

ORIGINAL

City of San Diego

CONTRACTOR'S NAME: Atlas Development
ADDRESS: 991C Lomas Santa fe Dr #115, Solana Beach, CA 92075
TELEPHONE NO.: 619-200-0902 **FAX NO.:** 858-350-9337
CITY CONTACT: Michelle Muñoz, Contract Specialist, Email: MichelleM@sandiego.gov
Phone No. (619) 533-3482, Fax No. (619) 533-3633
M. Garcia-Qullico/A.Rekani/Lad

BIDDING DOCUMENTS



FOR SDPD FIRING RANGE

RECAPITALIZATION/REFURBISHMENT

BID NO.: K-16-1419-DBB-3
SAP NO. (WBS/IO/CC): S-10118
CLIENT DEPARTMENT: 1914
COUNCIL DISTRICT: 9
PROJECT TYPE: BA

THIS CONTRACT WILL BE SUBJECT TO THE FOLLOWING:

- THE CITY'S SUBCONTRACTING PARTICIPATION REQUIREMENTS FOR SLBE PROGRAM.
- BID DISCOUNT PROGRAM (The WHITEBOOK, SLBE-ELBE Program Requirements, Section IV(2))
- PREVAILING WAGE RATES: STATE FEDERAL
- APPRENTICESHIP

BID DUE DATE:

2:00 PM

JULY 5, 2016

CITY OF SAN DIEGO

PUBLIC WORKS CONTRACTS

1010 SECOND AVENUE, 14th FLOOR, MS 614C

SAN DIEGO, CA 92101

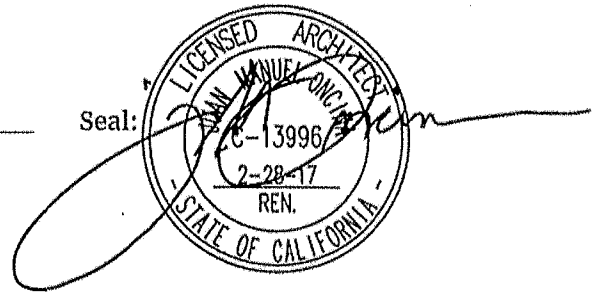
ENGINEER OF WORK

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

J. Manuel Oncina

7 June 2016

Seal:



1) Registered Architect

Date

George Salim Freija

6/8/2016

Seal:



2) For City Engineer

Date

TABLE OF CONTENTS

SECTION	PAGE
1. NOTICE INVITING BIDS	4
2. INSTRUCTIONS TO BIDDERS	8
3. PERFORMANCE BOND, LABOR AND MATERIALMEN'S BONDS	17
4. ATTACHMENTS:	
A. SCOPE OF WORK	20
B. INTENTIONALLY LEFT BLANK.....	23
C. EQUAL OPPORTUNITY CONTRACTING PROGRAM.....	24
D. PREVAILING WAGES	29
E. SUPPLEMENTARY SPECIAL PROVISIONS.....	33
TECHNICAL SPECIFICATION.....	60
1. Appendix A –Mitigated Negative Declaration and Notice of Exemption	563
2. Appendix B – Fire Hydrant Meter Program.....	616
3. Appendix C – Materials Typically Accepted by Certificate of Compliance	629
4. Appendix D – Sample City Invoice	630
5. Appendix E – Location Map.....	632
6. Appendix F – Lead and Asbestos Abatement Specifications	636
7. Appendix G – Sample of Public Notice.....	755
8. Appendix H – Areas Necessary Asphalt Repair	757
9. Appendix I – SDG&E Design Package.....	759
F. INTENTIONALLY LEFT BLANK.....	789
G. CONTRACT AGREEMENT.....	790
5. CERTIFICATIONS AND FORMS.....	793

NOTICE INVITING BIDS

1. **SUMMARY OF WORK:** This is the City of San Diego's (City) solicitation process to acquire Construction services for SDPD Firing Range Recapitalization/Refurbishment Project. For additional information refer to Attachment A.
2. **FULL AND OPEN COMPETITION:** This contract is open to full competition and may be bid on by Contractors who are on the City's current Prequalified Contractors' List. For information regarding the Contractors Prequalified list visit the City's website: <http://www.sandiego.gov>.
3. **ESTIMATED CONSTRUCTION COST:** The City's estimated construction cost for this project is **\$880,000**.
4. **BID DUE DATE AND TIME ARE:** **JULY 5, 2016 at 2:00 PM**
5. **PREVAILING WAGE RATES APPLY TO THIS CONTRACT:** Refer to Attachment D.
6. **LICENSE REQUIREMENT:**
 - 6.1. The Contractor shall possess the following California State Contractor's licensing classification(s) for this contract: **Class A**
 - 6.2. The Contractor shall be prequalified up to the total amount proposed, including any alternates or options, at the time of submission of the proposal.
 - 6.3. The Contractor's California State License and City of San Diego prequalification status as specified herein shall be valid at time of submission.
7. **SUBCONTRACTING PARTICIPATION PERCENTAGES:** 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	5.9%
2. ELBE participation	11.2%
3. Total mandatory participation	17.1%
- 7.1. The Bid may be declared non-responsive if the Bidder fails the following mandatory conditions:
 - 7.1.1. Attending the Pre-Bid Meeting as required in the Notice Inviting Bids of these documents.
 - 7.1.2. Bidder's inclusion of SLBE-ELBE certified subcontractors at the overall mandatory participation percentage identified in this document; **OR**

7.1.3. Bidder's submission of Good Faith Effort documentation, saved in searchable Portable Document Format (PDF) and stored on 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.

8. PRE-BID MEETING:

8.1. Prospective Bidders are required to attend the Pre-Bid Meeting. The purpose of the meeting is to discuss the scope of the Project, submittal requirements, the pre-qualification process and any Equal Opportunity Contracting Program requirements and reporting procedures. To request a sign language or oral interpreter for this visit, call the Public Works Contracts Division at (619) 533-3450 at least 5 Working Days prior to the meeting to ensure availability. Failure to attend the Mandatory Pre-Bid Meeting may result in the Design-Builder's Bid being deemed non-responsive. The Pre-Bid meeting is scheduled as follows:

Date: June 16, 2016
Time 10:00 AM
Location: 1010 Second Avenue 14th Floor, San Diego, CA 92101

Attendance at the Pre-Submittal Meeting will be evidenced by the Bidder's representative's signature on the attendance roster. It is the responsibility of the Bidder's representative to complete and sign the attendance roster.

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

9. PRE-BID SITE VISIT: All those wishing to submit a bid **MUST** visit the Work Site with the Engineer. The purpose of the Site visit is to acquaint Bidders with the Site conditions. To request a sign language or oral interpreter for this visit, call the Public Works Contracts at (619) 533-3450 at least 5 Working Days prior to the meeting to ensure availability. The Pre-Bid Site Visit is scheduled as follows:

Date: June 16, 2016
Time: 1:00 PM
Location: 4002-4008 Federal Boulevard, San Diego, CA 92101

10. AWARD PROCESS:

10.1. 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.

10.2. Upon acceptance of a Bid, the City will prepare contract documents for execution within approximately 21 days of the date of the Bid opening. The City will then award the Contract within approximately 14 days of receipt of properly signed Contract, bonds, and insurance documents.

- 10.3. 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.
- 10.4. The low Bid will be determined by Base Bid plus all Alternates.
- 10.5. Once the low bid has been determined, the City may, at its sole discretion, award the contract for the Base Bid **OR** Base Bid plus one or more alternates.

11. POST – AWARD BACKGROUND CHECK:

- 11.1. Upon award, **all** employees of the Prime and any Subcontractors who may be working on the project site must complete and pass a minor background check administered by SDPD.
- 11.2. Any such employee who does not successfully pass the background check will not be permitted on Police Department property. Not passing the background check affects that individual employee only – not the entire Prime or Subcontractor.
- 11.3. A clear, color copy of each person's valid Driver's License will be required to complete this process.
- 11.4. All Contractors, Subcontractors and their employees will be required to wear matching color Safety Vests at all times while on Police Department property.

12. SUBMISSION OF QUESTIONS:

- 12.1. The Director (or designee), of the 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. All questions related to this solicitation shall be submitted to:

Public Works Contracts
1010 Second Avenue, 14th Floor
San Diego, California, 92101
Attention: Michelle Muñoz

OR:

MichelleM@sandiego.gov

- 12.2. Questions received less than 14 days prior to the date for opening of Bids may not be considered.
- 12.3. 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.

12.4. 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.

13. ADDITIVE/DEDUCTIVE ALTERNATES:

The additive/deductive alternates have been established to allow the City to compare the cost of specific portions of the Work with the Project's budget and enable the City to make a decision whether to incorporate these portions prior to award. The award will be established as described in the Bid. The City reserves the right to award the Contract for the Base Bid only or for the Base Bid plus one or more Alternates.

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. Complete information and links to the on-line prequalification application are available at:

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

- 1.2. The completed application must be submitted online no later than 2 weeks prior to the bid opening. For additional information or the answer to questions about the prequalification program, contact David Stucky at 619-533-3474 or dstucky@sandiego.gov.
- 1.3. Due to the City's fiduciary requirement to safeguard vendor data, City staff will not be able to provide information regarding contractors' prequalification status over the telephone. Contractors may access real-time information about their prequalification status via their vendor profile on [PlanetBids™](#).

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

- 2.1. BIDDERS MUST BE PRE-REGISTERED with the City's bidding system and possess a system-assigned Digital ID in order to submit an electronic bid.
- 2.2. The City's bidding system will automatically track information submitted to the site including IP addresses, browsers being used and the URLs from which information was submitted. In addition, the City's bidding system will keep a history of every login instance including the time of login, and other information about the user's computer configuration such as the operating system, browser type, version, and more. Because of these security features, Contractors who disable their browsers' cookies will not be able to log in and use the City's bidding system.
- 2.3. The City's electronic bidding system is responsible for bid tabulations. Upon the bidder's or proposer's entry of their bid, the system will ensure that all required fields are entered. **The system will not accept a bid for which any required information is missing.** This includes all necessary pricing, subcontractor listing(s) and any other essential documentation and supporting materials and forms requested or contained in these solicitation documents.
- 2.4. BIDS REMAIN SEALED UNTIL BID DEADLINE. eBids are transmitted into the City's bidding system via hypertext transfer protocol secure (https) mechanism using SSL 128-256 bit security certificates issued from Verisign/Thawte which encrypts data being transferred from client to server. Bids submitted prior to the "Bid Due Date and Time" are not available for review by anyone other than the submitter which has until the "Bid Due Date and Time" to change, rescind or retrieve its proposal should it

desire to do so.

- 2.5. **BIDS MUST BE SUBMITTED BY BID DUE DATE AND TIME.** Once the bid deadline is reached, no further submissions are accepted into the system. Once the Bid Due Date and Time has lapsed, bidders, proposers, the general public, and City staff are able to immediately see the results on line. City staff may then begin reviewing the submissions for responsiveness, EOCB compliance and other issues. The City may require any Bidder to furnish statement of experience, financial responsibility, technical ability, equipment, and references.
- 2.6. **RECAPITULATION OF THE WORK.** Bids shall not contain any recapitulation of the Work. Conditional Bids may be rejected as being non-responsive. Alternative proposals will not be considered unless called for.
- 2.7. **BIDS MAY BE WITHDRAWN** by the Bidder only up to the bid due date and time.
 - 2.7.1. **Important Note:** Submission of the electronic bid into the system may not be instantaneous. Due to the speed and capabilities of the user's internet service provider (ISP), bandwidth, computer hardware and other variables, it may take time for the bidder's submission to upload and be received by the City's eBidding system. It is the bidder's sole responsibility to ensure their bids are received on time by the City's eBidding system. The City of San Diego is not responsible for bids that do not arrive by the required date and time.
- 2.8. **ACCESSIBILITY AND AMERICANS WITH DISABILITIES ACT (ADA) COMPLIANCE.** : To request a copy of this solicitation in an alternative format, contact the Public Works Contract Specialist listed in the cover of this solicitation at least five (5) working days prior to the Bid/Proposal due date to ensure availability.

3. ELECTRONIC BID SUBMISSIONS CARRY FULL FORCE AND EFFECT

- 3.1. The bidder, by submitting its electronic bid, acknowledges that doing so carries the same force and full legal effect as a paper submission with a longhand (wet) signature.
- 3.2. By submitting an electronic bid, the bidder certifies that the bidder has thoroughly examined and understands the entire Contract Documents (which consist of the plans and specifications, drawings, forms, affidavits and the solicitation documents), and that by submitting the eBid as its bid proposal, the bidder acknowledges, agrees to and is bound by the entire Contract Documents, including any addenda issued thereto, and incorporated by reference in the Contract Documents.
- 3.3. The Bidder, by submitting its electronic bid, agrees to and certifies under penalty of perjury under the laws of the State of California, that the certification, forms and affidavits submitted as part of this bid are true and correct.
- 3.4. The Bidder agrees to the construction of the project as described in Attachment "A-Scope of Work" for the City of San Diego, in accordance with the requirements set forth herein for the electronically submitted prices. The Bidder guarantees the Contract Price for a period of 120 days (90 days for federally funded contracts and contracts valued at \$500,000 or less) from the date of Bid opening. The duration of the Contract Price guarantee shall be extended by the number of days required for the City to obtain all items necessary to fulfill all conditions precedent.

4. **BIDS ARE PUBLIC RECORDS:** Upon receipt by the City, Bids shall become public records subject to public disclosure. It is the responsibility of the respondent to clearly identify any confidential, proprietary, trade secret or otherwise legally privileged information contained within the Bid. General references to sections of the California Public Records Act (PRA) will not suffice. If the Contractor does not provide applicable case law that clearly establishes that the requested information is exempt from the disclosure requirements of the PRA, the City shall be free to release the information when required in accordance with the PRA, pursuant to any other applicable law, or by order of any court or government agency, and the Contractor will hold the City harmless for release of this information.
5. **CONTRACTOR REGISTRATION AND ELECTRONIC REPORTING SYSTEM:**
- 5.1. **Prior** to the Award of the Contract or Task Order, you and your Subcontractors and Suppliers must register with the City's web-based vendor registration and bid management system. For additional information go to:
- <http://www.sandiego.gov/purchasing/bids-contracts/vendorreg.shtml>.
- 5.2. The City may not award the contract until registration of all subcontractors and suppliers is complete. In the event this requirement is not met within the time frame specified in the Notice of Intent to Award letter, the City reserves the right to rescind the Notice of Award / Intent to Award and to make the award to the next responsive and responsible bidder / proposer.
6. **JOINT VENTURE CONTRACTORS:** Provide a copy of the Joint Venture agreement and the Joint Venture license to the City within 10 Working Days after receiving the Contract forms. See 2-1.1.2, "Joint Venture Contractors" in The WHITEBOOK for details.
7. **PREVAILING WAGE RATES WILL APPLY:** Refer to Attachment D.
8. **SUBCONTRACTING PARTICIPATION PERCENTAGES:** Subcontracting participation percentages apply to this contract. Refer to Attachment E.
9. **INSURANCE REQUIREMENTS:**
- 9.1. 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.
- 9.2. Refer to sections 7-3, "LIABILITY INSURANCE", and 7-4, "WORKERS' COMPENSATION INSURANCE" of the Supplementary Special Provisions (SSP) for the insurance requirements which must be met.
10. **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")	2012	PWPI070116-01
City of San Diego Standard Specifications for Public Works Construction ("The WHITEBOOK")*	2012	PWPI070116-02

Title	Edition	Document Number
City of San Diego Standard Drawings*	2012	PWPI070116-03
Caltrans Standard Specifications	2010	PITS070112-04
Caltrans Standard Plans	2010	PITS070112-05
California MUTCD	2012	PITS070112-06
City Standard Drawings - Updates Approved For Use (when specified)*	Varies	Varies
Standard Federal Equal Employment Opportunity Construction Contract Specifications and the Equal Opportunity Clause Dated 09-11-84	1984	769023
NOTE: *Available online under Engineering Documents and References at: http://www.sandiego.gov/publicworks/edocref/index.shtml		

11. **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 addendum are made effective as though originally issued with the Bid. The Bidders shall acknowledge the receipt of Addenda at the time of bid submission.
12. **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.
13. **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.
14. **SUBCONTRACTOR INFORMATION:**
- 14.1. **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 further state within the description, the **PORTION** of the work which will be performed by each subcontractor under this Contract. The Contractor shall list only one Subcontractor for each portion of the Work. The **DOLLAR VALUE** of the total Bid to be performed shall be stated for all subcontractors listed. Failure to comply with this requirement may result in the Bid being rejected as **non-responsive** and ineligible for award. The Bidder's attention is directed to the

Special Provisions – General; Paragraph 2-3 Subcontracts, which stipulates the percent of the Work to be performed with the Bidders' own forces. The Bidder shall list all SLBE, ELBE, DBE, DVBE, MBE, WBE, OBE, SDB, WoSB, HUBZone, and SDVOSB Subcontractors for which Bidders are seeking recognition towards achieving any mandatory, voluntary (or both) subcontracting participation goals.

- 14.2. **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)** 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.
- 14.3. **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.
15. **SUBMITTAL OF “OR EQUAL” ITEMS:** See Section 4-1.6, “Trade Names or Equals” in The WHITEBOOK and as amended in the SSP.
16. **AWARD PROCESS:**
 - 16.1. The Award of this contract is contingent upon the Contractor’s compliance with all conditions precedent to Award.
 - 16.2. 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.
 - 16.3. 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.
17. **SUBCONTRACT LIMITATIONS:** The Bidder’s attention is directed to Standard Specifications for Public Works Construction, Section 2-3, “SUBCONTRACTS” 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.
18. **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.
19. **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.

20. **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.

21. **BIDDER'S GUARANTEE OF GOOD FAITH (BID SECURITY):**

21.1. 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.

21.2. 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.

21.3. 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.

21.4. 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. Within twenty-four (24) hours after the bid due date and time, the first five (5) apparent low bidders must provide the City with the original bid security.

