESIGNATIONS

- A. **General:** For purposes of delineating electrical enclosure and installation requirements, certain areas are classified. Electrical installations within these areas shall conform to the indicated code requirements for the area indicated.
- B. **General Purpose Locations:** WORK installed in areas which are not otherwise specifically classified shall be "General Purpose." Enclosures shall comply with the requirements of these Specifications and shall be NEMA Type 1.
- C. **Outdoor Locations:** In outdoor locations, raceway shall be rigid galvanized steel conduit; entrances shall be threaded; and fittings shall have gasketed covers. Fittings and conduit shall be drained. Threaded fastening hardware shall be stainless steel. Mounting brackets shall be galvanized. Attachments or welded assemblies shall be galvanized after fabrication. Instruments and control cabinets, panels, switchboards and motor control centers shall be "Weatherproof NEMA Type 3R." Enclosures shall be mounted 1/4-inch from walls to provide an air space unless specifically shown otherwise.
- D. **Damp Location:** Locations which are indoors and 2 feet below grade elevation or which are indicated as damp locations on the Drawings shall have electrical installations which conform to the requirements for outdoor locations; except, that the air space from walls may be less than 1/4-inch and enclosures shall be NEMA Type 2. "Damp locations" shall include pipe galleries, tunnels, and basements. Rooms housing liquid handling equipment are also classified as damp locations regardless of grade elevation.
- E. **Splash Locations:** Areas indicated as "splash-proof" locations shall have electrical installations as described for "outdoor locations"; except, that NEMA Type 4 enclosures shall be provided for instruments and controls, panels, switchboards, and motor control centers.
- F. **Corrosive Locations:** Areas indicated as "corrosive" locations shall have stainless steel threaded hardware; electrical hardware, fittings, and raceway systems shall be PVC-coated. Enclosures shall be NEMA Type 4X of fiberglass and reinforced polyester or approved equal. Corrosive locations include chemical feeder and chemical storage rooms, chlorination rooms, reservoir access, valve structures, and outdoor areas within 10 feet of chemical storage tanks and areas within 10 feet of inlet channels.
- G. **Hazardous Locations:** NEC "Hazardous (Classified) Locations" shall be as indicated and shall comply with NFPA 820.

## 1.10 FACTORY TESTING

- A. **Product Testing:** Products shall be tested at the factory for compliance with the indicated requirements and as follows:
  - 1. **Cabinets and Enclosures:** Each motor control center shall be completed, assembled, wired, and tested at the factory. All buses and wiring shall be given a dielectric test in accordance with the latest IEEE and NEMA Standards.



- B. **Witnesses:** The OWNER and the CONSTRUCTION MANAGER (at the option of either) reserves the right to witness factory tests.

#### 1.11 FIELD TESTING

- A. **Testing:** Products shall be field-tested for compliance with the indicated requirements.
- B. **Witnesses:** The OWNER and the CONSTRUCTION MANAGER (at the option of either) reserves the right to witness field tests.

#### 1.12 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. **Delivery of Materials:** Products 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. Products shall not be damaged, marred, or splattered with water, foam, plaster, or paint. Moving parts shall be kept clean and dry.
- C. **Replacement:** Damaged materials or equipment, including face plates of panels and switchboard sections, shall be replaced or refinished by the manufacturer at no expense to the OWNER.

#### 1.13 REGULATORY REQUIREMENTS

- A. In addition to other indicated regulatory requirements, the WORK of this Section shall comply with the requirements of SSPWC.

#### 1.14 UTILITY REQUIREMENTS

- A. The WORK of this Section includes compliance with the requirements of San Diego Gas and Electric Company and payment of related charges.

### PART 2 -- PRODUCTS

#### 2.1 GENERAL

- A. **Listing:** Electrical equipment and materials shall be listed for the intended purpose by an independent testing laboratory including Underwriters Laboratories (UL) or an independent testing laboratory shall be acceptable to the inspection authority having jurisdiction.
- B. **Unlisted Products:** When a product is not available with a testing laboratory listing for the intended purpose, special testing (if any) required by the authority having jurisdiction shall be included in the original contract price.
- C. **Project/Site Conditions:** Unless otherwise indicated, equipment and materials shall be sized and rated for the ambient conditions in San Diego but not less than an ambient temperature of 40 degrees C at sea level without exceeding the manufacturer's stated tolerances.

- D. **Product Qualifications:** Equipment and materials shall be new and shall bear the UL label, where UL requirements apply. Equipment and materials shall be the products of reputable manufacturers specializing in the products indicated in this Section. Similar items in the project shall be products of the same manufacturer. Equipment and materials shall be of industrial grade and standard of construction and shall be of sturdy design and manufacture; and shall be capable of reliable, trouble-free service.
- E. **Area Classification:** Dry well area is classified as damp and corrosive area. All product and installation specified herein or plans for dry well area shall comply with damp and corrosive application.

## 2.2 RACEWAY, FITTINGS AND SUPPORTS

- A. **Raceway:** Raceway shall comply with the following:
  - 1. **Rigid Steel Conduit:** Raceway shall be rigid steel conduit complying with ANSI C80.1 unless otherwise indicated. Rigid steel conduit shall be full weight, mild steel, hot-dip galvanized and bichromate coated inside and outside after galvanizing.
  - 2. **Intermediate Metal Conduit:** N/A.
  - 3. **Fittings:** Locknuts shall be extra heavy electrogalvanized steel for sizes through 2 inches. Locknuts larger than 2 inches shall be electrogalvanized malleable iron. Bushings shall be electrogalvanized malleable iron with insulating collar. Grounding bushings shall be locking type and shall include a feed-through compression lug for securing the ground cables. Unions shall be electrogalvanized ferrous alloy type. Threadless fittings are not acceptable. Gaskets shall be made of neoprene.

Expansion fittings in embedded runs shall be watertight and shall be provided with an internal bonding jumper. The expansion material shall be neoprene and shall allow for 3/4-inch movement in any direction.
  - 4. **Plastic Coated Rigid Steel Conduit and Fittings:** Plastic coated conduit shall be rigid steel conduit with PVC jacket and shall conform to Federal Specification WW-C-581E, ANSI C80.1, and to Underwriter's Laboratories specifications. The zinc surfaces of the conduit shall remain intact and undisturbed on both the inside and the outside of the conduit through the preparation and application processing. A PVC coating shall be bonded to the galvanized outer surface of the conduit. The bond between the PVC coating and the conduit surface shall be greater than the tensile strength of the plastic. The thickness of the PVC coating shall be a minimum of 40 mils. A PVC jacketed coupling shall be provided with each length of conduit. A PVC sleeve equal to the OD of the conduit shall extend 1-1/2 inches from each end of coupling.

Fittings used with plastic coated conduit shall be similarly coated to the same thickness as the conduit and shall be provided with type 304 stainless steel hardware. Conduit and fittings shall be manufactured by the same company. Minimum size shall be 3/4 inch.

5. **Electrical Metallic Tubing:** N/A.
6. **Flexible Metal Conduit:** Flexible metal conduit shall be formed from spirally wound galvanized steel strip with successive convolutions securely interlocked. Minimum size shall be 1/2 inch. Fittings shall be compression type. Flexible metal conduit shall be provided with ground wire.
7. **Liquidtight Flexible Steel Conduit:** Liquidtight flexible steel conduit shall be formed from spirally wound galvanized steel strip with successive convolutions securely interlocked and jacketed with liquidtight plastic cover. Minimum size shall be 1/2 inch. Fittings for liquidtight conduit shall have cadmium-plated malleable iron body and gland nut with cast-in lug, brass grounding ferrule threaded to engage conduit spiral and O-ring seals around the conduit, box connection and insulated throat. Forty-five and 90-degree fittings shall be used where applicable.
8. **Explosion proof Flexible Conduit:** Explosionproof flexible conduit shall be suitable for use in Class I, Division 1, Groups C and D hazardous areas complying with NEC and shall be watertight.
9. **Rigid Nonmetallic Conduit:** Rigid nonmetallic conduit shall be NEMA TC2, type EPC-40-PVC, or EPC-80-PVC high impact, polyvinylchloride (PVC). Fittings used with PVC conduit shall be PVC solvent weld type. Nonmetallic conduits shall be UL listed for applications indicated. Minimum size shall be 1 inch.
10. **Wireways:** Wireways and auxiliary gutters shall be JIC EMP-1 sectional flanged oiltight type with hinged covers and shall be 8 inches by 8 inches in cross section unless otherwise indicated.
11. **Cable Trays:** N/A.
12. **Metallic Insulation Bushings:** Metallic insulated bushings shall have ground terminals and smooth and well-rounded surfaces to protect the conductor insulation. The conduit threads shall be deep, clean and easily attached to the conduits. The bushing shall be O-Z/Gedney, Thomas and Betts, or approved equal.

B. **Boxes and Fittings:** Boxes and fittings shall comply with the following:

1. **Sheet Metal Boxes:** Boxes and fittings installed in areas where electrical metallic tubing is indicated shall be standard UL approved electro-galvanized sheet steel.

2. **Cast Ferrous Alloy Boxes:** Boxes shall be hot-dip galvanized cast ferrous alloy unless otherwise indicated. Integrally cast threaded hubs or bosses shall be provided for conduit entrances and shall provide for full 5-thread contact on tightening. Drilling and threading shall be done before galvanizing. A full body neoprene gasket shall be included with the cover. Type 304 stainless steel screws shall be provided for covers. Where two or more devices are located together, outlet and device boxes shall be gang type. Cover plates shall be hot-dip galvanized cast ferrous alloy unless the particular device requires a cover that is not manufactured in this material.
  3. **Floor Boxes:** Floor boxes shall be hot-dip galvanized cast boxes with an NEMA 4 rating. Boxes shall include a recessed ring neoprene gasket, hot-dip galvanized steel checker cover plates and type 304 stainless steel machine screws of not less than 1/4-inch diameter. The cover screws shall be flat head type or recessed socket head screws designed to be flush with cover plate.
  4. **Welded Sheet Steel Boxes:** Large boxes shall be fabricated from welded steel and shall be hot-dip galvanized after fabrication. Before finish is applied, a grounding pad drilled for two bolted grounding lugs or a grounding stud shall be welded to the inside of the box. Hardware shall be 304 stainless steel. Boxes shall, as a minimum, meet NEMA 12 and JIC EMP-1 requirements.
  5. **Explosion proof Boxes and Seal Fittings:** In areas specified as Class I, Division 1 or 2, hazardous, boxes and fittings shall be NEMA 7, Groups C and D, explosionproof. Seal fittings for conduit systems in hazardous atmosphere locations shall be hot-dip galvanized cast ferrous alloy. Sealing compound shall be hard type and UL listed for explosionproof sealing fittings.
  6. **Hubs:** Threaded hubs for connection of conduit to junction, device or terminal boxes shall be made of cast ferrous alloy, electroplated with zinc and shall have insulated liner and insulating bushings. The hubs shall utilize a neoprene O-ring and shall ensure a watertight connection.
- C. **Raceway Supports:** Raceway supports shall comply with the following:
1. **Conduit Supports:** Hot-dip galvanized framing channel shall be used to support groups of conduits. Individual conduit supports shall be one-hole galvanized malleable iron pipe straps used with galvanized clamp backs and nesting backs where required. Conduit supports for PVC coated rigid steel and PVC conduit systems shall be one-hole PVC coated clamps or PVC conduit wall hangers.
  2. **Ceiling Hangers:** Ceiling hangers shall be adjustable galvanized carbon steel rod hangers. Straps or hangers of plumber's perforated tape are not acceptable. Unless otherwise indicated hanger rods shall be 1/2-inch full-threaded rods and shall meet ASTM A193. Hanger rods in corrosive areas and those exposed to weather or moisture shall be stainless steel.

3. **Structural Attachments (Racks):** Structural attachments shall be constructed from hot-dip galvanized framing channel as specified. Field cuts shall be treated with zinc enriched paint.

## 2.3 CONCRETE PADS, UNDERGROUND DUCTS, MANHOLES AND PULL-BOXES

- A. **General:** The WORK of this Section includes concrete pads, manholes, pull-boxes and concrete required for encasement, installation, or construction and shall be 2500-psi concrete and the following:
  1. Consolidation of encasement concrete around duct banks shall be by hand puddling, and no mechanical vibration will be permitted.
  2. A workability admixture consisting of a hydroxylated carboxylic acid type in liquid form shall be used in encasement concrete, admixtures containing calcium chloride shall not be used.
  3. Concrete for encasement of conduit or duct banks shall contain an integral red-oxide coloring pigment in the proportion of 8 pounds per cubic yard of concrete.
- B. **Concrete Pads:** Concrete housekeeping pads shall be provided for floor-standing electrical equipment. Unless noted otherwise, housekeeping pads shall be 3 inches above surrounding finished floor or grade and shall be 2 inches larger in both dimensions than the supported equipment unless otherwise indicated.
- C. **Concrete-Encased Ducts:** Where an underground distribution system is indicated, it shall be constructed of multiple runs of single bore [thin-wall] non-metallic ducts, concrete encased, with steel reinforcing bars, with underground manholes and pullboxes.
- D. **Manholes and Pull-Boxes** N/A.

## 2.4 CONDUCTORS, WIRE AND CABLE

- A. **General:** The type, size and number of conductors shall comply with the indicated requirements. Number and types of communication, paging, and security cables shall be as required for the particular equipment provided.

Conductors, including ground conductors, shall be copper. Insulation shall bear the manufacturer's trademark, type, voltage rating, and conductor size.

- B. **Color Coding:** Color coding shall comply with the following:
  1. **Control Conductors:** Control conductors color coding shall be manufacturer's standard.
  2. **Power Conductors:** Single-conductor power conductors shall have the following colors for 600V or less:

|         | <u>120/208V</u> | <u>480/277V</u> |
|---------|-----------------|-----------------|
| Phase A | Black           | Brown           |
| Phase B | Red             | Orange          |
| Phase C | Blue            | Yellow          |
| Ground  | Green           | Green           |
| Neutral | White           | Grey            |

Color coding tape shall be used where colored insulation is not available. Branch circuit switch shall be yellow. Insulated ground wire shall be green, and neutral shall be gray. Color coding and phasing shall be consistent throughout the site, but bars at panelboards, switchboards, and motor control centers shall be connected Phase A-B-C, top to bottom, or left to right, facing connecting lugs.

General purpose ac control conductors shall be pink. General purpose dc control conductors shall be blue.

Cables sized No. 4 AWG and larger may be black with colored 3/4-inch vinyl plastic tape applied in 3-inch lengths around the cable at each end. The cables shall be tagged at terminations and in pull boxes, handholes and manholes.

C. **Lighting and Receptacle Branch Circuit Conductors:** Lighting conductors shall be stranded except for No. 12 AWG which shall be solid.

1. Conductors shall comply with the following characteristics:

|                   |   |
|-------------------|---|
| Voltage:          | 600 volts.  |
| Conductor:        | Bare annealed copper; stranded in accordance with ASTM B8.                      |
| Insulation:       | THWN/THHN, 90-degree C dry, 75 degree C wet, polyvinylchloride (PVC) per UL 83. |
| Jacket:           | Nylon.  |
| Flame resistance: | UL 83.  |

D. **Power and Control Conductors and Cable, 600 Volts:** Conductors and cable shall comply with the following:

1. **Single Conductors:** Single conductor cable shall be stranded and shall be installed in conduits for power and control circuits.

Conductors shall comply with the following characteristics:

|            |   |
|------------|---|
| Voltage:   | 600 volts.  |
| Conductor: | Coated, Class B, stranded, annealed copper per ASTM B8. |

Insulation: XHHW, 90 degrees C dry, 75 degrees C wet, composite of ethylene propylene rubber (EPR) and chlorosulfonated polyethylene (CSPE) per ICEA UL 44 and NEMA WC-7.

Jacket: Chlorosulfonated polyethylene (CSPE).

Flame resistance: IEEE 383.

2. **Multiconductor Cable:** Multiconductor cable shall be used for power and control circuits installed in cable tray. Cables shall be UL labeled, Type TC, designed for cable tray installation in accordance with NEC 340. The type of insulation, number of conductors, and size of conductor shall comply with the indicated requirements.

Multiconductor power cable shall contain three or four conductors, as indicated, plus an equipment grounding conductor.  
 Multiconductor power cables shall comply with the following:

Voltage: 600 volts.

Conductors: Annealed copper, stranded, per ASTM B8, coated per ASTM B33.

Insulation: THWN/THHN, 90 degrees C dry, 75 degrees C wet, ethylene propylene rubber (EPR) or a composite of EPR and chlorosulfonated polyethylene (CSPE) per ICEA S-68-516 and UL 44.

Jacket: Polyvinylchloride (PVC).

Flame resistance: IEEE 383.

Unless otherwise indicated, multiconductor control cable shall be size 14 AWG and shall comply with the following:

Voltage: 600 volts.

Conductors: Annealed copper, stranded, per ASTM B8, coated per ASTM B33.

Insulation: THWN/THHN, 90 degrees C dry, 75 degrees C wet, ethylene propylene rubber (EPR) or a composite of EPR and chlorosulfonated polyethylene (CSPE) per ICEA S-68-516 and UL 44.

Jacket: Polyvinylchloride (PVC).

Flame resistance: IEEE 383.

E. **Direct Burial:** N/A.

- F. **Medium Voltage Power Conductors and Cable (5 KV-15 KV):** N/A.
- G. **Signal Cables:** Signal cables shall comply with the following:
1. **General:** Signal cable shall be provided for instrument signal transmission, alarm, communication and any circuit operating at less than 100 volts. Cables shall be color coded black and white for pairs or black, white and red for triads. Circuit shielding shall be provided in addition to cable shielding.
  2. **Single Circuit:** Cable shall consist of one pair or triad, No. 16 AWG conductors with 15 mils of 90-degree C polyvinylchloride (PVC) insulation, 4 mils nylon conduit or jacket, twisted on a 2-inch lay, and covered with a 100 percent 1.35 mil aluminum-Mylar tape shield with No. 18 AWG 7-strand tinned copper drain wire and a 45 mil PVC jacket overall. Cable shall be UL listed, Type TC, rated 600 volts.
  3. **Multiple Circuit:** Cable shall consist of four or more pairs or triads which are made up of No. 18 AWG conductors with 15 mils of 90-degree C PVC insulation, 4 mils nylon jacket, twisted on a staggered lay 1-1/2 to 2-1/2 inches, and covered with a 100 percent 1.35 mil aluminum-Mylar tape shield with No. 22 AWG 7-strand tinned copper drain wire. Overall cable shield shall be 2.35 mil aluminum-Mylar tape with a No. 20 AWG 7-strand tinned copper drain wire. Cable shall be UL listed, Type TC, 600 volts.
  4. **Thermocouple Extension:** Extension cable shall be provided for the type of thermocouple circuit indicated. Conductors shall be 16 AWG, solid alloy, with 15 mils of 90-degree C flame-retardant polyvinylchloride insulation, twisted and covered with 100 percent 2.35 mil aluminum polyester tape and a 20 AWG, 7-strand, tinned-copper drain wire and a 35 mil, flame-retardant PVC jacket overall. Cable shall be listed for cable tray installation.
  5. **Communication, Paging and Security System:** Communication, paging, and security system cables shall comply with the existing system configuration and protocols.
  6. **Modbus cable:** Modbus cable shall be fully compatible with the network system shown on plans and meet the requirements set forth at <http://www.modbus.org/>. The contractor shall coordinate and be responsible for all cable configurations, proof of proper resistance, impedance, shielding, and connections to the motor protection relays and VFDs communication ports.
- H. **Portable Cord:** Portable cord shall be UL listed, Type SO for sizes No. 10 AWG and smaller. Cords with conductors larger than No. 10 AWG shall be UL listed, Type G. Cords shall contain an equipment grounding conductor.
1. Cables shall comply with the following:
 

|             |   |
|-------------|---|
| Conductors: | Flexible rope stranded per ASTM B189 and B33.<br>Conductors shall be coated except ground conductors may be uncoated. |
|-------------|---|



Insulation: Insulation shall be ethylenepropylene (EPR) as per ICEA S-68-516 and rated for continuous operation at 90 degrees C.

Jacket: Heavy-duty neoprene as per ICEA S-68-516.

I. **Splicing and Terminating Materials:** Splicing and terminating materials shall comply with the following:

1. **600 Volt Conductor and Cable Connectors:** Connectors shall be compression type of correct size and UL listed for the specific application. Connectors shall be tin-plated high conductivity copper. Connectors for wire sizes No. 10 AWG and smaller shall be nylon self-insulated, ring tongue or locking-spade terminals. Connectors for wire sizes No. 8 AWG and larger shall be one-hole lugs up to size No. 3/0 AWG, and two-hole or four-hole lugs for size No. 4/0 and larger. Mechanical clamp, dimple, screw-type connectors are not acceptable. In-line splices and taps shall be used only where indicated, or shown on the shop drawings. When used, they shall be of the same construction as other connectors. Splices shall be compression type, made with a compression tool die designed for the purpose. Splice shall be covered with a heat-shrinkable sleeve or boot.
2. **5 KV and 15 KV Cable Terminators:** N/A.

2.5 WIRING DEVICES

- A. **General:** Wiring devices shall be UL approved for the current and voltage indicated and shall comply with NEMA WD-1. Devices shall contain provisions for back wiring and side wiring with captively held binding screws.

Devices shall be brown, except those located in finished areas shall be ivory.

Special purpose devices shall be the color indicated.

Receptacles and switches shall conform to Federal Specifications W-C-596E and W-S-896E, respectively, and the indicated standards.

- B. **Receptacles and Plugs:** Receptacles and plugs shall comply with the following:

1. **General:** Receptacles shall be grounding type.
2. **120V Receptacles:** Receptacles indicated for indoor use in clean areas shall be duplex 20 amp, NEMA 5-20R, and shall accept NEMA 5-15P and 5-20P plug caps.

Receptacle indicated for use outdoors or in process or corrosive areas shall be duplex, 20 ampere, NEMA 5-20R, and shall accept NEMA 5-15P and 5-20P plug caps. Receptacle and plug caps shall be corrosion resistant, marine duty with yellow polycarbonate weatherproof lift covers.

3. **Ground Fault Interrupter Receptacles:** Receptacles shall be NEMA 5-20R configured and shall mount in a standard outlet box. Units shall trip at 5 milliamperes of ground current and shall comply with NEMA WD-1-1.10 and UL 943. GFI receptacles shall be capable of individual as well as "downstream" operation.
  4. **240V Receptacles:** 240-volt duplex receptacles shall be 2-pole, 3-wire, grounding type, 240-volt, ac, 20-amperes, NEMA Configuration 6-20R. Single 30-ampere receptacles shall be 2-pole, 3-wire, grounding type, 125-volt, ac, 30-amperes, NEMA Configuration 5-30R.
  5. **Plug Caps:** Male plug caps for 120 volt and 240 volt receptacles shall be of the cord grip armored type with heavy phenolic housing, of the same manufacture as the receptacle. Plug caps shall be rated 15 amps. One plug cap shall be provided for every four receptacles (minimum 2 plug caps).
  6. **Three Phase Receptacles and Plugs:** Receptacles shall be suitable for 480 volt, 3-phase, 4-wire service, with ampere ratings as indicated. Receptacles and plugs shall be designed so that the grounding pole is permanently connected to the housing. The grounding pole shall make contact before the line poles are engaged when the plug is connected to the receptacle housing. The plug sleeve shall also make contact with the receptacle housing before the line and load poles make contact. Receptacles shall include cast back box, angle adapter, gaskets, and a gasketed screw-type, weathertight cap with chain fastener. Each receptacle shall be provided with one plug.
  7. **Receptacles for Hazardous Areas:** Receptacles for use in hazardous areas shall be rated in accordance with NEC for the area in which they are to be located and shall be factory sealed. Receptacles shall be designed so the plug must be inserted and turned before load is energized. Receptacles shall be provided with mounting box, sealing chamber, and compatible plug.
- C. **Switches:** Switches shall comply with the following:
1. **General Purpose (Indoor, Clean Areas):** General purpose switches shall be quiet AC type, specification grade, and shall comply with rated capacities as required. Switches shall match receptacles in color.
  2. **Switches for Hazardous Areas:** Switches for control of lighting and small single-phase power loads in hazardous areas shall consist of a factory assembled and sealed combination general purpose type switch in an explosion-proof housing. The switch shall be rated in accordance with NEC for the area in which it is to be installed. The external operating mechanism shall consist of a wing-type handle having the "ON" and "OFF" positions visible from the front.
  3. **Switches for Outdoor and Corrosive Areas:** Switches shall be heavy-duty industrial type 20-ampere pressswitch type with weatherproof/corrosion resistant neoprene plate. CONTRACTOR shall provide abuse-resistant nylon handles, and switches with corrosion-resistant steel nickel plate bridge.

- D. **Device Plates:** Device plates shall be provided with switches. In noncorrosive indoor areas, receptacle device plates shall be made of sheet steel, zinc electroplated with chrome finish.

Device plates in corrosive or outdoor areas shall be corrosion-resistant/marine-duty type. Device plates for explosionproof equipment shall be factory provided with the equipment.

Device plates shall include engraved laminated phenolic nameplates with 1/8-inch white characters on black background.

Nameplates for switches shall identify panel and circuit number and area served.

Nameplates for receptacles shall identify circuit and voltage if other than 120 volts, single phase.

- E. **Plug Strips:** N/A.

## 2.6 LIGHTING AND POWER DISTRIBUTION PANELBOARDS (NOT USED)

## 2.7 DISCONNECT SWITCHES

- A. Disconnect switches shall be externally operated with quick-make/quick-break mechanisms. The handle shall be interlocked with the switch cover by means of a defeatable interlock device. The switch shall be lockable in the "off" position. Switches shall have nameplates with manufacturer, rating, and catalog number. Heavy-duty switches shall have arc suppressors, pin hinges, and shall be horsepower rated at 600-volts. Heavy-duty switches shall be provided for all motor circuits above 3 horsepower. In smaller motor circuits switches shall be general duty. Switch enclosure shall be NEMA 4X.

## 2.8 ELECTRICAL IDENTIFICATION

- A. **Nameplates:** Nameplates shall be fabricated from white-center, black-face laminated plastic engraving stock. Nameplates shall be fastened securely, using fasteners of brass, cadmium plated steel, or stainless steel, screwed into inserts or tapped holes, as required. Engraved characters shall be block style of adequate size to be read easily at a distance of 6 feet with no characters smaller than 1/8-inch high.
- B. **Conductor and Equipment Identification:** Conductor and equipment identification devices shall be either imprinted plastic-coated cloth marking devices or shall be heat-shrink plastic tubing, imprinted split-sleeve markers cemented in place.
- C. **Identification Tape (Buried):** Identification tape for protection of buried installation shall be a 6-inch wide green polyethylene tape imprinted "CAUTION - ELECTRIC UTILITIES BELOW".

## 2.9 PUSHBUTTONS

- A. Remote-mounted pushbuttons shall be NEMA rated heavy duty, oiltight type with synthetic rubber boots and any special gasketing required to make the completed station watertight. Provide NEMA Type 4 pushbutton for above ground indoor unit and NEMA Type 4X constructed of stainless steel or glass polyester for dry well area.
- B. Install provisions for locking pushbuttons in the OFF position wherever lockout provisions are indicated. Locking provision shall be 316 stainless steel.

## 2.10 CABINETS AND ENCLOSURES

- A. **General:** The WORK of this Section includes the following requirements for control compartments of motor control sections, for control cabinets of lighting panelboards, and for separate terminal and control cabinets:
  - 1. **Terminal Cabinets:** Terminal cabinets located indoors shall be NEMA 12. Cabinets located outdoors and in corrosive areas shall be NEMA 4X. Cabinets shall be provided with hinged doors. Cabinets shall be provided with channel mounted terminal blocks rated 30 amperes, 600-volt AC. Terminals shall be No. 8 minimum strap-screw type, suitable for ring tongue or locking spade terminals. Sufficient terminal blocks to terminate 25 percent more conductors than are indicated shall be provided.
  - 2. **Components:** Compartments of motor control centers containing terminal blocks and control components shall be isolated from other compartments of the control center and shall have a separate hinged door with locking handle. Internal control components shall be mounted on a removable mounting pan.
  - 3. **Relay and Control Cabinets:** Relay and control cabinets shall comply with NEMA 12 for enclosures. Floor-standing cabinets shall have locking handles with 3-point catches. Bottom conduit entrances shall be located accurately and cut to the conduit diameter using a circle cutter (not a torch). Interiors of relay and control compartments shall be finished white. Terminal block requirements shall comply with the requirements for Terminal Cabinets.
- B. **Wiring:** Wiring of terminal cabinets and control cabinets shall be accomplished with stranded copper conductor rated for 600-volts and UL listed as Type MTW. Wires for annunciator and indication circuits shall be No. 16 AWG. Other wiring shall be No. 14 AWG. Color coding shall comply with the indicated requirements. Incoming wires to terminal or relay cabinets shall be terminated on a master set of terminal blocks. All wiring from the master terminals to internal components shall be factory-installed and shall be contained in plastic raceways with removable covers. Wiring to door-mounted devices shall be extra flexible and anchored to doors using wire anchors cemented in place. Exposed terminals of door-mounted devices shall be guarded to prevent accidental personnel contact with energized terminals.
- C. **Engraving:** Nameplates shall comply with the indicated requirements.

2.11 ELECTROLIERS (NOT USED)

2.12 PROCESS CONTROL DEVICES (NOT USED)

2.13 MANUFACTURERS

A. Products of the type or model number indicated shall be manufactured by one of the below listed manufacturers (or approved equals):

1. Unions:  
Appleton UNF or UNY  
Crouse-Hinds UNF or UNY
2. Device Boxes:  
Appleton FD  
Crouse-Hinds FD
3. Sealing Compound:  
Chico A
4. Watertight Seals:  
O.Z. Gedney Co., Type CSMC  
Thunderline Corp.  
Link Seal
5. Lighting and Receptacle Branch Circuit Conductors:  
Okoseal-N, Series 116-67-XXXX
6. Single Power and Control Conductors and Cable, 600V:  
Okonite-Okolon, Series 112-11-XXXX  
Anaconda  
Durasheath EP
7. Multiconductor Cables:  
Okonite-Okolon, Series 202-11-3XXX  
Anaconda  
Durasheath EP
8. Direct Burial Cables:  
Okonite  
CLX
9. Medium Voltage Power Conductors and Cable (5-15 KV) Installed In Raceway:  
N/A
10. Armored Cable:  
Okoguard, Series 571-23-3XXX  
Anaconda  
Duralox Unishield EP

11. Single Circuit Signal Cable:  
Okoseal-N Type P-OS
12. Multiple Circuit Signal Cable:  
Okoseal-N Type SP-OS
13. Thermocouple Extension:  
Okonite P-OS, Type PLTC
14. Portable Cords:  
Okocord
15. Compression Tool Die For Splicing:  
Thomas and Betts Corp.
16. Heat Shrinkable Moisture Seal Caps:  
Raychem Corp. "Thermofit"
17. 120V Receptacles (Indoor, Clean Areas):  
Hubbell IG-5362  
Arrow-Hart 6766  
G.E. 4107-1 (Brown)
18. 120V Receptacles (Outdoor, Process or Corrosive Areas):  
Hubbell 53CM62/53CM21  
General Electric GE5262-C
19. 240V Duplex Receptacles (Gray):  
Hubbell 5462  
General Electric G.E. 4188-9
20. 240V Single Receptacles (Black):  
Hubbell 9308  
General Electric G.E. 4138-3
21. Three Phase Receptacles (60 amps):  
Crouse-Hinds Catalog No. AREA 6424  
Hubbell Hubbellock
22. Three Phase Receptacles (30 amps):  
Crouse-Hinds Catalogue No. AREA 3423  
Bryant Cat. 7223FR  
Russell Stoll No. JRFA6344
23. Toggle Switches:
 

| <b>Hubbell</b> | <b>Bryant</b> | <b>Hubbell</b> | <b>Bryant</b> | <b>Bryant</b> |
|----------------|---------------|----------------|---------------|---------------|
| Single Pole    | 1221 (brown)  | 4901 (brown)   | 1221I (ivory) | 4901I (ivory) |
| Three Way      | 1223          | 4903           | 1223I         | 4903I         |
| Double Pole    | 1222          | 4902           | 1222I         | 4902I         |
| Momentary      | 1556          | 4821           | 1556I         | 4821I         |

24. Switches (Hazardous Areas):  
Crouse-Hinds EFSC2129  
Appleton EFSC175-F1
25. Electrical Identification:  
Nameplates  
Formica Type ES-1  
  
Imprinted Plastic Coated Cloth  
Brady  
Thomas & Betts
26. Device Plates:  
Crouse-Hinds  
Appleton
27. Plug Strips:  
Plugmold
28. Manholes and Pullboxes:  
Brooks  
Quikset
29. Flexible Conduit:  
American Brass  
Anaconda  
Electroflex
30. Cable Trays:  
P-W  
Cope
31. Compression Connectors:  
Burndt "Hi Lug"  
Thomas & Betts "Shure Stake"
32. Spring Connectors (Wire Nuts):  
3M "Scotch Lok"  
Ideal "Wing Nuts"
33. Insulating Tape:  
Scotch No. 33  
Plymouth "Slipknot"
34. High Temperature Insulating Tape (Polyvinyl):  
Plymouth  
3M
35. Pre-Insulated Fork Tongue Lugs:  
Thomas & Betts RC Series  
Burndy

36. Epoxy Resin Splicing Kits:  
3M Scotchcoat 82 Series  
Burndy "Hy Seal"
37. Stress Cone Material For Make-up Of Medium Voltage Shielded Cable:  
G & W  
3M  
duPont
38. Stainless Steel Covers:  
Sierra S-line  
Hubbell
39. Products For Cast Boxes:  
Switches at outdoor locations  
Crouse-Hinds DS 128  
Mackworth Rees Style 3845  
Joy Flexitite  
  
Switches at damp locations  
Mackworth Rees Style 3496  
Joy Flexitite  
  
Switches at dry locations  
Crouse-Hinds DS 32G  
Pyle National SCT-10k  
  
Receptacles at outdoor locations  
Crouse-Hinds  
Hubbell  
  
Receptacles at damp or dry locations  
Crouse-Hinds DS 23G  
Pyle National N-1  
  
Receptacles at corrosive locations  
Crouse-Hinds "Ark Gard"  
Appleton DTQ  
Hubbell 52CM21 or 5221
40. Cast Boxes Required for Pull or Junction Boxes:  
Floor boxes with checker plate covers  
O-Z Type "YR",  
Surface boxes  
O-Z type "YH"
41. Floor Type Outlet Boxes:  
Hubbell Catalog B-2530 with S-2530 cover plate  
Steel City (Russell & Stoll) Catalog 78AL and 889



- 42. Power Outlet Boxes:  
Hubbell Cat. No. SC-3098  
Steel City Cat. No SFH40RG
- 43. Telephone Outlet Boxes:  
Hubbell Cat. No. SS-309-T  
Steel City Cat. No SFL10
- 44. Insulated Bushings:  
O-Z Type A and B  
Thomas & Betts  
Steel City  
Appleton  
Efcor  
Gedney
- 45. Insulated Grounding Bushings:  
O-Z Type BL  
Thomas & Betts  
Steel City  
Efcor  
Gedney
- 46. Erickson Couplings:  
Appleton Type EC  
Thomas & Betts  
Steel City  
Efcor  
Gedney
- 47. Liquid-tight Fittings:  
Appleton Type ST  
Thomas & Betts  
Crouse-Hinds  
Efcor  
Gedney
- 48. Hubs:  
Appleton Type HUB  
Thomas & Betts  
Myers Scrutite  
Efcor
- 49. Sealing Fittings:  
Appleton Type EYS  
O-Z Type FSK
- 50. Expansion Couplings:  
O-Z Type D  
Crouse-Hinds Type

## PART 3 -- EXECUTION

### 3.1 GENERAL

A. **Field Control of Location and Arrangement:** The Drawings diagrammatically indicate the location and arrangement of outlets, conduit runs, equipment, and other items. Exact locations shall be determined in the field based on the physical size and arrangement of equipment, finished elevations, and obstructions. Locations shown on the Drawings shall be adhered to as closely as possible. Omissions or conflicts on Drawings or between Drawings and Specifications shall be brought to the attention of the CONSTRUCTION MANAGER for clarification before proceeding with the WORK.

B. **Installation:** The CONTRACTOR shall make all necessary provisions throughout the site to receive the work as construction progresses and shall furnish and install adequate backing, supports, inserts, and anchor bolts for the hanging and support of all electrical fixtures, conduit, panelboard, and switches, and shall furnish and install sleeves through walls, floors, or foundations where electrical lines are required to penetrate.

Conduit and equipment shall be installed in such a manner as to avoid all obstructions and to preserve head room and keep openings and passageways clear. Fixtures, switches, convenience outlets, and similar items shall be located within finished rooms, as shown. Where the Drawings do not indicate exact locations, locations of concealed conductors shall be as indicated on the shop drawings.

C. **Workmanship:** Materials and equipment shall be installed in accordance with printed recommendations of the manufacturer. The installation shall be accomplished by workmen skilled in this type of work and installation shall be coordinated in the field with other trades so that interferences are avoided.

D. **Tests:** The WORK of this Section includes tests required by the authority having jurisdiction. Tests shall be performed in the presence of the CONSTRUCTION MANAGER. The WORK includes testing equipment, replacement parts and labor necessary to repair damage resulting from damaged equipment or from testing and correction of faulty installation. The following tests shall be performed:

Insulation resistance tests.

Operational testing of equipment.

E. **Field Quality Control:** Conduit shall be provided with a number tag at each end and in each manhole and pullbox. Trays shall be identified by stencils at intervals not exceeding 50 feet, at intersections, and at each end.

### 3.2 RACEWAY, FITTINGS AND SUPPORTS

A. **General:** Except as otherwise indicated, conduit installed in direct contact with earth and in concrete slabs on grade shall be corrosion-protected.

Conduit shall be left exposed until inspected by the CONSTRUCTION MANAGER.

Raceways shall be installed as indicated. Raceway systems shall be electrically and mechanically complete before conductors are installed. Bends and offsets shall be smooth and symmetrical, and shall be accomplished with tools designed for the purpose intended. Factory elbows shall be used for all 3/4-inch conduits. Bends in larger sizes of metallic conduit shall be accomplished by field bending or by the use of factory elbows.

Conduit may be cast integral with horizontal and vertical concrete slabs, providing one-inch clearance is maintained between conduit surface and concrete surface. If said clearance cannot be maintained, the conduit shall be installed exposed below elevated slabs; provided, that in the case of slabs on grade, conduit shall be installed below the slab and shall be encased with a minimum cover of 3 inches of concrete.

Non-metallic conduit may be cast integral with horizontal slabs with placement criteria as stated in the previous paragraph. Non-metallic conduit may be run beneath structures or slabs on grade, without concrete encasement. In these instances conduit shall be placed at least 12 inches below the bottom of the structure or slab. Non-metallic conduit may be buried 24 inches minimum below grade, with a 3-inch concrete cover, in open areas or where otherwise not protected by concrete slab or structures. Top of concrete cover shall be colored red. Non-metallic conduit shall be permitted only in concealed locations as described above. The use of direct burial thinwall duct will be permitted only as indicated for underground ducts.

Where a run of concealed PVC conduit becomes exposed, a transition to rigid steel conduit is required. Such transition shall be accomplished by means of a factory elbow or a minimum 3-foot length of rigid steel conduit, either terminating at the exposed concrete surface with a flush coupling. Piercing of concrete walls by non-metallic runs shall be accomplished by means of a short steel nipple terminating with flush couplings.

Flexible conduit may be used in lengths required for the connection of recessed lighting fixtures; otherwise the maximum length of flexible conduit shall be 18 inches.

1. Application: Galvanized rigid steel shall be installed unless noted otherwise:

|  |                             |
|--|-----------------------------|
| Embedded or encased in non-hazardous areas   | Schedule 40 PVC             |
| Exposed in corrosive areas   | Plastic coated, rigid steel |
| Direct buried lighting and receptacle raceways in non-hazardous areas  | Schedule 80 PVC             |
| Hazardous and corrosive areas within stud walls, above suspended ceilings, and within elevator machine rooms   | Plastic coated, rigid steel |
| Dry well/Pump room area  | Plastic coated, rigid steel |
| Final raceway connections to lighting fixtures, equipment and pressure switches subject to vibration-DRY AREAS | Flexible metallic           |

Final raceway connections to Equipment

Liquidtight, flexible metallic

2. Conduit Runs Between Boxes: The number of directional changes of the conduit shall be limited to total not more than 270 degrees in any run between pull boxes. Conduit runs shall be limited to 400 feet, less 100 feet or fraction thereof, for every 90 degrees of change in direction. Bends and offsets shall be avoided where possible but, where necessary, shall be made without flattening or kinking, or shall be factory preformed bends. Turns shall be made with cast metal fittings or conduit bends. Welding, brazing or otherwise heating of conduit is not acceptable.

3. Junction and Pull Boxes: Cast junction or pull boxes shall be installed where required for pulling cable and as necessary to meet the indicated requirements. Pull boxes used for multiple conduit runs shall not combine circuits of different motor control centers, switchboards, or switchgear.

4. Conduit Terminations: The WORK of this Section includes conductors required to interconnect incoming annunciator, control and instrumentation except as otherwise indicated.

Two- and 3-conductor shielded cables installed in conduit runs which exceed 2,000 feet may be spliced in pullboxes. These cable runs shall have only one splice per conductor.

Control conductors shall be spliced or terminated only at the locations indicated and only on terminal strips or terminal lugs of vendor furnished equipment. 120/208-volt and 480-volt branch circuit conductors may be spliced in suitable fittings at locations required. 5-kV conductors shall be spliced or terminated only at equipment terminals indicated.

Solid conductors shall be terminated at equipment terminal screws such that conductor is tightly wound around screw and does not protrude beyond screw head. Stranded conductors shall be terminated directly on equipment box lugs such that all conductor strands are confined within lug. Use forked-tongue lugs where equipment box lugs have not been provided.

Splices in 600-volt wire which are not pre-insulated shall be insulated with three layers of tape each half lapped except that splices in below grade pull boxes or in any box subject to flooding shall be made watertight using an epoxy resin splicing kit.

Splices to motor leads in motor terminal boxes shall be taped with varnished cambric tape and with high temperature tape on the exterior.

Shielded power cable shall be terminated with pre-assembled stress cones in a manner approved by the cable manufacturer. The CONTRACTOR shall submit the proposed termination procedure as described for shop drawings.

Control devices, such as solenoid operated valves, that are normally supplied with conductor pigtails, shall be terminated as described for control conductors.

Conduit entering NEMA 1 type sheet steel boxes or cabinets shall be secured by locknuts on both the interior and exterior of the box or cabinet and shall have an insulating grounding or bonding bushing installed over the conduit end. Conduit entering other boxes shall be terminated with a threaded hub. Cast boxes and nonmetallic enclosures shall have threaded hubs. Joints shall be made with standard couplings or threaded unions. Metal parts of nonmetallic boxes and plastic-coated boxes shall be bonded to the conduit system. Running threads shall not be used in lieu of conduit nipples, nor shall excessive thread be used on any conduit. The ends of conduit shall be cut square, reamed, and threaded with straight threads. Rigid steel conduit shall be made up tight and without thread compound. Exposed male threads on rigid steel conduit shall be coated with zinc-rich paint.

PVC conduit entering fiberglass boxes or cabinets shall be secured by threaded bushings on the interior of the box and shall be terminated with a threaded male terminal adapter having a neoprene O-ring. Joints shall be made with standard PVC couplings.

Conduit entering field equipment enclosures shall enter the bottom or side of the box. Where conduit comes from above, it shall be run down beside the enclosure and a tee conduit and drip leg installed.

5. Matching Existing Facilities: When new conduit is added to areas which are already painted, the conduit and its supports shall be painted to match the existing facilities. Where new conduit is used to replace existing conduit, the existing conduit and supports shall be removed, resulting blemishes shall be patched and repainted to match original conditions. Similarly, if existing conduits are to be reused and rerouted, resulting blemishes shall be corrected in the same manner.
6. Conduit Support: Exposed rigid steel or plastic-coated conduit shall be run on supports spaced not more than 10 feet apart and shall be constructed with runs parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceiling. Exposed PVC conduit shall be run on supports spaced not more than 3 feet apart for conduits up to 1 inch, 5 feet apart for conduits 1 1/4 inches to 2 inches and 6 feet apart for conduits 2 1/2 inches and larger. No conduit shall approach closer than 6 inches to any object operating above 30 degrees C. PVC conduit shall not be provided where it will be damaged by heat.

Conduit rack and tray supports shall be secured to concrete walls and ceilings by means of cast-in-place anchors. Individual conduit supports shall use cast-in-place anchors, die-cast, rustproof alloy or expansion shields. Wooden plugs, plastic inserts or gunpowder-driven inserts are not acceptable.

7. Conduit Penetrations: Unless otherwise indicated, conduit routed perpendicular through floors, walls or other concrete structures shall pass through cast-in-place openings wherever possible. In cases where cast-in-place openings are not possible, appropriate size holes shall be bored through the concrete to accommodate the conduit passage. The size and location of the holes shall not impair the structure's integrity. After completion, grout or calk around conduit

and finish to match existing surroundings. Unless otherwise protected, conduits that rise vertically through the floor shall be protected by a 3 1/2-inch high concrete pad with a sloping top.

Conduits entering manholes and handholes shall be horizontal. Conduits shall not enter through the concrete bottom of handholes and manholes.

Wherever conduits penetrate outdoor concrete walls or ceilings below grade, watertight seal shall be installed.

8. Conduit Separation: Signal conduits shall be separated from AC power or control conduits. The separation shall be a minimum of 12 inches for metallic conduits and 24 inches for nonmetallic conduits.
9. Conduit Seals for Hazardous or Corrosive Areas: Conduit passing from a hazardous or corrosive area into a nonhazardous or noncorrosive area shall be provided with a sealing fitting which shall be located at the boundary in accordance with NEC.

Seal fittings for conduit systems in hazardous atmosphere locations shall be hot-dip galvanized cast ferrous alloy. Sealing compound shall be hard type and shall be UL listed for explosionproof sealing fittings. Sealing compound shall be nonhardening type for corrosive areas. Sealing compound shall not be poured in place until electrical installation has been otherwise accepted.

10. Plastic Coated Conduit: Plastic coated conduit shall be made up tight with strap wrenches. Conduit threads shall be covered by a plastic overlap which shall be coated and sealed in accordance with manufacturer's recommendations. Pipe wrenches and channel locks shall not be used for tightening plastic-coated conduits. Damaged areas shall be patched, using manufacturer's recommended material. The area to be patched shall be built up to the full thickness of the coating. Painted fittings are not acceptable.
11. Liquidtight Flexible Conduit: The length of flexible liquidtight conduit shall not exceed 15 times the trade diameter of the conduit. The length of liquidtight conduit shall not exceed 36 inches.
12. Conduit Fittings: Fittings shall comply with the same requirements as the raceway with which they will be used. Fittings having a volume less than 100 cubic inches for use with rigid steel conduit, shall be cast or malleable non-ferrous metal. Fittings larger than one inch shall be "mogul size." Fittings shall be of the gland ring compression type. Covers of fittings, unless in "dry" locations, shall include gaskets. Surface-mounted cast fittings, housing wiring devices in outdoor and damp locations, shall have mounting lugs. Erickson couplings shall be used at all points of union between ends of rigid steel conduits which cannot be coupled. Running threads and threadless couplings shall not be used. Couplings shall be 3-piece type. Transition fittings to mate steel to PVC conduit, and PVC access fitting, shall be as furnished or recommended by the manufacturer of the PVC conduit.

**B. Cable Tray: N/A.**

### 3.3 UNDERGROUND DUCTS, MANHOLES AND PULL-BOXES (NOT USED)

### 3.4 CONDUCTORS, WIRE AND CABLE

- A. **General:** Pulling wire and cable into conduit or trays shall be completed without damaging or putting undue stress on the cable insulation. The cable pulling compound shall be polymer-based and UL approved. It shall be non-toxic, non-flammable, non-corrosive and compatible with all cable types. The product shall dry to a thin semi-liquid film that will not clog the conduit. The cable pulling lubricant shall be AquaGel II by Ideal Industries, or approved equal. Raceway construction shall be complete, cleaned, and protected from the weather before cable is installed.

Whenever a cable leaves a raceway, a cable support shall be provided.

When flat bus bar connections are made with unplated bar, the contact areas shall be "scratch-brushed" before connection. Bolts shall be torqued to the bus manufacturer's recommendations.

- B. **600 Volt Conductor and Cable:** Conductors in panels and electrical equipment, No. 6 AWG and smaller, shall be bundled and laced at intervals not greater than 6 inches, spread into trees and connected to their respective terminals. Lacing shall be made up with plastic cable ties. Lacing is not necessary in plastic panel wiring duct. Conductors crossing hinges shall be bundled into groups not exceeding 12 and shall be so arranged that they will be protected from chafing when the hinged member is moved.

Slack shall be provided in junction and pull boxes, handholes and manholes. Slack shall be sufficient to allow cables or conductors to be routed along the walls of the box. Amount of slack shall be equal to largest dimension of the box. Where plastic panel wiring duct is installed for wire runs, lacing is not required. Plastic panel wiring duct shall not be used in manholes and handholes.

Stranded conductors shall be terminated. Conductors shall be terminated directly on the terminal block. Compression lugs and connectors shall be installed using manufacturer's recommended tools.

Lighting and receptacle circuits may be in the same conduit in accordance with derating requirements of the NEC. However, lighting and receptacle circuits shall not be installed in conduits with power or control conductors.

Solid wire shall not be lugged nor shall electrical spring connectors be used on any except for solid wires in lighting and receptacle circuits. Lugs and connectors shall be installed with a compression tool.

Terminations at 460 volt motors shall be made by bolt-connecting the lugged connectors. Connections shall be insulated and sealed with factory-engineered kits. Motor connection kits shall consist of heat-shrinkable, polymeric insulating material over the connection area and a high dielectric strength mastic to seal the ends. Bolt connection area shall be kept free of mastics and fillers to facilitate rapid stripping and re-entry. Motor connection kits shall accommodate a range of cable sizes for both in-line and stub-type configurations.

In-line splices and tees shall be made with tubular compression connectors and insulated as for motor terminations, except that conductors No. 10 AWG and smaller may be spliced using self-insulating connectors. Splices and tees in underground handholes or pull boxes shall be insulated using Scotch-cast epoxy resin splicing kits. Terminations at devices with 120V pigtail leads, at solenoid valves, 120-volt motors, and other devices furnished with pigtail leads shall be made using self-insulating tubular compression connectors.

Conductor and cable markers shall be provided at splice points.

- C. **Signal Cable:** Circuits shall be installed as individually shielded twisted pairs or triads. In no case shall a circuit be made up using conductors from different pairs or triads. Triads shall be used wherever 3-wire circuits are required. Terminal blocks shall be provided at instrument cable junctions, and circuits shall be identified at such junctions unless otherwise indicated. Signal circuits shall be installed without splices between instruments, terminal boxes, or panels.

Shields are not acceptable as a signal path, except for circuits operating at radio frequencies and utilizing coaxial cables.

Common ground return conductors for two or more circuits are not acceptable.

Unless otherwise indicated, shields shall be bonded to the signal ground bus at the control panel and isolated from ground and other shields at other locations. Terminals shall be installed for running signal leads and shield drain wires through junction boxes.

Spare circuits and the shield drain wire shall be terminated on terminal blocks at both ends of the cable run and be electrically continuous through terminal boxes. Shield drain wires for spare circuits shall not be grounded at either end of the cable run.

Terminal boxes shall be installed at instrument cable splices. If cable is buried or in raceway below grade at splice, an instrument stand shall be provided as specified with terminal box mounted approximately 3 feet above grade.

Cable for paging, telephone, and security systems shall be installed and terminated in compliance with the manufacturer's recommendations.

- D. **5 KV and 15 KV Cable:** (NOT USED)

- E. **Portable Cord:** Portable cord feeding permanent equipment, such as pendant cords, pumps, cranes, hoists, and portable items shall have a wire mesh cord grip of flexible stainless-steel wire to take the tension from the cable termination. Connection of portable cords to permanent wiring shall be accomplished with the use of terminals. In-line taps and splices shall be used only where indicated.

- F. **Testing:** Testing shall comply with the requirements of Section 16030 and the following:

1. **Signal Cable:** Each signal pair or triad shall be tested for electrical continuity. Any pair or triad exhibiting a loop resistance of less than or equal to 50 ohms shall be deemed satisfactory without further test. For pairs with greater than 50



ohm loop resistance, the expected loop resistance shall be calculated considering loop length and intrinsic safety barriers if present. Loop resistance shall not exceed the calculated value by more than 5 percent.

Each shield drain conductor shall be tested for continuity. Shield drain conductor resistance shall not exceed the loop resistance of the pair or triad. Each conductor (signal and shield drain) shall be tested for insulation resistance with all other conductors in the cable grounded.

Instruments used for continuity measurements shall have a resolution of 0.1 ohms and an accuracy of better than 0.1 percent of reading plus 0.3 ohms. A 500 volt megohmmeter shall be used for insulation resistance measurements.

2. 5-15 KV Cable: N/A.

### 3.5 WIRING DEVICES

- A. **General:** Boxes shall be independently supported by galvanized brackets, expansion bolts, toggle bolts, or machine or wood screws as appropriate. Wooden plugs inserted in masonry or concrete shall not be used as a base to secure boxes, nor shall welding or brazing be used for attachment.

Unless otherwise indicated, receptacles and switches installed in sheet steel boxes shall be flush mounted and shall be located 18 inches above the floor unless otherwise indicated.

Switch boxes and receptacles installed in cast device boxes shall be mounted 48 inches above the floor.

- B. **Application of Boxes and Covers:** Boxes and covers shall be installed as follows:

1. Outlet, switch, and junction boxes for flush-mounting in general purpose locations shall be sheet metal.
2. Outlet, switch, and junction boxes where surface mounted in exposed locations shall be cast alloy ferrous boxes with mounting lugs, zinc or cadmium plating, and enamel finish. Surface mounted boxes in concealed locations may be welded sheet steel boxes.
3. Outlet, control station, and junction boxes, including covers, for installation in corrosive locations shall be fiberglass-reinforced polyester and shall include mounting lugs.
4. Sheet metal boxes for flush-mounting in concrete shall include with cast, malleable box covers and gaskets. Covers for pressed steel boxes shall be one-piece pressed steel, cadmium plated, except that boxes for installation in plastered areas shall be stainless steel over plaster rings.
5. Outlet boxes shall be used as junction boxes wherever possible. Where separate pullboxes are indicated, they shall include screw covers. Outdoors boxes shall be galvanized and shall be provided with gasketed covers and threaded hubs. Indoor boxes shall be painted.

### 3.6 LIGHTING AND POWER DISTRIBUTION PANELBOARDS

- A. **General:** The circuit description as indicated on the record drawings or panelboard schedule shall be typed on the circuit directory.
- B. **Testing:** Panelboards shall be tested for proper operation and function.

### 3.7 CABINETS AND ENCLOSURES

- A. The installation of cabinets and enclosures shall comply with the following:
  - 1. **Cabinets:** Cabinets shall be set plumb at an elevation such that the maximum circuit breaker height shall be less than 5 ft 6 inches. Top edge of trim of adjacent panels shall be at the same height. Panels which are indicated as flush mounted shall be set so cabinet is flush and serves as a "ground" for plaster application.
  - 2. **Connections:** Factory bus and wire connections shall be made at shipping splits, and all field wiring and grounding connections shall be made after the assemblies are anchored.
  - 3. **Finishes:** Enclosures smaller in volume than 500 cubic inches shall be finished in accordance with the manufacturer's standard procedures. Finish color shall be No. 61 complying with ANSI Z55.1.

### 3.8 EQUIPMENT ANCHORING

- A. Freestanding or wall-hung equipment shall be anchored in place by methods that will meet seismic requirement in the area where project is located. Wall-mounted panels that weigh more than 500 pounds or which are within 18 inches of the floor shall be provided with fabricated steel support pedestal(s). Pedestals shall be of welded steel angle sections. If the supported equipment is a panel or cabinet and enclosed with removable side plates, it shall match supported equipment in physical appearance and dimensions. Transformers hung from 4-inch stud walls and weighing more than 300 pounds, shall have auxiliary floor supports.
- B. Anchoring methods and leveling shall comply with the printed recommendations of the equipment manufacturers.

### 3.9 CONDUCTOR AND EQUIPMENT IDENTIFICATION

- A. The completed electrical installation shall include adequate identification to facilitate proper control of circuits and equipment and to reduce maintenance effort.
- B. Control and instrumentation wire and cable shall be assigned a unique identification number. Numbers shall be assigned to conductors having common terminals. Identification numbers shall appear within 3 inches of conductor terminals. "Control" shall be defined as any conductor used for alarm, annunciator, or signal purposes or any connect switch or relay contacts or any relay coils.

1. Multiconductor cable shall be assigned a number which shall be attached to the cable at intermediate pull boxes and at stub-up locations beneath free-standing equipment. It is expected that the cable number will form a part of the individual wire number. All individual control conductors and instrumentation cable shall be identified at pull points as described above.
  2. The instrumentation cable numbers shall incorporate the loop numbers shown.
  3. Numbering and wire names shall be retained from the existing system. Engineering approval of all new wire numbers shall be required.
- C. Spare conductors shall be terminated on terminal screws and shall be identified with a unique number as well as with destination.
- D. Nameplates shall be provided for panelboards, panels, starters, switches, and pushbutton stations. In addition to the name plates indicated, control devices shall be equipped with standard collar-type legend plates, as required.
- E. Terminal strips shall be identified by imprinted, varnished, marker strips attached under the terminal strip.
- F. Three-phase receptacles shall be consistent with respect to phase connection of receptacle terminals. Errors in phasing shall be corrected at the bus, not at the receptacle.
- G. Toggle switches which control loads out of sight of switch, and all multi-switch locations of more than 2 switches, shall have suitable inscribed finish plates.
- H. Empty conduits shall be tagged at both ends to indicate the destination at the far end. Where it is not possible to tag the conduit, destination shall be identified by marking an adjacent surface.
- I. Identification tape shall be installed directly above buried raceway. Tape shall be installed 8 inches below grade and parallel with raceway. Identification tape shall be installed for buried raceway not under buildings or equipment pads except identification tape is not required for protection of street lighting raceway.

**\*\* END OF SECTION \*\***

## SECTION 16431 - SHORT CIRCUIT AND COORDINATION REPORT

### PART 1 -- GENERAL

#### 1.1 WORK OF THIS SECTION

- A. The WORK of this Section includes providing a short circuit and protective device coordination study and harmonic measurement for the electrical power system.
- B. The studies shall include the electrical distribution system for normal and standby power sources including the 480V distribution system.
- C. The studies shall include protection studies for motors supplied with factory-installed solid-state overload and overcurrent protection devices.
- D. The WORK of this Section includes measurement of harmonic current and the installation of filters required for harmonic suppression.

#### 1.2 RELATED SECTIONS

- A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of these Technical specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.
  - 1. Section 16050 Basic Electrical Materials and Methods

#### 1.3 CODES

- A. The WORK of the Section shall comply with the current editions, with revisions, of the following codes and City of San Diego Supplements:
  - 1. National Electrical Code

#### 1.4 SPECIFICATIONS AND STANDARDS

- A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:
  - 1. ANSI/IEEE 141 Recommended Practice for Electrical Power Distribution for Industrial Plants
  - 2. ANSI/IEEE 242 Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems
  - 3. ANSI C 37.010 Standard Application Guide for AC High-Voltage Circuit Breakers
  - 4. ANSI C 37.5 Calculation of Fault Currents for Application of Power Circuit Breakers
  - 5. ANSI C 37.13 Low-Voltage AC Power Circuit Breaker (600-Volt Insulation Class)
  - 6. IEEE 519 Recommended Practice and Requirements for Harmonic Control in Electrical Power Systems

## 1.5 SHOP DRAWINGS AND SAMPLES

### A. The following shall be submitted:

1. Studies related to distribution system protection and coordination shall be submitted to the CONSTRUCTION MANAGER prior to submittal of distribution equipment shop drawings and/or release of equipment for manufacture. A preliminary submittal shall be made with sufficient detail to review the adequacy of products and to indicate the computer program selected for use in performing the WORK of this Section.
2. Studies for harmonic current, voltage and line notching test results shall be forwarded to the CONSTRUCTION MANAGER prior to acceptance of the project and after installation of harmonic generating and harmonic sensitive equipment.
3. Submittals for solid state motor protective devices shall be forwarded to the CONSTRUCTION MANAGER prior to loading the motor.
4. Protective device and coordination evaluation studies must be approved by the CONSTRUCTION MANAGER prior to acceptance testing.
5. Submittals shall indicate proposed changes to the protection scheme and equipment selection which will result in improved system reliability and safety.
6. Documentation of at least one successful study of comparable size and complexity completed in the recent past, including contact names, addresses, and telephone numbers.