21.5. Failure to submit the electronic version of the bid security at the time of bid submission AND failure to provide the original within twenty-four (24) hours may cause the bid to be rejected and deemed **non-responsive**.

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

22.1. This contract may be awarded to the lowest responsible and reliable Bidder.

22.2. Bidders shall complete ALL eBid forms as required by this solicitation. Incomplete eBids will not be accepted.

22.3. 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.

22.4. 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.

- 22.5. 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.
- 22.6. 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.
- 22.7. 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.
- 22.8. 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.

23. BID RESULTS:

- 23.1. 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.
- 23.2. 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.

24. THE CONTRACT:

- 24.1. 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.
- 24.2. 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.
- 24.3. 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.

- 24.4. 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.
- 24.5. 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 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.
25. **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 2-7, 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.
26. **CITY STANDARD PROVISIONS:** This contract is subject to the following standard provisions. See The WHITEBOOK for details.
- 26.1. The City of San Diego Resolution No. R-277952 adopted on May 20, 1991 for a Drug-Free Workplace.
- 26.2. The City of San Diego Resolution No. R-282153 adopted on June 14, 1993 related to the Americans with Disabilities Act.
- 26.3. The City of San Diego Municipal Code §22.3004 for Pledge of Compliance.
- 26.4. The City of San Diego's Labor Compliance Program and the State of California Labor Code §§1771.5(b) and 1776.
- 26.5. 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.
- 26.6. The City's Equal Benefits Ordinance (EBO), Chapter 2, Article 2, Division 43 of The San Diego Municipal Code (SDMC).
- 26.7. The City's Information Security Policy (ISP) as defined in the City's Administrative Regulation 90.63.

27. PRE-AWARD ACTIVITIES:

- 27.1. 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**.
- 27.2. 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

FAITHFUL PERFORMANCE BOND AND LABOR AND MATERIALMEN'S BOND:

Atlas Development Corporation, 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
Eight Hundred Forty Six Thousand Seven Hundred Eighteen Dollars and 37/100 (\$846,718.37)
for the faithful performance of the annexed contract, and in the sum of Eight Hundred Forty
Six Thousand Seven Hundred Eighteen Dollars and 37/100 (\$846,718.37) 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.

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

The Surety shall pay reasonable attorney's fees should suit be brought to enforce the provisions of this bond.

Dated July 20, 2016

Approved as to Form

Atlas Development Corporation

Principal

By M. Atefi

Mark Atefi

Printed Name of Person Signing for Principal

Jan I. Goldsmith, City Attorney

By Christina Rae
Deputy City Attorney 8/10/16

Great American Insurance Company

Surety

By Tara Bacon

Tara Bacon, Attorney-in-fact

Approved:

By Eleida Felix Yaekel
Eleida Felix Yaekel
Senior Contract Specialist
Public Works Contracts

750 The City Drive South, Suite 470

Local Address of Surety

Orange, CA 92868

Local Address (City, State) of Surety

714-740-3117

Local Telephone No. of Surety

Premium \$ 13,164.00

Bond No. 2119159

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.

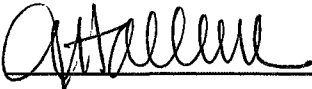
State of California
County of San Diego)

On July 20, 2016 before me, Maria Hallmark, Notary Public
(insert name and title of the officer)

personally appeared Tara Bacon
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  (Seal)



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 **FIVE**

No. 0 14839

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
DALE G. HARSHAW	KYLE KING	ALL OF	ALL
GEOFFREY SHELTON	JOHN R. QUALIN	SAN DIEGO,	\$100,000,000.00
TARA BACON		CALIFORNIA	

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 **23RD** day of **FEBRUARY**, 2016
Attest **GREAT AMERICAN INSURANCE COMPANY**



Atty L C B
Assistant Secretary

David C. Kitchin
Divisional Senior Vice President

STATE OF OHIO, COUNTY OF HAMILTON - ss:

DAVID C. KITCHIN (877-377-2405)

On this **23RD** day of **FEBRUARY**, 2016, before me personally appeared **DAVID C. KITCHIN**, 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 **20th** day of **July**, 2016



Atty L C B
Assistant Secretary

ATTACHMENTS

ATTACHMENT A
SCOPE OF WORK

SCOPE OF WORK

1. SCOPE OF WORK:

A. SDPD Firing Range Recapitalization/Refurbishment Project to include but not limited to the following:

1. Installation of accessible pedestrian gate.
2. (3) ADA parking spaces.
3. Path of travel – accessible route from public way and parking spaces, to range check-in, public range and existing restroom building.
4. Renovation of existing restroom building to include accessible route and accessible stall, fixtures and accessories.
5. Construction of masonry trash enclosure.
6. New SDG&E gas service and meter.
7. New SDG&E electrical service (3 phase) and meter.
8. New electrical main switchboard and site distribution.
9. New backflow preventers, water distribution, irrigation mainline, landscaping.
10. Parking lot repair and expansion: Remove and replace concrete paving on accessible route.
11. New parking lot lighting and site lighting.
12. Remove and replace private sewer lateral
13. Construction of masonry screen wall

B. Additive Alternate A:

The work will include but not be limited to the following:

1. Clubhouse ADA improvements which includes the following:
 - a. Removal and replacement of the following:
 - i. Two (2) entrance doors (frames and sidelights).
 - ii. One (1) interior door.
 - iii. Cabinetry, counter and sink in kitchen.
 - iv. Remove and replace (2) ceiling-hung space heaters.
 - v. Remove and replace all interior light fixtures.
 - vi. Renovate restroom, remove and replace all restroom fixtures and accessories.
 - vii. New sloped walkway to existing platform.
 - viii. Remove and replace existing sewer cleanout and portion of existing sewer line from clubhouse
 - b. Installation of new audio/visual equipment for training.
 - c. New floor and wall finishes.

2. Improvements to the staff office building includes:
 - i. Removal and replacement of all interior light fixtures and electrical panels.
 - ii. New floor, wall and ceiling finishes.
 - iii. Modifications to cabinetry.
3. Staff bathroom ADA improvements.

1.1. The Work shall be performed in accordance with:

1.1.1. The Notice Inviting Bids and Plans numbered 35568-01-D through 35568-104-D in addition to Construction Change 1 and Addendum A (SDPD Firing Range Recapitalization/Refurbishment Project), and 38742-01-D through 38742-34-D and Addendum A (SDPD Firing Range Tenant Improvement), inclusive.

2. LOCATION OF WORK: The location of the Work is as follows:

4002-4008 Federal Boulevard, San Diego, CA 92101

3. CONTRACT TIME: The Contract Time for completion of the Work, including the Plant Establishment Period, shall be 165 Working Days.

ATTACHMENT B
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ATTACHMENT C
EQUAL OPPORTUNITY CONTRACTING PROGRAM

EQUAL OPPORTUNITY CONTRACTING PROGRAM REQUIREMENTS

1. To The WHITEBOOK, Chapter 10, Sections D and E, DELETE each in its entirety, and SUBSTITUTE with the following:

D. CITY'S EQUAL OPPORTUNITY COMMITMENT.

1. Nondiscrimination in Contracting Ordinance.

1. The Contractor, Subcontractors and Suppliers shall comply with requirements of the City's Nondiscrimination in Contracting Ordinance, San Diego Municipal Code §§22.3501 through 22.3517.

The Contractor shall not discriminate on the basis of race, gender, religion, national origin, ethnicity, sexual orientation, age, or disability in the solicitation, selection, hiring, or treatment of subcontractors, vendors, or suppliers. The Contractor shall provide equal opportunity for subcontractors to participate in subcontracting opportunities. The Contractor understands and agrees that violation of this clause shall be considered a material breach of the contract and may result in contract termination, debarment, or other sanctions.

The Contractor shall include the foregoing clause in all contracts between the Contractor and Subcontractors and Suppliers.

2. Disclosure of Discrimination Complaints. As part of its Bid or Proposal, 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 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.
3. Upon the City's request, the Contractor agrees to provide to the City, within 60 days, a truthful and complete list of the names of all Subcontractors and Suppliers that the Contractor has used in the past 5 years on any of its contracts that were undertaken within San Diego County, including the total dollar amount paid by the Contractor for each subcontract or supply contract.
4. The Contractor further agrees to fully cooperate in any investigation conducted by the City pursuant to the City's Nondiscrimination in Contracting Ordinance, Municipal Code §§22.3501 through 22.3517. The Contractor understands and agrees that violation of this clause shall be considered a

material breach of the Contract and may result in remedies being ordered against the Contractor up to and including contract termination, debarment and other sanctions for violation of the provisions of the Nondiscrimination in Contracting Ordinance. The Contractor further understands and agrees that the procedures, remedies and sanctions provided for in the Nondiscrimination in Contracting Ordinance apply only to violations of the Ordinance.

E. EQUAL EMPLOYMENT OPPORTUNITY OUTREACH PROGRAM.

1. The Contractor, Subcontractors and Suppliers shall comply with the City's Equal Employment Opportunity Outreach Program, San Diego Municipal Code §§22.2701 through 22.2707.

The Contractor shall not discriminate against any employee or applicant for employment on any basis prohibited by law. Contractor shall provide equal opportunity in all employment practices. Prime Contractor shall ensure their subcontractors comply with this program. Nothing in this section shall be interpreted to hold a prime contractor liable for any discriminatory practice of its subcontractors.

The Contractor shall include the foregoing clause in all contracts between the Contractor and Subcontractors and Suppliers.

2. If the Contract is competitively solicited, the selected Bidder shall submit a Work Force Report (Form BB05), within 10 Working Days after receipt by the Bidder of Contract forms to the City for approval as specified in the Notice of Intent to Award letter from the City.
3. If a Work Force Report is submitted, and the City determines there are under-representations when compared to County Labor Force Availability data, the selected Bidder shall submit an Equal Employment Opportunity Plan.
4. If the selected Bidder submits an Equal Employment Opportunity Plan, it shall include the following assurances:
 1. The Contractor shall maintain a working environment free of discrimination, harassment, intimidation and coercion at all sites and in all facilities at which the Contractor's employees are assigned to work.
 2. The Contractor reviews its EEO Policy, at least annually, with all on-site supervisors involved in employment decisions.
 3. The Contractor disseminates and reviews its EEO Policy with all employees at least once a year, posts the policy statement and EEO posters on all company bulletin boards and job sites, and documents every dissemination, review and posting with

- a written record to identify the time, place, employees present, subject matter, and disposition of meetings.
4. The Contractor reviews, at least annually, all supervisors' adherence to and performance under the EEO Policy and maintains written documentation of these reviews.
 5. The Contractor discusses its EEO Policy Statement with subcontractors with whom it anticipates doing business, includes the EEO Policy Statement in its subcontracts, and provides such documentation to the City upon request.
 6. The Contractor documents and maintains a record of all bid solicitations and outreach efforts to and from subcontractors, contractor associations and other business associations.
 7. The Contractor disseminates its EEO Policy externally through various media, including the media of people of color and women, in advertisements to recruit, maintains files documenting these efforts, and provides copies of these advertisements to the City upon request.
 8. The Contractor disseminates its EEO Policy to union and community organizations.
 9. The Contractor provides immediate written notification to the City when any union referral process has impeded the Contractor's efforts to maintain its EEO Policy.
 10. The Contractor maintains a current list of recruitment sources, including those outreaching to people of color and women, and provides written notification of employment opportunities to these recruitment sources with a record of the organizations' responses.
 11. The Contractor maintains a current file of names, addresses and phone numbers of each walk-in applicant, including people of color and women, and referrals from unions, recruitment sources, or community organizations with a description of the employment action taken.
 12. The Contractor encourages all present employees, including people of color and women employees, to recruit others.
 13. The Contractor maintains all employment selection process information with records of all tests and other selection criteria.
 14. The Contractor develops and maintains documentation for on-the-job training opportunities, participates in training programs, or both for all of its employees, including people of color and women, and establishes apprenticeship, trainee,

and upgrade programs relevant to the Contractor's employment needs.

15. The Contractor conducts, at least annually, an inventory and evaluation of all employees for promotional opportunities and encourages all employees to seek and prepare appropriately for such opportunities.
16. The Contractor ensures the company's working environment and activities are non-segregated except for providing separate or single-user toilets and necessary changing facilities to assure privacy between the sexes.

ATTACHMENT D
PREVAILING WAGES

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.

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. For contracts entered into on or after April 1, 2015, Contractor and their subcontractors shall 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 design professionals 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 Equal Opportunity Contracting Department at 619-236-6000.

1.9. Contractor and Subcontractor Registration Requirements. This project is subject to compliance monitoring and enforcement by the DIR. As of March 1, 2015, no contractor or subcontractor may be listed on a bid or proposal for a public works project unless registered with the DIR pursuant to Labor Code section 1725.5. As of April 1, 2015, a contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, or enter into any contract for public work, unless currently registered and qualified to perform public work pursuant to Labor Code section 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 DIR in compliance with Labor Code sections 1771.1 and 1725.5, and Contractor shall provide proof of registration to the City upon request.

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.

ATTACHMENT E
SUPPLEMENTARY SPECIAL PROVISIONS

SUPPLEMENTARY SPECIAL PROVISIONS

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

- 1) Standard Specifications for Public Works Construction (The GREENBOOK) currently in effect.
 - 2) The City of San Diego Standard Specifications for Public Works Construction (The WHITEBOOK).
-

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

1-2 TERMS AND DEFINITIONS.

Normal Working Hours. To the City Supplement, ADD the following:

The Normal Working Hours are **7:00 AM to 3:30 PM.**

SECTION 2 – SCOPE AND CONTROL OF WORK

2-3.2 Self Performance. DELETE in its entirety and SUBSTITUTE with the following:

1. You must perform, with your own organization, Contract work amounting to at least 30% of the base bid alone or base bid and any additive or deductive alternate(s) that together when added or deducted form the basis of award.
2. The self-performance percentage requirement will be waived for contracts when a “B” License is required or allowed.

2-5.3.1 General. To the City Supplement, ADD the following:

7. For products for which an AML is available, products listed in the AML shall be used. A submittal review will be conducted for products not identified on an AML on a case-by-case basis when:
 - a) The product type or category is not in the AML.
 - b) The AML does not list at least two available manufacturers of the product.
 - c) The material or manufacturer listed in the AML is no longer available. Documentation to substantiate the product is no

longer available or in production is required as part of the submittal.

In the case of conducting a submittal review when required by the Plans or Special Provisions, or when requested by the Engineer, all submittals shall be accompanied by the City's submittal form.

The Product Submittal Form is available for download at:

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

2-9.1 Permanent Survey Markers. To the City Supplement, DELETE in its entirety and SUBSTITUTE with the following:

1. Pursuant to Division 3, Chapter 15 of the Business and Professions Code, you shall not disturb survey monuments that “control the location of subdivisions, tracts, boundaries, roads, streets, or highways, or provide horizontal or vertical survey control” until they have been tied out by a Registered Land Surveyor or Registered Civil Engineer authorized to practice land surveying within the State of California.
2. Monument Preservation shall be performed by the City's Construction Management and Field Services (CMFS) Division on all Projects, unless permission is obtained for these services in writing by CMFS.
3. You shall submit to the Engineer a minimum of 7 Days prior to the start of the Work a list of controlling survey monuments which may be disturbed. CMFS shall do the following:
 - a) Set survey points outside the affected Work area that reference and locate each controlling survey monument that may be disturbed.
 - b) File a Corner Record or Record of Survey with the County Surveyor after setting the survey points to be used for re-establishment of the disturbed controlling survey monuments.
 - c) File a Corner Record of Record of Survey with the County Surveyor after re-establishment of the disturbed controlling survey monuments.

2-9.2 Survey Service. DELETE in its entirety and SUBSTITUTE with the following:

1. Prior to the start of construction, you shall submit a letter to the Engineer identifying the Licensed Land Surveyor or the Registered Civil Engineer authorized to practice land surveying within the State of California that will be performing the survey services for the Project.
2. You are responsible for performing and meeting the accuracy of surveying standards adequate for construction through a Licensed

Land Surveyor or a Registered Civil Engineer authorized to practice land surveying within the State of California.

3. Survey stakes shall be set and stationed by you for curbs, headers, water mains, sewers, storm drains, structures, rough grade, and any other structures and appurtenances that are needed for the Project. A corresponding cut or fill to finished grade (or flow line) shall be indicated on a grade sheet.
4. Surveys performed shall list the basis of bearings as tied to Record of Survey 14492 or equivalent, based on the California Coordinate System of 1983, Zone 6, U.S. Survey foot, epoch 1991.35, along with a completed calibration sheet (blank form will be supplied by City Surveys). The vertical datum used shall be NGVD 29 in accordance with the City of San Diego Vertical Bench Book.
5. You shall preserve construction survey stakes, control points, and other survey related marks for the duration of the Project. If any construction survey stakes are lost or disturbed and need to be replaced, such replacement shall be performed by the Engineer at your expense.

2-9.2.1

Survey Files.

1. All Computer Aided Drafting (CAD) Work shall be done in accordance with the City of San Diego's Citywide Computer Aided Design and Drafting (CADD) Standards and shall be in City seed files (.job, .txt, .dgn, .alg, .raw, .fwd, .dtm, .pdf, .docx, .xlsx, .tif, and .jpg).
2. All survey files shall be completed in accordance with the City of San Diego's Citywide CADD Standards and shall adhere to the City's Microstation level and attribute structure.
3. The survey file deliverable will be either one Master .dgn file containing all xref's in geospatially referenced (and attached) models or one Master dgn with all xref's geospatially referenced (and attached) as dgn files. Resource files may be sent to you if requested.
4. Survey files shall include, but shall not be limited to, the following items:
 - a. Street center line and (record width) right-of-way lines.
 - b. Project geometry (.alg) files (this will be generated for use in InRoads).
 - c. 3D surface model (.dtm, break line and spot elevation) file.
 - d. Spot elevations of the new utility main at each intersection, midblocks, and for any change in grade.
 - e. Monuments.
 - f. Curb lines (top curb and gutter).
 - g. All other appurtenances including but not limited to water valves, meters, vaults, manholes, fire hydrants, utility boxes, cleanouts, and poles.

5. You shall use the survey information to produce red-lines drawings as described in Section 2-5.4 "Red-lines and Record Documents."

2-9.2.2 Submittal.

1. Survey files shall be submitted in accordance with 2-5.3, "Submittals" and 2-5.4, "Red-Lines and Record Documents". You shall provide the Survey Files, proposed Drawings, and/or Red-line Drawings on a CD/DVD to the Engineer and shall post the Survey Files, proposed Drawings, and/or Red-line Drawings to the following website:

<ftp://ftp.sannet.gov/IN/SURVEYS/>

2. After the documents have been posted to the website, you shall send a confirmation email, which includes the hyperlink to the website, to the Engineer and to SurveyReview@sanidiego.gov.
3. All survey Work and submittals which reveal non-compliance with the requirements of the Construction Documents shall be corrected as deemed necessary by the Engineer and the cost of the corrections to your survey submittals shall be at your expense.

2-9.2.3 Payment.

1. The payment for survey services Work shall be included in the lump sum Bid item for "Survey Services".

2-15 TECHNICAL STUDIES AND DATA. To the City Supplement, ADD the following:

1. In preparation of the Contract Documents, the designer has relied upon the following reports of explorations and tests at the Work Site:
 1. Report of Geotechnical Investigation dated March 22, 2012 by Southern California Soil & Testing, Inc.
 1. Report of Historical Designation dated October 2010 by Vonn Marie May of Cultural Land Planning & Research
 2. Water Quality Technical Report dated February 20, 2013 by Nasland Engineering
5. The reports listed above are available for review by contacting the Contract Specialist or visiting:

<ftp://ftp.sannet.gov/OUT/SDPD%20Firing%20Range%20Recap%20%26%20TI/SDPD%20Firing%20Rnage%20Recap%26TI%20Technical%20Reports/>

SECTION 4 - CONTROL OF MATERIALS

- 4-1.3.6 Preapproved Materials.** To the City Supplement, 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.
- 4-1.6 Trade Names or Equals.** ADD the following:
14. You shall submit your list of proposed substitutions for an “equal” item **no later than 5 Working Days after the determination of the Apparent Low Bidder** and on the City’s Product Submittal Form available at:

<http://www.sandiego.gov/publicworks/edocref/index.shtml>
- 4-1.10 Foreign Materials.** To the City Supplement, DELETE in its entirety and SUBSTITUTE with the following:
1. Materials that are manufactured, produced, or fabricated outside of the United States shall be delivered to a distribution point in California, unless otherwise specified. Quality Control and related testing shall be performed to all applicable specified US standards. Manufacturer’s testing and staff certification shall be traceable to a United States regulatory agency. Retain the materials for a sufficient period of time to permit inspection, sampling, and testing. You shall not be entitled to an extension of time for acts or events occurring outside of, at point of entry, or during transport to the United States.

SECTION 5 – UTILITIES

- 5-2 PROTECTION.** ADD the following:
1. You shall repair or replace traffic signal and lighting system equipment within 72 hours after notification of defects by the Engineer.
 2. While working in or around meter boxes, you shall protect in place all Advanced Metering Infrastructure (AMI) devices attached to the water meter or located in or near water meter boxes, coffins, or vaults. This includes any antenna installed through the meter box lid.
 - a) Avoid damaging the antenna, cable, and endpoints when removing the meter box lid and when disconnecting AMI endpoints from the register on top of the water meter.
 - b) If meters or AMI devices need to be removed or relocated, the AMI endpoints shall be reinstalled with the Encoder/Receiver/Transmitter (ERT) pointing upwards.
 - c) Because the AMI equipment is uniquely matched to each service location and to specific meter serial numbers, any AMI devices that are removed or disconnected shall be reinstalled

on the same service lateral as well as to the same meter serial number it was attached to originally.

- d) Do not change or modify the lid if the lid has an antenna drilled through it.
- e) If you encounter damaged, disconnected, buried, or broken AMI endpoints, cables between the registers, antennae, lids, or ERTs, notify the Engineer within 24 hours.
- f) Any AMI equipment damaged by you shall be repaired or replaced by City Forces at your expense.

ADD:

5-6.1 Cooperation with SDG&E-SDG&E Design Package. You shall comply with all the work for SDG&E requirements including, but not limited to, clearing path, trenching, backfill, conduit and concrete substructure(s), etc. For additional information please refer to Appendix I, "SDG&E Design Package".

5-7 Payment.

- 2. Payment for 5-6.1 Cooperation with SDG&E –SDG&E Design Package will be paid for through the Lump Sum Bid Item for "SDG&E Design Package".

SECTION 6 - PROSECUTION, PROGRESS AND ACCEPTANCE OF WORK

6-1.1 Construction Schedule. To item 20, ADD the following:

The 120 Calendar Days for the Plant Establishment Period is included in the stipulated Contract Time.

SECTION 7 - RESPONSIBILITIES OF THE CONTRACTOR

7-3 LIABILITY INSURANCE. DELETE in its entirety and SUBSTITUTE with the following:

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

7-3.1 Policies and Procedures.

- 1. You must 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.

7-3.2 Types of Insurance.

7-3.2.1 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

7-3.2.2 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.

7-3.2.3 Contractors Pollution Liability Insurance.

1. You shall procure and maintain at your expense or require your Subcontractor, as described below, to procure and maintain the Contractors Pollution Liability Insurance including contractual liability coverage to cover liability arising out of cleanup, removal, storage, or handling of hazardous or toxic chemicals, materials, substances, or any other pollutants by you or any Subcontractor in an amount not less than \$2,000,000 limit for bodily injury and property damage.
2. All costs of defense shall be outside the limits of the policy. Any such insurance provided by your Subcontractor instead of you shall be approved separately in writing by the City.
3. For approval of a substitution of your Subcontractor’s insurance, you shall certify that all activities for which the Contractors Pollution Liability Insurance will provide coverage will be performed exclusively by the Subcontractor providing the insurance. The deductible shall not exceed \$25,000 per claim.
4. Contractual liability shall include coverage of tort liability of another party to pay for bodily injury or property damage to a third person or organization. There shall be no endorsement or modification of the coverage limiting the scope of coverage for either “insured vs. insured” claims or contractual liability.
5. Occurrence based policies shall be procured before the Work commences and shall be maintained for the Contract Time. Claims Made policies shall be procured before the Work commences, shall be maintained for the Contract Time, and shall include a 12 month extended Claims Discovery Period applicable to this contract or the existing policy or policies that shall continue to be maintained for 12 months after the completion of the Work without advancing the retroactive date.
6. 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.

7-3.2.4

Contractors Hazardous Transporters Pollution Liability Insurance.

1. You shall provide at your expense or require your Subcontractor to provide, as described below, Contractors Hazardous Transporters Pollution Liability Insurance including contractual liability coverage to cover liability arising out of transportation of hazardous or toxic, materials, substances, or any other pollutants by you or any Subcontractor in an amount not less than \$2,000,000 limit per occurrence/aggregate for bodily injury and property damage.
2. All costs of defense shall be outside the limits of the policy. The deductible shall not exceed \$25,000 per claim. Any such insurance provided by a subcontractor instead of you shall be approved separately in writing by the City.
3. For approval of the substitution of Subcontractor's insurance the Contractor shall certify that all activities for which Contractors Hazardous Transporters Pollution Liability Insurance will provide coverage will be performed exclusively by the Subcontractor providing the insurance.
4. Contractual liability shall include coverage of tort liability of another party to pay for bodily injury or property damage to a third person or organization. There shall be no endorsement or modification of the coverage limiting the scope of coverage for either "insured vs. insured" claims or contractual liability. Occurrence based policies shall be procured before the Work commences and shall be maintained for the duration of this Contract. Claims Made policies shall be procured before the Work commences, shall be maintained for the duration of this contract, and shall include a 12 month extended Claims Discovery Period applicable to this contract or the existing policy or policies that shall continue to be maintained for 12 months after the completion of the Work under this Contract without advancing the retroactive date.
5. 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.

7-3.3

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.

7-3.3.1

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.

7-3.4 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.

7-3.5 Policy Endorsements.

7-3.5.1 Commercial General Liability Insurance

7-3.5.1.1 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.

7-3.5.1.2 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.

7-3.5.1.3 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.

7-3.5.2 Commercial Automobile Liability Insurance.

7-3.5.2.1 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.

7-3.5.3 Contractors Pollution Liability Insurance Endorsements.

7-3.5.3.1 Additional Insured.

1. The policy or policies shall be endorsed to include as an Insured the City and its respective elected officials, officers, employees, agents, and representatives, with respect to 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.

Except that in connection with, collateral to, or affecting any construction contract to which the provisions of subdivision (b) of § 2782 of the California Civil Code apply, this endorsement shall not provide any duty of indemnity coverage for the active negligence of the City and its respective elected officials, officers, employees, agents, and representatives in any case where an agreement to indemnify the City and its respective elected officials, officers, employees, agents, and representatives would be invalid under subdivision (b) of §2782 of the California Civil Code.

2. In any case where a claim or loss encompasses the negligence of the Insured and the active negligence of the City and its respective elected officials, officers, employees, agents, and representatives that are not covered because of California Insurance Code §11580.04, the insurer's obligation to the City and its respective elected officials, officers, employees, agents, and representatives shall be limited to obligations permitted by California Insurance Code §11580.04.

7-3.5.3.2 Primary and Non-Contributory Coverage. The policy or policies shall be endorsed to provide that the insurance afforded by the Contractors Pollution Liability Insurance policy or policies is primary to any insurance or self-insurance of the City and its elected officials, officers, employees, agents and representatives with respect to operations including the completed operations of the Named Insured. 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.

7-3.5.3.3 Severability of Interest. For Contractors Pollution Liability Insurance, the policy or policies shall provide that your insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability and shall provide cross-liability coverage.

7-3.5.4 Contractors Hazardous Transporters Pollution Liability Insurance Endorsements.

7-3.5.4.1 Additional Insured.

1. The policy or policies must be endorsed to include as an Insured the City and its respective elected officials, officers, employees, agents, and representatives, with respect to 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.

Except that in connection with, collateral to, or affecting any construction contract to which the provisions of subdivision (b) of §2782 of the California Civil Code apply, this endorsement shall not provide any duty of indemnity coverage for the active negligence of the City and its respective elected officials, officers, employees, agents, and representatives in any case where an agreement to indemnify the City and its respective elected officials, officers, employees, agents, and representatives would be invalid under subdivision (b) of §2782 of the California Civil Code.

2. In any case where a claim or loss encompasses the negligence of the Insured and the active negligence of the City and its respective elected officials, officers, employees, agents, and representatives that are not covered because of California Insurance Code §11580.04, the insurer's obligation to the City and its respective elected officials, officers, employees, agents, and representatives shall be limited to obligations permitted by California Insurance Code §11580.04.

7-3.5.4.2 Primary and Non-Contributory Coverage. The policy or policies shall be endorsed to provide that the insurance afforded by the Contractors Pollution Liability Insurance policy or policies is primary to any insurance or self-insurance of the City and its elected officials, officers, employees, agents and representatives with respect to operations including the completed operations of the Named Insured. Any insurance maintained by the City and its elected officials, officers, employees, agents and representatives shall be in excess of your insurance and must not contribute to it.

7-3.5.4.3 Severability of Interest. For Contractors Hazardous Transporters Pollution Liability Insurance, the policy or policies shall provide that your insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability and shall provide cross-liability coverage.

7-3.6 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.

7-3.7 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.

7-3.8 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.

7-3.9 Excess Insurance. Policies providing excess coverage shall follow the form of the primary policy or policies e.g., all endorsements.

7-3.10 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.

7-4 WORKERS' COMPENSATION INSURANCE. DELETE in its entirety and SUBSTITUTE with the following:

7-4.1 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.

7-4.1.1 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.

7-5 PERMITS, FEES, AND NOTICES. To the City Supplement, ADD the following:

The City will obtain, at no cost to you, the following permits:

1. The Building permit for the SDPD Firing Range Recapitalization/Refurbishment project

NOTE: Contractor needs to obtain Building permit for Additive Alternate A.

7-9 PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS. ADD the following:

All Contractors, Subcontractors and their employees MUST ensure that while entering and exiting doors and gates, that they completely close before leaving the project site.

7-10.4.1.1 General. ADD the following:

All Contractors, Subcontractors and their employees MUST wear matching color "Safety Vests" at all times while on Police Department property.

7-10.5.3 Steel Plate Covers. Table 7-10.5.3 (A), REVISE the plate thickness for 5'-3" trench width to read 1³/₄".

7-15 INDEMNIFICATION AND HOLD HARMLESS AGREEMENT. To the City Supplement, Paragraph (4), Sentence (3), DELETE in its entirety and SUBSTITUTE with the following:

Your duty to indemnify and hold harmless does not include any claims or liability arising from the established active or sole negligence, or willful misconduct of the City, its officers, or employees.

7-16 COMMUNITY LIAISON. To the City Supplement, DELETE in its entirety and SUBSTITUTE with the following:

ADD:

7-16 COMMUNITY OUTREACH.

7-16.1 General.

1. To ensure consistency with the City's community outreach plan for the project, the City shall work with you to inform the public (which includes, but shall not be limited to, property owners, renters, homeowners, business owners, recreational users, and other community members and stakeholders) of construction impacts. Your efforts to mitigate construction impacts by communicating with the public require close coordination and cooperation with the City.

2. You shall perform the community outreach activities required throughout the Contract Time. You shall assign a staff member who shall perform the required community outreach services.
3. You shall closely coordinate the Work with the businesses, institutions, residents, and property owners impacted by the Project.
4. Your example duties include notifying businesses, institutions, and residents of the commencement of construction activities not less than 5 Days in advance, coordinating access for vehicular and pedestrian traffic to businesses, institutions, and residences impacted by the Project, reporting activities at all Project progress meetings scheduled by the Engineer, attending the Project Pre-construction meeting, attending 2 community meetings, responding to community questions and complaints related to your activities, and documenting, in writing, as well as logging in all inquiries and complaints received into the City's internal public contact tracking system.
5. You shall execute the Information Security Policy (ISP) Acknowledgement Form - For Non-City Employees within 15 Days of the award of the Contract if any of the following apply:
 - a) Your contact information is made available on any outreach materials.
 - b) You will be the primary point of contact to resolve project related inquiries and complaints.
6. Electronic Communication.
 - a) All inquiries and complaints shall be logged in to the City's internal public contact tracking system within 24 hours of receipt of inquiries and complaints.
 - b) Any updates or a resolution of inquiries and complaints shall be documented in the City's internal public contact tracking system within 24 hours.
 - c) Copies of email communications shall be saved individually on to the City's internal public contact tracking system in an Outlook Message Format (*.msg).
 - d) All graphics, photos, and other electronic files associated with inquiries and/or complaints shall be saved into the individual records, located within the City's internal public contact tracking system.

7-16.1.1 Quality Assurance.

1. During the course of community outreach, you shall ensure that the character of all persons that conduct community outreach (distributing door hangers, attending community meetings, interacting with the public, and etc.) on your behalf shall:
 - a. Have the ability to speak and comprehend English and/or Spanish, as appropriate for the community or public they are informing.

- b. Possess and display easily verifiable and readable personal identification that identifies the person as your employee.
- c. Have the interpersonal skills to effectively, professionally, and tactfully represent you, the project, and the City to the public.

7-16.1.2

Submittals.

- 1. You shall submit to the Resident Engineer, for review and approval, all drafts of letters, notices, postcards, door hangers, signs, mailing lists, proposed addresses for hand-delivery, and any other notices and letters that are to be mailed and or distributed to the public.
 - a. Prior to distributing or mailing, you shall submit final drafts of letters, notices, postcards, door hangers, signs, and any other notices and letters to the Resident Engineer for final review and approval. Submit a PDF copy of the approved door hangers to the Engineer.
 - b. After distributing or mailing, you shall submit verification of delivery and any copies of returned notices to the Resident Engineer. Submit a PDF copy of the approved letters and notices to the Engineer.
- 2. You shall use the City's internal public contact tracking system to identify and summarize communications (via phone, in person, and email) with the public within 24 hours of receipt, even if your response to the individual is still incomplete. You shall upload to the City's internal public contact tracking system copies of all written, electronic, and verbal communications and conversations with the public.

7-16.2

Community Outreach Services.

7-16.2.1

Public Notice by Contractor.

- 1. Post Project Identification Signs in accordance with 7-10.6.2, "Project Identification Sign".
- 2. Notify businesses, institutions, property owners, residents or any other impacted stakeholders, within a minimum 300 feet (90 m) radius of the Project, of construction activities and utility service interruptions not less than 5 Days in advance.
- 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 5 Days before starting construction or survey activities or impacting the community as approved by the Resident Engineer.
 - b. Within 5 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. No less than 48 hours in advance and no more than 72 hours in advance of the scheduled resurfacing.
- 4. Leave the door hanger notices on or at the front door of each dwelling and apartment unit and at each tenant of commercial buildings abutting each of the street block segments. Where the front doors of apartment units are inaccessible, distribute the door hanger notices to the apartment manager or security officer.
- 5. Door Hanger Material: You shall use Blanks/USA brand, Item Number DHJ5B6WH, 1¼ inch (31.8 mm) Holes (removed), 2-up Jumbo Door Hanger in Bristol White, or approved equal.
- 6. Mailed Notice Material: You shall use Cougar by Domtar, Item Number 2834, or approved equal.
- 7. For all Work on private property, contact each owner and occupant individually a minimum of 15 Days prior to the Work. If the Work has been delayed, re-notify owners and occupants of the new Work schedule, as directed by the Resident Engineer.
- 8. A sample of public notices is included in the Contract Appendix.

7-16.2.2 Communications with the Public.