## 1.6 QUALIFICATIONS

- ### A.
- Short circuit studies, protective device evaluation studies, and protective coordination studies shall be performed by an electrical testing service regularly engaged in short circuit and protective device coordination studies, having at least one successful study of comparable size and complexity completed in the recent past.

## 1.7 STUDY REPORTS

- ### A.
- The results of the power system study and harmonic current, voltage and line notching measurements shall be summarized in a final report, signed by the professional electrical engineer, registered in the State of California responsible for the studies. Six bound copies of the final report shall be submitted and shall include the following:
1. Single-line diagram
  2. Impedance diagram
  3. Tabulation and identification of protective devices on a single-line diagram.
  4. Time/current coordination curves
  5. Computerized fault current calculations

6. Test instrumentation, condition and connections, as applicable, for each study
7. Harmonic measurement results
8. Specific recommendations (if any)

## PART 2 – PRODUCTS

### 2.1 GENERAL

- A. **General:** The report shall include a single-line and an impedance diagram of the power system. This diagram shall identify components included in the study and the ratings of power devices including transformers, circuit breakers, relays, fuses, busses, and cables. The resistances and reactance of cables shall be indicated in the impedance diagram. The study shall include written data regarding maximum available short circuit current, voltage, and X/R ratio of San Diego Gas and Electric Co.

### 2.2 SHORT CIRCUIT STUDY

- A. The short circuit study shall be performed with the aid of a computer program complying with ANSI C 37.5, IEEE Standard 242, and IEEE Standard 141.

### 2.3 PROTECTIVE DEVICE EVALUATION STUDY

- A. A protective device evaluation study shall be performed to determine the adequacy of circuit breakers, molded case switches, automatic transfer switches, and fuses. Any problem areas or inadequacies in the equipment due to prospective short-circuit currents shall be promptly brought to the CONSTRUCTION MANAGER's attention in writing but in no case more than 7 days after discovery.

### 2.4 PROTECTIVE DEVICE COORDINATION STUDY

- A. A protective device coordination study shall be performed including calculations required to review the selection of power fuse ratings, protective relay characteristics and settings, ratios and characteristics of associated current transformers, and low-voltage breaker trip characteristics and settings.

### 2.5 TIME/CURRENT COORDINATION CURVES

- A. The time/current coordination curves for the power distribution system shall include, on 5-cycle log-log graph paper, at least the following:
  1. Time/current curves for each protective relay or fuse showing graphically that the settings will provide protection and selectivity within industry standards. Each curve shall be identified, and tap and time dial settings shall be shown.
  2. Time/current curves for each device shall be positioned to provide the maximum selectivity to minimize system disturbances during fault clearing. Where selectivity cannot be achieved, the CONSTRUCTION MANAGER shall be promptly notified of the cause in writing but in no case more than 7

days after discovery.

3. Time/current curves and points for cable and equipment damage.
4. Circuit interrupting device operating and interrupting times.
5. Maximum fault values.
6. Sketch of bus and breaker arrangement.
7. Magnetizing inrush points of transformers.
8. Compliance with Code requirements and proper coordination intervals and separation of characteristics curves.
9. Thermal limits of motors 250 HP and above.

## 2.6 HARMONIC MEASUREMENT

- A. The report of the distribution system, at all voltage levels, shall indicate the harmonic currents anticipated at each voltage level. The report shall indicate sources of harmonic currents, voltages, and line notching of equipment. The report shall state the tolerance of sensitive equipment to harmonics.
- B. The report shall include measurement of harmonics present in the output of harmonic-generating equipment at the input terminals of sensitive equipment. Filters required to prevent equipment malfunction due to harmonics shall be installed. Harmonic measurements shall be performed and documented after the filter installation.
- C. Equipment which is required to conform with IEEE 519 shall be measured to determine output harmonic content. Corrective action necessary for compliance with IEEE 519, Tables 2 and 4 General System Class shall be made. Measurements and documentation shall be performed to demonstrate compliance with 5 percent voltage distortion limitation.

## 2.7 MOTOR PROTECTION

- A. Where overload protection as phase overcurrent for medium voltage motors is specified to be solid state protective modules, modules shall be adjusted for actual installed motor torque, current and thermal characteristics. Protective settings shall be submitted, and reviewed, before motors are run under load.

## PART 3 -- EXECUTION

### 3.1 TESTING, CALIBRATION, AND ADJUSTMENT

- A. The low voltage equipment manufacturer shall provide the services of a qualified field engineer and necessary tools and equipment to test, calibrate, and adjust the protective relays and circuit breaker trip devices as recommended in the power system study for 2 days.

**\*\* END OF SECTION \*\***



# Appendix A

## Pump 34-P-501 DCS Loop RW Reclaimed Water (600HP)

The following is the required IO from VFD to the DCS.

| Tag        | Description                   | IO Type<br>(At the<br>VFD) | Range                          | Comment   |
|------------|-------------------------------|----------------------------|--------------------------------|---|
| 34HS0501A  | RW Pump 1 Run Command         | DI                         | 24 VDC Digital                 | Output from DCS to VFD to run enable the drive  |
| 34ZL0501   | RW Pump 1 In DCS              | DO                         | 24 VDC Digital                 | Input to DCS from VFD indicating drive is in DCS (or REMOTE) mode   |
| 34YL0501   | RW Pump 1 Running             | DO                         | 24 VDC Digital                 | Input to DCS from VFD indicating drive's Run Enable is active   |
| 34UA0501   | RW Pump 1 VDF Fault           | DO                         | 24 VDC Digital                 | Input to DCS from VFD indicating drive has a fault  |
| 34SC0501   | RW Pump 1 VDF Speed Reference | AI                         | 4 – 20 mA sourced from the DCS | Output from DCS to VFD for speed control speed reference. Acts as a bias speed reference that will reference the drive from minimum speed, set in the VFD, to 100 percent. Range of output form DCS is 0 – 100% biased to VFD minimum speed setting                             |
| 34SI0501   | RW Pump 1 VFD Speed Feedback  | AO                         | 4 – 20 mA source from the VFD  | Input to DCS from VFD for speed feedback. Represents full speed range 0 – 100 percent.  |
| 34FAL0501A | RW Pump 1 NO FLOW             | DO                         | 24 VDC Digital                 | The no flow signal comes from the check valve in the field. It is wired to a relay in the VFD which has a contact that trips the VFD and a contact which come to the DCS. The drive vender will have to investigate this circuit further to ensure it is implemented correctly. |
|            |                               |                            |                                |   |

In addition to the above hardwired IO points, we also want to request an Ethernet datalink using MODBUS TCP to the VFD. With the city's forecasted energy optimization goals we will need to have electrical data such as volts, current, kW, demand KW, etc. So the new VFD should be able to accommodate this type of data link.


# LOOP NO: 34Y0501

R:\mwske\comnet\loops\project\SOUTHBA\area 34 effluent sys\34y0501.001

| N | UP NO | TAG PRE | TAG NO | TAG LR | EQUIPMENT SERVICE        | SERVICE DESCRIPTION | DEVICE TYPE   | LOCATION | DEVICE MANUF'R/SUPP | MODEL NO        | SPEC NO | AREA CONTRACTOR | SUBMITTAL NO | REMARKS |
|---|-------|---------|--------|--------|--------------------------|---------------------|---------------|----------|---------------------|-----------------|---------|-----------------|--------------|---------|
| S | 34    | HS      | 0501   | C      | RECLAIM WATER PUMP NO. 1 | START/STOP          | PUSH BUTTON   | 34LCS501 | G.E.                | CR104PBG        | 16050   | KPC             | PF1272       |         |
| S | 34    | HS      | 0501   | A      | RECLAIM WATER PUMP NO. 1 | RUN                 | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | HS      | 0501   | B      | RECLAIM WATER PUMP NO. 1 | LOCAL/DCS           | SELECT SWITCH | 34LCS501 | G.E.                | CR104PSM        | 16050   | KPC             | PF1272       |         |
| S | 34    | ZL      | 0501   |        | RECLAIM WATER PUMP NO. 1 | DCS                 | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | YL      | 0501   |        | RECLAIM WATER PUMP NO. 1 | RUNNING             | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | UA      | 0501   |        | RECLAIM WATER PUMP NO. 1 | VFD FAIL            | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | HK      | 0501   |        | RECLAIM WATER PUMP NO. 1 | SPD IND CONTRL      | POTENTIOMETER | 34LCS501 | G.E.                | CR104PXP        | 16050   | KPC             | PF1272       |         |
| S | 34    | SC      | 0501   |        | RECLAIM WATER PUMP NO. 1 | SPEED CONTROL       | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | SI      | 0501   |        | RECLAIM WATER PUMP NO. 1 | SPEED INDICATN      | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | ZSL     | 0501   | A      | RECLAIM WATER PUMP NO. 1 | NO FLOW             | LIMIT SWITCH  | FIELD    | A-B                 | 871TM-B15N30-H2 | 13300   | KPC             | SUB-267      |         |
| S | 34    | FAL     | 0501   | A      | RECLAIM WATER PUMP NO. 1 | NO FLOW             | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | JL      | 0501   |        | RECLAIM WATER PUMP NO. 1 | CONTRL PWR ON       | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | JA      | 0501   |        | RECLAIM WATER PUMP NO. 1 | PWR SUPPLY FAIL     | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |

| N | UP NO | TAG PRE | TAG NO | TAG LR | EQUIPMENT SERVICE        | DATA SH NO | I/O SIGNAL | SIGNAL LEVEL | DEVICE RANGE | ENGR UNITS | PROC SET PT | AREA LOOP DIAGRAM NO | P&ID DWG NO | LOOP FILENAME | INTERCONNECT FILENAME |
|---|-------|---------|--------|--------|--------------------------|------------|------------|--------------|--------------|------------|-------------|----------------------|-------------|---------------|-----------------------|
| S | 34    | HS      | 0501   | C      | RECLAIM WATER PUMP NO. 1 | N/A        | N/A        | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.003  | S34Y0501.006          |
| S | 34    | HS      | 0501   | A      | RECLAIM WATER PUMP NO. 1 | N/A        | DO         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.003  | S34Y0501.006          |
| S | 34    | HS      | 0501   | B      | RECLAIM WATER PUMP NO. 1 | N/A        | N/A        | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.003  | S34Y0501.006          |
| S | 34    | ZL      | 0501   |        | RECLAIM WATER PUMP NO. 1 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.003  | S34Y0501.006          |
| S | 34    | YL      | 0501   |        | RECLAIM WATER PUMP NO. 1 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.003  | S34Y0501.006          |
| S | 34    | UA      | 0501   |        | RECLAIM WATER PUMP NO. 1 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.003  | S34Y0501.006          |
| S | 34    | HK      | 0501   |        | RECLAIM WATER PUMP NO. 1 | N/A        | N/A        | 4-20MA       | 0-100        | PERCENT    | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.003  | S34Y0501.006          |
| S | 34    | SC      | 0501   |        | RECLAIM WATER PUMP NO. 1 | N/A        | AO         | 4-20MA       | 0-100        | PERCENT    | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.003  | S34Y0501.006          |
| S | 34    | SI      | 0501   |        | RECLAIM WATER PUMP NO. 1 | N/A        | AI         | 4-20MA       | 0-100        | PERCENT    | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.003  | S34Y0501.006          |
| S | 34    | ZSL     | 0501   | A      | RECLAIM WATER PUMP NO. 1 | N/A        | N/A        | 24VDC        | N/A          | GPM        | .12         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.004  | S34Y0501.007          |
| S | 34    | FAL     | 0501   | A      | RECLAIM WATER PUMP NO. 1 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.004  | S34Y0501.007          |
| S | 34    | JL      | 0501   |        | RECLAIM WATER PUMP NO. 1 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.004  | S34Y0501.007          |
| S | 34    | JA      | 0501   |        | RECLAIM WATER PUMP NO. 1 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.004  | S34Y0501.007          |

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| REFERENCE DRAWINGS                       |     | DESTROY ALL PRINTS BEARING EARLIER DATE |                         |    |     | APPROVAL |     | FOR CONTINUATION<br>SEE SHEET 2 OF 8<br>FILE NAME S34Y0501.002   |                            |  |                 |          |
|--|-----|---|-------------------------|----|-----|----------|-----|--|----------------------------|---|-----------------|----------|
| P & ID:                                  | REV | DATE                                    | DESCRIPTION             | BY | CKD | ENGR     | MGR |  |                            |   |                 |          |
| ELECTRICAL/CONDUIT DWG: 34-E-31, 29-E-31 | A   | 3/21/00                                 | DRAFT                   | JG |     |          |     |  |                            |   |                 |          |
| ELECTRICAL FEEDER SCHED: D-439, 440      | 0   | 6/7/00                                  | ISSUED FOR CONSTRUCTION | DN |     |          |     |  |                            |   |                 |          |
| MOTOR CONTROL CENTER DWG: D-414          | 1   | 5/30/03                                 | AS BUILT                | CW |     |          |     |  |                            |   |                 |          |
| TOSHIBA DWG: 10429IC1800 18 THRU 30      |     |   |                         |    |     |          |     |  |                            |   |                 |          |
|  |     |   |                         |    |     |          |     | SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA |                            | CIP NO.<br>42-910.6   |                 |          |
|  |     |   |                         |    |     |          |     | INSTRUMENT LOOP DIAGRAM DEVICE SCHEDULE<br>RECLAIM WATER PUMP NO. 1                                      |                            | FILE<br>S34Y0501.001  |                 |          |
|  |     |   |                         |    |     |          |     | LOOP NO.<br>34Y0501  | DWG NO.<br>LD-SBWRP34Y0501 |   | SHEET<br>1 OF 8 | REV<br>1 |
| I/O LOC: BUS.BRANCH.MODULE               |     |   |                         |    |     |          |     |  |                            |   |                 |          |

LOOP NO:  
34Y0501


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| N | UP NO | TAG PRE | TAG NO | TAG LR | EQUIPMENT SERVICE        | SERVICE DESCRIPTION | DEVICE TYPE | LOCATION | DEVICE MANUF'R/SUPP | MODEL NO  | SPEC NO | AREA CONTRACTOR | SUBMITTAL NO | REMARKS |
|---|-------|---------|--------|--------|--------------------------|---------------------|-------------|----------|---------------------|-----------|---------|-----------------|--------------|---------|
| S | 34    | TE      | 0501   | A      | RECLAIM WATER PUMP NO. 1 | BEARING TEMP 1      | RTD         | FIELD    | US MOTORS           | 943432    | 11214   | KPC             | PF1213B      |         |
| S | 34    | TI      | 0501   | A      | RECLAIM WATER PUMP NO. 1 | BEARING TEMP 1      | DCS         | 29PCM02  | WESTINGHOUSE        | OVATION   | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | TE      | 0501   | B      | RECLAIM WATER PUMP NO. 1 | BEARING TEMP 2      | RTD         | FIELD    | US MOTORS           | 943432    | 11214   | KPC             | PF1213B      |         |
| S | 34    | TI      | 0501   | B      | RECLAIM WATER PUMP NO. 1 | BEARING TEMP 2      | DCS         | 29PCM02  | WESTINGHOUSE        | OVATION   | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | VE      | 0501   |        | RECLAIM WATER PUMP NO. 1 | VIBRATION           | ELEMENT     | FIELD    | METRIX              | 5484C-1XX | 11214   | KPC             | PF1213B      |         |
| S | 34    | VI      | 0501   |        | RECLAIM WATER PUMP NO. 1 | VIBRATION           | DCS         | 29PCM02  | WESTINGHOUSE        | OVATION   | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | TAH     | 0501   | A      | RECLAIM WATER PUMP NO. 1 | BEARING TMP HI      | DCS         | 29PCM02  | WESTINGHOUSE        | OVATION   | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | TAH     | 0501   | B      | RECLAIM WATER PUMP NO. 1 | MTR WIND TMP HI     | DCS         | 29PCM02  | WESTINGHOUSE        | OVATION   | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | VAH     | 0501   |        | RECLAIM WATER PUMP NO. 1 | MTR VIBR. HI        | DCS         | 29PCM02  | WESTINGHOUSE        | OVATION   | 13400   | WPCI            | SBRP-200     |         |

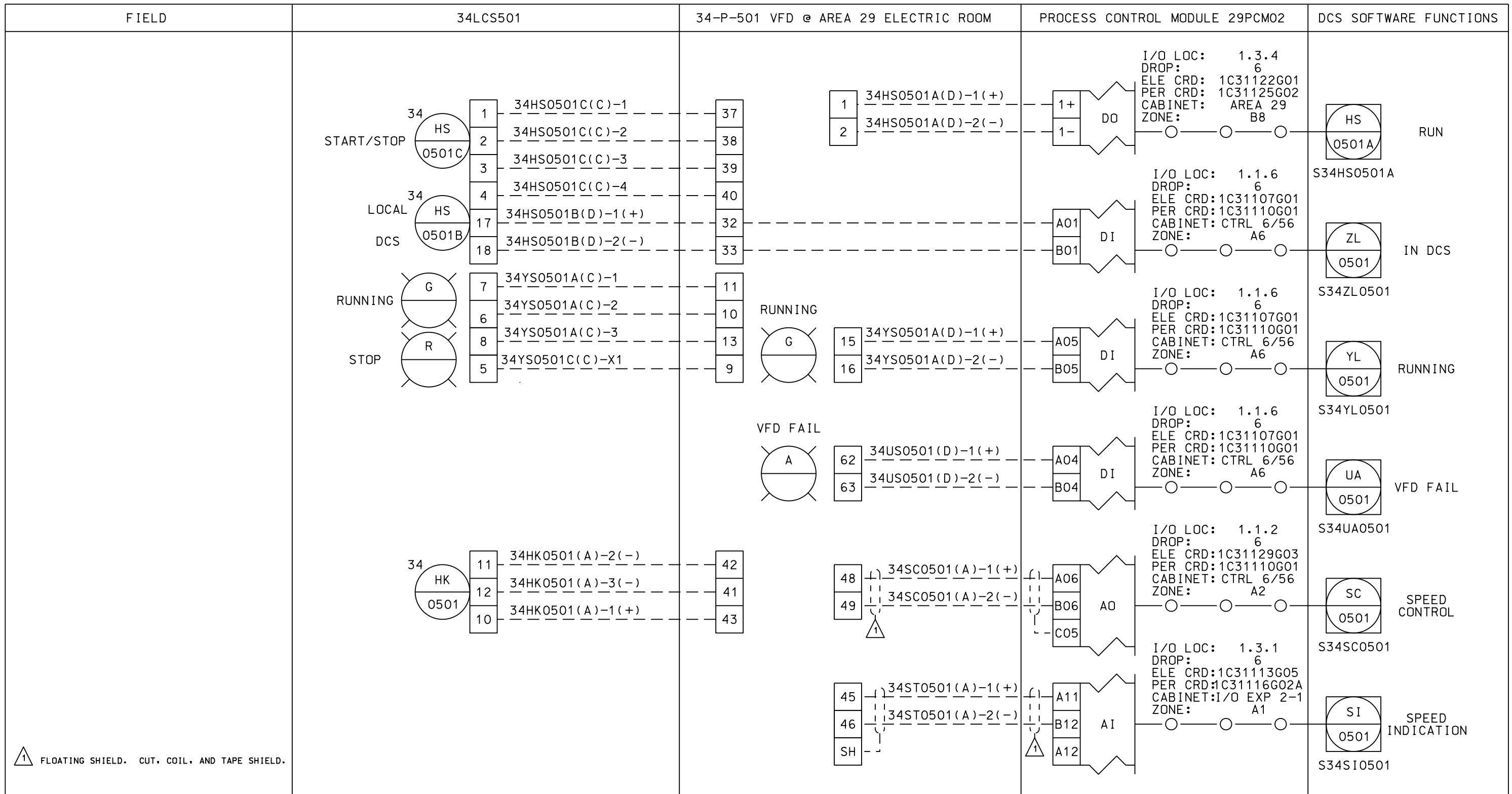
| N | UP NO | TAG PRE | TAG NO | TAG LR | EQUIPMENT SERVICE        | DATA SH NO | I/O SIGNAL | SIGNAL LEVEL | DEVICE RANGE | ENGR UNITS | PROC SET PT | AREA LOOP DIAGRAM NO | P&ID DWG NO | LOOP FILENAME | INTERCONNECT FILENAME |
|---|-------|---------|--------|--------|--------------------------|------------|------------|--------------|--------------|------------|-------------|----------------------|-------------|---------------|-----------------------|
| S | 34    | TE      | 0501   | A      | RECLAIM WATER PUMP NO. 1 | S20.13a    | N/A        | MILLIVOLT    | 0-300        | DEGREES F  | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.005  | S34Y0501.008          |
| S | 34    | TI      | 0501   | A      | RECLAIM WATER PUMP NO. 1 | N/A        | AI         | 4-20MA       | 0-300        | DEGREES F  | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.005  | S34Y0501.008          |
| S | 34    | TE      | 0501   | B      | RECLAIM WATER PUMP NO. 1 | S20.13a    | N/A        | MILLIVOLT    | 0-300        | DEGREES F  | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.005  | S34Y0501.008          |
| S | 34    | TI      | 0501   | B      | RECLAIM WATER PUMP NO. 1 | N/A        | AI         | 4-20MA       | 0-300        | DEGREES F  | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.005  | S34Y0501.008          |
| S | 34    | VE      | 0501   |        | RECLAIM WATER PUMP NO. 1 | N/A        | N/A        | MILLIVOLT    | 0-2          | IN/SEC     | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.005  | S34Y0501.008          |
| S | 34    | VI      | 0501   |        | RECLAIM WATER PUMP NO. 1 | N/A        | AI         | 4-20MA       | 0-2          | IN/SEC     | N/A         | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.005  | S34Y0501.008          |
| S | 34    | TAH     | 0501   | A      | RECLAIM WATER PUMP NO. 1 | N/A        | DI         | 24VDC        | N/A          | N/A        | 200 F       | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.005  | S34Y0501.008          |
| S | 34    | TAH     | 0501   | B      | RECLAIM WATER PUMP NO. 1 | N/A        | DI         | 24VDC        | N/A          | N/A        | 90 C        | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.005  | S34Y0501.008          |
| S | 34    | VAH     | 0501   |        | RECLAIM WATER PUMP NO. 1 | N/A        | DI         | 24VDC        | N/A          | N/A        | 1 IN/SEC.   | LD-SBWRP34Y0501      | 34-I-04     | S34Y0501.005  | S34Y0501.008          |

| REFERENCE DRAWINGS                       |     |         |                         | DESTROY ALL PRINTS BEARING EARLIER DATE |     |      |     | APPROVAL |  | FOR CONTINUATION<br>SEE SHEET 3 OF 8<br>FILE NAME S34Y0501.003 |                            |  |                      |
|--|-----|---------|-------------------------|---|-----|------|-----|----------|--|--|----------------------------|---|----------------------|
| P & ID:                                  | REV | DATE    | DESCRIPTION             | BY                                      | CKD | ENGR | MGR |          |  |  |                            |   |                      |
| ELECTRICAL/CONDUIT DWG: 34-E-31, 29-E-31 | A   | 3/21/00 | DRAFT                   | JG                                      |     |      |     |          |  |  |                            |   |                      |
| ELECTRICAL FEEDER SCHED: D-439, 440      | 0   | 6/7/00  | ISSUED FOR CONSTRUCTION | DN                                      |     |      |     |          |  |  |                            |   |                      |
| MTR CONTROL CENTER DWG: D-414            | 1   | 5/30/03 | AS BUILT                | CW                                      |     |      |     |          |  |  |                            |   |                      |
| TOSHIBA DWG: 104291CI800 18 THRU 30      |     |         |                         |   |     |      |     |          |  |  |                            |   |                      |
| I/O LOC: BUS.BRANCH.MODULE               |     |         |                         |   |     |      |     |          |  | LOOP NO.<br>34Y0501  | DWG NO.<br>LD-SBWRP34Y0501 | CIP NO.<br>42-910.6   | FILE<br>S34Y0501.002 |
|  |     |         |                         |   |     |      |     |          |  | SHEET<br>2 OF 8  | REV<br>1                   |   |                      |

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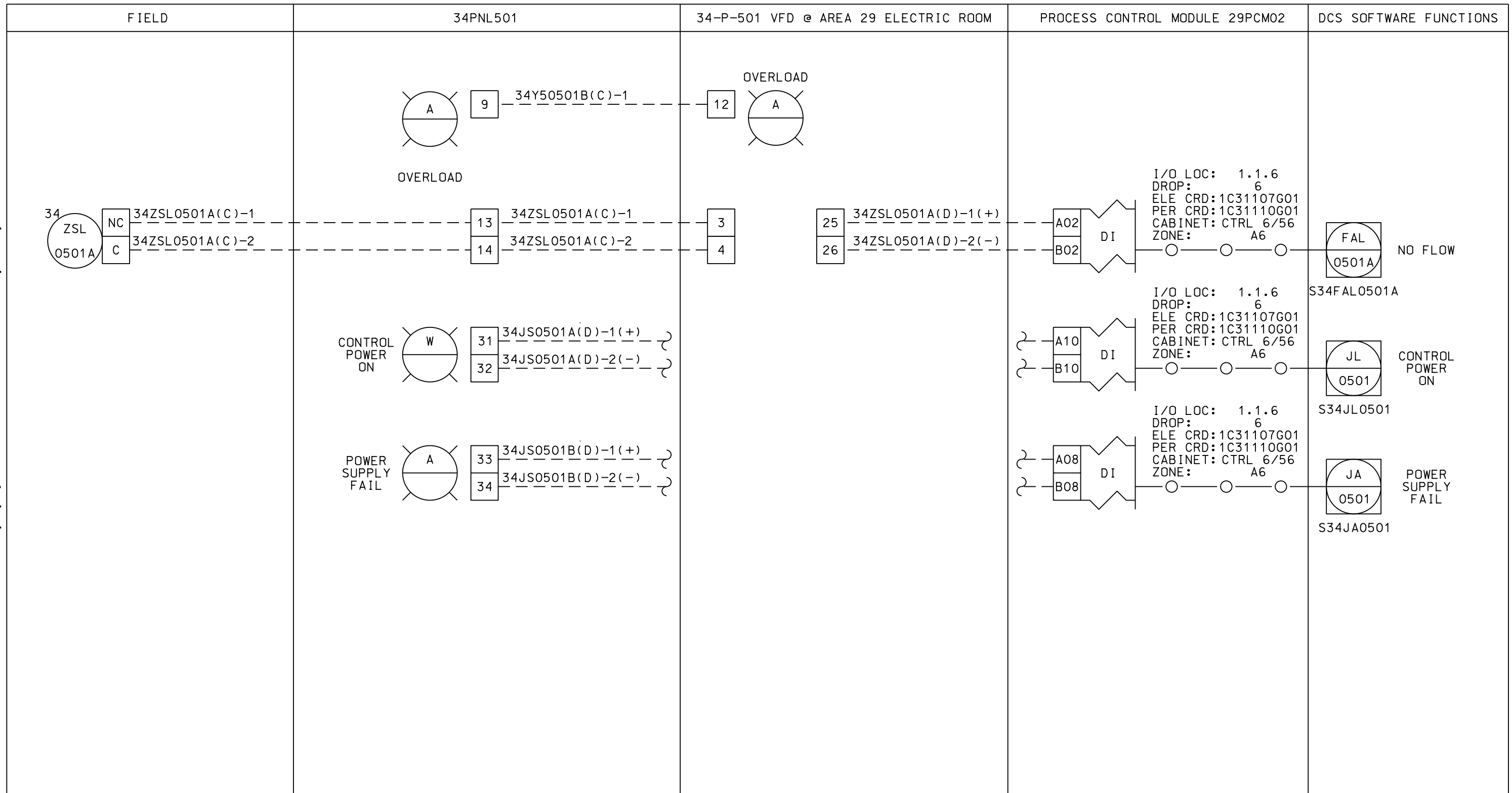
△ FLOATING SHIELD. CUT, COIL, AND TAPE SHIELD.

| REFERENCE DRAWINGS                       |     | DESTROY ALL PRINTS BEARING EARLIER DATE |                         |    |     | APPROVAL |     |  |                            |                      |          |
|--|-----|---|-------------------------|----|-----|----------|-----|--|----------------------------|----------------------|----------|
| P & ID:                                  | REV | DATE                                    | DESCRIPTION             | BY | CKD | ENGR     | MGR |  |                            |                      |          |
| 34-I-04                                  | A   | 3/21/00                                 | DRAFT                   | JG |     |          |     | SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA |                            |                      |          |
| ELECTRICAL/CONDUIT DWG: 34-E-31, 29-E-31 | 0   | 6/7/00                                  | ISSUED FOR CONSTRUCTION | DN |     |          |     |  |                            | CIP NO.<br>42-910.6  |          |
| ELECTRICAL FEEDER SCHED: D-439, 440      | 1   | 5/30/03                                 | AS BUILT                | CW |     |          |     |  |                            | FILE<br>S34Y0501.003 |          |
| MOTOR CONTROL CENTER DWG: D-414          |     |   |                         |    |     |          |     | INSTRUMENT LOOP DIAGRAM<br>RECLAIM WATER PUMP NO. 1  |                            |                      |          |
| TOSHIBA DWG: 10429ICI800 18 THRU 30      |     |   |                         |    |     |          |     | LOOP NO.<br>34Y0501  | DWG NO.<br>LD-SBWRP34Y0501 | SHEET<br>3 OF 8      | REV<br>1 |