- 1. Coordinate access for vehicular and pedestrian traffic to businesses, institutions, and residences impacted by the Project.
- 2. You shall provide updates on construction impacts to the Resident Engineer. You shall notify the Resident Engineer in advance about time-sensitive construction impacts and may be required to distribute construction impact notices to the public on short notice.
- 3. You shall incorporate community outreach activities related to construction impacts in the baseline schedule and update the Resident Engineer with each week's submittal of the Three-Week Look Ahead Schedule.
- 4. At the request of the Resident Engineer, you shall attend and participate in project briefings at community meetings.
- 5. You shall coordinate with the Resident Engineer on all responses and actions taken to address public inquiries and complaints within the 24 hours that they are received.

7-16.2.3 Communications with Media.

- 1. The City may allow members of the media access to its construction site(s) on a case-by-case basis only.
- 2. Occasionally, uninvited members of the media may show up at construction Sites. Members of the media (including, but not limited to newspapers, magazines, radios, television, bloggers, and videographers) do not have the legal right to be in the construction Site without the City's permission.

3. In the event that media representatives arrive near or on the construction Site(s), you shall keep them off the Site(s) in a courteous and professional manner until a Public Information Officer is available to meet them at an approved location.
4. You shall report all visits from members of the media to the Resident Engineer as quickly as possible so that the City's Public Information Officer can meet with the members of the media at the construction Site(s).
5. If the City allows members of the media to access a construction Site, you shall allow the City to escort the media representatives while they are on the construction Site and shall ensure their safety.
6. You shall require media representatives to sign in and out of the Site Visitor Log and to use personal protective equipment.
7. You have a right to speak to members of the media about your company and its role on the project. All other questions shall be referred to the City.

7-16.4 Payment.

1. The payment for the community outreach services shall be included in the Contract Price.

7-20 ELECTRONIC COMMUNICATION. ADD the following:

1. Virtual Project Manager will be used on this contract.

SECTION 9 - MEASUREMENT AND PAYMENT

9-3.1 GENERAL. To the City Supplement, ADD the following:

4. You shall comply with all the work included in the plans numbered 35568-01-D to 35568-104-D inclusive with Construction Change #1 and Addendum A and its related specifications for SDPD Firing Range Recapitalization/Refurbishment Project. Please refer to Attachment A-Scope of Work. The payment for SDPD Firing Range Recapitalization/Refurbishment shall be included in the Lump Sum Bid Item "Construction of SDPD Firing Range Recapitalization/Refurbishment".
5. Additive Alternate A: You shall comply with all the work included in the plans numbered 38742-1-D to 38742-34-D inclusive with Addendum A, and its related specifications for SDPD Firing Range Tenant Improvement Project. Please refer to Attachment A-Scope of Work. The payment shall be included in the Lump Sum Bid Item for "Construction of SDPD Firing Range Tenant Improvements".

9-3.2.5 Withholding of Payment. To the City Supplement, item 1, subsection i), DELETE in its entirety and SUBSTITUTE with the following:

- i) Your failure to comply with 7-2.3, "PAYROLL RECORDS" and 2-16, "CONTRACTOR REGISTRATION AND ELECTRONIC REPORTING SYSTEM".

ADD:

9-3.7 **Compensation Adjustments for Price Index Fluctuations.** To the City Supplement, subsection c), item 2, DELETE in its entirety and SUBSTITUTE with the following:

- 2) In the event of an overrun of Contract time, adjustment in compensation for asphalt binder included in estimates during the overrun period shall be determined using the California Statewide Crude Oil Price Index in effect on the first business day of the month within the pay period in which the overrun began.

ADD the following:

- e) This Contract is not subject to the provisions of The WHITEBOOK for Compensation Adjustments for Price Index Fluctuations for the paving asphalt.

SECTION 203 – BITUMINOUS MATERIALS

203-15 **RUBBER POLYMER MODIFIED SLURRY (RPMS).** To the City Supplement, CORRECT section numbering as follows:

OLD SECTION NUMBER	TITLE	NEW SECTION NUMBER
203-15	RUBBER POLYMER MODIFIED SLURRY (RPMS)	203-16
203-15.1	General	203-16.1
203-15.2	Materials	203-16.2
203-15.3	Composition and Grading	203-16.3
203-15.4	Mix Design	203-16.4

ADD the following:

RPMS shall be used on this contract.

SECTION 207 – PIPE

207-9.2.3 **Fittings.** To the City Supplement, ADD the following:

- 8. Flange gaskets shall be 3.2 mm (1/8 inch) thick acrylic or aramid fibers bound with nitrile for all sizes of pipe. Gaskets shall be full-face type with pre-punched holes free of asbestos material. All insulating flange kits shall require full face gaskets.

207-9.2.4 Lining and Coating. To the City Supplement, Item 4, DELETE in its entirety and SUBSTITUTE with the following:

4. The fitting shall be lined with cement mortar and tar (seal) in accordance with AWWA C104/A21.4. The interior of bells shall be lined. You shall provide double thickness lining and shall use cement conforming to ASTM C150 Type II. Coating on Interior bells shall be holiday free.

207-9.2.6 Polyethylene Encasement for External Corrosion Protection. To the City Supplement, DELETE in its entirety and SUBSTITUTE with the following:

1. When soils have been determined to be mildly corrosive through resistivity testing as specified in the City of San Diego Sewer and Water Design Guides, the outside surfaces of ductile iron pipe and fittings for general use shall be coated with bituminous coating 1 mil (25 um) thick in accordance with AWWA C151 or AWWA C110. Polyethylene encasement shall be provided in accordance with AWWA C105.

207-17.2.3 Pipe Manufacturer. To the City Supplement, DELETE in its entirety and SUBSTITUTE with the following:

1. PVC products, C900 and C905, as manufactured or distributed by J-M Manufacturing Company or JM Eagle shall not be used on the Contract for pressurized pipe.

207-26.4 Butterfly Valves. To the City Supplement, Paragraph (2), DELETE the last sentence.

To the City Supplement, Paragraph (3), DELETE in its entirety and SUBSTITUTE with the following:

3. The operator shall be manual with a 2 inch (50 mm) square operating nut and shall open the valve when turned counterclockwise.

SECTION 209 – STREET LIGHTING AND TRAFFIC SIGNAL MATERIALS

209-6.4 Induction Cobra Head Luminaire. To the City Supplement, CORRECT section numbering as follows:

OLD SECTION NUMBER	TITLE	NEW SECTION NUMBER
209-6.4.7	Luminaire Identification	209-6.4.8
209-6.4.8	Photometric Documentation	209-6.4.9
209-6.4.9	Quality Assurance	209-6.4.10

SECTION 212 - LANDSCAPE AND IRRIGATION MATERIALS

ADD:

212-3.2.2.3 Trench Marker Tape. To the City Supplement, DELETE in its entirety and SUBSTITUTE with the following:

1. Trench marker tape shall be installed in accordance with Standard Drawing SDM-105, "Warning/Identification Tape Installation".

SECTION 300 - EARTHWORK

300-1.4 Payment. To the City Supplement, item 2, DELETE in its entirety and SUBSTITUTE with the following:

2. Payment for existing pavement removal and disposal of up to 12 inches thick, within the excavation e.g., trench limits, shall be included in the Bid item for the installation of the mains or the Work item that requires pavement removal.

SECTION 302 - ROADWAY SURFACING

302-3 PREPARATORY REPAIR WORK. To the City Supplement, DELETE in its entirety and SUBSTITUTE with the following:

302-3 PREPARATORY REPAIR WORK.

1. Prior to the placement of asphalt concrete or the application of slurry, you shall complete all necessary preparation and repair Work to the road segment.
2. Unless otherwise specified, preparatory Work shall include tree trimming, weed spray, weed abatement, crack sealing, asphalt repair, mill and pave, hump removal, miscellaneous asphalt patching, removal of raised pavement markers, and removal of pavement markings.
3. You shall repair areas of distressed asphalt concrete pavement by milling or removing damaged areas of pavement to a minimum depth of 2 inches (50.8 mm) for residential streets and a minimum depth of 3 inches (76.2 mm) for all others to expose firm and unyielding pavement.
4. You shall prepare subgrade as needed and install a minimum of 2 inches (50.8 mm) for residential streets and a minimum of 3 inches (76.2 mm) for all other streets of compacted asphalt concrete pavement over compacted native material as directed by the Engineer.
5. If the base material is exposed in order to achieve the minimum specified depth, the material shall be compacted to 95% relative

compaction (dig out). Compaction tests shall be made to ensure compliance with the specifications.

6. The Engineer shall determine when and where the test shall occur. The City will pay for the soils testing required by the Engineer which meets the required compaction. You shall reimburse the City for the cost of retesting failing compaction tests. If additional base material is required, you shall use Class 2 Aggregate Base in accordance with 200-2.2, "Crushed Aggregate Base".
7. Recycled base material shall conform to crushed miscellaneous base material in accordance with 200-2.4, "Crushed Miscellaneous Base".
8. Prior to replacing asphalt, the area shall be cleaned by removing all loose and damaged material, moisture, dirt, and other foreign matter and shall be tack coated in accordance with 302-5.4, "Tack Coat".
9. You shall install new asphalt within the repair area or for patches in accordance with 302-5, "Asphalt Concrete Pavement". Asphalt concrete shall be C2-PG 64-10 in compliance with 400-4, "Asphalt Concrete".
10. No preparatory asphalt Work shall be done when the atmospheric temperature is below 50° F (10° C) or during unsuitable weather.
11. Following the asphalt placement, you shall roll the entire area of new asphalt in both directions at least twice. The finished patch shall be level and smooth in compliance with 302-5.6.2, "Density and Smoothness". After placement and compaction of the asphalt patch, you shall seal all finished edges with a 4 inch (101.6 mm) wide continuous band of SS-1H.
12. The minimum dimensions for each individual repair shall be 4 feet by 4 feet (1.2 m by 1.2 m) and shall be subject to the following conditions:
 - a) If the base material is exposed to achieve the required minimum removal thickness, the base material shall be prepared conforming to 301-1, "SUBGRADE PREPARATION".
 - b) When additional base material is required, then you shall use Class 2 Aggregate Base in accordance with 200-2.2, "Crushed Aggregate Base". Recycled base material shall conform to crushed miscellaneous aggregate base material in accordance with 200-2.4, "Crushed Miscellaneous Base".
 - c) You may use grinding as a method for removal of deteriorated pavement when the areas indicated for removal are large enough (a minimum of the machine drum width) and when approved by the Engineer.
 - d) For both scheduled and unscheduled base repairs, failed areas may be removed by milling or by excavation provided that the

edges are cut cleanly with a saw. The areas shall be cleaned and tack coated in accordance with 302-5.4, "Tack Coat" before replacing the asphalt. The areas for scheduled repairs have been marked on the street.

- e) Base Repairs with RAC. Areas where failed paving is removed either by cold milling or by excavation shall be restored to existing pavement grade with $\frac{3}{4}$ inch (19.1 mm) RAC at 8 inch (203.2 mm) depth unless otherwise directed by the Engineer. These areas have been marked on the street as "DO". The asphalt concrete shall be B3-PG 64-10 as specified in 400-4, "Asphalt Concrete". Preliminary quantities are identified in the Contract Appendix but may need to be increased and approved by the Engineer at the time of construction. Base repairs shall not exceed 15% RAP in content.
- f) Unscheduled Base Repair with RAC. If paving operations cause damage outside of your control and require additional base repair, the areas shall be removed either by cold milling or by excavation and shall be restored to existing pavement grade with $\frac{3}{4}$ inch (19.1 mm) RAC at 8 inch (203.2 mm) depth unless otherwise directed by the Engineer. The asphalt concrete shall be B3-PG 64-10 as specified in 400-4, "Asphalt Concrete". Unscheduled base repairs shall not exceed 15% RAP.
- g) A base repair is considered unscheduled when it is not identified on the pavement with a "DO" or when you are directed by the Engineer to perform a base repair for the proper placement of an asphalt overlay.

302-3.1 Asphalt Patching.

1. Asphalt patching shall consist of patching potholes, gutter-line erosions, and other low spots in the pavement that are deeper than $\frac{1}{2}$ inch (12.7 mm) in accordance with 302-5.6.2, "Density and Smoothness".
2. The areas requiring patching have been identified in the Contract Documents, marked on the streets, or as directed by the Engineer. You shall identify any new areas that may require patching prior to slurry Work to ensure the smoothness and quality of the finished product.
3. You shall identify and repair any areas that may require patching prior to the placement of slurry seal for a smooth and finished product.
4. Asphalt overlay shall not be applied over deteriorating pavement. Preparatory asphalt Work shall be completed and approved by the Engineer before proceeding with asphalt overlay.

5. You shall remove distressed asphalt pavement either by saw cutting or milling to expose firm and unyielding pavement, prepare subgrade (as needed), and install compacted asphalt concrete pavement over compacted native material as directed by the Engineer.
6. Prior to replacing asphalt, the area shall be cleaned and tack coated in accordance with 302-5.4, "Tack Coat".
7. Following the asphalt placement, you shall roll the entire patch in both directions and shall cover the patch at least twice.
8. After placement and compaction of the asphalt patch, you shall seal all finished edges with a 4 inch (101.6 mm) wide continuous band of SS-1H.
9. Base repairs shall not exceed 15% RAP in content.

302-3.2 Payment.

1. The payment for the replacement of existing pavement when required shall be included in the Lump Sum Bid item for "Construction of SDPD Firing Range Recapitalization/Refurbishment" for the total area replaced and no additional payment shall be made regardless of the number and size of replacements completed. No payment shall be made for areas of over-excavation or outside trench areas in utility Works unless previously approved by the Engineer. No payment for pavement replacement will be made when the damage is due to your failure to protect existing improvements. You shall reimburse the City for the cost of retesting all failing compaction tests.
2. The areas and quantities shown on the road segments and in the appendices are given only for your aid in planning the Work and preparing Bids. The Engineer will designate the limits to be removed and these designated areas shall be considered to take precedence over the area shown in an Appendix to the Contract Documents. The quantities shown in the appendices are based on a street assessment survey and may vary.
3. At the end of each day, you shall submit to the Engineer an itemized list of the asphalt pavement repair Work completed. The list shall include the location of the Work and the exact square footage of the repair.
4. The payment for preparatory repair Work and tack coating shall be included in the Lump Sum Bid item for "Construction of SDPD Firing Range Recapitalization/Refurbishment".
5. The payment for milling shall be included in the Lump Sum Bid item for "Construction of SDPD Firing Range Recapitalization/Refurbishment".

6. The payment for miscellaneous asphalt patching shall be included in the Lump Sum Bid item for "Construction of SDPD Firing Range Recapitalization/Refurbishment".

302-5.1.1 Damaged AC Pavement Replacement. To the City Supplement, DELETE in its entirety.

302-5.1.2 Measurement and Payment. To the City Supplement, DELETE in its entirety.

302-5.2.1 Measurement and Payment. To the City Supplement, item c), ADD the following:

Payment for Imported Subgrade material shall be included in the contract price.

SECTION 306 – UNDERGROUND CONDUIT CONSTRUCTION

306-1 OPEN TRENCH OPERATIONS. To the City Supplement, CORRECT section numbering as follows:

OLD SECTION NUMBER	TITLE	NEW SECTION NUMBER
306-1.8	House Connection Sewer (Laterals) and Cleanouts	306-1.9
306-1.7.1	Payment	306-1.9.1
306-1.7.2	Sewer Lateral with Private Replumbing	306-1.9.2
306-1.7.2.1	Location	306-1.9.2.1
306-1.7.2.2	Permits	306-1.9.2.2
306-1.7.2.3	Submittals	306-1.9.2.3
306-1.7.2.4	Trenchless Construction	306-1.9.2.4
306-1.7.2.5	Payment	306-1.9.2.5
306-1.7.3.6	Private Pump Installation	306-1.9.2.6
306-1.7.3.7	Payment	306-1.9.2.7

306-1.6 Basis of Payment for Open Trench Installations. To the City Supplement, ADD the following:

8. The payment for imported backfill when you elect to import material from a source outside the project limits and when authorized by the Engineer shall be included in the contract price. The price shall include the removal and disposal of unsuitable materials.

SECTION 703 – ENCOUNTERING OR RELEASING HAZARDOUS SUBSTANCES

703-20 **Payment.** To the City Supplement, Item 1, DELETE in its entirety and SUBSTITUTE with the following:

1. Payment for waste management shall be included in the applicable Bid items as follows:
 - a) Preparation of Hazardous Waste Management Plan, Reporting, Sampling, Treatment and Disposal (AL).

SECTION 707 – RESOURCE DISCOVERIES

ADD:

707-1.1 **Environmental Document.** The City of San Diego Environmental Services Department has prepared a **Mitigated Negative Declaration, Notice of Exemption, a Lead Containing Materials and Universal Waste Abatement Specification** dated May 4, 2016, a **Asbestos Abatement Specification** dated May 4, 2016, a **Lead Related Construction Specification, Section 13282, SDPD Firing Range Refurbishment**, ALMP Project #6447, dated November 19, 2013, and an **Asbestos and Lead Inspection Report**, ALMP Project #6447, dated June 22, 2010. You must comply with all requirements as set forth in the Contract Appendix A and Appendix F.

Compliance with the City’s environmental document is included in the various Bid items, unless a bid item has been provided.