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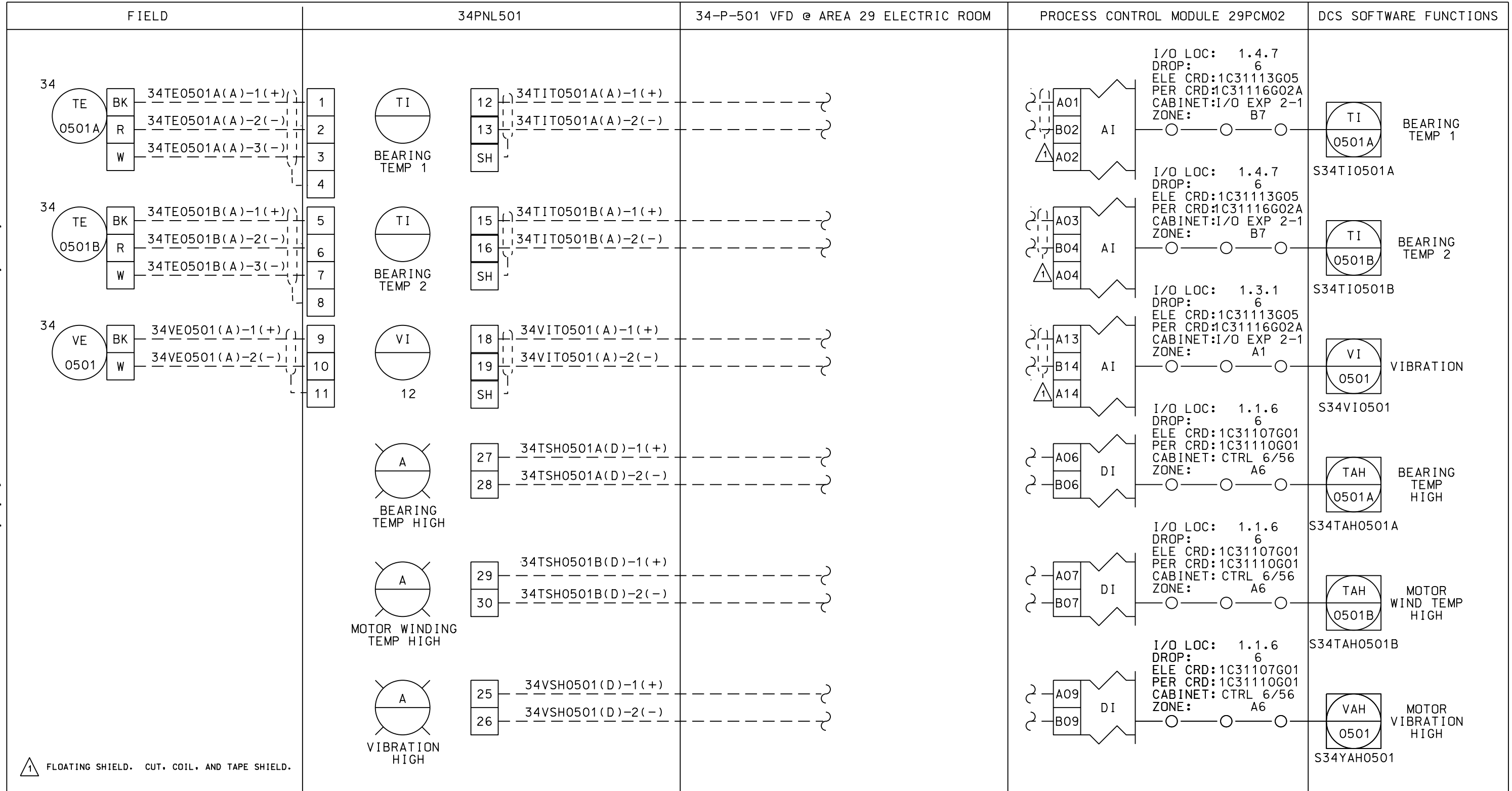


| REFERENCE DRAWINGS                       | DESTROY ALL PRINTS BEARING EARLIER DATE |         |                         |    | APPROVAL |      |     |  |                            |                      |
|--|---|---------|-------------------------|----|----------|------|-----|--|----------------------------|----------------------|
| P & ID: 34-I-04                          | REV                                     | DATE    | DESCRIPTION             | BY | CKD      | ENGR | MGR |  |                            |                      |
| ELECTRICAL/CONDUIT DWG: 34-E-31, 29-E-31 | A                                       | 3/21/00 | DRAFT                   | JG |          |      |     | SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA |                            | CIP NO.<br>42-910.6  |
| ELECTRICAL FEEDER SCHED: D-439, 440      | 0                                       | 6/7/00  | ISSUED FOR CONSTRUCTION | DN |          |      |     |  |                            | FILE<br>S34Y0501.004 |
| MTR CONTROL CENTER DWG: D-414            | 1                                       | 5/30/03 | AS BUILT                | CW |          |      |     |  |                            |                      |
| TOSHIBA DWG: 104291CI800 18 THRU 30      |   |         |                         |    |          |      |     | INSTRUMENT LOOP DIAGRAM<br>RECLAIM WATER PUMP NO. 1  |                            | SHEET<br>4 OF 8      |
| I/O LOC: BUS.BRANCH.MODULE               |   |         |                         |    |          |      |     | LOOP NO.<br>34Y0501  | DWG NO.<br>LD-SBWRP34Y0501 | REV<br>1             |

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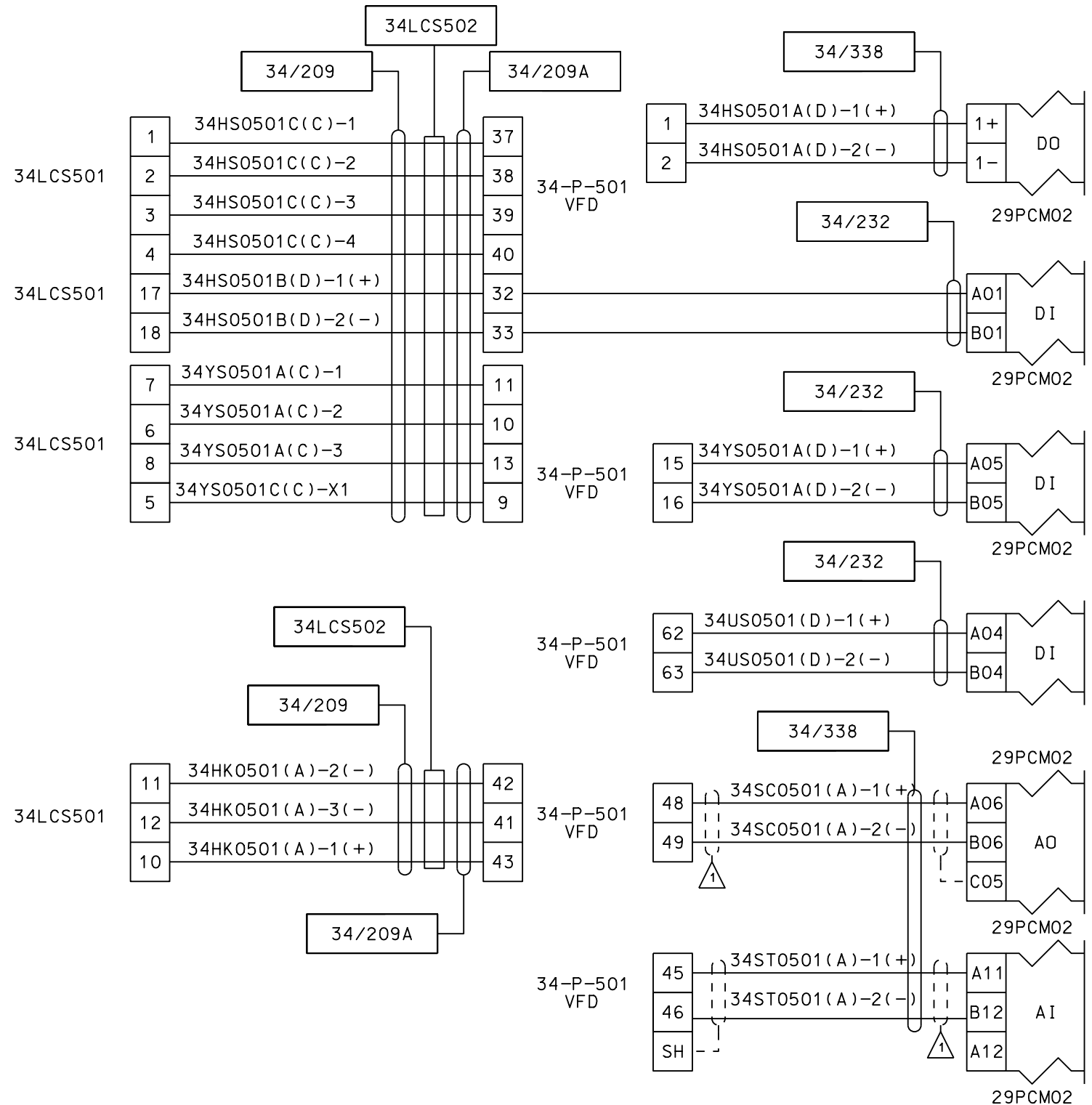
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FLOATING SHIELD. CUT, COIL, AND TAPE SHIELD.

| REFERENCE DRAWINGS                       | DESTROY ALL PRINTS BEARING EARLIER DATE |         |                         |    | APPROVAL |      |     |  |
|--|---|---------|-------------------------|----|----------|------|-----|--|
| P & ID: 34-I-04                          | REV                                     | DATE    | DESCRIPTION             | BY | CKD      | ENGR | MGR |  |
| ELECTRICAL/CONDUIT DWG: 34-E-31, 29-E-31 | A                                       | 3/21/00 | DRAFT                   | JG |          |      |     |  |
| ELECTRICAL FEEDER SCHED: D-439, 440      | 0                                       | 6/7/00  | ISSUED FOR CONSTRUCTION | DN |          |      |     |  |
| MOTOR CONTROL CENTER DWG: D-414          | 1                                       | 5/30/03 | AS BUILT                | CW |          |      |     |  |
| TOSHIBA DWG: 104291CI800 18 THRU 30      |   |         |                         |    |          |      |     |  |
| I/O LOC: BUS.BRANCH.MODULE               |   |         |                         |    |          |      |     |  |

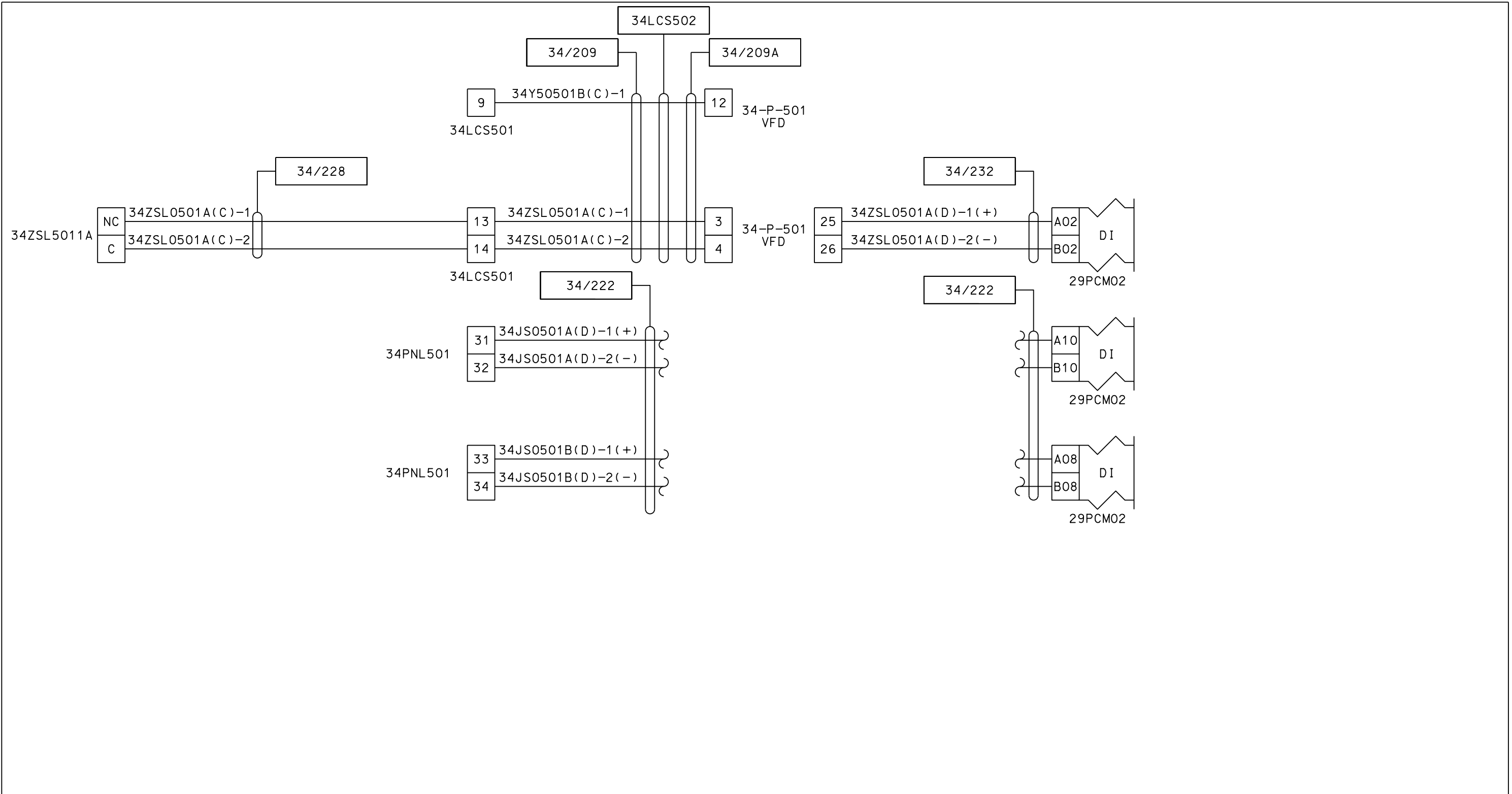
|   |                 |              |
|---|-----------------|--------------|
| SOUTH BAY WATER RECLAMATION PLANT                                   |                 | CIP NO.      |
| METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA |                 | 42-910.6     |
| INSTRUMENT LOOP DIAGRAM   |                 | FILE         |
| RECLAIM WATER PUMP NO. 1  |                 | S34Y0501.005 |
| LOOP NO.  | DWG NO.         | SHEET        |
| 34Y0501   | LD-SBWRP34Y0501 | 5 OF 8       |
|   |                 | REV          |
|   |                 | 1            |



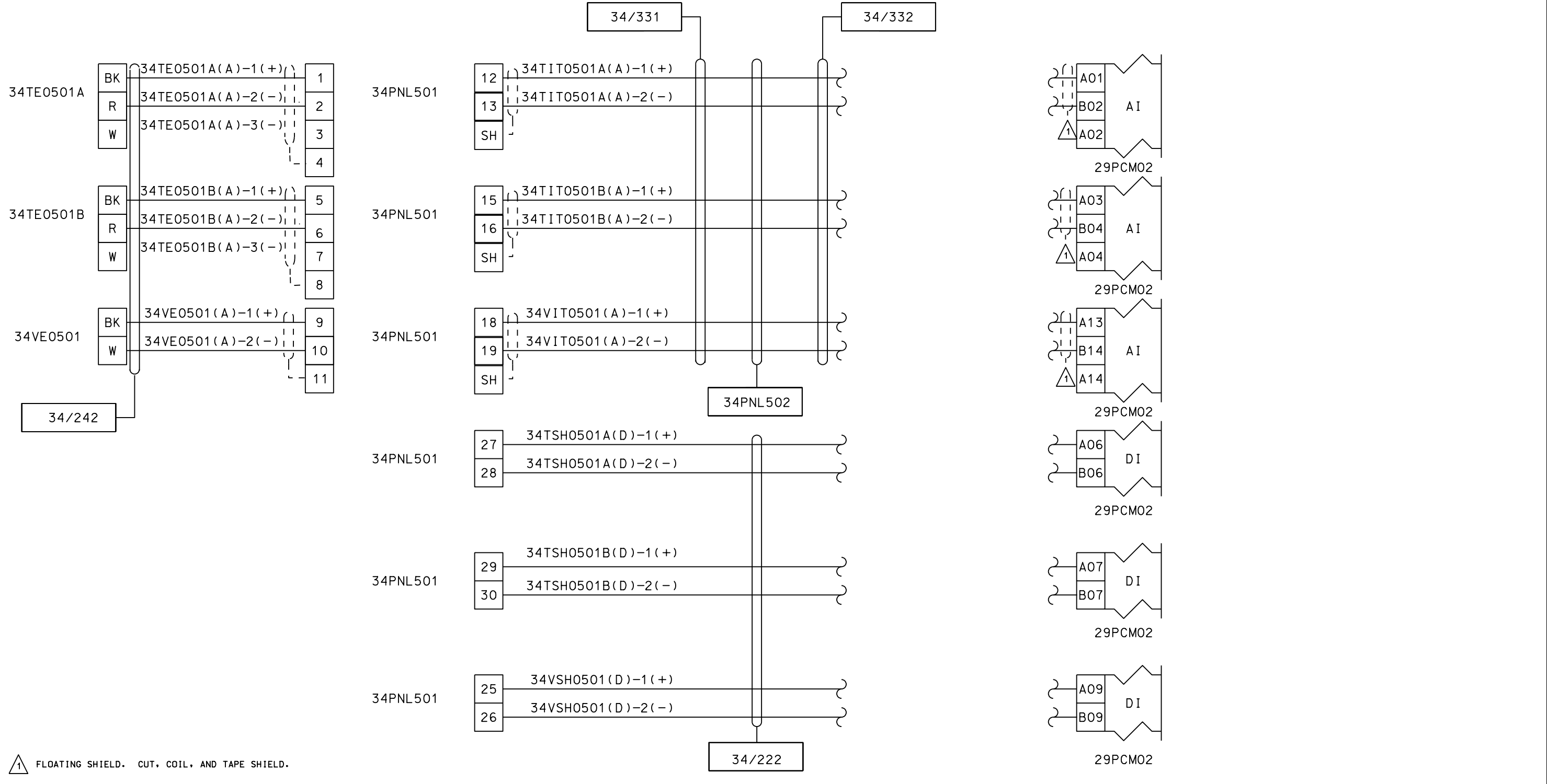
1 FLOATING SHIELD. CUT, COIL, AND TAPE SHIELD.

| REFERENCE DRAWINGS        |                        | DESTROY ALL PRINTS BEARING EARLIER DATE |         |                         |    | APPROVAL |      |  |  |                            |                      |          |
|---------------------------|------------------------|---|---------|-------------------------|----|----------|------|--|--|----------------------------|----------------------|----------|
| P & ID:                   | 34-I-04                | REV                                     | DATE    | DESCRIPTION             | BY | CKD      | ENGR |  |  | MGR                        |                      |          |
| ELECTRICAL/CONDUIT DWG:   | 34-E-31, 29-E-31       | A                                       | 3/21/00 | DRAFT                   | JG |          |      |  | SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA | CIP NO.<br>42-910.6        |                      |          |
| ELECTRICAL FEEDER SCHED:  | D-439, 440             | 0                                       | 6/7/00  | ISSUED FOR CONSTRUCTION | DN |          |      |  |  |                            |                      |          |
| MOTOR CONTROL CENTER DWG: | D-414                  | 1                                       | 5/30/03 | AS BUILT                | CW |          |      |  |  |                            |                      |          |
| TOSHIBA DWG:              | 10429ICI800 18 THRU 30 |   |         |                         |    |          |      |  | INTERCONNECTION DIAGRAM<br>RECLAIM WATER PUMP NO. 1  |                            | FILE<br>S34Y0501.006 |          |
| I/O LOC:                  | BUS.BRANCH.MODULE      |   |         |                         |    |          |      |  | LOOP NO.<br>34Y0501  | DWG NO.<br>LD-SBWRP34Y0501 | SHEET<br>6 OF 8      | REV<br>1 |





| REFERENCE DRAWINGS       |                        | DESTROY ALL PRINTS BEARING EARLIER DATE |         |                         |    | APPROVAL |      |  |  |                            |                 |          |
|--------------------------|------------------------|---|---------|-------------------------|----|----------|------|--|--|----------------------------|-----------------|----------|
| P & ID:                  | 34-I-04                | REV                                     | DATE    | DESCRIPTION             | BY | CKD      | ENGR |  |  | MGR                        |                 |          |
| ELECTRICAL/CONDUIT DWG:  | 34-E-31, 29-E-31       | A                                       | 3/21/00 | DRAFT                   | JG |          |      |  | SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA | CIP NO.<br>42-910.6        |                 |          |
| ELECTRICAL FEEDER SCHED: | D-439, 440             | 0                                       | 6/7/00  | ISSUED FOR CONSTRUCTION | DN |          |      |  |  |                            |                 |          |
| MTR CONTROL CENTER DWG:  | D-414                  | 1                                       | 5/30/03 | AS BUILT                | CW |          |      |  |  |                            |                 |          |
| TOSHIBA DWG:             | 104291CI800 18 THRU 30 |   |         |                         |    |          |      |  | INTERCONNECTION DIAGRAM<br>RECLAIM WATER PUMP NO. 1  | FILE<br>S34Y0501.007       |                 |          |
| I/O LOC:                 | BUS.BRANCH.MODULE      |   |         |                         |    |          |      |  | LOOP NO.<br>34Y0501  | DWG NO.<br>LD-SBWRP34Y0501 | SHEET<br>7 OF 8 | REV<br>1 |



△ FLOATING SHIELD. CUT, COIL, AND TAPE SHIELD.

| REFERENCE DRAWINGS         |                        | DESTROY ALL PRINTS BEARING EARLIER DATE |         |                         |    | APPROVAL |      |  |  |                            |                 |          |
|----------------------------|------------------------|---|---------|-------------------------|----|----------|------|--|--|----------------------------|-----------------|----------|
| P & ID:                    | 34-I-04                | REV                                     | DATE    | DESCRIPTION             | BY | CKD      | ENGR |  |  | MGR                        |                 |          |
| ELECTRICAL/CONDUIT DWG:    | 34-E-31, 29-E-31       | A                                       | 3/21/00 | DRAFT                   | JG |          |      |  | SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA | CIP NO.<br>42-910.6        |                 |          |
| ELECTRICAL FEEDER SCHED:   | D-439, 440             | 0                                       | 6/7/00  | ISSUED FOR CONSTRUCTION | DN |          |      |  |  |                            |                 |          |
| MOTOR CONTROL CENTER DWG:  | D-414                  | 1                                       | 5/30/03 | AS BUILT                | CW |          |      |  |  |                            |                 |          |
| TOSHIBA DWG:               | 104291CI800 18 THRU 30 |   |         |                         |    |          |      |  |  |                            |                 |          |
| I/O LOC: BUS.BRANCH.MODULE |                        |   |         |                         |    |          |      |  | INTERCONNECTION DIAGRAM<br>RECLAIM WATER PUMP NO. 1  | FILE<br>S34Y0501.008       |                 |          |
|                            |                        |   |         |                         |    |          |      |  | LOOP NO.<br>34Y0501  | DWG NO.<br>LD-SBWRP34Y0501 | SHEET<br>8 OF 8 | REV<br>1 |

Pump 34.P.502 DCS Loop RW Reclaimed Water (600HP)

LOOP NO:  
34Y0502

R:\mwske\comnet\loops\project\SOUTHBA\area 34 effluent sys\34y0502.001

| N | UP NO | TAG PRE | TAG NO | TAG LR | EQUIPMENT SERVICE        | SERVICE DESCRIPTION | DEVICE TYPE   | LOCATION | DEVICE MANUF'R/SUPP | MODEL NO        | SPEC NO | AREA CONTRACTOR | SUBMITTAL NO | REMARKS |
|---|-------|---------|--------|--------|--------------------------|---------------------|---------------|----------|---------------------|-----------------|---------|-----------------|--------------|---------|
| S | 34    | HS      | 0502   | C      | RECLAIM WATER PUMP NO. 2 | START/STOP          | PUSH BUTTON   | 34LCS502 | G.E.                | CR104PBG        | 16050   | KPC             | PF1272       |         |
| S | 34    | HS      | 0502   | A      | RECLAIM WATER PUMP NO. 2 | RUN                 | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | HS      | 0502   | B      | RECLAIM WATER PUMP NO. 2 | LOCAL/DCS           | SELECT SWITCH | 34LCS502 | G.E.                | CR104PSM        | 16050   | KPC             | PF1272       |         |
| S | 34    | ZL      | 0502   |        | RECLAIM WATER PUMP NO. 2 | DCS                 | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | YL      | 0502   |        | RECLAIM WATER PUMP NO. 2 | RUNNING             | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | UA      | 0502   |        | RECLAIM WATER PUMP NO. 2 | VFD FAIL            | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | HK      | 0502   |        | RECLAIM WATER PUMP NO. 2 | SPD IND CONTRL      | POTENTIOMETER | 34LCS502 | G.E.                | CR104PXP        | 16050   | KPC             | PF1272       |         |
| S | 34    | SC      | 0502   |        | RECLAIM WATER PUMP NO. 2 | SPEED CONTROL       | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | SI      | 0502   |        | RECLAIM WATER PUMP NO. 2 | SPEED INDICATN      | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | ZSL     | 0502   | A      | RECLAIM WATER PUMP NO. 2 | NO FLOW             | LIMIT SWITCH  | FIELD    | A-B                 | 871TM-B15N30-H2 | 13300   | KPC             | SUB-267      |         |
| S | 34    | FAL     | 0502   | A      | RECLAIM WATER PUMP NO. 2 | NO FLOW             | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | JL      | 0502   |        | RECLAIM WATER PUMP NO. 2 | CONTRL PWR ON       | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | JA      | 0502   |        | RECLAIM WATER PUMP NO. 2 | PWR SUPPLY FAIL     | DCS           | 29PCMO2  | WESTINGHOUSE        | OVATION         | 13400   | WPCI            | SBRP-200     |         |

| N | UP NO | TAG PRE | TAG NO | TAG LR | EQUIPMENT SERVICE        | DATA SH NO | I/O SIGNAL | SIGNAL LEVEL | DEVICE RANGE | ENGR UNITS | PROC SET PT | AREA LOOP DIAGRAM NO | P&ID DWG NO | LOOP FILENAME | INTERCONNECT FILENAME |
|---|-------|---------|--------|--------|--------------------------|------------|------------|--------------|--------------|------------|-------------|----------------------|-------------|---------------|-----------------------|
| S | 34    | HS      | 0502   | C      | RECLAIM WATER PUMP NO. 2 | N/A        | N/A        | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.003  | S34Y0502.006          |
| S | 34    | HS      | 0502   | A      | RECLAIM WATER PUMP NO. 2 | N/A        | DO         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.003  | S34Y0502.006          |
| S | 34    | HS      | 0502   | B      | RECLAIM WATER PUMP NO. 2 | N/A        | N/A        | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.003  | S34Y0502.006          |
| S | 34    | ZL      | 0502   |        | RECLAIM WATER PUMP NO. 2 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.003  | S34Y0502.006          |
| S | 34    | YL      | 0502   |        | RECLAIM WATER PUMP NO. 2 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.003  | S34Y0502.006          |
| S | 34    | UA      | 0502   |        | RECLAIM WATER PUMP NO. 2 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.003  | S34Y0502.006          |
| S | 34    | HK      | 0502   |        | RECLAIM WATER PUMP NO. 2 | N/A        | N/A        | 4-20MA       | 0-100        | PERCENT    | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.003  | S34Y0502.006          |
| S | 34    | SC      | 0502   |        | RECLAIM WATER PUMP NO. 2 | N/A        | AO         | 4-20MA       | 0-100        | PERCENT    | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.003  | S34Y0502.006          |
| S | 34    | SI      | 0502   |        | RECLAIM WATER PUMP NO. 2 | N/A        | AI         | 4-20MA       | 0-100        | PERCENT    | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.003  | S34Y0502.006          |
| S | 34    | ZSL     | 0502   | A      | RECLAIM WATER PUMP NO. 2 | N/A        | N/A        | 24VDC        | N/A          | GPM        | .12         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.004  | S34Y0502.007          |
| S | 34    | FAL     | 0502   | A      | RECLAIM WATER PUMP NO. 2 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.004  | S34Y0502.007          |
| S | 34    | JL      | 0502   |        | RECLAIM WATER PUMP NO. 2 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.004  | S34Y0502.007          |
| S | 34    | JA      | 0502   |        | RECLAIM WATER PUMP NO. 2 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.004  | S34Y0502.007          |

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| REFERENCE DRAWINGS                       |     |         |                         | DESTROY ALL PRINTS BEARING EARLIER DATE |     |      |     | APPROVAL |                 | FOR CONTINUATION<br>SEE SHEET 2 OF 8<br>FILE NAME S34Y0502.002      |  | Sverdrup ICF KAISER ENGINEERS |     |
|--|-----|---------|-------------------------|---|-----|------|-----|----------|-----------------|---|--|-------------------------------|-----|
| P & ID:                                  | REV | DATE    | DESCRIPTION             | BY                                      | CKD | ENGR | MGR |          |                 | SOUTH BAY WATER RECLAMATION PLANT                                   |  | CIP NO.                       |     |
| ELECTRICAL/CONDUIT DWG: 34-E-31, 29-E-31 | A   | 3/21/00 | DRAFT                   | JG                                      |     |      |     |          |                 | METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA |  | 42-910.6                      |     |
| ELECTRICAL FEEDER SCHED: D-439, 440      | 0   | 6/8/00  | ISSUED FOR CONSTRUCTION | DN                                      |     |      |     |          |                 | INSTRUMENT LOOP DIAGRAM DEVICE SCHEDULE                             |  | FILE                          |     |
| MOTOR CONTROL CENTER DWG: D-414          | 1   | 5/30/03 | AS BUILT                | CW                                      |     |      |     |          |                 | RECLAIM WATER PUMP NO. 1  |  | S34Y0502.001                  |     |
| TOSHIBA DWG: 10429IC1800 18 THRU 30      |     |         |                         |   |     |      |     | LOOP NO. | DWG NO.         |   |  | SHEET                         | REV |
| I/O LOC: BUS.BRANCH.MODULE               |     |         |                         |   |     |      |     | 34Y0502  | LD-SBWRP34Y0502 |   |  | 1 OF 8                        | 1   |