END OF SUPPLEMENTARY SPECIAL PROVISIONS (SSP)

TECHNICAL SPECIFICATION

**SDPD Firing Range
Recapitalization and Tenant Improvement Project**

TECHNICAL SPECIFICATION

TABLE OF CONTENTS

Existing Conditions

02 4100 – Demolition

Concrete

03 3000 - Cast-in-Place Concrete

Masonry

04 2000 - Unit Masonry

Metals

05 5000 - Metal Fabrications

Wood, Plastics, and Composites

06 1000 - Rough Carpentry

06 4100 – Architectural Wood Casework

Thermal and Moisture Protection

07 4233 – Plastic Wall Panels

07 9200 – Joint Sealants

Openings

08 1400 – Wood Doors

08 3100 – Access Doors and Frames

08 7100 - Door Hardware

08 8000 – Glazing

Finishes

09 0561 – Common Work Results for Flooring Preparation

09 2216 – Non-Structural Metal Framing

09 2900 – Gypsum Board

09 3000 – Tiling

09 6500 – Resilient Flooring

09 6800 – Carpeting

09 9000 - Painting and Coating

Specialties

10 1400 – Signage

10 2113.13 – Metal Toilet Compartments

10 2800 - Toilet and Utility Room Accessories

10 4400 - Fire Protection Specialties

Special Construction

13 0541 – Seismic Restraint Requirements for Non-Structural Components

Plumbing

22 0000 – Plumbing, General Purpose

Electrical

26 0500 – General Electric Requirements

26 0510 – Basic Electrical Materials and Methods

26 0519 – Wires and Cables

26 0526 – Grounding and Bonding

26 0533 – Raceways and Boxes for Electrical Systems

26 0553 – Identification for Electrical Systems

26 0573 – Overcurrent Protective Devices

26 0913 – Electrical Power Monitoring and Control

26 0923 – Lighting Control Devices

26 0924 – Digital Lighting and Plug Control System

26 0943.23 – Relay-Based Lighting Controls

26 2413 – Switchboards

26 2416 – Panelboards

26 2726 – Wiring Devices

26 2813 – Fuses

26 5100 – Lighting Fixtures

26 5600 – Exterior Lighting

Communications

27 5116 – Public Address and Mass Notifications System

Earthwork

31 1000 - Site Clearing

31 2200 - Grading

31 2316.13 - Trenching

31 2323 – Fill

Exterior Improvements

32 1123 - Aggregate Base Courses

32 1216 - Asphalt Paving

32 1313 - Concrete Paving

32 1540 – Aggregate Surfacing

32 3119 – Decorative Metal Fences and Gates

32 8400 – Planting Irrigation

32 9000 – Planting

Utilities

33 1116 - Site Water Utility Distribution Piping

33 1300 - Disinfecting of Water Utility Distribution

33 3111 - Site Sanitary Utility Sewerage Piping

33 4111 - Site Storm Utility Drainage Piping

END OF TABLE OF CONTENTS

SECTION 02 4100

DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Selective demolition existing improvements.
- B. Selective demolition of built site elements.
- C. Abandonment and removal of existing utilities and utility structures.
- D. Salvaging items for reuse by City.

1.02 RELATED REQUIREMENTS

- A. 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK' provisions for Demolition and Site Clearing operations. Including, but not limited to the following:
 - 1. Section 300-1 – Clearing and Grubbing.
 - 2. Section 702 – Construction and Demolition Waste Management.
 - 3. Section 703 – Encountering or Releasing Hazardous Materials.
 - 4. Section 706 – Cleanup and Dust Control.
 - 5. Section 707 – Resource Discoveries.
 - 6. Section 708 – Asbestos Materials.
- B. Section 13282 – Lead Related Construction Specification; as provided by City of San Diego Environmental Services Department (Find this City-provided Section as an Appendix to the Supplemental Special Provisions (SSP's) but not part of these Technical Specifications.)
- C. Section 31 1000 - Site Clearing: Vegetation and existing debris removal.
- D. Section 31 2200 - Grading: Topsoil removal.
- E. Section 31 2323 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.
- F. Coordinate with Drawings for additional scope and instructions.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; current edition.

1.04 DEFINITIONS

- A. Demolish: Completely remove and legally dispose of off-site.
- B. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, salvage or recycled.
- C. Recycle: Recovery of demolition waste for subsequent processing in preparation for reuse.
- D. Remove: Detach items from existing construction and legally dispose of off-site unless indicated to be removed and salvaged or recycled.
- E. Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to City unless otherwise noted to be relocated or reinstalled as part of Work. Include fasteners and/or brackets needed for reattachment elsewhere.
- F. Topsoil: Natural or cultivated surface soil layer containing organic matter and sand, silt and clay particles; friable, pervious, and black or a darker shade of brown, gray or red than underlying subsoil; reasonably free of subsoil and weeds, roots, exotic materials or other nonsoil materials.
- G. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.05 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to City that may be uncovered during demolition remain the property of the City.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to City.
 - 2. Comply with 2012 City Supplement ‘The WHITEBOOK’, Section 707 for Resource Discoveries.

1.06 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, current editions, Section 2-5.3 for Shop Drawings and Submittals.

- B. Proposed Protection Measures: Submit informational report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and for noise control. Indicate proposed locations and construction of barriers.
1. Adjacent Buildings: Detail specific measures proposed to protect adjacent buildings to remain.
- C. Schedule of Selective Demolition Activities: Indicate the following:
1. Detailed sequence of demolition work, with starting and ending dates for each activity.
 2. Temporary interruption of utility services.
 3. Shutoff and capping or re-routing of utility services.
 4. Coordination of City's continuing occupancy of portions of existing building(s)/site and of City's partial occupancy of completed Work.
- D. Site Plan: Showing:
1. Vegetation to be protected.
 2. Areas for temporary construction and field offices.
 3. Areas for temporary and permanent placement of removed materials.
 4. Locations of temporary protection and means of egress for adjacent occupied buildings and fire truck access.
- E. Inventory: Submit a list of items to be salvaged and deliver to City prior to start of demolition.
- F. Pre-demolition Photographs/Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by building demolition operations. Submit to Engineer and Inspector before the Work begins.
1. In addition, comply with 2012 City Supplement 'The WHITEBOOK', Section 7-9.1.
- G. Post-demolition Photographs/Video: Sufficiently detailed, of conditions of trees and plantings, adjoining buildings and construction, and site improvements that might be misconstrued as damage caused by site clearing. Submit to Engineer and Inspector at completion of demolition operations.
1. In addition, comply with 2012 City Supplement 'The WHITEBOOK', Section 7-9.1.
- H. Statement of Refrigerant Recovery (when refrigerant present and indicated as part of existing improvements to be removed): Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.07 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: Company specializing in the type of work required, similar in material and extent to that indicated for this Project.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities have jurisdiction.
- D. Standards: Comply with ANSI A10.6 and NFPA 241.
- E. Pre-demolition Conference: Conduct conference at Project site. Review methods and procedures related to building demolition including, but not limited to, the following:
 - 1. Inspect and discuss condition of construction to be demolished.
 - 2. Review structural load limitations of existing structures.
 - 3. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review and finalize protection requirements.
 - 5. Review areas where existing construction is to remain and requires protection.
 - 6. Review procedures for noise control and dust control.
 - 7. Review items to be salvaged and returned to City.

1.08 PROJECT CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before Start of Work.
- B. City and Public will occupy shooting ranges and site immediately adjacent to the demolition area. Conduct building demolition so shooting range use will not be disrupted.
 - 1. Provide not less than 72 hours notice to City of activities that will affect City's operations.
 - 2. Maintain access to existing walkways, exits or other occupied of used facilities. Do not close or obstruct without written permission from authorities having jurisdiction.
 - 3. Coordinate utility outages to not disrupt building or shooting range operations. Shut downs and cross-overs are to take place on weekends as arranged with Engineer.
- C. City assumes no responsibility for buildings and structures to be demolished.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by City as

far as practical.

2. Prior to building demolition, City will remove all salvaged items except as noted and listed in the salvage list.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Hazardous Materials: Hazardous materials are present in the buildings and structures where selective demolition is to occur. A report on the presence of hazardous materials is on file for your review and use. Examine the report to become aware of locations where hazardous materials are present.
1. Comply with 2012 City Supplement 'The WHITEBOOK', Section 703 – Encountering or Releasing Hazardous Materials and Section 708 – Asbestos Materials.
 2. Comply with Section 13282 – Lead Related Construction Specification; as provided by City of San Diego Environmental Services Department.
- F. Traffic: Minimize interference with adjoining roads, streets, walks and other adjacent occupied or used facilities during site-clearing operations.
1. Do not close or obstruct streets, walks or other adjacent occupied or used facilities without permission from City and authorities having jurisdiction.
 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- G. Salvable Improvements: Carefully remove items indicated to be salvaged and store on City's premises where indicated.
- H. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- I. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- J. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

1.09 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Fill Material: As specified in Section 31 2323.

PART 3 EXECUTION

3.01 SCOPE

- A. Remove selective portions of the existing buildings as indicated on Drawings.
- B. Remove selective portions of the existing site as indicted on Drawings.
- C. Remove paving and curbs as required to accomplish new work.
 - 1. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 300-1.3 for Removal and Disposal of Materials.
- D. Within area of new construction, remove foundation walls and footings to a minimum of 5 feet below finished grade.
- E. See Demolition drawings and Notes for further clarification of scope of demolition and site-clearing requirements.
- F. Remove other items indicated, for salvage, relocation, and storage.
- G. Remove selective utilities and utility structures as indicated on Drawings. Coordinate with private utility company as required by each service provider's standards.
- H. Refer also to Drawings and Drawing Notes for complete scope of demolition and selective demolition.

3.02 EXAMINATION

- A. Survey existing conditions and correlate with requirements indicated to determine extent of demolition required.
 - 1. Special Requirement for Historic Paving: Contractor shall detail survey any portions of existing PCC paving to be removed as a part of this work (including boundaries and all construction, expansion and control joints) for horizontal control prior to demolition; and shall stake out and re-pave to same boundaries. All existing construction and control joints shall be replicated identical to existing condition.
- B. Verify that utilities have been disconnected and capped before starting building demolition operations.
- C. Review Project Record Documents of existing construction provided by City. City does not guarantee the existing conditions are same as those indicated in Project Record Documents.
- D. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by demolition salvage operations.

- E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- F. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.
- G. Record existing conditions by use of preconstruction photographs and video. Submit to Engineer per requirements in Informational Submittals subsection.

3.03 UTILITY SERVICES AND MECHANICAL / ELECTRICAL ITEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. City will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.04 PREPARATION

- A. Remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction before starting demolition.
- B. Existing Utilities: Locate, identify, disconnect and seal or cap off indicated utilities serving buildings and structures to be demolished.
 - 1. City will arrange to shut off indicated utilities when requested by Contractor.
 - 2. Arrange to shut off indicated utilities with utility companies.
 - 3. If removal, relocation or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
 - 4. Cut off pipe or conduit a minimum of 24 inches below grade. Cap, valve or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
 - 5. Utilities are to be completely removed where not designated to remain or to be abandoned in place. Include trenching and backfill in demolition.
- C. Temporary Shoring: Provide and maintain shoring, bracing and structural support as required to preserve stability and prevent movement, settlement or collapse of construction and finishes

to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished. Strengthen or add new supports when required during progress of selective demolition.

- D. Salvaged Items: Comply with the following:
 - 1. Clean salvaged items of dirt and demolition debris.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to City.
 - 4. Transport items to storage area designated by City.
 - 5. Protect items from damage during transport and storage.
- E. Protect and maintain benchmarks and survey control points from disturbance during construction.
- F. Identify and protect existing Buildings and Site Elements to remain and be protected from damage or disturbance during demolition and construction phases.
- G. Locate and clearly flag trees and vegetation to remain or to be relocated.
- H. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable by City.

3.05 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 7-8.6 and 701 for Water Pollution Control measures.
- B. Inspect, repair and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.06 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries and other building facilities during demolition operations.
- B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during construction.
- C. Existing Utilities: Maintain utility services indicated to remain and protect them against damage during demolition operations.

- D. **Temporary Protection:** Erect temporary protection, such as walks, fences, railings, canopies and covered passageways where required by authorities having jurisdiction and as required for pedestrian safety.
 - 1. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 2. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
 - 3. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 4. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 5. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 6. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 7-1.2 for Temporary Utilities.
- E. Remove temporary barriers and protections when hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.
- F. **Hillside:** Protect adjacent ranges and hillside from erosion, sedimentation and debris due to demolition operations.

3.07 TREE PROTECTION

- A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.
 - 1. Do not store construction materials, debris, or excavated materials within fenced area.
 - 2. Do not permit vehicles, equipment or foot traffic within fenced area.
 - 3. Maintain fenced area free of weeds and trash.
- B. Do not excavate within tree protection zones, unless otherwise indicated.
- C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots and cleanly cut roots as close to excavation as possible.
 - 1. Cover exposed roots with burlap and water regularly.
 - 2. Temporary support and protect roots from damage until they are permanently redirected

and covered with soil.

3. Coat cut faces of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
4. Backfill with soils as soon as possible.

3.08 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 1. Obtain required permits.
 2. Comply with applicable requirements of NFPA 241.
 3. Use of explosives is not permitted.
 4. Use of cutting torches:
 - a. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
 - b. Maintain fire watch during and for at least four hours after flame-cutting operations.
 - c. Maintain adequate ventilation when using cutting torches.
 5. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, framing.
 6. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 7. Provide, erect, and maintain temporary barriers and security devices.
 8. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 9. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 10. Do not close or obstruct roadways or sidewalks without permit.
 11. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
 12. Obtain written permission from City of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

13. Remove decayed, vermin-infested or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 14. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 15. Dispose of demolished items and materials promptly.
- B. Do not begin removal until receipt of notification to proceed from City.
 - C. Protect existing structures and other elements that are not to be removed.
 1. Provide bracing and shoring.
 2. Prevent movement or settlement of adjacent structures.
 3. Stop work immediately if adjacent structures appear to be in danger.
 - D. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
 - E. If hazardous materials are discovered during removal operations, stop work and notify Engineer and City; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.
 - F. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.09 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 1. Proceed with selective demolition systematically, from higher to lower level.
 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 5. Maintain adequate ventilation when using cutting torches.

6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 7. Remove framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Protect items from damage during storage.
 3. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.10 REPAIRS

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 7-9 for Protection and Restoration of Existing Improvements.
- B. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- C. Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.11 WASTE MANAGEMENT AND RECYCLING DEMOLISHED MATERIALS

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 702 for Construction and Demolition Waste Management ; and Section 706 – Cleanup and Dust Control.
- B. Remove debris, junk, and trash from site.
- C. Transport debris in manner that will prevent spillage on adjacent surfaces and areas.
- D. Burning of demolished materials is not permitted.
- E. Leave site in clean condition, ready for subsequent work.

- F. Clean up spillage and wind-blown debris from public and private lands.

3.12 CLEANING

- A. Clean adjacent structures, improvements and surfaces of dust, dirt and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.

END OF SECTION

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete formwork.
- B. Concrete reinforcement.
- C. Foundations, floors and slabs on grade.
- D. Accessories and joint devices associated with concrete work.
- E. Miscellaneous concrete elements, including equipment pads, light pole bases, flagpole bases, thrust blocks, and manholes.
- F. Mix design.
- G. Placement procedures.
- H. Concrete curing.
- I. Concrete finishes.

1.02 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants.
- B. Section 32 1313 – Concrete Paving: Concrete pavement and walks.
- C. Comply with Drawings including general notes, details and project specific instructions.

1.03 REFERENCE STANDARDS

- A. ACI 117 – Specifications for Tolerances for Concrete Construction and Materials.
- B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International.
- C. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International.
- D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International.
- E. ACI 305R - Specification for Hot Weather Concreting.
- F. ACI 306.1 - Cold Weather Concreting; American Concrete Institute International.
- G. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International.
- H. ASTM C 31 – Standard Specification for Making and Curing Concrete Test Specimens in the Field.
- I. ASTM C 33 - Standard Specification for Concrete Aggregates.

- J. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- K. ASTM C 42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
- L. ASTM C 88 - Standard Test Method for Soundness of Aggregates by use of Sodium Sulphate or Magnesium Sulphate.
- M. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete.
- N. ASTM C 143/C 143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
- O. ASTM C 150 - Standard Specification for Portland Cement.
- P. ASTM C 171 - Standard Specification for Sheet Materials for Curing Concrete.
- Q. ASTM C 172 – Standard Practice for Sampling Freshly Mixed Concrete.
- R. ASTM C 173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
- S. ASTM C 260 – Standard Specification for Air-Entraining Admixtures for Concrete.
- T. ASTM C 289 - Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).
- U. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- V. ASTM C 494 - Standard Specification for Chemical Admixtures for Concrete.
- W. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
- X. ASTM C 845 - Standard Specification for Expansive Hydraulic Cement.
- Y. ASTM C 881/C 881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- Z. ASTM C 989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
- AA. ASTM C 1059 - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
- BB. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
- CC. ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
- DD. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixers.
- EE. ASTM C1567 - Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method).
- FF. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

- GG. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
- HH. ASTM E1155 - Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers.
- II. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- JJ. ASTM E 1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.04 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Shop Drawings:
 - 1. Indicate locations of cast-in-place concrete Work and accessory items such as vapor barriers.
 - 2. Steel Reinforcement: Placing drawings that detail fabrication, bending and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing and supports for concrete reinforcement.
 - 3. Location and type of Embedded items.
 - 4. How Work will interface with adjacent Work.
 - 5. Construction Joint Layout: Indicate proposed construction joints required. Location of construction joints is subject to approval of the Engineer.
- C. Mix Design Data:
 - 1. Submit name, address and telephone number of the concrete production facility which the contractor intends to engage to design the concrete mixes. Submit name and qualifications of the proposed concrete technologist.
 - 2. Mix Design: Submit a concrete mix design for each strength and type of concrete indicated in the drawings or specified. Include:
 - a. minimum compressive strength
 - b. water/cement ratio
 - c. maximum slump
 - d. air content percentage
 - e. source of materials
 - f. size and amount of coarse aggregate
 - g. proposed admixtures
 - h. mix proportions of all aggregates
 - i. Clearly indicate project-specific locations where each mix design will be used.