LOOP NO:  
34Y0502

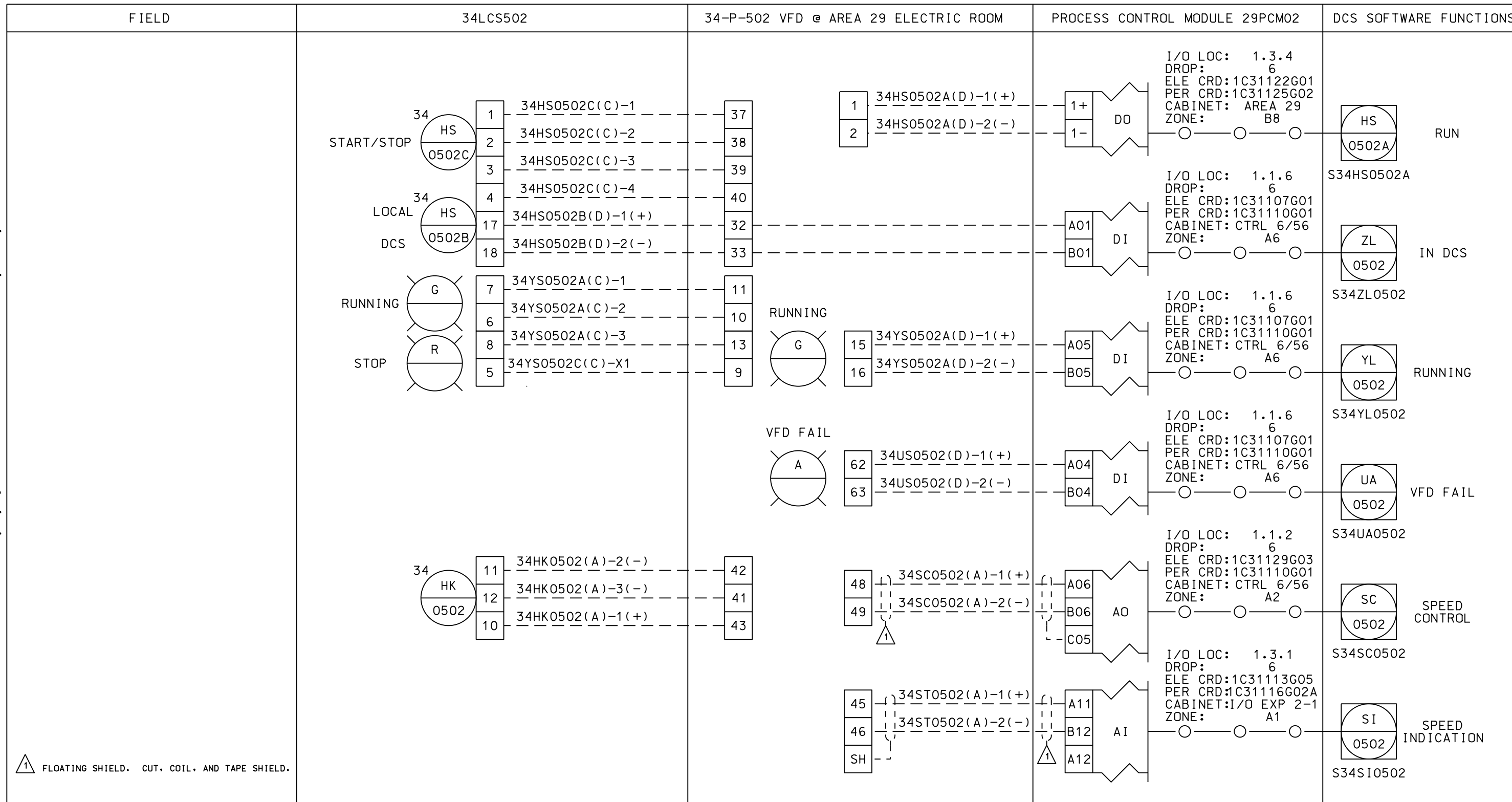
R:\mwske\comnet\loops\project\SOUTHBA\area 34 effluent sys\34y0502.002

| N | UP NO | TAG PRE | TAG NO | TAG LR | EQUIPMENT SERVICE        | SERVICE DESCRIPTION | DEVICE TYPE | LOCATION | DEVICE MANUF'R/SUPP | MODEL NO  | SPEC NO | AREA CONTRACTOR | SUBMITTAL NO | REMARKS |
|---|-------|---------|--------|--------|--------------------------|---------------------|-------------|----------|---------------------|-----------|---------|-----------------|--------------|---------|
| S | 34    | TE      | 0502   | A      | RECLAIM WATER PUMP NO. 2 | BEARING TEMP 1      | RTD         | FIELD    | US MOTORS           | 943432    | 11214   | KPC             | PF1213B      |         |
| S | 34    | TI      | 0502   | A      | RECLAIM WATER PUMP NO. 2 | BEARING TEMP 1      | DCS         | 29PCM02  | WESTINGHOUSE        | OVATION   | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | TE      | 0502   | B      | RECLAIM WATER PUMP NO. 2 | BEARING TEMP 2      | RTD         | FIELD    | US MOTORS           | 943432    | 11214   | KPC             | PF1213B      |         |
| S | 34    | TI      | 0502   | B      | RECLAIM WATER PUMP NO. 2 | BEARING TEMP 2      | DCS         | 29PCM02  | WESTINGHOUSE        | OVATION   | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | VE      | 0502   |        | RECLAIM WATER PUMP NO. 2 | VIBRATION           | ELEMENT     | FIELD    | METRIX              | 5484C-1XX | 11214   | KPC             | PF1213B      |         |
| S | 34    | VI      | 0502   |        | RECLAIM WATER PUMP NO. 2 | VIBRATION           | DCS         | 29PCM02  | WESTINGHOUSE        | OVATION   | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | TAH     | 0502   | A      | RECLAIM WATER PUMP NO. 2 | BEARING TMP HI      | DCS         | 29PCM02  | WESTINGHOUSE        | OVATION   | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | TAH     | 0502   | B      | RECLAIM WATER PUMP NO. 2 | MTR WIND TMP HI     | DCS         | 29PCM02  | WESTINGHOUSE        | OVATION   | 13400   | WPCI            | SBRP-200     |         |
| S | 34    | VAH     | 0502   |        | RECLAIM WATER PUMP NO. 2 | MTR VIBR. HI        | DCS         | 29PCM02  | WESTINGHOUSE        | OVATION   | 13400   | WPCI            | SBRP-200     |         |
|   |       |         |        |        |                          |                     |             |          |                     |           |         |                 |              |         |
|   |       |         |        |        |                          |                     |             |          |                     |           |         |                 |              |         |
|   |       |         |        |        |                          |                     |             |          |                     |           |         |                 |              |         |
|   |       |         |        |        |                          |                     |             |          |                     |           |         |                 |              |         |
|   |       |         |        |        |                          |                     |             |          |                     |           |         |                 |              |         |

| N | UP NO | TAG PRE | TAG NO | TAG LR | EQUIPMENT SERVICE        | DATA SH NO | I/O SIGNAL | SIGNAL LEVEL | DEVICE RANGE | ENGR UNITS | PROC SET PT | AREA LOOP DIAGRAM NO | P&ID DWG NO | LOOP FILENAME | INTERCONNECT FILENAME |
|---|-------|---------|--------|--------|--------------------------|------------|------------|--------------|--------------|------------|-------------|----------------------|-------------|---------------|-----------------------|
| S | 34    | TE      | 0502   | A      | RECLAIM WATER PUMP NO. 2 | S20.13a    | N/A        | MILLIVOLT    | 0-300        | DEGREES F  | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.005  | S34Y0502.008          |
| S | 34    | TI      | 0502   | A      | RECLAIM WATER PUMP NO. 2 | N/A        | AI         | 4-20MA       | 0-300        | DEGREES F  | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.005  | S34Y0502.008          |
| S | 34    | TE      | 0502   | B      | RECLAIM WATER PUMP NO. 2 | S20.13a    | N/A        | MILLIVOLT    | 0-300        | DEGREES F  | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.005  | S34Y0502.008          |
| S | 34    | TI      | 0502   | B      | RECLAIM WATER PUMP NO. 2 | N/A        | AI         | 4-20MA       | 0-300        | DEGREES F  | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.005  | S34Y0502.008          |
| S | 34    | VE      | 0502   |        | RECLAIM WATER PUMP NO. 2 | N/A        | N/A        | MILLIVOLT    | 0-2          | IN/SEC     | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.005  | S34Y0502.008          |
| S | 34    | VI      | 0502   |        | RECLAIM WATER PUMP NO. 2 | N/A        | AI         | 4-20MA       | 0-2          | IN/SEC     | N/A         | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.005  | S34Y0502.008          |
| S | 34    | TAH     | 0502   | A      | RECLAIM WATER PUMP NO. 2 | N/A        | DI         | 24VDC        | N/A          | N/A        | 200 F       | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.005  | S34Y0502.008          |
| S | 34    | TAH     | 0502   | B      | RECLAIM WATER PUMP NO. 2 | N/A        | DI         | 24VDC        | N/A          | N/A        | 90 C        | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.005  | S34Y0502.008          |
| S | 34    | VAH     | 0502   |        | RECLAIM WATER PUMP NO. 2 | N/A        | DI         | 24VDC        | N/A          | N/A        | 1 IN/SEC.   | LD-SBWRP34Y0502      | 34-I-04     | S34Y0502.005  | S34Y0502.008          |
|   |       |         |        |        |                          |            |            |              |              |            |             |                      |             |               |                       |
|   |       |         |        |        |                          |            |            |              |              |            |             |                      |             |               |                       |
|   |       |         |        |        |                          |            |            |              |              |            |             |                      |             |               |                       |
|   |       |         |        |        |                          |            |            |              |              |            |             |                      |             |               |                       |

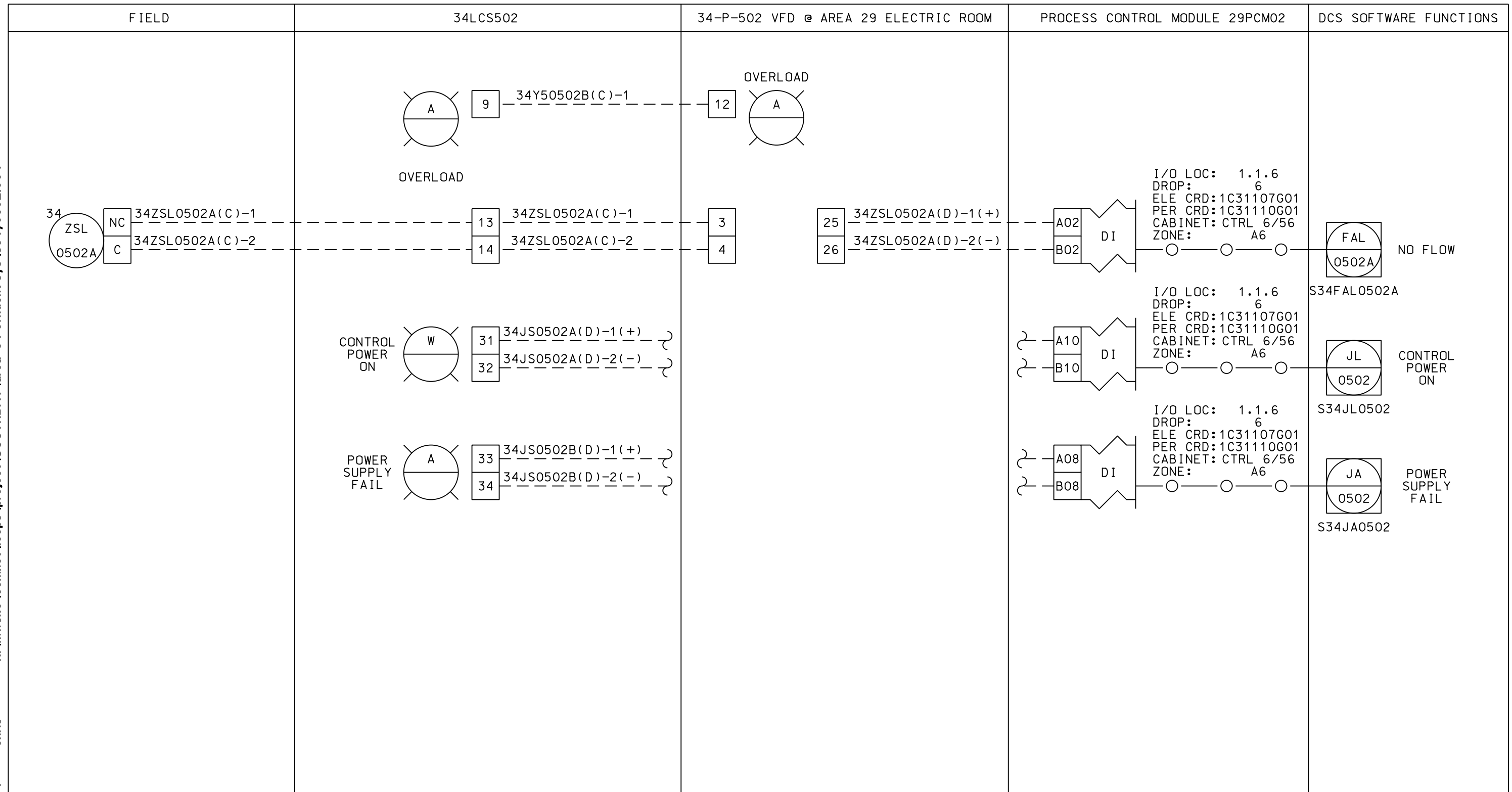
28-AUG-2008 09:04 chris

| REFERENCE DRAWINGS                       |     |         | DESTROY ALL PRINTS BEARING EARLIER DATE |    |     |      | APPROVAL |                     | FOR CONTINUATION<br>SEE SHEET 3 OF 8<br>FILE NAME S34Y0502.003 |   | Sverdrup ICF KAISER ENGINEERS |  |
|--|-----|---------|---|----|-----|------|----------|---------------------|--|---|-------------------------------|--|
| P & ID:                                  | REV | DATE    | DESCRIPTION                             | BY | CKD | ENGR | MGR      |                     |  |   |                               |  |
| ELECTRICAL/CONDUIT DWG: 34-E-31, 29-E-31 | A   | 3/21/00 | DRAFT                                   | JG |     |      |          |                     |  |   |                               |  |
| ELECTRICAL FEEDER SCHED: D-439, 440      | 0   | 6/8/00  | ISSUED FOR CONSTRUCTION                 | DN |     |      |          |                     |  | SOUTH BAY WATER RECLAMATION PLANT                                   |                               |  |
| MTR CONTROL CENTER DWG: D-414            | 1   | 5/30/03 | AS BUILT                                | CW |     |      |          |                     |  | METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA |                               |  |
| TOSHIBA DWG: 104291CI800 18 THRU 30      |     |         |   |    |     |      |          |                     |  | INSTRUMENT LOOP DIAGRAM DEVICE SCHEDULE                             |                               |  |
|  |     |         |   |    |     |      |          |                     |  | RECLAIM WATER PUMP NO. 1  |                               |  |
|  |     |         |   |    |     |      |          | LOOP NO.<br>34Y0502 | DWG NO.<br>LD-SBWRP34Y0502                                     | SHEET<br>2 OF 8   | REV<br>1                      |  |
| I/O LOC: BUS.BRANCH.MODULE               |     |         |   |    |     |      |          |                     |  |   |                               |  |



1 FLOATING SHIELD. CUT, COIL, AND TAPE SHIELD.

| REFERENCE DRAWINGS                       |     | DESTROY ALL PRINTS BEARING EARLIER DATE |                         |    |     | APPROVAL            |                            | Sverdrup ICF KAISER ENGINEERS  |          |
|--|-----|---|-------------------------|----|-----|---------------------|----------------------------|--|----------|
| P & ID                                   | REV | DATE                                    | DESCRIPTION             | BY | CKD | ENGR                | MGR                        |  |          |
| P & ID: 34-I-04                          |     |   |                         |    |     |                     |                            |  |          |
| ELECTRICAL/CONDUIT DWG: 34-E-31, 29-E-31 | A   | 3/21/00                                 | DRAFT                   | JG |     |                     |                            |  |          |
| ELECTRICAL FEEDER SCHED: D-439, 440      | 0   | 6/8/00                                  | ISSUED FOR CONSTRUCTION | DN |     |                     |                            |  |          |
| MOTOR CONTROL CENTER DWG: D-414          | 1   | 5/30/03                                 | AS BUILT                | CW |     |                     |                            |  |          |
| TOSHIBA DWG: 10429ICI800 18 THRU 30      |     |   |                         |    |     |                     |                            |  |          |
|  |     |   |                         |    |     |                     |                            | SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA |          |
|  |     |   |                         |    |     |                     |                            | CIP NO.<br>42-910.6  |          |
|  |     |   |                         |    |     |                     |                            | INSTRUMENT LOOP DIAGRAM<br>RECLAIM WATER PUMP NO. 1  |          |
|  |     |   |                         |    |     |                     |                            | FILE<br>S34Y0502.003   |          |
|  |     |   |                         |    |     | LOOP NO.<br>34Y0502 | DWG NO.<br>LD-SBWRP34Y0502 | SHEET<br>3 OF 8  | REV<br>1 |

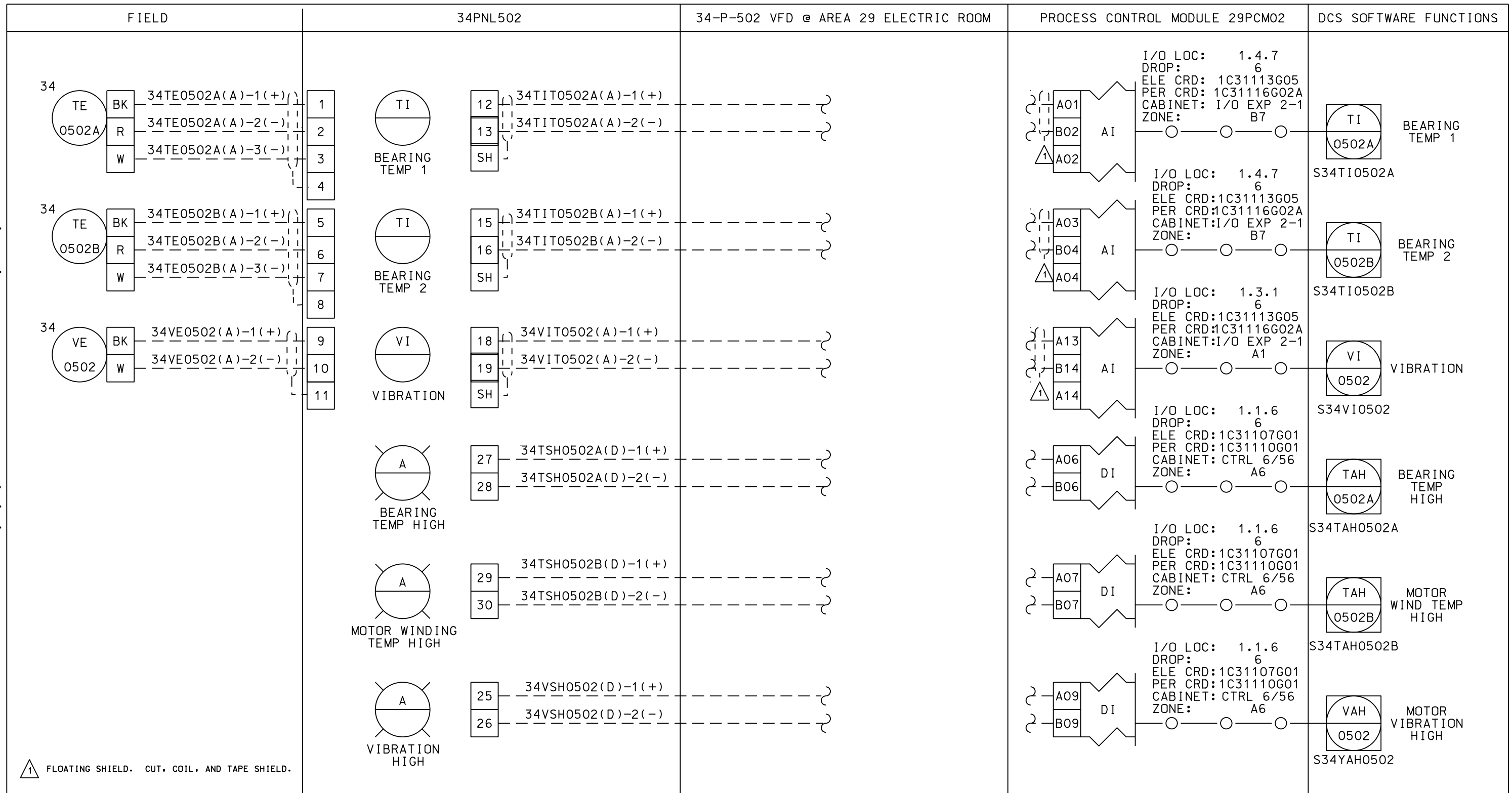


| REFERENCE DRAWINGS                       |     | DESTROY ALL PRINTS BEARING EARLIER DATE |                         |    |     | APPROVAL |     | Sverdrup ICF KAISER ENGINEERS  |                         |
|--|-----|---|-------------------------|----|-----|----------|-----|--|-------------------------|
| P & ID                                   | REV | DATE                                    | DESCRIPTION             | BY | CKD | ENGR     | MGR |  |                         |
| 34-I-04                                  | A   | 3/21/00                                 | DRAFT                   | JG |     |          |     |  |                         |
| ELECTRICAL/CONDUIT DWG: 34-E-31, 29-E-31 | 0   | 6/8/00                                  | ISSUED FOR CONSTRUCTION | DN |     |          |     |  |                         |
| ELECTRICAL FEEDER SCHED: D-439, 440      | 1   | 5/30/03                                 | AS BUILT                | CW |     |          |     |  |                         |
| MTR CONTROL CENTER DWG: D-414            |     |   |                         |    |     |          |     |  |                         |
| TOSHIBA DWG: 104291CI800 18 THRU 30      |     |   |                         |    |     |          |     |  |                         |
| I/O LOC: BUS.BRANCH.MODULE               |     |   |                         |    |     |          |     | LOOP NO. 34Y0502   | DWG NO. LD-SBWRP34Y0502 |
|  |     |   |                         |    |     |          |     | SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA |                         |
|  |     |   |                         |    |     |          |     | CIP NO. 42-910.6   | FILE 34LCS502.004       |
|  |     |   |                         |    |     |          |     | INSTRUMENT LOOP DIAGRAM<br>RECLAIM WATER PUMP NO. 1  |                         |
|  |     |   |                         |    |     |          |     | SHEET 4 OF 8   | REV 1                   |

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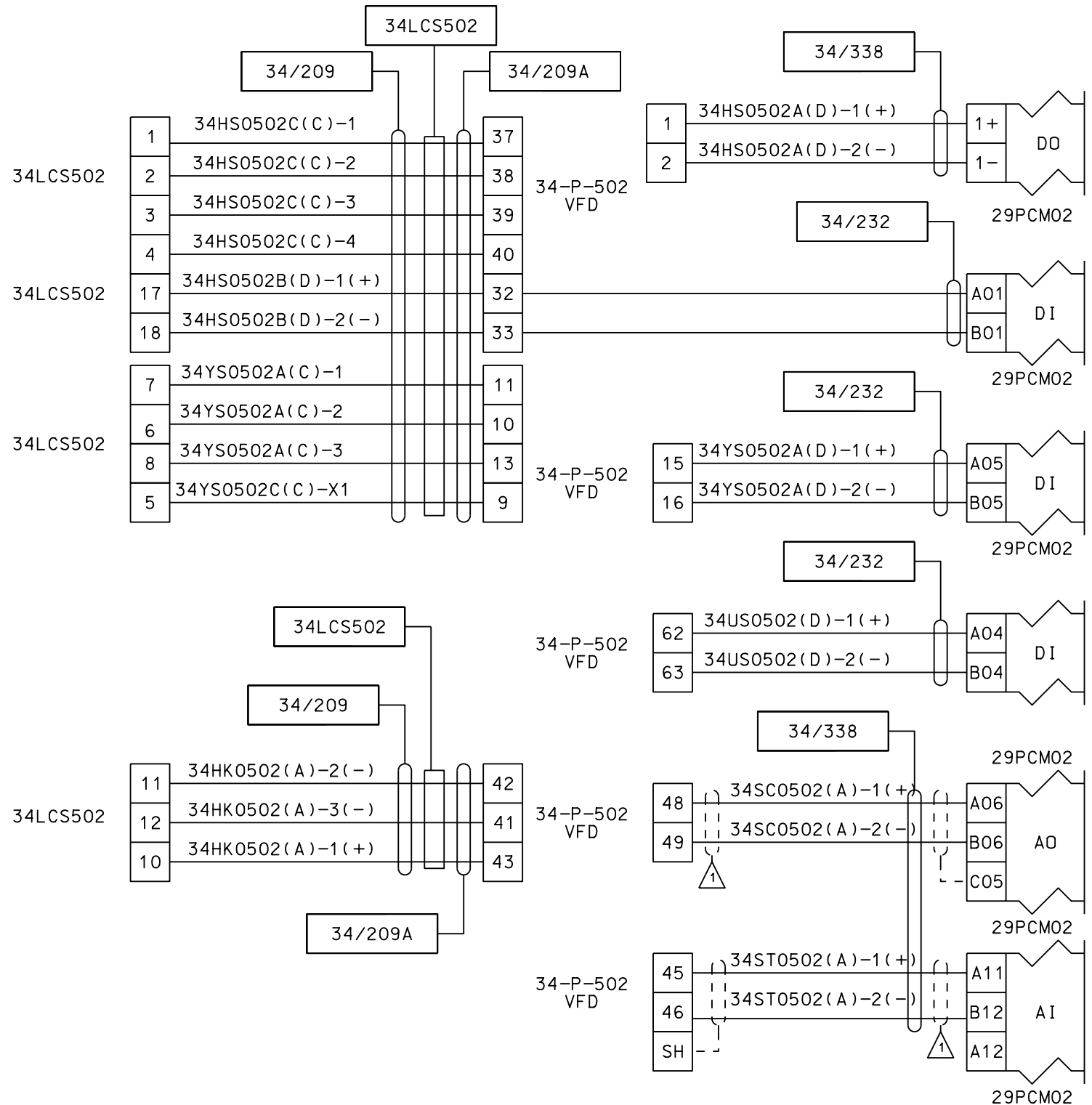
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chris



△ FLOATING SHIELD. CUT, COIL, AND TAPE SHIELD.

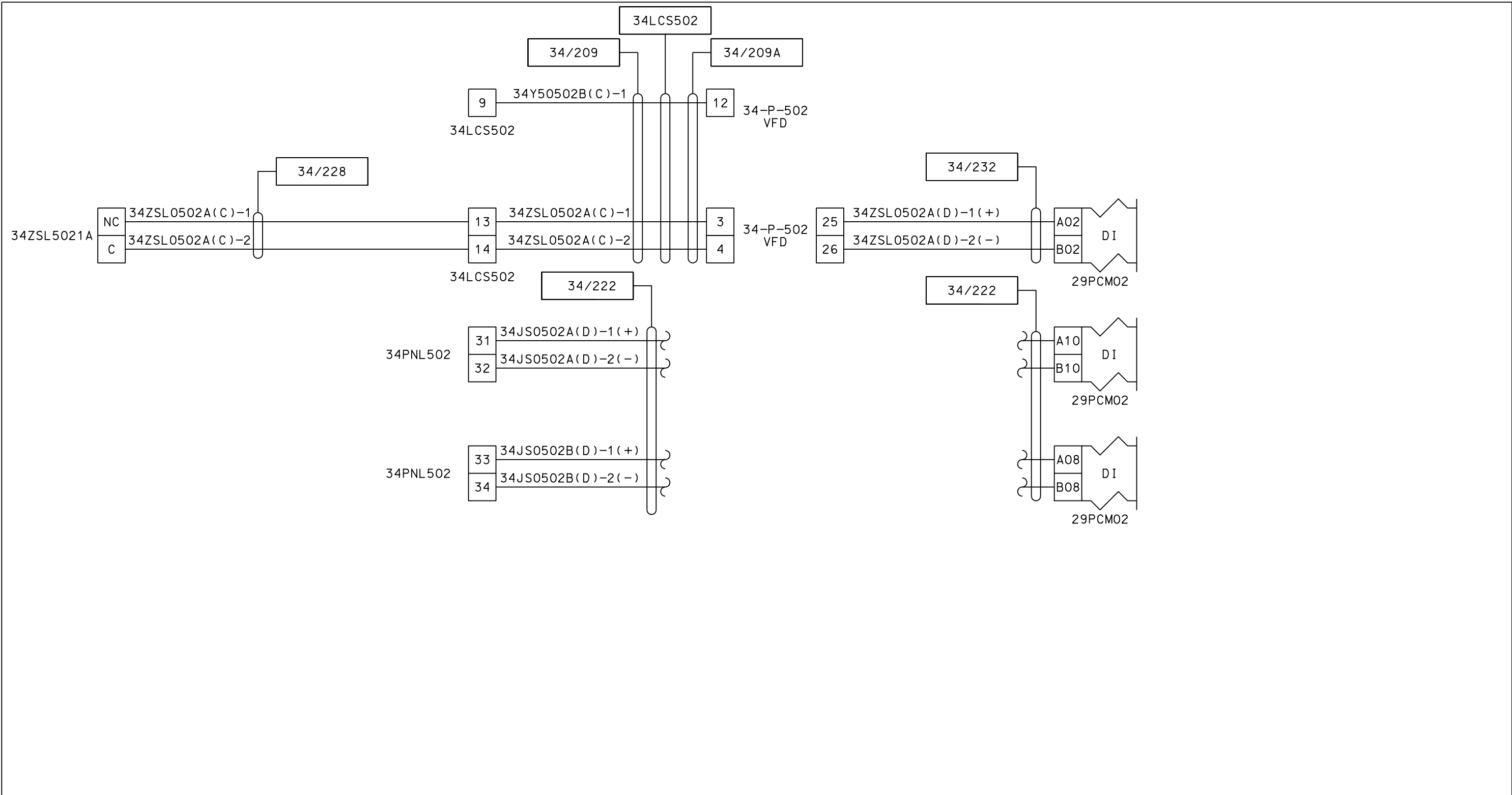
| REFERENCE DRAWINGS                       |     | DESTROY ALL PRINTS BEARING EARLIER DATE |                         |    |     | APPROVAL |     |  |  |
|--|-----|---|-------------------------|----|-----|----------|-----|--|--|
| P & ID:                                  | REV | DATE                                    | DESCRIPTION             | BY | CKD | ENGR     | MGR |  |  |
| 34-I-04                                  | A   | 3/21/00                                 | DRAFT                   | JG |     |          |     | SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA<br>INSTRUMENT LOOP DIAGRAM<br>RECLAIM WATER PUMP NO. 1<br>CIP NO. 42-910.6<br>FILE S34Y0502.005<br>SHEET 5 OF 8 REV 1 |  |
| ELECTRICAL/CONDUIT DWG: 34-E-31, 29-E-31 | 0   | 6/8/00                                  | ISSUED FOR CONSTRUCTION | DN |     |          |     |  |  |
| ELECTRICAL FEEDER SCHED: D-439, 440      | 1   | 5/30/03                                 | AS BUILT                | CW |     |          |     |  |  |
| MOTOR CONTROL CENTER DWG: D-414          |     |   |                         |    |     |          |     |  |  |
| TOSHIBA DWG: 104291CI800 18 THRU 30      |     |   |                         |    |     |          |     |  |  |
| I/O LOC: BUS.BRANCH.MODULE               |     |   |                         |    |     |          |     | LOOP NO. 34Y0502<br>DWG NO. LD-SBWRP34Y0502  |  |