3. Test Reports: Submit copies of test reports showing that the proposed mixes produce concrete with the strengths and properties specified. Include tests for cement, aggregates and admixtures. Provide gradation analysis.
- D. Material Certificates: Submit certification that each of the following conforms to the standards indicated:
1. Portland cement: ASTM C150.
 2. Normal weight concrete aggregates: ASTM C33.
 3. Lightweight concrete aggregates: ASTM C330.
 4. Aggregates: Submit evidence that the aggregate is not reactive in the presence of cement alkalis. In the absence of evidence, aggregate shall be tested per ASTM C289. If results of test are other than innocuous, aggregates shall be tested per ASTM C1567 as reported per ACI 318 as modified by CBC, Section 1903A.3.
 5. Curing materials.
 6. Reinforcement and accessories.
- E. Product Data and Manufacturer Installation Instructions: Submit manufacturers' data on each type of manufactured products indicated showing compliance with specified requirements.
1. Admixtures.
 2. Waterstops.
 3. Floor and slab treatments.
 4. Vapor Barriers.
 5. Proposed bar supports
 6. Form liner
- F. Product Certificates: Adjacent or interfacing systems that interface directly with concrete, certifying that curing compounds are compatible with respective system and signed by manufacturers of :
1. Waterproofing system(s)
 2. Roofing system(s)
 3. Floor-covering system(s)
- G. Material Samples: Submit the following:
1. Samples of underslab vapor barrier.
 2. 4 inch long samples of construction joint devices.
- H. Qualification Data: For installer and manufacturer.
- I. Minutes of Pre-installation Conference.
- J. Field Quality Control and Material Test Reports.
- K. Project Record Documents/Contractor AS-BUILTS: Accurately record actual locations of

embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 QUALITY ASSURANCE

- A. **Installer Qualifications:** A qualified installer, who specializes in performing the work of this section with minimum five years experience.
- B. **Manufacturer Qualifications:** A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- C. **Concrete Testing Agency Qualifications:** An independent agency, approved by City, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- D. **Source Limitations:** Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant. Obtain aggregate from a single source. Obtain admixtures from single source from single manufacturer.
- E. **Welding Qualifications:** Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code – Reinforcing Steel."
- F. Perform work of this section in accordance with ACI 301 and ACI 318, unless specifically modified by requirements in the Contract Documents.
- G. **Pre-installation Conference:** Before starting concrete construction, conduct conference at Project site.
 - 1. Meet with City, Engineer, testing and inspection agency representative, Contractor's superintendent, installer, independent testing agency representative responsible for concrete design mixtures, ready mix concrete manufacturer, concrete subcontractor, special concrete finish subcontractor, and installers whose work interfaces with or affects concrete construction, including installer of structural steel connections and rough plumbing.
 - 2. Review methods and procedures related to concrete construction.
 - 3. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials.
 - 4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.
 - 5. Review surface finish requirements for conditions and finishes.
 - 6. Review special inspection and testing requirements and inspecting agency procedures for field quality control, concrete finishes and finishing, curing procedures, construction contraction and isolation joints, joint filler strips, semi-rigid joint fillers, vapor-barrier installation, floor and slab flatness and levelness measurement, concrete repair procedures and concrete protection.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Store cement and aggregate materials so as to prevent their deterioration or intrusion by foreign matter. Deteriorated or contaminated materials shall not be furnished.

- B. Packaged materials shall bear the manufacturers and brand name label, and shall be stored in their original unbroken package in a weather tight place until ready for use in the work.
- C. Steel Reinforcement: Deliver, store and handle steel reinforcement in manner that prevents bending and damage.
- D. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil and other contaminants.

1.07 PROJECT CONDITIONS

- A. Cold Weather Requirements: Batching, mixing, delivering and placing of concrete in cold weather shall comply with the applicable requirements of ACI 306.1.
- B. Hot Weather Requirements: Batching, mixing, delivering and placing of concrete in hot weather shall comply with the applicable requirements of ACI 305R.
- C. Concrete temperature of freshly mixed concrete shall be determined per ASTM C1064.

PART 2 PRODUCTS

2.01 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true and smooth concrete surfaces. Furnish in largest practical sizes to minimize number of joints.
 - 1. Plywood, metal or other approved panel materials.
 - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. High density overlay, Class 1 or better.
 - b. Medium density overlay, Class 1 or better; mill-release agent treated and edge-sealed.
 - c. Structural 1, B-B or better; mill-oiled and edge-sealed.
 - d. B-B (Concrete Form), Class 1 or better; mill-oiled and edge-sealed.
- B. Rough Form-Finished Concrete: Plywood, lumber, metal or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete loads and other superimposed loads.
- D. Chamfer Strips: Wood, metal, PVC or rubber strips; ¾ x ¾ inch minimum.
- E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain or adversely affect concrete surface and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- F. Form Ties: Factory-fabricated, removable or snap-off metal or fiberglass-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed

concrete surface.

2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.02 REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, grade 60, deformed.
- B. Low-Alloy Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- C. Stirrup Steel: ASTM A 82/A 82M steel wire, unfinished.
- D. Reinforcement Accessories:
 1. Tie Wire: Annealed, minimum 16 gage.
 2. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain steel bars, cut true to length with ends square and free of burns.
 3. Bar Supports: Chairs, bolsters, spacer and other devices for spacing, supporting and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - a. Sized and shaped for adequate support of reinforcement during concrete placement.
 - b. For concrete surface exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless steel bar supports.
 - c. No brick or porous materials shall be used to support foundation steel off the ground. This includes 'dobies' unless precast and provided with supporting documentation of cement type and compressive strength.
 4. Provide stainless steel components for placement within 1-1/2 inches of weathering surfaces.

2.03 MATERIALS

- A. Cement: ASTM C 150, Portland Cement. Type V, low alkali.
- B. Aggregates: Conform to the following standards:
 1. Normal weight concrete: ASTM C 33, Class 1N aggregate or better, graded.
 2. Aggregate shall be tested for Potential Alkali Reactivity of Cement-Aggregate Combinations per ASTM C289.
- C. Water: Water for concrete mixes, curing and cleaning shall be potable and not detrimental to concrete.
- D. Admixtures: Shall be shown capable of maintaining essentially the same composition and performance throughout the work as the product used in establishing concrete proportions in

accordance with ACI 318, Section 3.6. Provide admixtures certified by manufacturer(s) to be compatible with other admixtures.

1. Admixtures containing chlorides or sulfides are not permitted.
2. Air-entraining admixtures shall comply with ASTM C 260. Air-entrained admixtures shall not be used for floor slabs to receive steel trowel finish.
3. Admixtures for water reduction and setting time modification shall conform to ASTM C494.

E. Fly Ash: ASTM C 618, Class F.

F. Silica Fume: ASTM C 1240, amorphous silica.

G. Underslab Vapor Barrier: Must meet or exceed ASTM E1745, Class A, stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs.

MINIMUM THICKNESS – 15 MILS. 10 feet minimum width.

Permeance shall be less than 0.01 perms [grains/(ft²*hr*inHg)] as determined by ASTM E96 or ASTM F1249 and after mandatory conditioning tests per ASTM E154 Sections 8, 11, 12, & 13.

Provide all manufacturer-recommended accessory products for complete vapor barrier system.

NOTE: Single ply polyethylene is prohibited.

1. Stego Wrap by Stego Industries LLC.
2. Perminator by W.R. Meadows.
3. Ecoshield-E by Epro.
4. Approved equal.
 - a. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Substitutions.
5. Accessory Products: Vapor barrier manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations in vapor barrier.

H. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

I. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch sieve, 10 to 30 percent passing a No. 100 sieve, and at least 5 percent passing No. 200 sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

J. Curing Paper: Shall conform to ASTM C171 and consist of two sheets of kraft paper cemented together with a bituminous material in which are embedded cords or strands of fiber running in both directions. The paper shall be light in color, shall be free of visible defects, with uniform appearance.

K. Grout: ASTM C1107, non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 7 days; of consistency suitable for application and a 30

minute working time.

2.04 CONCRETE MIX

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
 - 2. Mix shall be signed and sealed by a Civil or Structural Engineer currently registered in the State of California.
- B. Strength of Concrete: 3,000 psi at 28 days, minimum, unless otherwise specified in Drawings.
- C. Concrete proportioning shall be determined on the basis of field experience and/or trial mixtures shall in accordance with ACI 318, Section 5.3. Proportions of materials shall provide workability and consistency to permit concrete to be placed readily into forms and around reinforcement under conditions of placement to be employed, without segregation or excessive bleeding.
- D. Water to Cement ratio shall not exceed 0.50.
- E. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows, unless otherwise noted:
 - 1. Fly Ash: 25 percent.
 - 2. Combined Fly Ash and Pozzolan: 25 percent.
 - 3. Silica Fume: 10 percent.
 - 4. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
- F. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- G. Admixtures: Use admixtures only with approval of Engineer. Submit proposed admixtures per part 1.04, this section, for consideration and approval of Engineer. Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water to cementitious materials ratio below 0.50.
- H. Do not retemper mix or add water in field.
- I. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- J. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 1. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record location of final deposit in structure.

2.05 BONDING AND JOINTING PRODUCTS

- A. Bonding Agent: Non-dispersible acrylic emulsion or styrene butadiene , complying with ASTM C 1059/ C 1059 M, Type II.
- B. Epoxy Bonding System: Complying with ASTM C 881/C 881M and of Type required for specific application. Two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- C. Expansion Joint Fillers: Nonextruding, resilient asphalt impregnated fiberboard or felt, complying with ASTM D 1751, 1/4 inch thick and 4 inches deep; tongue and groove profile.
- D. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with minimum 1 inch diameter holes for conduit or rebars to pass through at 6 inches on center; ribbed steel stakes for setting.
 1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.
 2. Height: To suit slab thickness.
- E. Reglets: Fabricate reglets of not less than 0.0217 inch thick galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- F. Dovetail Anchor Slots: Hot-dip galvanized steel, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete debris.

2.06 FLOOR AND SLAB TREATMENTS

- A. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- B. Penetrating Liquid Floor Hardener and Densifier: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.
 1. Products: Subject to compliance with requirements, available products that shall be incorporated into the Work include, but are not limited to, the following:
 - a. Meadows, W. R., Inc.; LIQUI-HARD.

- b. Aquaseal W20 by Monopole Inc.,
 - c. Kure-N-Harden by BASF.
 - d. Chem Hard by L&M.
 - e. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Substitutions
- C. Penetrating Liquid Floor Enhancer: Clear, high solids, penetrating waterborne solution that seals concrete surfaces without forming a film.
- 1. Products: Subject to compliance with requirements, available products that shall be incorporated into the Work include, but are not limited to, the following:
 - a. Meadows, W. R., Inc.; BELLATRIX.
 - b. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Substitutions.
- D. See Schedule at end of Section.

2.07 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
- 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
- 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

PART 3 EXECUTION

3.01 GENERAL

- A. Surfaces to receive concrete shall be free of debris, standing water, and any other deleterious substances before start of concrete placing.
- B. Time of Placing: Do not place concrete until reinforcement, conduits, outlet boxes, anchors, hangers, sleeves, bolts, and other embedded materials are securely fastened in place. Contact the Inspector at least 24 hours before placing concrete; do not place concrete until inspected by the City Inspector and Engineer.
- C. Pouring Record: A record shall be kept on the Project site of time and date of placing concrete in each portion of structure. Such record shall be maintained on the Project site until Substantial Completion and shall be available for examination by the Engineer.

3.02 PREPARATION

- A. Vapor Barrier: Before installation of screeds and slab reinforcement, install vapor barrier under slabs on grade, as indicated in the drawings.
 - 1. Place, protect, and repair sheet vapor barrier according to ASTM E 1643 and manufacturer's written instructions.
 - 2. Place vapor retarder sheeting with the longest dimension parallel with the direction of the concrete pour.
 - 3. Laps or seams shall be overlapped 6 inches, or as recommended by manufacturer. Laps and penetrations shall be sealed with the manufacturer's recommended tape and/or mastic.
 - 4. Engineer will inspect and mark areas of damage and insufficient installation of the vapor barrier sufficiently in advance of concrete placement.
 - a. Deficiencies shall be corrected before concrete is placed.
 - b. Patch damaged areas with vapor barrier overlapping four sides 6 inches and adhering with tape.
- B. Embedded Items, Reglets and Rebates: Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions. Coordinate dimensions and locations required with other related Work.
 - 3. Install dovetail anchor slots in concrete structures as indicated.
 - 4. If concrete slabs on grade adjoin a wall or other perpendicular concrete surface, form a reglet in wall to receive and carry horizontal concrete Work. Reglet shall be full thickness of the slab and shall be 3/4 inch wide, unless otherwise indicated. Requirement does not apply to

exterior walks, unless specifically indicated.

- C. Anchor Slots: Embedded anchor slots in concrete walls to receive masonry veneer shall be set vertically in forms, 24 inches maximum on centers measured horizontally. Anchor slots shall be No. 24 gage galvanized sheet steel with removable fiber filler to prevent seepage of cement in slot.
- D. Screeds: Install screeds accurately and maintain at required grade or slab elevations after steel reinforcement has been installed, but before starting to place concrete. Install screeds adjacent to walls and in parallel rows not to exceed 8 feet on centers.
- E. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- F. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- G. Repair underslab vapor barrier damaged during placement of concrete reinforcing. Repair with vapor barrier material; lap over damaged areas minimum 6 inches and seal watertight.
- H. Separate slabs on grade from vertical surfaces with joint filler.
- I. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- J. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface. Conform to Section 07 9005 for finish joint sealer requirements.
- K. Install joint devices in accordance with manufacturer's instructions.
- L. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

3.03 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - 2. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.

- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete. Chamfer exterior corners and edges of concrete that are to be wrapped with waterproofing.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.04 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Engineer.

3.05 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 - 1. Do not cut or puncture vapor barrier. Repair damage and reseal vapor barrier before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to

minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.06 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groove tool marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 07 9005 Joint Sealants, are indicated.
 - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.07 INSTALLATION

A. Conveying and Placing:

1. Concrete shall be placed only under direct observation of the Engineer. Notify Engineer not less than 24 hours prior to commencement of placement operations. Do not place concrete outside of regular working hours, unless the Engineer has been notified at least 48 hours in advance.
2. Place concrete in accordance with ACI 304R.
3. Place concrete for floor slabs in accordance with ACI 302.1R.
4. Concrete shall be conveyed from mixer to location of final placement by methods that will prevent separation or loss of materials.
5. Concrete shall be placed as nearly as practicable to its final position to avoid segregation due to re-handling or flowing. No concrete that has partially hydrated or has been contaminated by foreign materials shall be placed, nor shall re-tempered concrete or concrete which has been remixed after initial set be placed.
6. In placing concrete in columns, walls or thin sections, provide openings in forms, elephant trunks, tremies or other recognized devices, to prevent segregation and accumulation of partially hydrated concrete on forms or metal reinforcement above level of concrete being placed. Such devices shall be installed so that concrete will be dropped vertically. Unconfined vertical drop of concrete from end of such devices to final placement surface shall not exceed 6 feet.
7. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
8. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer.
9. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - a. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - b. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - c. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

- d. Top surfaces of vertically formed lifts shall be level.
10. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - a. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners of forms.
 - b. Maintain reinforcement in position on chairs during concrete placement.
 - c. Where conditions make consolidation difficult or where reinforcement is congested, batches of mortar containing same proportions of cement, sand, and water as provided in the concrete, shall first be deposited in the forms to a depth of at least one inch.
 11. Do not interrupt successive placement; do not permit cold joints to occur.
- B. Cold Weather:
1. Provide adequate equipment for heating concrete materials and protecting concrete during freezing or near-freezing weather. All ground with which concrete is to come in contact shall be free from frost. No frozen materials or materials containing ice shall be used.
 2. The temperature of concrete at the time of placement shall not be below the minimum temperatures given in Table 3.1 of ACI 306.1.
 3. Concrete shall be maintained at a temperature of at least 50° F. for not less than 72 hours after placing or until it has thoroughly hardened. Cover concrete and provide sufficient heat as required. When necessary, aggregates shall be heated before mixing. Special precautions shall be taken for protection of transit-mixed concrete.
- C. Hot Weather:
1. Concrete to be placed during hot weather shall comply with the requirements of ACI 318, Section 5.13.
 2. Maintain concrete temperatures indicated in Table 2.1.5 of ACI 305R to prevent the evaporation rate from exceeding 0.2 pound of water per square feet of exposed concrete per hour.
 3. Cool concrete using methods indicated in ACI 305R Appendix B.
 4. Place and cure concrete as specified in ACI 305R Chapter 4.
- D. Finishing Formed Surfaces:
1. Rough-Formed Finish: As-cast concrete texture impaired by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 374R limits for class of surface specified.
 2. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch in height.
 - a. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, damp proofing, veneer plaster, or painting.