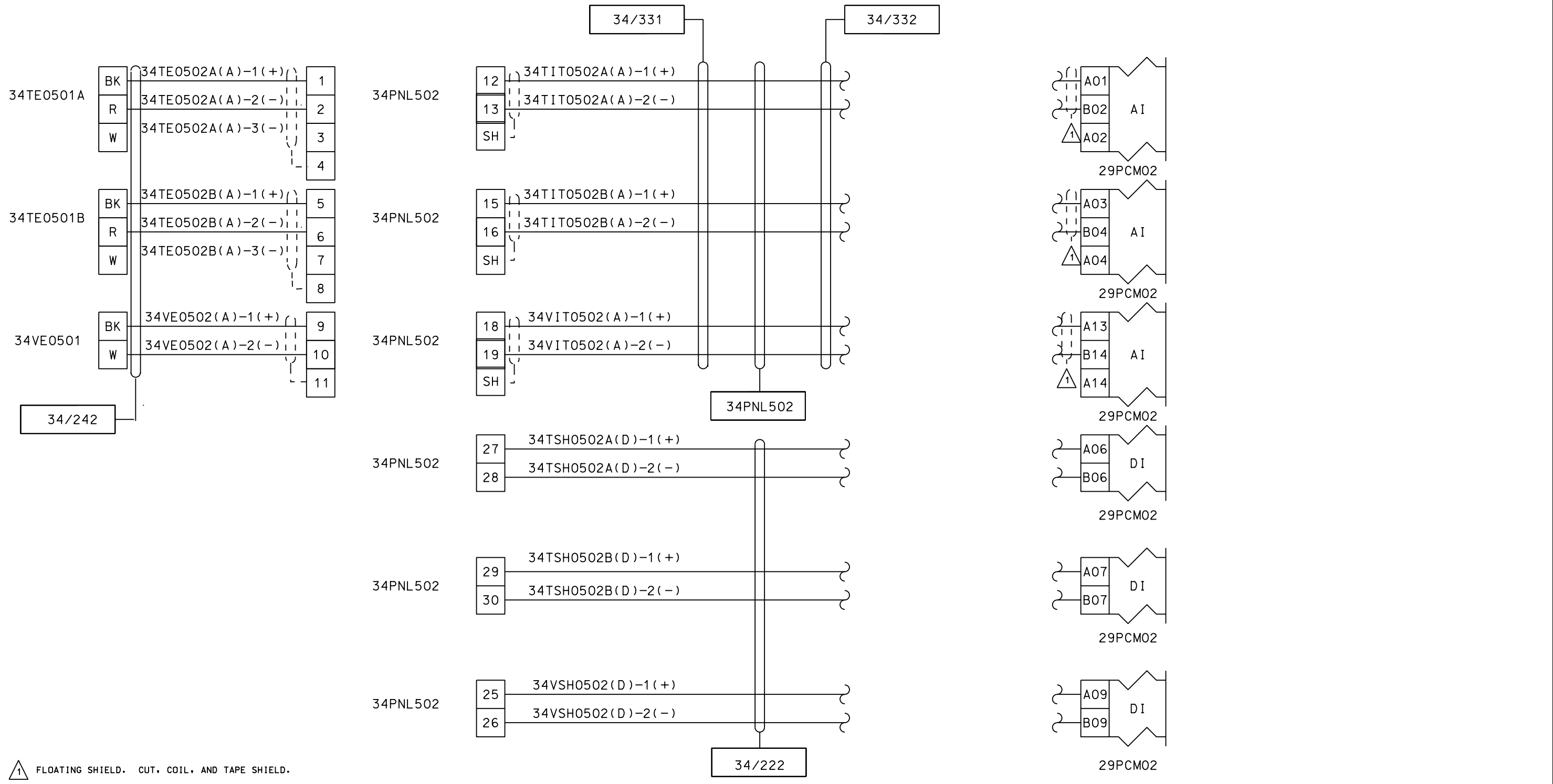
1 FLOATING SHIELD. CUT, COIL, AND TAPE SHIELD.

| REFERENCE DRAWINGS                       |     | DESTROY ALL PRINTS BEARING EARLIER DATE |                         |    |     | APPROVAL |     |  |                 |              |     |
|--|-----|---|-------------------------|----|-----|----------|-----|--|-----------------|--------------|-----|
| P & ID:                                  | REV | DATE                                    | DESCRIPTION             | BY | CKD | ENGR     | MGR |  |                 |              |     |
| 34-I-04                                  | A   | 3/21/00                                 | DRAFT                   | JG |     |          |     | SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA |                 | CIP NO.      |     |
| ELECTRICAL/CONDUIT DWG: 34-E-31, 29-E-31 | 0   | 6/8/00                                  | ISSUED FOR CONSTRUCTION | DN |     |          |     |  |                 | 42-910.6     |     |
| ELECTRICAL FEEDER SCHED: D-439, 440      | 1   | 5/30/03                                 | AS BUILT                | CW |     |          |     |  |                 | FILE         |     |
| MOTOR CONTROL CENTER DWG: D-414          |     |   |                         |    |     |          |     | INTERCONNECTION DIAGRAM  |                 | S34Y0502.006 |     |
| TOSHIBA DWG: 10429ICI800 18 THRU 30      |     |   |                         |    |     |          |     | RECLAIM WATER PUMP NO. 1   |                 |              |     |
| I/O LOC: BUS.BRANCH.MODULE               |     |   |                         |    |     |          |     | LOOP NO.   | DWG NO.         | SHEET        | REV |
|  |     |   |                         |    |     |          |     | 34Y0502  | LD-SBWRP34Y0502 | 6 OF 8       | 1   |





| REFERENCE DRAWINGS         |                        | DESTROY ALL PRINTS BEARING EARLIER DATE |         |                         |    | APPROVAL |      |  |  |                            |
|----------------------------|------------------------|---|---------|-------------------------|----|----------|------|--|--|----------------------------|
| P & ID:                    | 34-I-04                | REV                                     | DATE    | DESCRIPTION             | BY | CKD      | ENGR |  |  | MGR                        |
| ELECTRICAL/CONDUIT DWG:    | 34-E-31, 29-E-31       | A                                       | 3/21/00 | DRAFT                   | JG |          |      |  | SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA | CIP NO.<br>42-910.6        |
| ELECTRICAL FEEDER SCHED:   | D-439, 440             | 0                                       | 6/8/00  | ISSUED FOR CONSTRUCTION | DN |          |      |  |  |                            |
| MTR CONTROL CENTER DWG:    | D-414                  | 1                                       | 5/30/03 | AS BUILT                | CW |          |      |  |  |                            |
| TOSHIBA DWG:               | 104291CI800 18 THRU 30 |   |         |                         |    |          |      |  |  |                            |
| I/O LOC: BUS.BRANCH.MODULE |                        |   |         |                         |    |          |      |  | INTERCONNECTION DIAGRAM<br>RECLAIM WATER PUMP NO. 1  | FILE<br>34LCS502.007       |
|                            |                        |   |         |                         |    |          |      |  | LOOP NO.<br>34Y0502  | DWG NO.<br>LD-SBWRP34Y0502 |
|                            |                        |   |         |                         |    |          |      |  | SHEET<br>7 OF 8  | REV<br>1                   |



△ FLOATING SHIELD. CUT, COIL, AND TAPE SHIELD.

| REFERENCE DRAWINGS         |                        | DESTROY ALL PRINTS BEARING EARLIER DATE |         |                         |    | APPROVAL |      |  |  |                            |
|----------------------------|------------------------|---|---------|-------------------------|----|----------|------|--|--|----------------------------|
| P & ID:                    | 34-I-04                | REV                                     | DATE    | DESCRIPTION             | BY | CKD      | ENGR |  |  | MGR                        |
| ELECTRICAL/CONDUIT DWG:    | 34-E-31, 29-E-31       | A                                       | 3/21/00 | DRAFT                   | JG |          |      |  | SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA | CIP NO.<br>42-910.6        |
| ELECTRICAL FEEDER SCHED:   | D-439, 440             | 0                                       | 6/8/00  | ISSUED FOR CONSTRUCTION | DN |          |      |  |  |                            |
| MOTOR CONTROL CENTER DWG:  | D-414                  | 1                                       | 5/30/03 | AS BUILT                | CW |          |      |  |  |                            |
| TOSHIBA DWG:               | 104291CI800 18 THRU 30 |   |         |                         |    |          |      |  |  |                            |
| I/O LOC: BUS.BRANCH.MODULE |                        |   |         |                         |    |          |      |  | INTERCONNECTION DIAGRAM<br>RECLAIM WATER PUMP NO. 1  | FILE<br>S34Y0502.008       |
|                            |                        |   |         |                         |    |          |      |  | LOOP NO.<br>34Y0502  | DWG NO.<br>LD-SBWRP34Y0502 |
|                            |                        |   |         |                         |    |          |      |  | SHEET<br>8 OF 8  | REV<br>1                   |

# Pump 10-P-901 DCS Loop for Blended Sludge (200HP)


## LOOP NO: 10Y0901

| N | UP NO | TAG PRE | TAG NO | TAG LR | EQUIPMENT SERVICE        | SERVICE DESCRIPTION | DEVICE TYPE   | LOCATION | DEVICE MANUF'R/SUPP | MODEL NO | SPEC NO | AREA CONTRACTOR | SUBMITTAL NO | REMARKS |
|---|-------|---------|--------|--------|--------------------------|---------------------|---------------|----------|---------------------|----------|---------|-----------------|--------------|---------|
| S | 10    | HS      | 0901   | C      | BLENDED SLUDGE PUMP NO.1 | START/STOP          | PUSH BUTTON   | 10LCS901 | GE                  | CR104PBG | 16050   | KEWEIT          | PF1272/1254A |         |
| S | 10    | HS      | 0901   | A      | BLENDED SLUDGE PUMP NO.1 | RUN                 | DCS           | 05PCM02  | WESTINGHOUSE        | OVATION  | 13400   | WPCI            | SBRP-200     |         |
| S | 10    | HS      | 0901   | B      | BLENDED SLUDGE PUMP NO.1 | LOCAL/DCS           | HANDSWITCH    | 10LCS901 | GE                  | CR104PSM | 16050   | KEWEIT          | PF1272/1254A |         |
| S | 10    | ZL      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | DCS                 | DCS           | 05PCM02  | WESTINGHOUSE        | OVATION  | 13400   | WPCI            | SBRP-200     |         |
| S | 10    | YL      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | RUNNING             | DCS           | 05PCM02  | WESTINGHOUSE        | OVATION  | 13400   | WPCI            | SBRP-200     |         |
| S | 10    | HK      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | SPEED CONTROL       | POTENTIOMETER | 10LCS901 | GE                  | CR104PXP | 13300   | KEWEIT          | PF1254A      |         |
| S | 10    | SC      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | SPEED CONTROL       | DCS           | 05PCM02  | WESTINGHOUSE        | OVATION  | 13400   | WPCI            | SBRP-200     |         |
| S | 10    | SI      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | SPEED INDICT        | DCS           | 05PCM02  | WESTINGHOUSE        | OVATION  | 13400   | WPCI            | SBRP-200     |         |

| N | UP NO | TAG PRE | TAG NO | TAG LR | EQUIPMENT SERVICE        | DATA SH NO | I/O SIGNAL | SIGNAL LEVEL | DEVICE RANGE | ENGR UNITS | PROC SET PT | AREA LOOP DIAGRAM NO | P&ID DWG NO | LOOP FILENAME | INTERCONNECT FILENAME |
|---|-------|---------|--------|--------|--------------------------|------------|------------|--------------|--------------|------------|-------------|----------------------|-------------|---------------|-----------------------|
| S | 10    | HS      | 0901   | C      | BLENDED SLUDGE PUMP NO.1 | N/A        | N/A        | 120VAC       | N/A          | N/A        | N/A         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.003  | S10Y0901.005          |
| S | 10    | HS      | 0901   | A      | BLENDED SLUDGE PUMP NO.1 | N/A        | DO         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.003  | S10Y0901.005          |
| S | 10    | HS      | 0901   | B      | BLENDED SLUDGE PUMP NO.1 | N/A        | N/A        | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.003  | S10Y0901.005          |
| S | 10    | ZL      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.003  | S10Y0901.005          |
| S | 10    | YL      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.003  | S10Y0901.005          |
| S | 10    | HK      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | N/A        | N/A        | 4-20MA       | 0-100        | PCT        | N/A         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.003  | S10Y0901.005          |
| S | 10    | SC      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | N/A        | AO         | 4-20MA       | 0-100        | PCT        | N/A         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.003  | S10Y0901.005          |
| S | 10    | SI      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | N/A        | AI         | 4-20MA       | 0-100        | PCT        | N/A         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.003  | S10Y0901.005          |

| REFERENCE DRAWINGS |         |                         |    |     |      |   |  |  |  |  |          |  |  |   |
|--------------------|---------|-------------------------|----|-----|------|---|--|--|--|--|----------|--|--|---|
| P & ID: 10-I-09    |         |                         |    |     |      | DESTROY ALL PRINTS BEARING EARLIER DATE |  |  |  |  | APPROVAL |  |  | FOR CONTINUATION SEE SHEET 2 OF 6 FILE NAME 10Y0901.002 |
| REV                | DATE    | DESCRIPTION             | BY | CKD | ENGR | MGR                                     |  |  |  |  |          |  |  |   |
| A                  | 2/10/00 | DRAFT                   | MB |     |      |   |  |  |  |  |          |  |  |   |
| 0                  | 6/21/00 | ISSUED FOR CONSTRUCTION | MB |     |      |   |  |  |  |  |          |  |  |   |
| 1                  | 2/20/03 | AS BUILT                | MB |     |      |   |  |  |  |  |          |  |  |   |

| SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA |                 |  |  |  |  |  |  |  |  |  |  |          |     |              |
|--|-----------------|--|--|--|--|--|--|--|--|--|--|----------|-----|--------------|
| INSTRUMENT LOOP DIAGRAM DEVICE SCHEDULE  |                 |  |  |  |  |  |  |  |  |  |  | CIP NO.  |     | FILE         |
| BLENDED SLUDGE PUMP NO.1   |                 |  |  |  |  |  |  |  |  |  |  | 42-910.6 |     | S10Y0901.001 |
| LOOP NO.   | DWG NO.         |  |  |  |  |  |  |  |  |  |  | SHEET    | REV |              |
| 10Y0901  | LD-SBWRP10Y0901 |  |  |  |  |  |  |  |  |  |  | 1 OF 6   | 1   |              |

| SBWRP Variable Frequency Drive Repl<br>Technicals                                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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17-JUL-2008 09:06

chris

LOOP NO:  
10Y0901


| N | UP NO | TAG PRE | TAG NO | TAG LR | EQUIPMENT SERVICE        | SERVICE DESCRIPTION | DEVICE TYPE  | LOCATION | DEVICE MANUF'R/SUPP | MODEL NO       | SPEC NO | AREA CONTRACTOR | SUBMITTAL NO | REMARKS     |
|---|-------|---------|--------|--------|--------------------------|---------------------|--------------|----------|---------------------|----------------|---------|-----------------|--------------|-------------|
| S | 10    | SV      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | SEAL WTR            | SOLENOID     | FIELD    | GC VALVES           | S21 SERIES     | 15112   | KEWEIT          | PF1250A      |             |
| S | 10    | FSL     | 0901   |        | BLENDED SLUDGE PUMP NO.1 | SEAL WTR FAIL       | FLOW SWTCH   | FIELD    | HARWIL              | Q-1/1/F        | 13300   | KEWEIT          | PF1262A      |             |
| S | 10    | FAL     | 0901   |        | BLENDED SLUDGE PUMP NO.1 | SEAL WTR FAIL       | DCS          | 05PCMO2  | WESTINGHOUSE        | OVATION        | 13400   | WPCI            | SBRP-200     |             |
| S | 10    | ZSL     | 0901   |        | BLENDED SLUDGE PUMP NO.1 | NO FLOW             | LIMIT SWITCH | FIELD    | A-B                 | 871TM-B15N30H2 | 15105   | KEWEIT          | N/A          | SEE SUB-267 |
| S | 10    | FAL     | 0901   | A      | BLENDED SLUDGE PUMP NO.1 | NO FLOW             | DCS          | 05PCMO2  | WESTINGHOUSE        | OVATION        | 13400   | WPCI            | SBRP-200     |             |
| S | 10    | TAH     | 0901   | A      | BLENDED SLUDGE PUMP NO.1 | MTR WIND TEMP       | DCS          | 05PCMO2  | WESTINGHOUSE        | OVATION        | 13400   | WPCI            | SBRP-200     |             |
| S | 10    | UA      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | VFD FAIL            | DCS          | 05PCMO2  | WESTINGHOUSE        | OVATION        | 13400   | WPCI            | SBRP-200     |             |
| S | 10    | FIT     | 0901   |        | BLENDED SLUDGE PUMP NO.1 | FLOW                | XMTTR        | FIELD    | KROHNE              | IFC-090        | 13300   | KEWEIT          | PF1262A      |             |
| S | 10    | FI      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | FLOW                | DCS          | 05PCMO2  | WESTINGHOUSE        | OVATION        | 13400   | WPCI            | SBRP-200     |             |

| N | UP NO | TAG PRE | TAG NO | TAG LR | EQUIPMENT SERVICE        | DATA SH NO | I/O SIGNAL | SIGNAL LEVEL | DEVICE RANGE | ENGR UNITS | PROC SET PT | AREA LOOP DIAGRAM NO | P&ID DWG NO | LOOP FILENAME | INTERCONNECT FILENAME |
|---|-------|---------|--------|--------|--------------------------|------------|------------|--------------|--------------|------------|-------------|----------------------|-------------|---------------|-----------------------|
| S | 10    | SV      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | S20.55     | N/A        | 120VAC       | N/A          | N/A        | N/A         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.004  | S10Y0901.006          |
| S | 10    | FSL     | 0901   |        | BLENDED SLUDGE PUMP NO.1 | S20.28     | N/A        | 120VAC       | N/A          | GPM        | .12         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.004  | S10Y0901.006          |
| S | 10    | FAL     | 0901   |        | BLENDED SLUDGE PUMP NO.1 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.004  | S10Y0901.006          |
| S | 10    | ZSL     | 0901   |        | BLENDED SLUDGE PUMP NO.1 | N/A        | N/A        | 120VAC       | N/A          | N/A        | NO FLOW     | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.004  | S10Y0901.006          |
| S | 10    | FAL     | 0901   | A      | BLENDED SLUDGE PUMP NO.1 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.004  | S10Y0901.006          |
| S | 10    | TAH     | 0901   | A      | BLENDED SLUDGE PUMP NO.1 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.004  | S10Y0901.006          |
| S | 10    | UA      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | N/A        | DI         | 24VDC        | N/A          | N/A        | N/A         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.004  | S10Y0901.006          |
| S | 10    | FIT     | 0901   |        | BLENDED SLUDGE PUMP NO.1 | S20.23     | N/A        | 4-20MA       | 0-1500       | GPM        | N/A         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.004  | S10Y0901.006          |
| S | 10    | FI      | 0901   |        | BLENDED SLUDGE PUMP NO.1 | N/A        | AI         | 4-20MA       | 0-1500       | GPM        | N/A         | LD-SBWRP10Y0901      | 10-I-09     | S10Y0901.004  | S10Y0901.006          |

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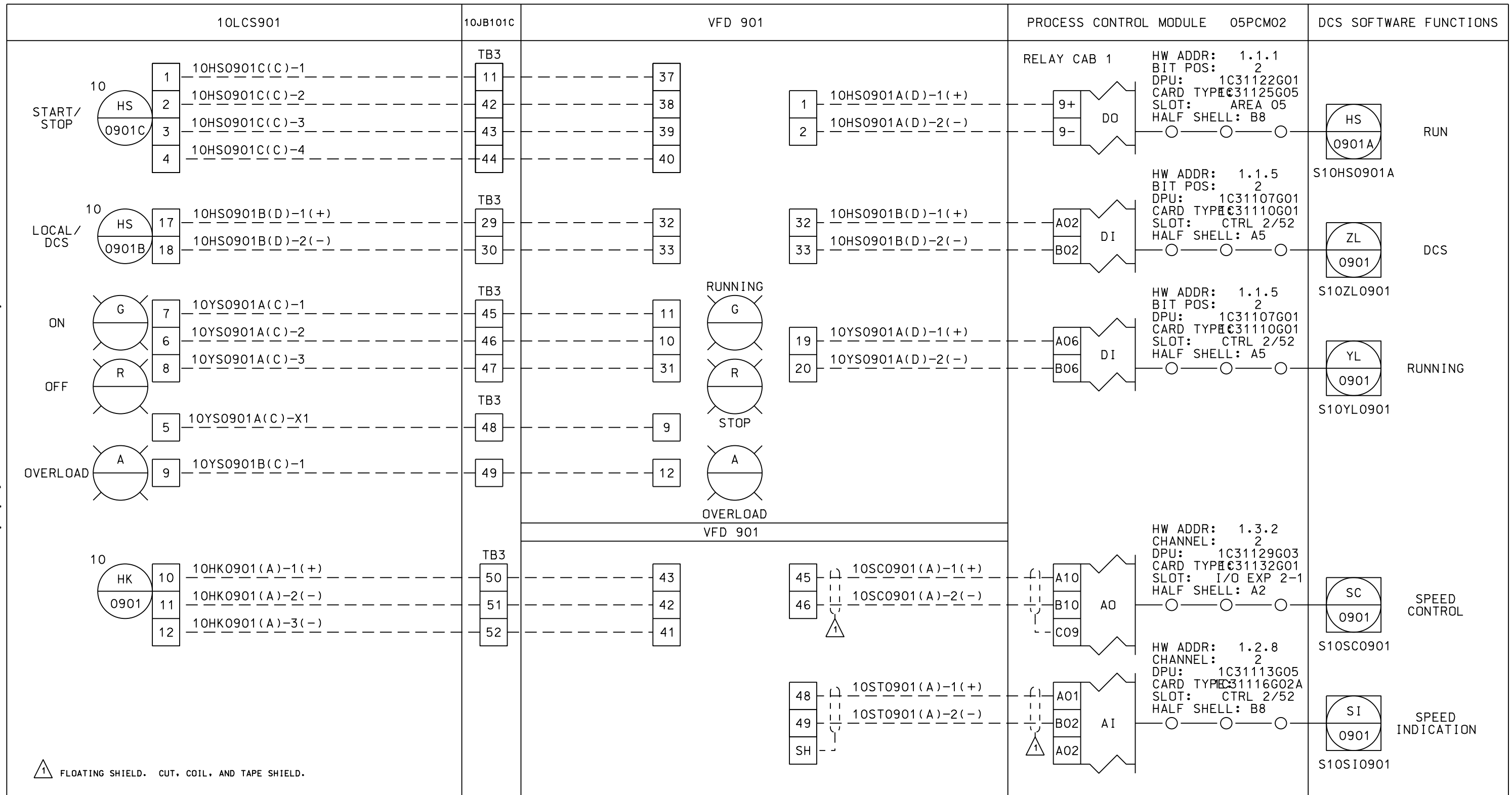
chris

| REFERENCE DRAWINGS                     |     |         |                         | DESTROY ALL PRINTS BEARING EARLIER DATE |     |      |     | APPROVAL   |                            |  |  |  |  |
|--|-----|---------|-------------------------|---|-----|------|-----|--|----------------------------|--|--|---|--|
| P & ID:                                | REV | DATE    | DESCRIPTION             | BY                                      | CKD | ENGR | MGR |  |                            |  |  |   |  |
| 10-I-09                                | A   | 2/10/00 | DRAFT                   | MB                                      |     |      |     | SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA |                            |  |  | CIP NO.<br>42-910.6   |  |
| ELECTRICAL/CONDUIT DWG: 10-E-11        | 0   | 6/21/00 | ISSUED FOR CONSTRUCTION | MB                                      |     |      |     |  |                            |  |  | FILE<br>S10Y0901.002  |  |
| ELECTRICAL FEEDER SCHED: D-434         | 1   | 2/20/03 | AS BUILT                | MB                                      |     |      |     |  |                            |  |  | SHEET<br>2 OF 6   |  |
| MOTOR CONTROL CENTER DWG: D-418        |     |         |                         |   |     |      |     |  |                            |  |  | REV<br>1  |  |
| GE MCC DWG: 335B5118 SHT 128,128A,128B |     |         |                         |   |     |      |     | LOOP NO.<br>10Y0901  | DWG NO.<br>LD-SBWRP10Y0901 |  |  |   |  |

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chris

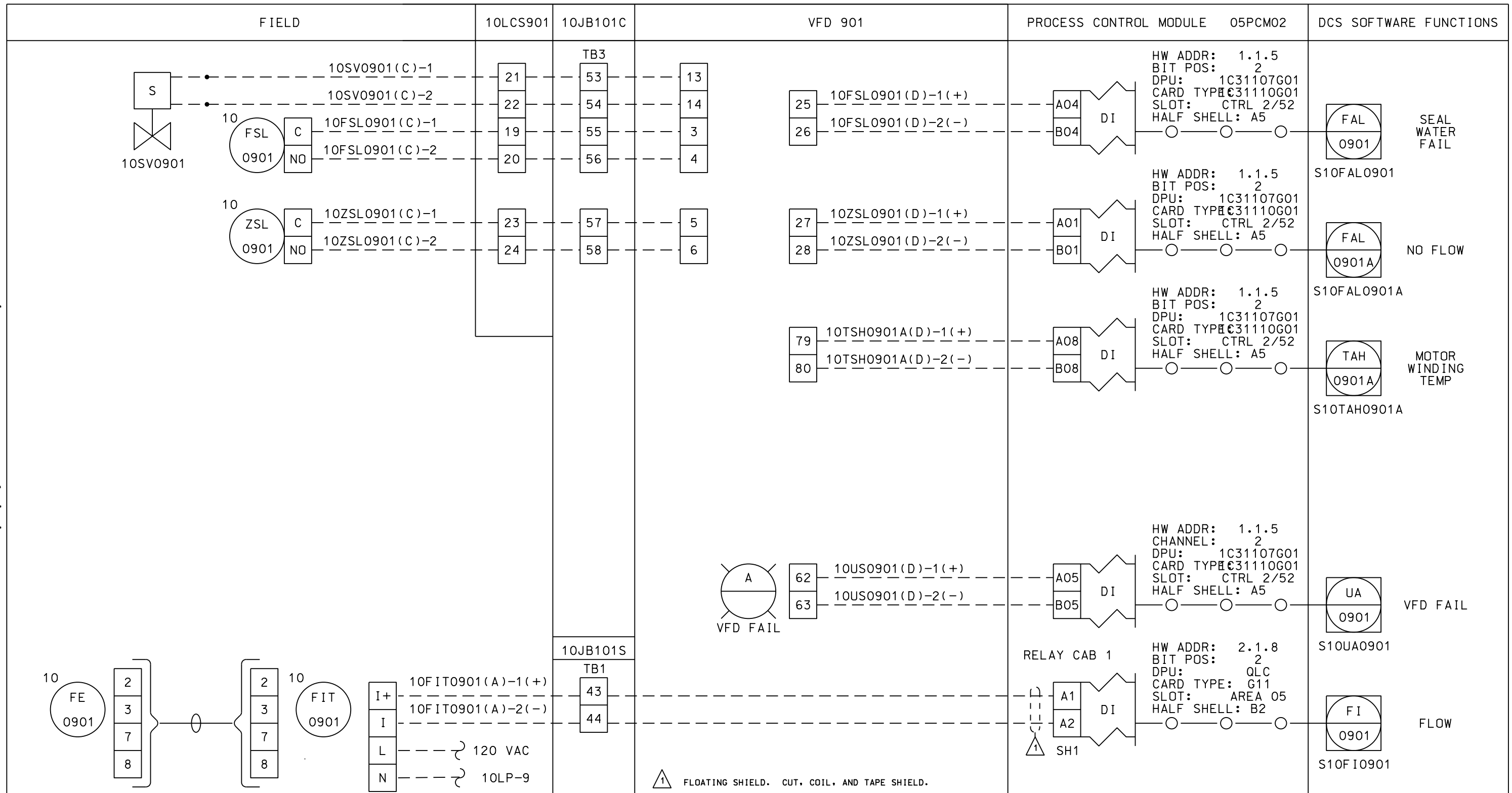
17-JUL-2008 09:06



△ FLOATING SHIELD. CUT, COIL, AND TAPE SHIELD.

| REFERENCE DRAWINGS                     |     | DESTROY ALL PRINTS BEARING EARLIER DATE |                         |    |     | APPROVAL |     |  |                 |         |              |
|--|-----|---|-------------------------|----|-----|----------|-----|--|-----------------|---------|--------------|
| P & ID:                                | REV | DATE                                    | DESCRIPTION             | BY | CKD | ENGR     | MGR |  |                 |         |              |
| 10-I-09                                | A   | 2/10/00                                 | DRAFT                   | MB |     |          |     | SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA |                 |         |              |
| ELECTRICAL/CONDUIT DWG: 10-E-11        | 0   | 6/21/00                                 | ISSUED FOR CONSTRUCTION | MB |     |          |     |  |                 | CIP NO. | 42-910.6     |
| ELECTRICAL FEEDER SCHED: D-434         | 1   | 2/20/03                                 | AS BUILT                | MB |     |          |     |  |                 | FILE    | S10Y0901.003 |
| MOTOR CONTROL CENTER DWG: D-418        |     |   |                         |    |     |          |     |  |                 | SHEET   | 3 OF 6       |
| GE MCC DWG: 335B5118 SHT 128,128A,128B |     |   |                         |    |     |          |     | REV  | 1               |         |              |
|  |     |   |                         |    |     |          |     | LOOP NO.   | DWG NO.         |         |              |
|  |     |   |                         |    |     |          |     | 10Y0901  | LD-SBWRP10Y0901 |         |              |

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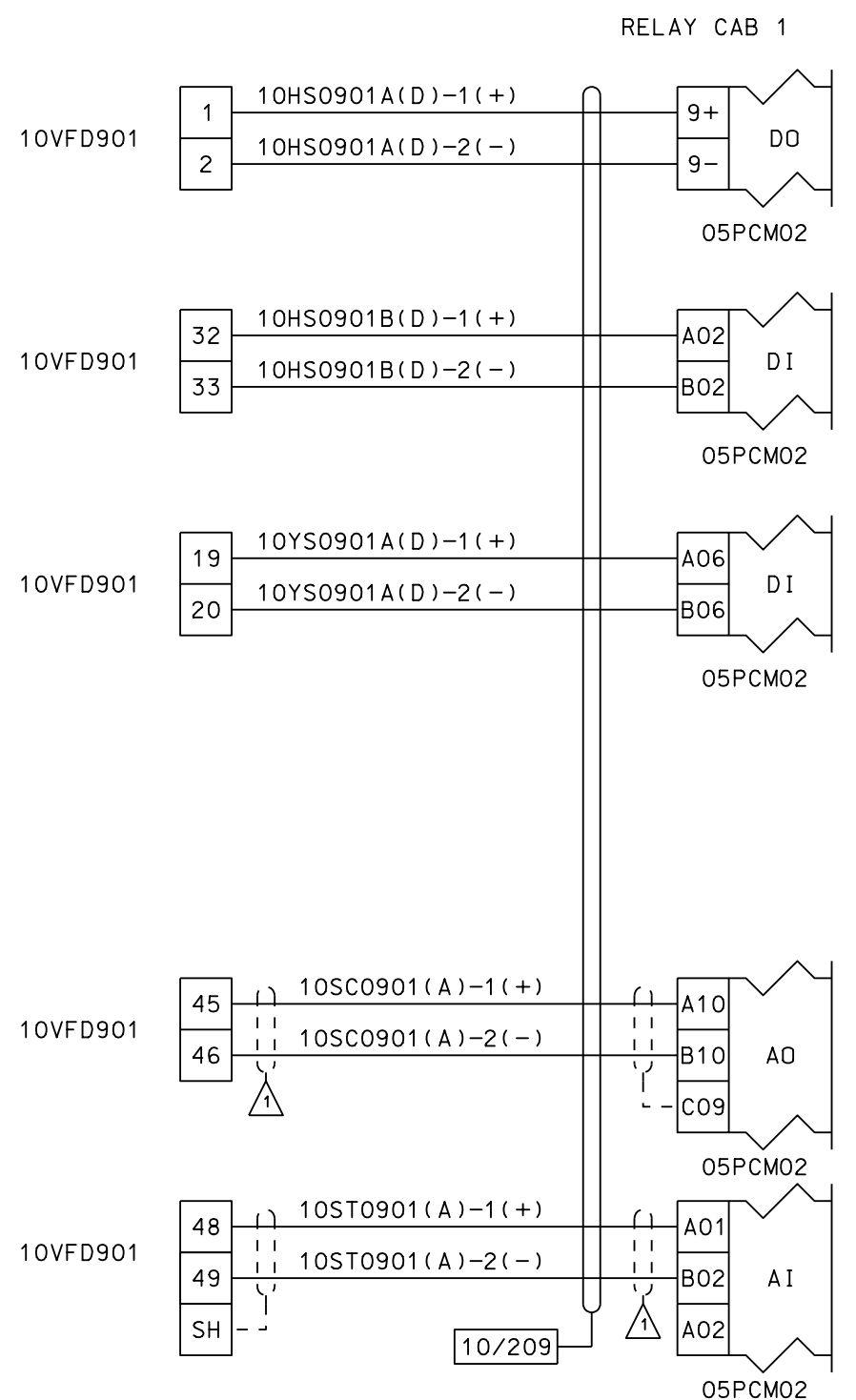
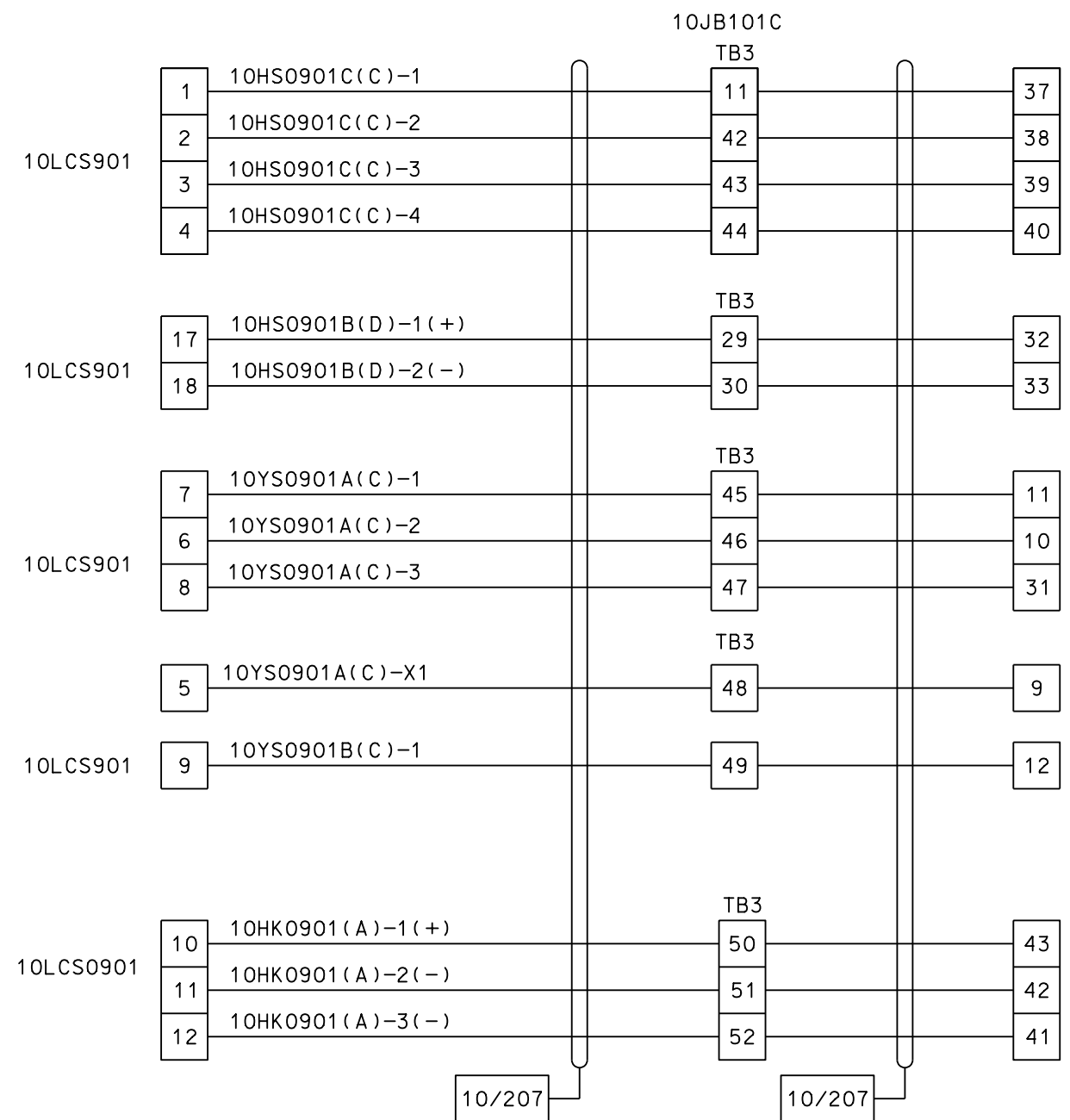


| REFERENCE DRAWINGS                     |     | DESTROY ALL PRINTS BEARING EARLIER DATE |                         |    |     | APPROVAL |     | Sverdrup ICF KAISER ENGINEERS                                       |                         |
|--|-----|---|-------------------------|----|-----|----------|-----|---|-------------------------|
| P & ID:                                | REV | DATE                                    | DESCRIPTION             | BY | CKD | ENGR     | MGR |   |                         |
| 10-I-09                                | A   | 2/10/00                                 | DRAFT                   | MB |     |          |     | SOUTH BAY WATER RECLAMATION PLANT                                   |                         |
| ELECTRICAL/CONDUIT DWG: 10-E-11        | 0   | 6/21/00                                 | ISSUED FOR CONSTRUCTION | MB |     |          |     | CIP NO. 42-910.6  |                         |
| ELECTRICAL FEEDER SCHED: D-434         | 1   | 2/20/03                                 | AS BUILT                | MB |     |          |     | METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA |                         |
| MOTOR CONTROL CENTER DWG: D-418        |     |   |                         |    |     |          |     | INSTRUMENT LOOP DIAGRAM   |                         |
| GE MCC DWG: 335B5118 SHT 128,128A,128B |     |   |                         |    |     |          |     | FILE S10Y0901.004   |                         |
|  |     |   |                         |    |     |          |     | LOOP NO. 10Y0901  | DWG NO. LD-SBWRP10Y0901 |
|  |     |   |                         |    |     |          |     | SHEET 4 OF 6  | REV 1                   |

R:\mwske\comnet\loops\project\SOUTH BAY\area 10\10y0901.005

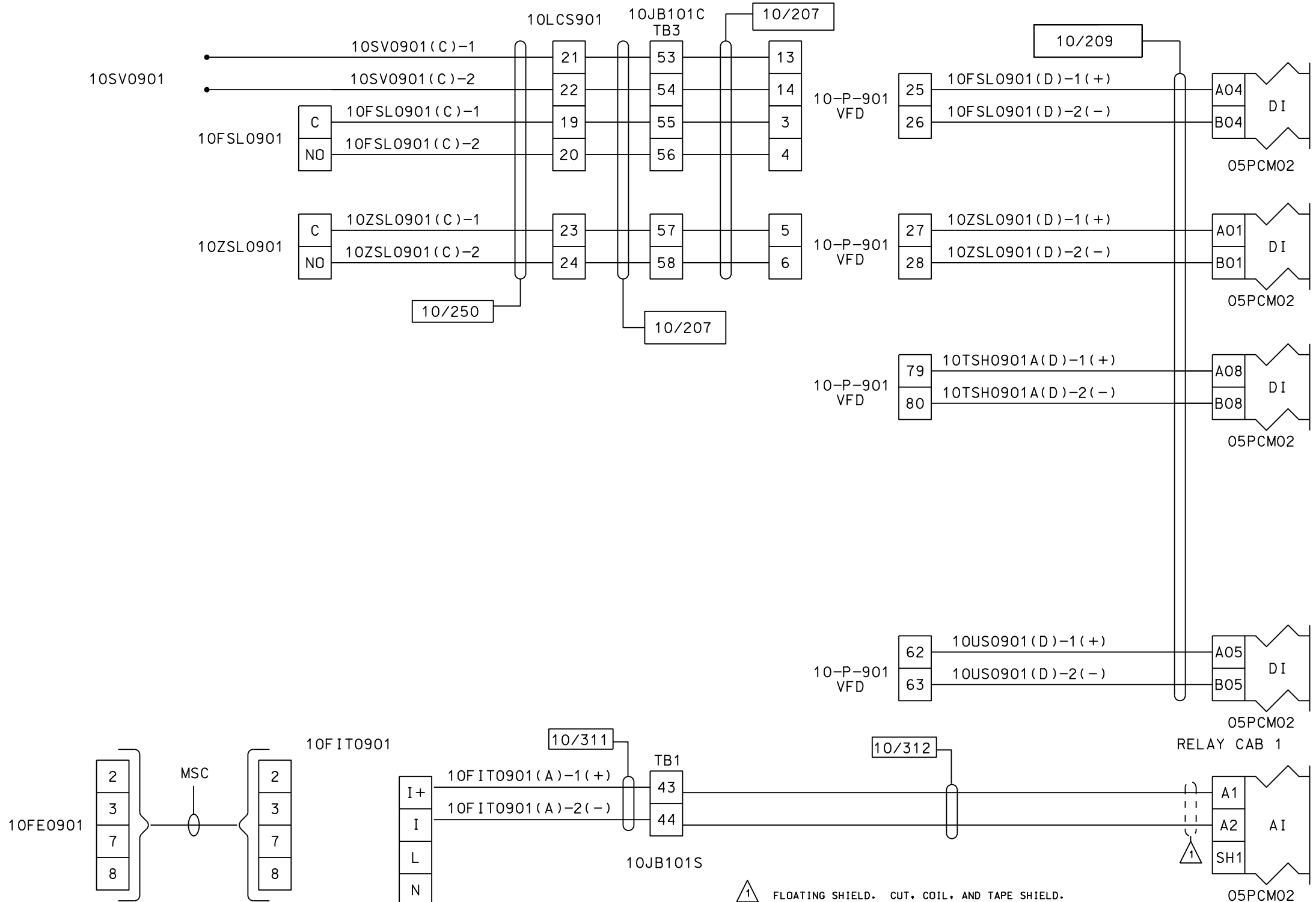
chris

17-JUL-2008 09:06



△ 1 FLOATING SHIELD. CUT, COIL, AND TAPE SHIELD.

| REFERENCE DRAWINGS   |                            | DESTROY ALL PRINTS BEARING EARLIER DATE |         |                         |    | APPROVAL |                 | Sverdrup ICF KAISER ENGINEERS |        |     |
|--|----------------------------|---|---------|-------------------------|----|----------|-----------------|-------------------------------|--------|-----|
| P & ID:  | 10-I-09                    | REV                                     | DATE    | DESCRIPTION             | BY | CKD      | ENGR            | MGR                           |        |     |
| ELECTRICAL/CONDUIT DWG:  | 10-E-11                    | A                                       | 2/10/00 | DRAFT                   | MB |          |                 |                               |        |     |
| ELECTRICAL FEEDER SCHED:   | D-434                      | 0                                       | 6/21/00 | ISSUED FOR CONSTRUCTION | MB |          |                 |                               |        |     |
| MOTOR CONTROL CENTER DWG:  | D-418                      | 1                                       | 2/20/03 | AS BUILT                | MB |          |                 |                               |        |     |
| GE MCC DWG:  | 335B5118 SHT 128,128A,128B |   |         |                         |    |          |                 |                               |        |     |
| SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA |                            |   |         |                         |    |          |                 | CIP NO.<br>42-910.6           |        |     |
| INTERCONNECTION DIAGRAM<br>BLENDED SLUDGE PUMP NO.1  |                            |   |         |                         |    |          |                 | FILE<br>S10Y0901.005          |        |     |
|  |                            |   |         |                         |    | LOOP NO. | DWG NO.         |                               | SHEET  | REV |
|  |                            |   |         |                         |    | 10Y0901  | LD-SBWRP10Y0901 |                               | 5 OF 6 | 1   |



| REFERENCE DRAWINGS   |                            | DESTROY ALL PRINTS BEARING EARLIER DATE |         |                         |    | APPROVAL |                 |         |              |
|--|----------------------------|---|---------|-------------------------|----|----------|-----------------|---------|--------------|
| P & ID:  | 10-I-09                    | REV                                     | DATE    | DESCRIPTION             | BY | CKD      | ENGR            |         |              |
| ELECTRICAL/CONDUIT DWG:  | 10-E-11                    | A                                       | 2/10/00 | DRAFT                   | MB |          |                 |         |              |
| ELECTRICAL FEEDER SCHED:   | D-434                      | 0                                       | 6/21/00 | ISSUED FOR CONSTRUCTION | MB |          |                 |         |              |
| MOTOR CONTROL CENTER DWG:  | D-418                      | 1                                       | 2/20/03 | AS BUILT                | MB |          |                 |         |              |
| GE MCC DWG:  | 335B5118 SHT 128,128A,128B |   |         |                         |    |          |                 |         |              |
| SOUTH BAY WATER RECLAMATION PLANT<br>METROPOLITAN WASTEWATER DEPARTMENT<br>CITY OF SAN DIEGO, CALIFORNIA |                            |   |         |                         |    |          |                 | CIP NO. | 42-910.6     |
| INTERCONNECTION DIAGRAM<br>BLENDED SLUDGE PUMP NO.1  |                            |   |         |                         |    |          |                 | FILE    | S10Y0901.006 |
|  |                            |   |         |                         |    | LOOP NO. | DWG NO.         | SHEET   | REV          |
|  |                            |   |         |                         |    | 10Y0901  | LD-SBWRP10Y0901 | 6 OF 6  | 1            |



**SUPPLEMENTARY SPECIAL PROVISIONS**  
**APPENDICES**

**APPENDIX A**  
**NOTICE OF EXEMPTION**

**NOTICE OF EXEMPTION**

(Check one or both)

TO:  Recorder/County Clerk  
P.O. Box 1750, MS A-33  
1600 Pacific Hwy, Room 260  
San Diego, CA 92101-2400

FROM: City of San Diego  
Public Works Department  
525 B Street, Suite 750, MS 908A  
San Diego, CA 92101

Office of Planning and Research  
1400 Tenth Street, Room 121  
Sacramento, CA 95814

**Project Name:** South Bay Wastewater Treatment Plant  
Variable Frequency Drive Replacement

**Project No. / WBS No.:** B-19066.02.06

**Project Location-Specific:** This project is located at 2441 Dairy Mart Road and at 2995 Clearwater Way. This project is located within the Tijuana River Valley Community Planning Area in Council District 8.

**Project Location-City/County:** San Diego/San Diego

**Description of nature and purpose of the Project:** This project will remove and replace two, 600 horsepower (HP) Variable Frequency Drive and one 200 HP Variable Frequency Drive at the South Bay Wastewater Treatment Plant. Work will occur within the interior of the buildings, and will not require any excavation.

**Name of Public Agency Approving Project:** City of San Diego

**Name of Person or Agency Carrying Out Project:** Juan Baligad, 525 B Street, Suite 908A, San Diego, CA, 92101, (619) 533-5473

Exempt Status: (CHECK ONE)

- Ministerial (Sec. 21080(b)(1); 15268);
- Declared Emergency (Sec. 21080(b)(3); 15269(a));
- Emergency Project (Sec. 21080(b)(4); 15269 (b)(c))
- Categorical Exemption: 15301 (Existing Facilities); Section 15302 (Replacement or Reconstruction)
- Statutory Exemptions:

Reasons why project is exempt: The City of San Diego conducted an environmental review which determined that the project meets the categorical exemption criteria set forth in CEQA State Guidelines, Section 15301 (Existing Facilities), which allows for the operation, repair, maintenance, or minor alteration of existing public or private structures, facilities, involving no expansion of existing or former use; Section 15302 (Replacement or Reconstruction), which allows for the replacement or reconstruction of existing structures and facilities where the new structure will be located on the same sit as the structure replaced and will have substantially the same purpose and capacity as the structure replaced; and where the exceptions listed in Section 15300.2 would not apply.

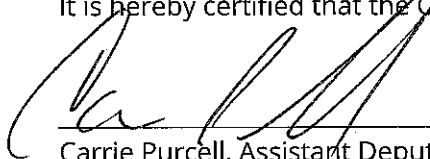
Lead Agency Contact Person: Juan Baligad

Telephone: (619) 533-5473

If filed by applicant:

1. Attach certified document of exemption finding.
2. Has a notice of exemption been filed by the public agency approving the project?  Yes  No

It is hereby certified that the City of San Diego has determined the above activity to be exempt from CEQA

  
\_\_\_\_\_  
Carrie Purcell, Assistant Deputy Director

2/20/20  
\_\_\_\_\_  
Date

Check One:

- Signed By Lead Agency
- Signed by Applicant

Date Received for Filing with County Clerk or OPR:

**APPENDIX B**  
**FIRE HYDRANT METER PROGRAM**

|   |                                |   |
|---|--------------------------------|---|
| <b>CITY OF SAN DIEGO CALIFORNIA<br/>DEPARTMENT INSTRUCTIONS</b>                                   | <b>NUMBER<br/>DI 55.27</b>     | <b>DEPARTMENT<br/>Water Department</b>          |
| <b>SUBJECT<br/><br/>FIRE HYDRANT METER PROGRAM<br/>(FORMERLY: CONSTRUCTION METER<br/>PROGRAM)</b> | <b>PAGE 1 OF 10</b>            | <b>EFFECTIVE DATE<br/><br/>October 15, 2002</b> |
|   | <b>SUPERSEDES<br/>DI 55.27</b> | <b>DATED<br/>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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|---|--------------------------------|---|
| <b>CITY OF SAN DIEGO CALIFORNIA<br/>DEPARTMENT INSTRUCTIONS</b>                                   | <b>NUMBER<br/>DI 55.27</b>     | <b>DEPARTMENT<br/>Water Department</b>          |
| <b>SUBJECT<br/><br/>FIRE HYDRANT METER PROGRAM<br/>(FORMERLY: CONSTRUCTION METER<br/>PROGRAM)</b> | <b>PAGE 2 OF 10</b>            | <b>EFFECTIVE DATE<br/><br/>October 15, 2002</b> |
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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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| <b>SUBJECT<br/><br/>FIRE HYDRANT METER PROGRAM<br/>(FORMERLY: CONSTRUCTION METER<br/>PROGRAM)</b> | <b>PAGE 3 OF 10</b>            | <b>EFFECTIVE DATE<br/><br/>October 15, 2002</b> |
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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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| <b>CITY OF SAN DIEGO CALIFORNIA<br/>DEPARTMENT INSTRUCTIONS</b>                                   | <b>NUMBER<br/>DI 55.27</b>     | <b>DEPARTMENT<br/>Water Department</b>          |
| <b>SUBJECT<br/><br/>FIRE HYDRANT METER PROGRAM<br/>(FORMERLY: CONSTRUCTION METER<br/>PROGRAM)</b> | <b>PAGE 4 OF 10</b>            | <b>EFFECTIVE DATE<br/><br/>October 15, 2002</b> |
|   | <b>SUPERSEDES<br/>DI 55.27</b> | <b>DATED<br/>April 21, 2000</b>                 |

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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| <b>SUBJECT<br/><br/>FIRE HYDRANT METER PROGRAM<br/>(FORMERLY: CONSTRUCTION METER<br/>PROGRAM)</b> | <b>PAGE 5 OF 10</b>            | <b>EFFECTIVE DATE<br/><br/>October 15, 2002</b> |
|   | <b>SUPERSEDES<br/>DI 55.27</b> | <b>DATED<br/>April 21, 2000</b>                 |

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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| <b>SUBJECT<br/><br/>FIRE HYDRANT METER PROGRAM<br/>(FORMERLY: CONSTRUCTION METER<br/>PROGRAM)</b> | <b>PAGE 7 OF 10</b>            | <b>EFFECTIVE DATE<br/><br/>October 15, 2002</b> |
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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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| <b>SUBJECT<br/><br/>FIRE HYDRANT METER PROGRAM<br/>(FORMERLY: CONSTRUCTION METER<br/>PROGRAM)</b> | <b>PAGE 10 OF 10</b>           | <b>EFFECTIVE DATE<br/><br/>October 15, 2002</b> |
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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.)<br><b>Zip:</b> | 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:  |      | 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:<br><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     | <b>Field Orders</b>                                       |                        |       |     | \$ -      |                         | \$ -   |               | \$ -   | 0.00%          | \$ -                |      |
|        |   |                        |       |     | \$ -      |                         | \$ -   |               | \$ -   | 0.00%          | \$ -                |      |
|        | <b>CHANGE ORDER No.</b>                                   |                        |       |     | \$ -      |                         | \$ -   |               | \$ -   | 0.00%          | \$ -                |      |
|        |   |                        |       |     | \$ -      |                         | \$ -   |               | \$ -   | 0.00%          | \$ -                |      |
|        |   |                        |       |     | \$ -      |                         | \$ -   |               | \$ -   | 0.00%          | \$ -                |      |
|        | Total Authorized Amount (including approved Change Order) |                        |       |     |           | \$ -                    |        | \$ -          |        | \$ -           | <b>Total Billed</b> | \$ - |

**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: \_\_\_\_\_

|                             |                 |
|-----------------------------|-----------------|
| 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**

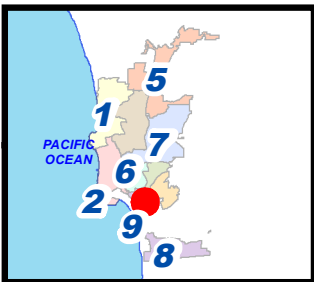


## PUMP STATION 1 REPLACEMENT

SENIOR ENGINEER  
Richard Snow  
(619) 221-8321

PROJECT MANAGER  
Mohammed Ireiqat  
(619) 221-8744

FOR QUESTIONS ABOUT THIS PROJECT  
Call: 619-221-8744  
Email: [mireiqat@sanidiego.gov](mailto:mireiqat@sanidiego.gov)



### Legend

SBWRP Variable Frequency Drives Replacement



COMMUNITY NAME: MILITARY FACILITIES COUNCIL DISTRICT: 8

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**APPENDIX F**  
**SAMPLE OF PUBLIC NOTICE**



CONSTRUCTION NOTICE

PROJECT TITLE

Work on your street will begin within one week to replace the existing water mains servicing your community.

The work will consist of:

- Saw-cutting and trench work on Ingulf Street from Morena Boulevard to Galveston Street to install new water mains, water laterals and fire hydrants.
• Streets where trenching takes place will be resurfaced and curb ramps will be upgraded to facilitate access for persons with disabilities where required.
• This work is anticipated to be complete in your community by December 2016.

How your neighborhood may be impacted:

- Water service to some properties during construction will be provided by a two-inch highline pipe that will run along the curb. To report a highline leak call 619-515-3525.
• Temporary water service disruptions are planned. If planned disruptions impact your property, you will receive advance notice.
• Parking restrictions will exist because of the presence of construction equipment and materials.
• "No Parking" signs will be displayed 72 hours in advance of the work.
• Cars parked in violation of signs will be TOWED.

Hours and Days of Operation:

Monday through Friday X:XX AM to X:XX PM.

City of San Diego Contractor:

Company Name, XXX-XXX-XXXX



CONSTRUCTION NOTICE

PROJECT TITLE

Work on your street will begin within one week to replace the existing water mains servicing your community.

The work will consist of:

- Saw-cutting and trench work on Ingulf Street from Morena Boulevard to Galveston Street to install new water mains, water laterals and fire hydrants.
• Streets where trenching takes place will be resurfaced and curb ramps will be upgraded to facilitate access for persons with disabilities where required.
• This work is anticipated to be complete in your community by December 2016.

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• Parking restrictions will exist because of the presence of construction equipment and materials.
• "No Parking" signs will be displayed 72 hours in advance of the work.
• Cars parked in violation of signs will be TOWED.

Hours and Days of Operation:

Monday through Friday X:XX AM to X:XX PM.

City of San Diego Contractor:

Company Name, XXX-XXX-XXXX

**ATTACHMENT F**  
**RESERVED**

**ATTACHMENT G**  
**CONTRACT AGREEMENT**

## CONTRACT AGREEMENT

---

### CONSTRUCTION CONTRACT

This contract is made and entered into between THE CITY OF SAN DIEGO, a municipal corporation, herein called "City", and **CSI Electrical Contractors, Inc.**, herein called "Contractor" for construction of **SBWRP Variable Frequency Drive Repl**; Bid No **K-20-1807-DBB-3**; in the amount of **Five Hundred Eight Thousand Two Hundred Ninety Two Dollars and Nine Cents (\$508,292.09)**, which is comprised of the Base Bid.

IN CONSIDERATION of the payments to be made hereunder and the mutual undertakings of the parties hereto, City and Contractor agree as follows:

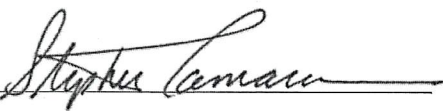
1. The following are incorporated into this contract as though fully set forth herein:
  - (a) The attached Faithful Performance and Payment Bonds.
  - (b) The attached Proposal included in the Bid documents by the Contractor.
  - (c) Reference Standards listed in the Instruction to Bidders and the Supplementary Special Provisions (SSP).
  - (d) That certain documents entitled **SBWRP Variable Frequency Drive Repl**, on file in the office of the Public Works Department as Document No. **B-19066**, 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, **SBWRP Variable Frequency Drive Repl**, Bid Number, **K-20-1807-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.
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.

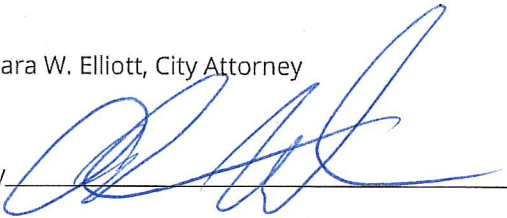
**CONTRACT AGREEMENT (continued)**

**IN WITNESS WHEREOF**, this Agreement is signed by the City of San Diego, acting by and through its Mayor or designee, pursuant to Municipal Code §22.3102 authorizing such execution.

**THE CITY OF SAN DIEGO**

**APPROVED AS TO FORM**

By 

Mara W. Elliott, City Attorney  
By 


Print Name: Stephen Samara  
Principal Contract Specialist  
Engineering & Capital Projects

Print Name: ~~Mara W. Elliott~~  
Deputy City Attorney

Date: 1/5/2021

Date: 1/6/21

**CONTRACTOR**

By 

Print Name: Paul Pica

Title: President

Date: 07/13/2020

City of San Diego License No.: B2019018392

State Contractor's License No.: 1055811

DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) REGISTRATION NUMBER: 1000438973

## **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**

---

### **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 7-13.3, "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:

**SBWRP Variable Frequency Drive Repl**

(Project Title)

as particularly described in said contract and identified as Bid No. **K-20-1807-DBB-3**; SAP No. (WBS/IO/CC) **B-19066**; 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 - General; Paragraph 2-3 Subcontracts, 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 | DIR Registration Number | 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: _____<br>Address: _____<br>City: _____ State: _____<br>Zip: _____ Phone: _____<br>Email: _____ |                         |                         |                              |              |                             |  |                              |                                    |
| Name: _____<br>Address: _____<br>City: _____ State: _____<br>Zip: _____ Phone: _____<br>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 | DIR Registration Number | 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: _____<br>Address: _____<br>City: _____ State: _____<br>Zip: _____ Phone: _____<br>Email: _____ |                       |                         |                                      |                   |                       |  |                              |
| Name: _____<br>Address: _____<br>City: _____ State: _____<br>Zip: _____ Phone: _____<br>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.**

## **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)**

**BID BOND**

**See Instructions to Bidders, Bidder Guarantee of Good Faith  
(Bid Security)**

KNOW ALL MEN BY THESE PRESENTS,

That CSI Electrical Contractors, Inc. as Principal, and Great American Insurance Company 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

SBWRP Variable Frequency Drive REPL

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 1st day of May, 2020

CSI Electrical Contractors, Inc. (SEAL)  
(Principal)

Great American Insurance Company (SEAL)  
(Surety)

By: *Paul Rice*  
(Signature)

By: *Emily Preciado*  
(Signature) Emily Preciado,  
Attorney-In-Fact

(SEAL AND NOTARIAL ACKNOWLEDGEMENT OF SURETY)



CALIFORNIA ACKNOWLEDGMENT

CIVIL CODE § 1189

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 California

County of Los Angeles

On May 4th 2020 before me, Tamara J. Reznor, Notary Public

personally appeared Paul Pica Name(s) of Signer(s)

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 Tamara J. Reznor Signature of Notary Public

Place Notary Seal and/or Stamp Above

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document

Title or Type of Document: Bid Bond

Document Date: May 1st 2020 Number of Pages: 1

Signer(s) Other Than Named Above: Emily Preciado

Capacity(ies) Claimed by Signer(s)

- Signer's Name: Paul Pica
Corporate Officer - Title(s): President
Partner - Limited General
Individual Attorney in Fact
Trustee Guardian or Conservator
Other:

Signer is Representing: CSI Electrical Contractors Inc.