- b. Do not apply rubbed finish to smooth-formed finish.
3. Rubbed Finish: Apply the following to smooth-formed finished concrete:
- a. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process..
 - b. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
 - c. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part Portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In swirling motion, finish surface with a cork float.
4. Soda and Acid Wash: Concrete surfaces to receive plaster, paint or other finish, and which have been formed by oil coated forms, shall be scrubbed with a solution of 1-1/2 pounds of caustic soda to one gallon of water. Surfaces where smooth wood or waste molds have been furnished shall be scrubbed with a solution of 20 percent muriatic acid. Wash with clean water after scrubbing.
5. Sacking: Exposed concrete curbs, walls and other surfaces shall be sacked by an application of Portland cement grout, floated and rubbed. Sacking shall not be performed until patching and filling of holes has been completed. Entire sacking operation for any continuous area shall be started and completed within the same day.
- a. Mix one part Portland cement and 1-1/2 parts fine sand with sufficient water to produce a grout having consistency of thick paint. Wet surface of concrete sufficiently to prevent absorption of water from grout. Apply grout uniformly with a brush or spray gun, then immediately float surface with a cork or other suitable float, scouring wall vigorously.
 - b. While grout is still plastic, finish surface with a sponge-rubber float, removing excess grout. Allow surface to dry thoroughly, then rub vigorously with dry burlap to completely remove dried grout. No visible film or grout shall remain after rubbing with burlap.
6. Sandblasting: Exterior concrete surfaces to receive stucco finish, where plywood or other smooth forms have been provided, shall be uniformly sand-blasted with sharp quartz sand under sufficient air pressure to remove dirt, form oil and other foreign materials, and roughen surface to provide adequate bond with stucco finish. Such surfaces shall be thoroughly washed with clean water after sandblasting.
7. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching

adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

8. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

E. Finishing Floors and Slabs:

1. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
 - a. Sloped Floors: In area with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal. Floors sloped for drainage should be brushed in the direction of flow.
2. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bullfloated or darbied. Use stiff brushes, brooms, or rakes.
 - a. Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes.
3. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
 - a. Apply float finish to surfaces indicated, to receive trowel finish, and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing. Surfaces shall be formed true in plane, and without honeycombs, voids, dips, or sharp protrusions.
4. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - a. Apply a trowel finish to surfaces indicated, exposed to view, or to be covered with resilient flooring, carpet, terrazzo, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
5. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
6. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - a. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

7. **Slip-Resistive Aggregate Finish:** Before final floating, apply slip-resistive aggregate finish where indicated and to concrete stair treads, platforms, and ramps. Apply according to manufacturer's written instructions and as follows:
 - a. Uniformly spread 25 lb/100 sq. ft. of dampened slip-resistive aggregate over surface in one or two applications. Tamp aggregate flush with surface, but do not force below surface.
 - b. After broadcasting and tamping, apply loat finish..
 - c. After curing, lightly work surface with a steel wire brush or an abrasive stone, and water to expose slip-resistive aggregate.
8. **Mineral Dry-Shake Floor Hardener Finish:** After initial floating, apply mineral dry-shake materials to surfaces according to manufacturer's written instructions and as follows:
 - a. Uniformly apply mineral dry-shake materials at a rate of 100 lb/100 sq. ft., unless greater amount is recommended by manufacturer..
 - b. Uniformly distribute approximately two-thirds of mineral dry shake materials over surface by hand or with mechanical spreader, and embed by power floating. Follow power floating with a second mineral dry-shake application, uniformly distributing remainder of material, and embed by power floating..
 - c. After final floating, apply a trowel finish. Cure concrete with curing compound recommended by dry-shake material manufacturer and apply immediately after final finishing.

F. **Curing:**

1. Length of time, temperature and moisture conditions for curing concrete shall be in accordance with ACI 308.1.
2. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305R for hot-weather protection during curing.
3. **Evaporation Retarder:** Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
4. **Formed Surfaces:** Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
5. **Unformed Surfaces:** Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
6. Immediately after finishing, cover monolithic floor slabs with curing paper. Lap paper 4 inches at joints and seal with waterproof sealer. Cement edges to finish. Repair or replace paper damaged during construction operations.

3.08 LIQUID FLOOR TREATMENTS

- A. Exposed interior concrete floors throughout shall be treated with floor hardener.
- B. Penetrating Liquid Floor Hardener and Densifier: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions. Apply to all concrete surfaces where indicated and otherwise indicated to remain exposed to view.
 - 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 - 2. Do not apply to concrete that is less than 28 days' old.
 - 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
- C. Penetrating Liquid Floor Sealer: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions. Apply to concrete surfaces where indicated and otherwise indicated to remain exposed to view.

3.09 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions. Defer joint filling until concrete has aged at least two months. Do not fill joints until construction traffic has substantially ceased..
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semigrind epoxy joint filler full depth in saw-cut joints (not including control joints at slabon-grade) and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.10 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer 's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- F. Repair materials and installation not specified above may be used, subject to Engineer's approval.
- G. Concrete slabs exhibiting high or low spots and indicated to receive resilient floor covering or soft floor covering, shall have surfaces repaired. High spots shall be honed, or ground with power-driven machines to required tolerances. Low spots shall be filled with latex underlayment, installed in strict accordance with manufacturer's written recommendations.
- H. Holes resulting from form ties or sleeve nuts shall be solidly packed, through exterior walls, by pressure grouting with cement grout, as specified, unless otherwise noted. Grouted holes on exposed surfaces shall be screeded flush and finished to match adjoining surfaces. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.11 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Contractor shall engage a third-party, City-approved special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- D. Tests of concrete materials may be performed at any time prior to placement to ensure conformance with specified requirements.

- E. Special Inspections shall be performed as identified in Drawings.
- F. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 6. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure two sets of three standard cylinder specimens for each composite sample.
 - b. Cast and field cure two sets of three standard cylinder specimens for each composite sample.
 - c. Obtain test samples for every 100 cu yd or less of each class of concrete placed.
 7. Compressive-Strength Tests: ASTM C 39/C 39M;
 - a. Test one set of three laboratory-cured specimens at 7 days, and one set of three specimens at 28 days.
 - b. Test one set of three field-cured specimens at 7 days, and one set of three specimens at 28 days.
 - c. A compressive-strength test shall be the average compressive strength from a set of three specimens obtained from same composite sample and tested at age indicated.
 8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
 9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength

and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

10. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
11. Additional Tests: At Contractor's expense, Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Engineer.

G. Defective Concrete:

1. Should strength of any grade of concrete, for any portion of the Work indicated by tests of molded cylinders and core tests, fall below minimum 28 days strength specified or indicated, concrete will be deemed defective Work and shall be replaced or adequately strengthened in a manner acceptable to the Engineer.
2. Concrete Work that is not formed as indicated, is not true within 1/250 of span, not true to intended alignment, not plumb or level where so intended, not true to intended grades and levels, contains sawdust shavings, wood or embedded debris, or does not fully conform to Contract provisions, shall be deemed to be defective Work and shall be removed and replaced at no expense to City.
3. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.12 PROTECTION OF FLOOR TREATMENTS

- A. Protect floor treatments from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

3.13 TREATMENT SCHEDULE

- A. Penetrating Liquid Floor Hardener and Densifier:
 1. Public Restrooms
- B. Penetrating Liquid Sealer:
 1. Public Restrooms
- C. Anti-Graffiti Coating System: All vertical cast concrete, exposed to exterior condition. See Section 09 9000 – Painting and Coating for system information.

END OF SECTION

SECTION 04 2000

UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete Masonry Units.
- B. Mortar and Grout.
- C. Reinforcement.
- D. Anchorage.
- E. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 05 5000 –Metal Fabrications: Metal fabrications anchored to masonry.
- B. Section 07 9200 - Joint Sealers: Backing rod and sealant at control and expansion joints.

1.03 REFERENCE STANDARDS

- A. ACI 530/ASCE 5/TMS 402 - Building Code Requirements for Masonry Structures; American Concrete Institute International.
- B. ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American Concrete Institute International.
- C. ASTM C 90 - Standard Specification for Loadbearing Concrete Masonry Units.
- D. ASTM C 91 - Standard Specification for Masonry Cement.
- E. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete.
- F. ASTM C 140 - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units.
- G. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.
- H. ASTM C 150 - Standard Specification for Portland Cement.
- I. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes.
- J. ASTM C 270 - Standard Specification for Mortar for Unit Masonry.
- K. ASTM C 404 - Standard Specification for Aggregates for Masonry Grout.
- L. ASTM C 476 - Standard Specification for Grout for Masonry.
- M. ASTM C 744 - Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units.
- N. ASTM C 780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
- O. ASTM C 979 - Standard Specification for Pigments for Integrally Colored Concrete.

- P. ASTM C 1019 - Standard Test Method for Sampling and Testing Grout.
- Q. ASTM C 1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength.
- R. ASTM C 1142 - Standard Specification for Extended Life Mortar for Unit Masonry.
- S. ASTM C 1314 - Standard Test Method for Compressive Strength of Masonry Prisms.
- T. ASTM E 518 - Standard Test Methods for Flexural Bond Strength of Masonry.

1.04 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data: Provide data for each type of product indicated, including: masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Shop Drawings, for the following:
 - 1. Masonry Units: Show sizes, profiles, coursing and locations of special shapes.
 - 2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement".
- D. Samples: Submit four samples of precision face, split face, glazed face, cap block and screen block units to illustrate color, texture, and extremes of color range.
- E. Samples: Submit four samples of each color of mortar for use on project to illustrate color, texture, and extremes of color range.
- F. Manufacturer's Certificate, for each type and size of the following:
 - 1. Certify that masonry units meet or exceed specified requirements for strength, shrinkage, absorption and moisture content.
 - 2. Cementitious Materials: Include brand, type and name of manufacturer.
 - 3. Preblended, dry mortar mixes: Include description of type and proportions of ingredients.
 - 4. Grout Mixes: Include description of type and proportions of ingredients.
 - 5. Reinforcing Bars.
 - 6. Anchors, ties and metal accessories.
- G. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
 - 1. Include test reports for mortar mixes required to comply with property specification. Test results according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
- H. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

I. Qualification Data: For testing agency.

1.05 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.
 - 1. Maintain one copy of each document on project site.
- B. Pre-installation Conference: Before starting masonry construction, conduct conference at Project site.
 - 1. Meet with City, Engineer, Engineer, City's Insurer if applicable, testing and inspection agency representative, installer, manufacturer's representative, and installers whose work interfaces with or affects unit masonry construction, including installer of structural steel connections, rough plumbing, steel grating and supporting structure and sheet metal flashing and trim.
 - 2. Review methods and procedures related to masonry construction.
 - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.
 - 4. Review surface finish and pattern requirements for conditions and finishes, including glazed units, and areas of media-blasting following installation.
 - 5. Review special inspection and testing requirements and inspecting agency procedures for field quality control.
- C. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.
- D. Source Limitation for Masonry Units: Obtain exposed masonry unit of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- E. Source Limitation for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
- B. Handle and store ceramic glazed masonry units and pre-faced concrete block units in protective cartons or trays. Do not remove from protective packaging until ready for installation.
- C. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- D. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- E. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

- F. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- G. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.
- H. Damaged Materials: Promptly replace all damaged materials at no increase to Contract Sum.

1.07 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides of wall and hold cover securely in place.
- B. Stain Prevention: Prevent mortar, grout and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- C. Cold Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but no less than 7 days after completing cleaning.
- D. Hot Weather Requirements: Comply with hot weather requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. Concrete Masonry Units: Standard Manufactured units, conforming to requirements of ASTM C 90 for Grade N-1, normal weight units with sizes, shapes and types indicated on Drawings:
 - 1. Moisture Content: Shall not exceed 25 percent of total absorption at the time units are placed.
 - 2. Shrinkage: Linear shrinkage shall not exceed 0.55 percent as determined by ASTM C 426.

3. Color/Finish: Integral color as selected from manufacturer's full line at time of submittal. Finish to be split-face, unless otherwise indicated on Drawings.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks or other defects exceeding limits stated in the Standard. Do not use units where such defects will be exposed in the completed Work.

2.02 MORTAR AND GROUT MATERIALS

- A. Mortar Aggregate: ASTM C 144.
- B. Grout Aggregate: ASTM C 404.
- C. Portland Cement: ASTM C 150, Type I or II, free alkali content 0.06 percent maximum. Use Type V where soil contact will occur. Color as required to produce approved color sample.
1. Color: As chosen from manufacturer's full range at time of submittal.
- D. Hydrated Lime: ASTM C 207, Type S.
- E. Water: Clean and potable.
- F. Admixtures:
1. Mortar Admixtures: None permitted, except colorant.
 2. Grout Admixtures: Sika "Grout Aid," or approved equal, mixed in proportions as recommended by manufacturer.
- G. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C 979.
1. Color(s): As selected by Architect from manufacturer's full range.
 2. Manufacturers:
 - a. Davis Colors: www.daviscolors.com.
 - b. Lambert Corporation: www.lambertusa.com.
 - c. Solomon Colors: www.solomoncolors.com.
 - d. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Substitutions.

2.03 MORTAR AND GROUT MIXES

- A. Mortar: Comply with ASTM C 270, Proportion Specification.
1. Provide Type S or M as indicated on Drawings, minimum compressive strength as indicated on Drawings.
- B. Mortar Mixing: Thoroughly mix mortar ingredients, in accordance with ASTM C 270 and in quantities needed for immediate use. Use mixer with capacity for batches using full sack volumes of cement.
- C. Grout: Comply with ASTM C 476.
1. Use grout of type indicated, or if not otherwise indicated, of type (fine or course) that will

comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.

2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated on Drawings, but not less than 2,000 psi.
 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.
- D. Grout Mixing: Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C 476 for fine and coarse grout.

2.04 REINFORCEMENT

- A. Reinforcing Steel: ASTM A 615/A 615M, Grade 60 uncoated. Use clean, new, un-rusted stock free from mill, scale and dirt debris.

2.05 MISCELLANEOUS ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane or PVC.
- B. Bond Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, type 1 (No.15 asphalt felt).
- C. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148 inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine conditions with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of Work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- D. Verify that other built-in items are in proper location, and ready for roughing into masonry work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.
- C. Build chases and recesses to accommodate items specified in this and other Sections.
- D. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- E. Use full size units without cutting if possible. If cutting is required, cut units with motor-driven saws, provide clear, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
 - 1. Cutting of units will be required at top of each pilaster, and each location where masonry interfaces with structural wood laminated beam, to match pitch of beam.

3.04 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: As indicated on Drawings.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joint Tooling: Concave.

3.05 REINFORCEMENT AND ANCHORAGE - GENERAL

- A. Space and position reinforcement as shown. Hold bars firmly in place at ends and at intervals not exceeding 192 diameters by means of ties, frames, chairs, or other suitable means.
- B. Place horizontal reinforcement in bond beam units. Use bars of the longest practical length. Stagger splice locations and lap 40 diameters. Hook ends at corners and wall intersections as shown.
- C. Splice vertical reinforcement only where shown. Lap splices 50 diameters or 24-inches minimum unless otherwise noted.
- D. Conform to applicable code for concrete cover over reinforcement.

3.06 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.
- F. Interlock intersections and external corners, except for units laid in stack bond.

- G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.
- K. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar before laying fresh masonry.
- L. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
- M. Temporary Formwork and Shoring: Construct formwork and shores as needed to support reinforced masonry elements during construction.
- N. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings and adjacent construction, to provide a neat uniform appearance. Prepare joints for sealant application, where indicated.

3.07 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 4 inches into adjacent masonry or turn up at least 4 inches to form watertight pan at non-masonry construction.
 - 2. Remove or cover protrusions or sharp edges that could puncture flashings.
 - 3. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Extend metal flashings through exterior face of masonry and turn down to form drip. Install joint sealer below drip edge to prevent moisture migration under flashing.
- C. Lap end joints of flashings at least 4 inches and seal watertight with mastic or elastic sealant.

3.09 GROUTING

- A. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- B. Wet masonry surfaces in contact with grout just prior to grout placement.
- C. Place and consolidate grout fill without displacing reinforcing.
- D. Maintain weep joints free of grout.

3.10 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames, fabricated metal frames, anchor bolts, and plates and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

3.11 TOLERANCES

- A. Maximum Variation from Alignment of Columns: 1/4 inch.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.12 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.13 FIELD QUALITY CONTROL

- A. Provide inspection per CBC Section 1705.4.
- B. Provide testing per CBC Section 1705.4.

3.14 CLEANING

- A. In-progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods of sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Engineer's approval of sample cleaning before proceeding with cleaning of masonry.
 - 3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering

them with liquid strippable masking agent or polyethylene film and waterproof masking tape.

4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 5. Clean concrete masonry by cleaning method indicated in NMCA TEK 8-2A applicable to type of stain on exposed surfaces.
- C. Remove excess mortar, mortar smears and mortar droppings.
- D. Replace defective mortar. Match adjacent work.

3.15 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

3.16 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Excess Masonry Waste: Remove excess clean masonry waste and legally dispose of off City's property.

END OF SECTION

SECTION 05 5000
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section includes the following:
1. Miscellaneous fabricated ferrous metal items, galvanized, plated and prime painted.
 2. Miscellaneous fabricated stainless steel items, brush finished.
 3. Miscellaneous fabricated structural connectors and clips.
 4. Steel framing and supports for mechanical and electrical equipment
 5. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 6. Loose bearing and leveling plates.
 7. Fabricated fences and gates.
 8. Fabricated metal bollards.
- B. Products furnished, but not installed, under this Section include the following:
1. Anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
 2. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.
- C. Section 08 7100 – Door Hardware: Coordination of hardware in fabricated gates.
- D. Section 09 9000 - Painting and Coating: Paint finish.

1.03 REFERENCE STANDARDS

- A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.
- B. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- C. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- D. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- E. ASTM A 283/A 283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

- F. ASTM A 307 – Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
- G. ASTM A 325/A 325M - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- H. ASTM A 500/A 500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- I. ASTM A 653 – Steel Sheet, Zinc-coated (Galvanized) or Zinc-Iron-Alloy Coated (Galvannealed) by the Hot-Dip Process.
- J. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- K. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society.
- L. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.
- M. SSPC – The Society for Protective Coatings.

1.04 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Provide templates for anchors and bolts specified for installation under other Sections.
 - 3. Indicate finishes to each item and provide product data where applicable.
 - 4. Fabricated Gates: Gate manufacturer shall be responsible for designing specified gate hardware into gate assembly, and shall be responsible for gate hinge engineering and anchorage. Provide shop drawings and calculations for gate assemblies.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.
- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.
- E. Mill Certificates: Signed by stainless-steel manufacturers, certifying materials furnished comply with requirements.

1.05 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code – Steel."
 - 2. AWS D1.2, "Structural Welding Code – Aluminum."

3. AWS D1.3, "Structural Welding Code – Sheet Steel."
 4. AWS D1.6, "Structural Welding Code – Stainless Steel."
- B. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- C. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
 2. Provide allowance for trimming and fitting at site.

1.06 COORDINATION

- A. Coordinate installation of metal fabrications that are anchored to, or receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Deliver such items to Project site in time for installation.
- C. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturer's recommendations to ensure that shop primers and topcoats are compatible with one another.
- D. Coordinate specified door hardware with gate manufacturer.

PART 2 PRODUCTS

2.01 MATERIALS - GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Basis of Design: Characteristics of products, where named in this Section, are indicated to establish required level of quality, appearance and performance. An approved equal may be considered by complying with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.