- Signer's Name:
Corporate Officer - Title(s):
Partner - Limited General
Individual Attorney in Fact
Trustee Guardian or Conservator
Other:

Signer is Representing:

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT**

**CIVIL CODE § 1189**

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 California )  
County of Los Angeles )

On May 1, 2020 before me, Mary Smith, Notary Public  
*Date Here Insert Name and Title of the Officer*

personally appeared Emily Preciado  
*Name(s) of Signer(s)*

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 Mary Smith  
*Signature of Notary Public*

*Place Notary Seal Above*

**OPTIONAL**

*Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

Title or Type of Document: \_\_\_\_\_ Document Date: \_\_\_\_\_  
Number of Pages: \_\_\_\_\_ Signer(s) Other Than Named Above: \_\_\_\_\_

**Capacity(ies) Claimed by Signer(s)**

Signer's Name: \_\_\_\_\_ Signer's Name: \_\_\_\_\_  
 Corporate Officer — Title(s): \_\_\_\_\_  Corporate Officer — Title(s): \_\_\_\_\_  
 Partner —  Limited  General  Partner —  Limited  General  
 Individual  Attorney in Fact  Individual  Attorney in Fact  
 Trustee  Guardian or Conservator  Trustee  Guardian or Conservator  
 Other: \_\_\_\_\_  Other: \_\_\_\_\_  
Signer Is Representing: \_\_\_\_\_ Signer Is Representing: \_\_\_\_\_

**GREAT AMERICAN INSURANCE COMPANY®**

**Administrative Office: 301 E 4TH STREET • CINCINNATI, OHIO 45202 • 513-369-5000 • FAX 513-723-2740**

The number of persons authorized by this power of attorney is not more than **FOUR**

No. 0 13798

**POWER OF ATTORNEY**

**KNOW ALL MEN BY THESE PRESENTS:** That the GREAT AMERICAN INSURANCE COMPANY, a corporation organized and existing under and by virtue of the laws of the State of Ohio, does hereby nominate, constitute and appoint the person or persons named below, each individually if more than one is named, its true and lawful attorney-in-fact, for it and in its name, place and stead to execute on behalf of the said Company, as surety, any and all bonds, undertakings and contracts of suretyship, or other written obligations in the nature thereof; provided that the liability of the said Company on any such bond, undertaking or contract of suretyship executed under this authority shall not exceed the limit stated below.

| Name                 | Address      | Limit of Power |
|----------------------|--------------|----------------|
| STEVEN L. BROCKMEYER | ALL OF       | ALL            |
| MARY SMITH           | PASADENA, CA | \$100,000,000  |
| EMILY PRECIADO       |              |                |
| RONALD C. WANGLIN    |              |                |

This Power of Attorney revokes all previous powers issued on behalf of the attorney(s)-in-fact named above.

IN WITNESS WHEREOF the GREAT AMERICAN INSURANCE COMPANY has caused these presents to be signed and attested by its appropriate officers and its corporate seal hereunto affixed this **16TH** day of **SEPTEMBER**, 2019



*Stephen C. Beraha*

Assistant Secretary

GREAT AMERICAN INSURANCE COMPANY

*Mark Vicario*

Divisional Senior Vice President

MARK VICARIO (877-377-2405)

STATE OF OHIO, COUNTY OF HAMILTON - ss:

On this **16TH** day of **SEPTEMBER**, 2019, before me personally appeared MARK VICARIO, to me known, being duly sworn, deposes and says that he resides in Cincinnati, Ohio, that he is a Divisional Senior Vice President of the Bond Division of Great American Insurance Company, the Company described in and which executed the above instrument; that he knows the seal of the said Company; that the seal affixed to the said instrument is such corporate seal; that it was so affixed by authority of his office under the By-Laws of said Company, and that he signed his name thereto by like authority.



**Susan A. Kohorst**  
Notary Public, State of Ohio  
My Commission Expires 05-18-2020

*Susan A. Kohorst*

This Power of Attorney is granted by authority of the following resolutions adopted by the Board of Directors of Great American Insurance Company by unanimous written consent dated June 9, 2008.

*RESOLVED: That the Divisional President, the several Divisional Senior Vice Presidents, Divisional Vice Presidents and Divisional Assistant Vice Presidents, or any one of them, be and hereby is authorized, from time to time, to appoint one or more Attorneys-in-Fact to execute on behalf of the Company, as surety, any and all bonds, undertakings and contracts of suretyship, or other written obligations in the nature thereof; to prescribe their respective duties and the respective limits of their authority; and to revoke any such appointment at any time.*

*RESOLVED FURTHER: That the Company seal and the signature of any of the aforesaid officers and any Secretary or Assistant Secretary of the Company may be affixed by facsimile to any power of attorney or certificate of either given for the execution of any bond, undertaking, contract of suretyship, or other written obligation in the nature thereof, such signature and seal when so used being hereby adopted by the Company as the original signature of such officer and the original seal of the Company, to be valid and binding upon the Company with the same force and effect as though manually affixed.*

**CERTIFICATION**

I, STEPHEN C. BERHAHA, Assistant Secretary of Great American Insurance Company, do hereby certify that the foregoing Power of Attorney and the Resolutions of the Board of Directors of June 9, 2008 have not been revoked and are now in full force and effect.

Signed and sealed this **1st** day of **May**, 2020



*Stephen C. Beraha*

Assistant Secretary

## 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 |
|---------------|--------------------|--|------------------|--------|----------------------------------|
| 6/2/2014      | DFEH and LA County | complaint filed with DFEH alleging discrimination based on disability and gender | Yes              | Closed | Dismissed                        |
|               |                    |  |                  |        |                                  |
|               |                    |  |                  |        |                                  |
|               |                    |  |                  |        |                                  |
|               |                    |  |                  |        |                                  |
|               |                    |  |                  |        |                                  |

Contractor Name: CSI Electrical Contractors Inc.

Certified By Paul Pica Name Title President

  
 \_\_\_\_\_ Date 5/4/2020  
 Signature

**USE ADDITIONAL FORMS AS NECESSARY**



## Mandatory Disclosure of Business Interests Form

### BIDDER/PROPOSER INFORMATION

| Legal Name                      |                  | DBA               |              |
|---------------------------------|------------------|-------------------|--------------|
| CSI Electrical Contractors Inc. |                  | N/A               |              |
| Street Address                  | City             | State             | Zip          |
| 10623 Fulton Wells Avenue,      | Santa Fe Springs | California        | 90670        |
| Contact Person, Title           |                  | Phone             | Fax          |
| Kevin Nguyen, Estimator         |                  | 562-946-0700 X422 | 562-946-0700 |

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.

| Name                        | Title/Position                               |
|-----------------------------|--|
| Kevin Nguyen                | Estimator                                    |
| City and State of Residence | Employer (if different than Bidder/Proposer) |
| Santa Fe Springs, CA        |  |
| Interest in the transaction |  |
| Submitting, Preparing bids, |  |

| Name                                     | Title/Position                               |
|--|--|
| Gene Acosta                              | VP Energy Solutions                          |
| City and State of Residence              | Employer (if different than Bidder/Proposer) |
| Santa Fe Springs, CA                     |  |
| Interest in the transaction              |  |
| Supervising The Actions of Kevin Nguyen. |  |

\* 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.

Paul Pica, President



5/4/2020

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.**

**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          |
|-------------|----------------|
| Steve Watts | CEO            |
| Paul Pica   | President      |
| Rick Yauney | CEO/ Treasurer |
| William Fry | Secretary      |

**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.

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: CSI Electrical Contractors Inc.

Certified By Paul Pica Title President

 Name \_\_\_\_\_ Date 5/4/2020

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 |
|--------------------------------------|-------|
| Keith Colburn                        | Owner |
| Consolidated Electrical Distributors |       |
|                                      |       |

SUBCONTRACTOR       SUPPLIER       MANUFACTURER

| NAME               | TITLE                      |
|--------------------|----------------------------|
| Alfredo Briseno    | Key Account Sales Engineer |
| Schneider Electric |                            |
|                    |                            |

SUBCONTRACTOR       SUPPLIER       MANUFACTURER


| NAME | TITLE |
|------|-------|
|      |       |
|      |       |
|      |       |

SUBCONTRACTOR       SUPPLIER       MANUFACTURER

| NAME | TITLE |
|------|-------|
|      |       |
|      |       |
|      |       |

Contractor Name. CSI ELECTRIC INC.

Certified By KEVIN NGUYEN Title ESTIMATOR

Name  
  
 Signature

Date 5/5/2020

\*USE ADDITIONAL FORMS AS NECESSARY\*\*

**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            |
|----------------------|------------------|
| <i>Michael Lopez</i> | <i>President</i> |
|                      |                  |
|                      |                  |
|                      |                  |

SUBCONTRACTOR       SUPPLIER       MANUFACTURER

| NAME | TITLE |
|------|-------|
|      |       |
|      |       |
|      |       |
|      |       |

SUBCONTRACTOR       SUPPLIER       MANUFACTURER

| NAME | TITLE |
|------|-------|
|      |       |
|      |       |
|      |       |
|      |       |

SUBCONTRACTOR       SUPPLIER       MANUFACTURER

| NAME | TITLE |
|------|-------|
|      |       |
|      |       |
|      |       |
|      |       |

Contractor Name: *Tharsos Inc*

Certified By *Michael Lopez* Title *President*

*[Signature]* Name   Date *5-5-2020*

Signature

**\*USE ADDITIONAL FORMS AS NECESSARY\*\***

**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>Tharsos Inc.</u><br>Address: <u>7839 University Ave. 210</u><br>City: <u>LaMesa</u><br>State: <u>California</u><br>Zip: <u>91942</u><br>Phone: <u>619-464-1261</u><br>Email: <u>mlopez@tharsosinc.com</u> | Constructor             | 1000012874              | 980621                       | VFD<br>Supplier,<br>Special<br>Rigging,<br>Demo |
| Name: _____<br>Address: _____<br>City: _____<br>State: _____<br>Zip: _____<br>Phone: _____<br>Email: _____   |                         |                         |                              |   |
| Name: _____<br>Address: _____<br>City: _____<br>State: _____<br>Zip: _____<br>Phone: _____<br>Email: _____   |                         |                         |                              |   |
| Name: _____<br>Address: _____<br>City: _____<br>State: _____<br>Zip: _____<br>Phone: _____<br>Email: _____   |                         |                         |                              |   |

**\*\* USE ADDITIONAL FORMS AS NECESSARY \*\***

# City of San Diego

CITY CONTACT: Celina Suarez, Contract Specialist, Email: [CSuarez@sandiego.gov](mailto:CSuarez@sandiego.gov)  
Phone No. (619) 533-6678

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## ADDENDUM A



**FOR**

## SBWRP VARIABLE FREQUENCY DRIVE REPL

|                      |                        |
|----------------------|------------------------|
| BID NO.:             | <u>K-20-1807-DBB-3</u> |
| SAP NO. (WBS/IO/CC): | <u>B-19066</u>         |
| CLIENT DEPARTMENT:   | <u>2000</u>            |
| COUNCIL DISTRICT:    | <u>8</u>               |
| PROJECT TYPE:        | <u>HA</u>              |

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**BID DUE DATE:**

**2:00 PM  
MAY 5, 2020**

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

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

**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. I am looking at the above project documents and I do not see any drawings showing the location of VFD, nature of the location, location of electric panels or switch gears. How can we get these information?

A1. The VFDs are located within an electrical room separate from the plant process. The Location map shows the location of work. Not all equipment are close to each other as shown on the map but the conditions are not hazardous. See Appendices on pages 5 through 11 of this Addendum.

**C. SUPPLEMENTARY SPECIAL PROVISIONS**

1. To Appendices, Appendix E, Location Map, page 158, **DELETE** in its entirety and **SUBSTITUTE** with page 3 of this Addendum.
2. To Appendices, **ADD** pages 4 through 11 of this Addendum.

James Nagelvoort, Director  
Public Works Department

Dated: *April 10, 2020*  
San Diego, California

JN/AJ/rd

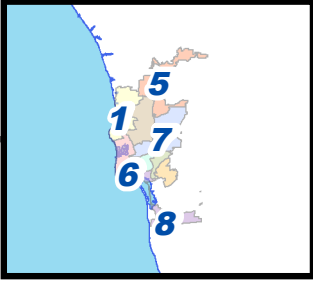
**Southbay Water Reclamation Plant (SBWRP)  
Variable Frequency Drive Replacement**

SENIOR ENGINEER  
Parita Ammerlahn  
619-533-5406

PROJECT MANAGER  
Ivan Hoffman  
619-533-5196

PROJECT ENGINEER  
Art Arvizu  
619-533-4114

FOR QUESTIONS ABOUT THIS PROJECT  
Call: 619-533-4207  
Email: [engineering@sandiego.gov](mailto:engineering@sandiego.gov)



**Legend**

 SBWRP Project Locations



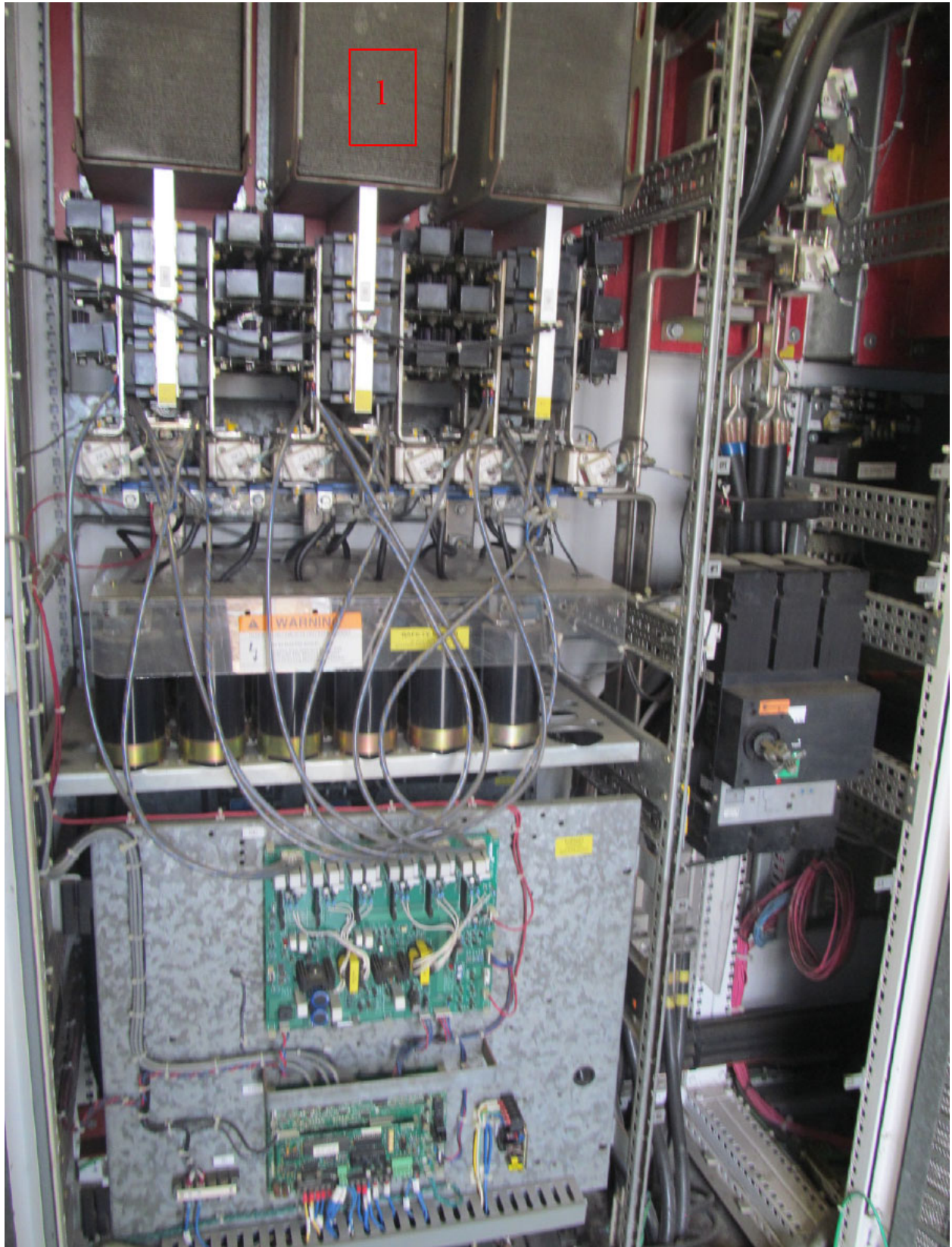
THIS MAP/DATA IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Note: This product may contain information reproduced with permission granted by RAND MCNALLY & COMPANY to SANDAG. This product may contain information reproduced with permission granted by RAND MCNALLY & COMPANY to SANDAG. This map is copyrighted by RAND MCNALLY & COMPANY. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without the prior, written permission of RAND MCNALLY & COMPANY.

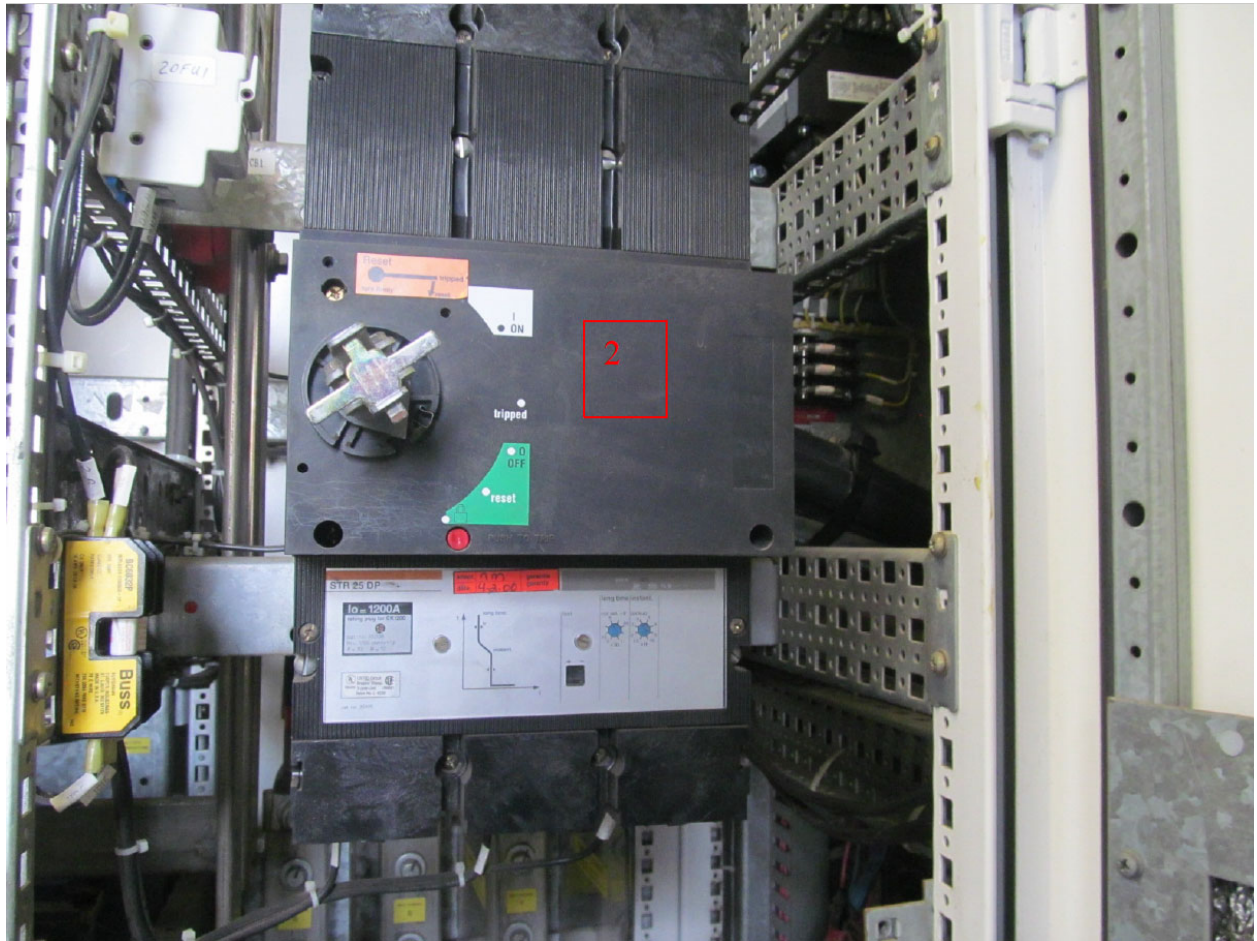


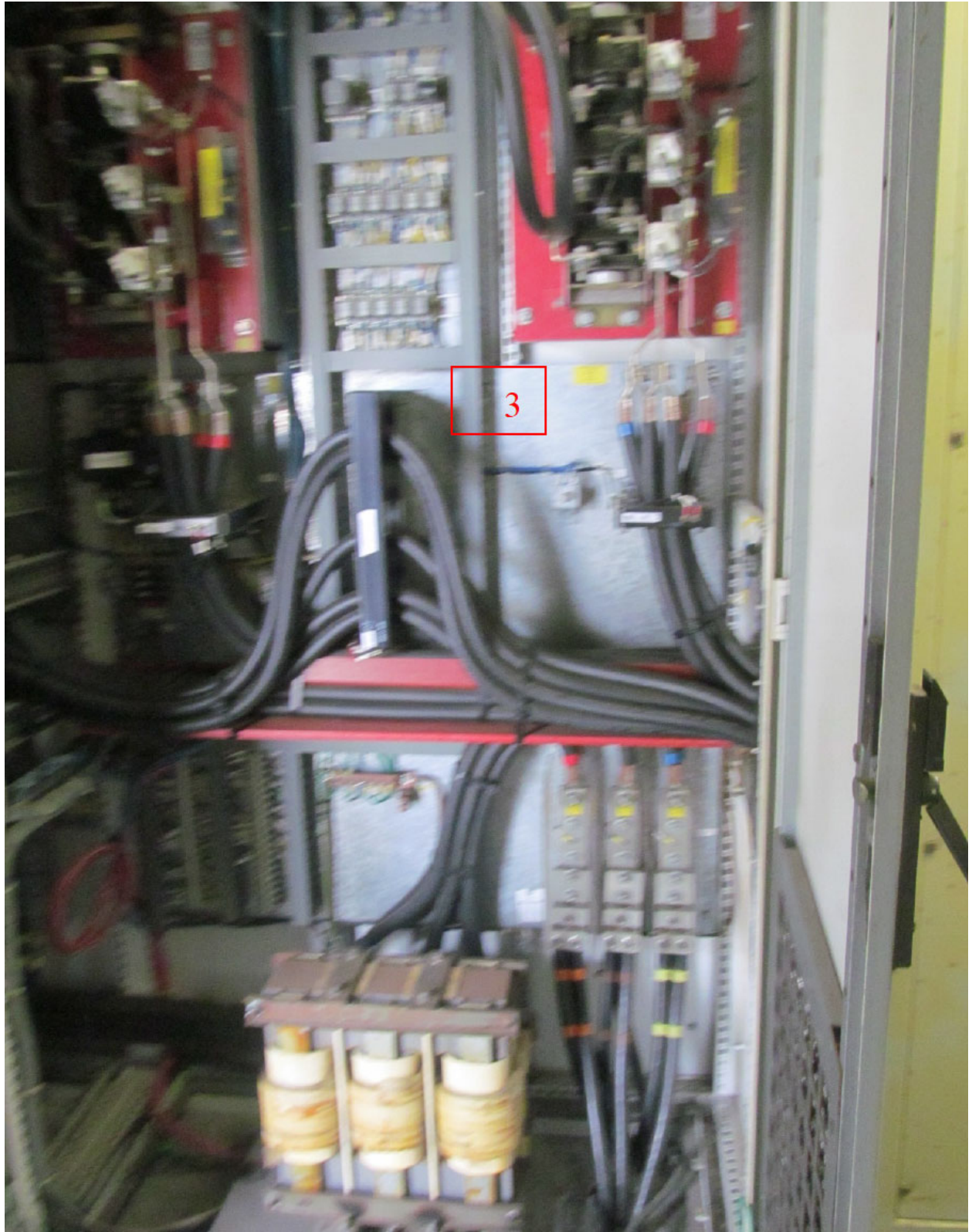
**APPENDIX G**  
**SBWRP PIC 600hp VFD 34-VFD-501 & Pump**

















# City of San Diego

CITY CONTACT: Celina Suarez, Contract Specialist, Email: [CSuarez@sandiego.gov](mailto:CSuarez@sandiego.gov)  
Phone No. (619) 533-6678

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## ADDENDUM B



**FOR**

## SBWRP VARIABLE FREQUENCY DRIVE REPL

|                      |                          |
|----------------------|--------------------------|
| BID NO.:             | <u>K-20-1807-DBB-3-A</u> |
| SAP NO. (WBS/IO/CC): | <u>B-19066</u>           |
| CLIENT DEPARTMENT:   | <u>2000</u>              |
| COUNCIL DISTRICT:    | <u>8</u>                 |
| PROJECT TYPE:        | <u>HA</u>                |

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**BID DUE DATE:**

**2:00 PM  
MAY 5, 2020**

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

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

**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. If the existing cables are found to be deficient will replacement of these conductors be done as a change order to the contract?
  - A1. A request for additional scope will be submitted and approved for additional work. Note that verifying existing cable conditions will be the contractor's responsibility.
- Q2. Please provide single line diagrams for the existing VFD's to be replaced.
  - A2. This information will be provided at the start of the project.
- Q3. Are there any outage restrictions for replacing this equipment?
  - A3. Scheduling for outages will need to be coordinated with plant operations. Not all VFDs will be able to be replaced at once.

James Nagelvoort, Director  
Public Works Department

Dated: *April 21, 2020*  
San Diego, California

JN/AJ/rd

**Bid Results**

**Bidder Details**

**Vendor Name** CSI Electrical Contractors Inc.  
**Address** 10623 Fulton Wells Ave  
 Santa Fe Springs, CA 90670  
 United States  
**Respondee** Kevin Nguyen  
**Respondee Title** Estimator  
**Phone** 562-946-0700 Ext. 422  
**Email** kevin.nguyen@csielectric.com  
**Vendor Type** PQUAL,CADIR  
**License #** 1055811  
**CADIR** 1000438973

**Bid Detail**

**Bid Format** Electronic  
**Submitted** May 5, 2020 1:51:30 PM (Pacific)  
**Delivery Method**  
**Bid Responsive**  
**Bid Status** Submitted  
**Confirmation #** 210412  
**Ranking** 0

**Respondee Comment**

**Buyer Comment**

**Attachments**

| File Title  | File Name   | File Type   |
|---|---|---|
| CSI - Contractor's Certification of Pending Actions.pdf   | CSI - Contractor's Certification of Pending Actions.pdf       | Contractor's Certification of Pending Actions                                   |
| CSI - Mandatory Disclosure of Business Interests          | CSI - Mandatory Disclosure of Business Interests.pdf          | Mandatory Disclosure of Business Interests Form                                 |
| CSI - Debarment Suspension Certification (Prime)          | CSI - Debarment Suspension Certification (Prime).pdf          | Debarment and Suspension Certification (Prime)                                  |
| CSI - Debarment Suspension Certification (Subs-Suppliers) | CSI - Debarment Suspension Certification (Subs-Suppliers).pdf | Debarment and Suspension Certification (Subcontractors/Suppliers/Manufacturers) |
| CSI - Bid Bond  | CSI - Bid Bond.pdf  | Bid Bond  |

**Line Items**

| Type | Item Code   | UOM | Qty | Unit Price   | Line Total   | Comment |
|------|---|-----|-----|--------------|--------------|---------|
|      | <b>Main Bid</b>                                     |     |     |              |              |         |
| 1    | Bonds (Payment and Performance)                     |     |     |              |              |         |
|      | 524126  | LS  | 1   | \$5,500.00   | \$5,500.00   |         |
| 2    | Field Orders (EOC Type II)                          |     |     |              |              |         |
|      |   | AL  | 1   | \$44,130.00  | \$44,130.00  |         |
| 3    | 600Hp Variable Frequency Drive for Reclamation Pump |     |     |              |              |         |
|      | 237110  | EA  | 2   | \$165,147.40 | \$330,294.80 |         |

**Bid Results**

| Type            | Item Code  | UOM | Qty | Unit Price   | Line Total          | Comment |
|-----------------|--|-----|-----|--------------|---------------------|---------|
| 4               | 200HP Variable Frequency Drive for Blended Sludge Pump |     |     |              |                     |         |
|                 | 237110   | EA  | 1   | \$128,367.29 | \$128,367.29        |         |
| <b>Subtotal</b> |  |     |     |              | <b>\$508,292.09</b> |         |
| <b>Total</b>    |  |     |     |              | <b>\$508,292.09</b> |         |

**Subcontractors**

| Name & Address  | Description           | License Num | CADIR      | Amount       | Type                        |
|---|-----------------------|-------------|------------|--------------|-----------------------------|
| <b>Tharsos Inc</b><br>7839 University Ave, #210<br>La Mesa, CA 91942<br>United States | VFD rigging, supplier | 980621      | 1000012874 | \$113,287.59 | DBE,ELBE,LAT,MAL<br>E,PQUAL |

Line Totals (Unit Price \* Quantity)

| Item Num | Section  | Item Code | Description  | Reference | Unit of Measure | Quantity | CSI Electrical Contractors Inc. Unit Price | CSI Electrical Contractors Inc. Line Total |
|----------|----------|-----------|--|-----------|-----------------|----------|--|--|
| 1        | Main Bid | 524126    | Bonds (Payment and Performance)                        | 1-7.2.1   | LS              | 1        | \$5,500.00                                 | \$5,500.00                                 |
| 2        | Main Bid |           | Field Orders (EOC Type II)                             | 7-3.9     | AL              | 1        | \$44,130.00                                | \$44,130.00                                |
| 3        | Main Bid | 237110    | 600Hp Variable Frequency Drive for Reclamation Pump    | 7-3.1     | EA              | 2        | \$165,147.40                               | \$330,294.80                               |
| 4        | Main Bid | 237110    | 200HP Variable Frequency Drive for Blended Sludge Pump | 7-3.1     | EA              | 1        | \$128,367.29                               | \$128,367.29                               |
|          |          |           |  |           |                 |          | Subtotal                                   | \$508,292.09                               |
|          |          |           |  |           |                 |          | Total                                      | \$508,292.09                               |