2.02 MATERIALS

A. Carbon Steel:

1. Steel Sections: ASTM A 36/A 36M.
2. Steel Sections: AISC W shapes to comply with ASTM A 992.
3. Steel Tubing: ASTM A 500, Grade B cold-formed structural tubing.
4. Plates: ASTM A 283.
5. Bars: ASTM A 322.
6. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, unless otherwise noted.

B. Stainless Steel:

1. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304. Type 316 for exterior use and in corrosive environments.
2. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304. Type 316 for exterior use and in corrosive environments.

C. Aluminum:

1. Aluminum Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.
2. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.
3. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.
4. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.03 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners, Type 316 for exterior use and corrosive environments, and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.
2. Provide stainless-steel fasteners for fastening stainless steel.
3. Provide stainless-steel fasteners for fastening nickel silver.
4. Provide bronze fasteners for fastening bronze.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, nuts and, where indicated, flat washers; ASTM F 593 (ASTM F 738M) for bolts and ASTM F 594 (ASTM F 836M) for nuts, Alloy Group 1 (A1). Provide Alloy Group 2 for corrosive environments.

D. Anchor Bolts: ASTM F 1554, Grade 36.

1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.

- E. Eyebolts: ASTM A 489.
- F. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).
- G. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- H. Plain Washers: Round, ASME B18.22.1 (ASME B18.22M).
- I. Lock Washers: Helical, spring type, ASME B18.21.1 (ASME B18.21.2M).
- J. Anchors – General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in masonry, and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- K. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- L. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5.
 - 2. Material for Anchors in Exterior Locations or where Stainless Steel indicated: Alloy Group 1 (A1) stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

2.05 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS D1.1/D1.1M specifications for metal alloy welded.
- B. Shop Primers: Provide primers that comply with Section 09 9000 – Painting and Coating.
- C. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- D. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.
 - 1. Products:
 - a. Benjamin Moore & Co.; Epoxy Zinc-Rich Primer CM18/19.
 - b. Carboline Company; Carbozinc 621.
 - c. ICI Devoe Coatings; Catha-Coat 313.
 - d. International Coatings Limited; Interzinc 315 Epoxy Zinc-Rich Primer.
 - e. PPG Architectural Finishes, Inc.; Aquapon Zinc-Rich Primer 97-670.
 - f. Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer.
 - g. Tnemec Company, Inc.; Tneme-Zinc 90-97.
 - h. Approved Equal: Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 4-1.6 for Trade Names or Equals.

- E. Water-based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.
- F. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- H. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.
- I. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- J. Slotted Channel Framing: ASTM A 653, Grade 33.
- K. Slotted Channel Fittings: ASTM A 1011/A 1011M.

2.06 FABRICATION

- A. Shop Assembly: Fit and shop assemble each item in largest practical sections. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- E. Continuously seal joined members by continuous welds. Weld corners and seams continuously to comply with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Grind exposed joints flush and smooth with adjacent finish surface. East exposed edges to small uniform radius.
- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.
- H. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

- I. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- J. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
 - 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.
- K. In addition to the above criteria, fabricate gate components for exposed architectural appearance conditions.
 - 1. Remove all weld splatter, grind and sand all weld joints uniformly smooth, without visible scratches, gouges, or patch marks. Conform to Finish #2 of National Ornamental and Miscellaneous Metals Association's "Joint Finish Guidelines."
 - 2. All visible welds shall be continuous; bead or spot welding is not acceptable.
 - 3. Provide tube closures at all type and pipe components.
 - 4. Grind edges of all bent and fabricated components smooth to a 1/4 inch radius.

2.07 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts if units are installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports unless otherwise indicated.
- D. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.08 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.
 - 1. Provide mitered and welded units at corners.
 - 2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.
- B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
- C. Galvanize shelf angles located in exterior walls.

2.09 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

2.09 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete or masonry construction as needed to complete the Work. Provide each unit with not less than two integrally welded steel strap anchors for embedding in concrete or masonry.

2.10 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

2.11 FABRICATED GATE HARDWARE AND COMPONENTS

- A. Manufacturer: Guardian, www.guardiangatehardware.com, or approved equal.
- B. Swing Gate Hinges:
 - 1. At gates up to 4 feet in width, provide Guardian 2100.200 hinges, galvanized finish. Minimum 1 pair hinges per gate, unless otherwise indicated.
 - 2. A gates deeper than 4 feet but less than 8 feet in width, provide Guardian 2000.200 hinges, galvanized finish. Minimum 1 pair hinges per gate, unless otherwise indicated.
 - 3. A gates greater than 8 feet in width, provide Guardian 2000.200 hinges, galvanized finish. Minimum 1 pair hinges per gate, unless otherwise indicated.
- C. Guide Wheels: Builders Fence Company, or approved equal. Steel construction with galvanized finish, 6 inch diameter with v-groove wheel runner, 5/8 inch stainless steel axle, roller bearings in sealed race with grease nipple.
- D. Guide Rollers: Builder's Fence Company, or approved equal. 2 inch diameter x 4 inch long roller, 1/4 inch neoprene jacket covering, stainless steel axle and roller bearings.
- E. Cane Bolt: steel, 1/2 inch diameter, with locking tab and guide angles for welded attachment.
- F. Pull: Provide 1-1/2 inch diameter steel pull, design as indicated on Drawings, with weld attachment.
- G. Knox Box: Provide Knox Box Model 3200 at each gate as directed by Engineer. Provide steel backing plate for attachment, 1/4 inch thick, welded to gate frame.
- H. Kick Panel: Provide steel plate full width of gate on each side, 10 inches high x 1/4 inch thick, welded to gate pickets. Ease all edges.
- I. Refer to Section 32 3119 – Decorative Metal Fences and Gates for additional fabrication and finishing instructions.

2.11 FINISHES - GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.
- C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.12 FINISHES - STEEL

- A. Galvanize exterior steel fabrications and interior miscellaneous steel fabrications, where indicated.
- B. Prime interior miscellaneous steel fabrications, where indicated with zinc-rich primer.
- C. Galvanizing:
 - 1. General: Prior to the galvanizing operation, the Contractor shall identify to the galvanizer the specific assemblies and surfaces receiving a paint or coating system after galvanizing, to ensure that the galvanizing method used on these assemblies is compatible with subsequent application of the paint or coating system. Specifically, such assemblies shall neither be water-quenched, nor receive a chromate conversion coating, as part of the galvanizing operation. For galvanized surfaces to remain exposed to view, the Contractor shall identify to the galvanizer the specific assemblies and surfaces to ensure that the galvanized surfaces are consistent in appearance, finish, and reflectivity.
 - 2. Hot-dip galvanize items as indicated to comply with applicable standard listed below:
 - a. ASTM A 123/A 123M, for galvanizing steel and iron products.
 - b. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
 - c. Fill vent holes and grind smooth after galvanizing.
 - 3. Galvanized Surface Cleaning and Preparation:
 - a. Galvanized surfaces receiving a paint or coating system shall be cleaned and prepared for coating in accordance with ASTM D 6386 and the written instructions of the painting or coating system manufacturer.
 - b. Assemblies conforming to the ASTM D 6386 definition for newly galvanized steel shall receive surface smoothing and surface cleaning in accordance with ASTM D 6386 Section 5, and surface preparation in accordance with ASTM D 6386 Section 5.4.1.
 - c. Assemblies conforming to the ASTM D 6386 definition for partially weathered galvanized steel shall be checked and prepared in accordance with ASTM D 6386 Section 6, before then receiving surface smoothing and surface cleaning in accordance with ASTM D 6386 Section 5, and surface preparation in accordance with ASTM D 6386 Section 5.4.1.
 - d. Assemblies conforming to the ASTM D 6386 definition for weathered galvanized steel shall be checked and prepared in accordance with ASTM D 6386 Section 7, before then receiving surface smoothing and surface cleaning in accordance with

ASTM D 6386 Section 5, and surface preparation in accordance with ASTM D 6386 Section 5.4.1.

- D. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exterior Items (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
- E. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.13 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- D. Field Welding: Comply with the following requirements:
 - 1. Clean and strip primed steel items to bare metal where site welding is required.
 - 2. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 3. Obtain fusion without undercut or overlap.
 - 4. Remove welding flux immediately.
 - 5. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent

surface.

- E. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.
- F. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- G. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.02 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions securely to and rigidly brace from building structure.
- C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
 - 1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.
- D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.
 - 1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.03 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 - 1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.04 INSTALLING METAL BOLLARDS

- A. Permanent: Pipe guards shall be set vertically in concrete piers. Piers shall be constructed of, and the hollow cores of the pipe filled with, concrete having a 28-day compressive strength of 3,000 psi. Fill bollards solidly with concrete, mounding top surface to shed water.
- B. Removable:

1. Anchor internal sleeves for removable bollards in place with concrete footings. Center and align sleeves in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace sleeves in position until concrete has cured.
2. Place removable bollards over internal sleeves and secure with 3/4-inch machine bolts and nuts. After tightening nuts, drill holes in bolts for inserting padlocks. Owner furnishes padlocks.
3. Do not fill removable bollards with concrete.

3.05 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.06 INSTALLATION TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 06 1000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Framing with dimensional lumber.
- B. Rooftop curbs, cants and equipment bases.
- C. Wood blocking, backing and nailers.
- D. Communications and electrical room mounting panels.
- E. Metal framing connectors and fasteners.

1.02 RELATED REQUIREMENTS

- A. Not Used.

1.03 REFERENCE STANDARDS

- A. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; American Forest and Paper Association.
- B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- C. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. AWWPA U1 - Use Category System: User Specification for Treated Wood; American Wood Protection Association.
- E. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce).
- F. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17; West Coast Lumber Inspection Bureau, and supplements.

1.04 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NHLA: National Hardwood Lumber Association.
 - 3. NLGA: National Lumber Grades Authority.
 - 4. WCLIB: West Coast Lumber Inspection Bureau.
 - 5. WWPA: Western Wood Products Association.

1.05 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Submit certificate citing actual moisture content readings performed in accordance with this Section, indicating moisture content of all lumber was 19 percent or less at time of installation.
- C. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
 - 4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
- D. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.
- E. Research/Evaluation Reports: For the following, from ICC-ES:
 - 1. Preservative-treated wood.
 - 2. Fire-retardant-treated wood.
 - 3. Power-driven fasteners.
 - 4. Powder-actuated fasteners.
 - 5. Expansion anchors.
 - 6. Metal framing anchors.

1.06 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture and sun. Support stacked products with spacers between each bundle to prevent deformation and to allow air circulation.
- B. Deliver interior wood materials that are to be exposed to view only after building is enclosed and weatherproof, wet work other than painting is dry, and HVAC system is operating and

maintaining temperature and humidity at occupancy levels.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
 - 3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 4. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.
- C. Comply with applicable requirements of CA Title 24, Part 2, CBC, Chapter 23.

2.02 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: A WPA C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to A WPA C31 with inorganic boron (SBX).
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 - 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
 - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Interior wood sleepers, blocking, furring and similar concealed members in contact with masonry or concrete.
 - 3. Any wood framing or panel product within 8 inches of finished grade.

2.03 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Use treatment that does not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
 - 4. Design Value Adjustment Factors: Treated lumber shall be tested according ASTM D 5664, and design value adjustment factors shall be calculated according to ASTM D 6841.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.
- E. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
- F. Application: Treat all miscellaneous carpentry unless otherwise indicated.
 - 1. Framing for raised platforms.
 - 2. Concealed blocking.
 - 3. Roof framing and blocking.
 - 4. Wood cants, nailers, curbs, equipment support bases, blocking, and similar members in connection with roofing.
 - 5. Plywood backing panels.

2.04 DIMENSION LUMBER FRAMING

- A. Grading Agency: West Coast Lumber Inspection Bureau (WCLIB).

- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16):
 - 1. Species: Douglas Fir-Larch.
 - 2. Grade: No. 2 or better.

2.05 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Rooftop equipment bases and support curbs.
 - 4. Cants.
 - 5. Furring.
 - 6. Grounds.
- B. For items of dimension lumber size, provide lumber grade as indicated on Drawings with 15 percent maximum moisture content of any species.
- C. For exposed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:
 - 1. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; No. 2 or better; NeLMA, NLGA, WCLIB, or WWPA.
 - 2. Hem-fir or hem-fir (north), No. 2 or better; NLGA, WCLIB, or WWPA.
 - 3. Spruce-pine-fir (south) or spruce-pine-fir, No. 2 or better; NeLMA, NLGA, WCLIB, or WWPA.
- D. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:
 - 1. Hem-fir or hem-fir (north), No. 2 or better; NLGA, WCLIB, or WWPA.
 - 2. Spruce-pine-fir (south) or spruce-pine-fir, No. 2 or better; NeLMA, NLGA, WCLIB, or WWPA.
 - 3. Western woods, No. 2 or better; WCLIB or WWPA.
- E. For blocking not used for attachment of other construction No. 2 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- F. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.06 CONSTRUCTION PANELS

- A. Equipment Backing Panels: DOC PS 1, Exterior, AC, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.
 - 1. Plywood shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.07 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- F. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- G. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - 1. Interior Locations, where stainless steel is not indicated, use:
 - a. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn.
 - 2. Exterior Locations, interior areas with exposure to moisture, and where indicated, use:
 - b. Stainless steel, Type 316.

2.08 METAL FRAMING CONNECTORS

- A. Acceptable Products: Subject to compliance with requirements, provide products by one of the following:
 - 1. Simpson Strong-Tie Co., Inc.
 - 2. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
- B. Interior Locations, where stainless steel is not indicated, use:

1. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

C. Exterior Locations, and where indicated, use:

1. Stainless-Steel Sheet: ASTM A 666, Type 316.

2.09 MISCELLANEOUS MATERIALS

A. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

1. Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 EXECUTION

3.01 PREPARATION

A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 FRAMING INSTALLATION

A. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

C. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

D. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

E. Install structural members full length without splices unless otherwise specifically detailed.

F. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.

- G. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.
- H. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- I. Provide bridging at joists in excess of 8 feet span as detailed. Fit solid blocking at ends of members.
- J. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.
- K. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.
- L. Comply with A WPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
- M. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. 2013 CBC Table 2304.9.1, "Fastening Schedule."
- N. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

3.04 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- B. All structural members, grounds, blocking, backing, furring, brackets, or other anchorage which becomes an integral part of the building's walls, floors or ceilings, required for the installation of architectural woodwork or casework is to be furnished and installed as part of this Section and not to be furnished or installed by the architectural woodwork manufacturer or installer.
- C. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- D. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.
- E. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

- F. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- G. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- H. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.05 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

3.06 INSTALLATION OF CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Panels: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
 - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 - 3. Install adjacent boards without gaps.
 - 4. Coordinate locations with utilities requiring backing panels.
 - 5. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.

3.07 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.08 CLEANING

- A. Waste Disposal: 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK' provisions for Demolition and Site Clearing operations. Including, but not limited to the following:
 - 1. Section 702 – Construction and Demolition Waste Management.
 - 2. Section 706 – Cleanup and Dust Control.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 4100

ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Casework.
- B. Hardware typically furnished by casework manufacturer.
- C. Shelving.
- D. Structural supports incorporated into wood casework.
- E. Factory finishing.
- F. Preparation for installing utilities.
- G. Excluding:
 - 1. Metal support brackets and fittings that are part of the building structure.
 - 2. Plumbing, electrical fixtures, and telephone equipment.

1.02 RELATED REQUIREMENTS

- A. Section 05 5000 – Metal Fabrications: Fabricated steel supports.
- B. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- C. Sections in Division 22 – Plumbing. Fixtures and fittings installed in countertops.

1.03 REFERENCE STANDARDS

- A. ANSI A135.4 - American National Standard for Basic Hardboard.
- B. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use.
- C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards.
- D. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada.
- E. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association (ANSI/BHMA A156.9).
- F. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 2-5.3 for Shop Drawings and

Submittals.

- B. Shop Drawings:
 - 1. Submit shop drawings in conformance with the requirements of the *Architectural Woodwork Standards*.
 - 2. On casework and countertop elevations show the location of backing required for attachment within walls.
 - 3. Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Product Data: Provide data for all components, hardware and accessories.
- D. Samples: Submit actual samples of each laminate finish pattern and color.
- E. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.
- F. Schedule indicating keyed locking requirements at cabinets and drawers, for City verification.

1.06 QUALITY ASSURANCE

- A. Work shall be in accordance with the Grade or Grades specified of the *Architectural Woodwork Standards*.
- B. Fabricator Qualifications:
 - 1. Firm (woodwork manufacturer) with no less than 5 years of production experience similar to the work of this project, whose qualifications indicate the ability to comply with the requirements of this Section.
 - 2. The woodwork manufacturer must have at least 1 project in the past 5 years where the value of the woodwork was within 20 percent of the cost of woodwork for this Project.
- C. Single Source Responsibility: A single manufacturer shall provide and install the work described in this Section.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials only when the project is ready for installation and the general contractor has provided a clean storage area.
 - 1. Delivery of architectural millwork shall be made only when the area of operation is enclosed, all plaster and concrete work is dry and the area broom clean.
 - 2. During and after installation, maintain indoor temperature and humidity within the range recommended by the *Architectural Woodwork Standards* for the location of the project.
- B. Protect units from moisture damage.

1.08 SCHEDULING

- A. Coordinate fabrication, delivery and installation with the general contractor and other applicable trades.

PART 2 PRODUCTS

2.01 COMPONENTS

- A. Lumber shall be in accordance with the Architectural Woodwork Standards Grade specified for

the product being fabricated. Moisture Content shall be 6% to 12% for boards up to 2 inch nominal thickness, and shall not exceed 19% for thicker pieces.

- B. Veneers shall be in accordance with the *Architectural Woodwork Standards* requirements for its use and the Grades.
- C. Core shall be **hardwood plywood manufactured with exterior glue** meeting the requirements of Architectural Woodwork Standards.
- D. Veneer core plywood shall be a non-telegraphing hardwood manufactured with exterior glue.
- E. Plastic Laminate shall meet the requirements of the *Architectural Woodwork Standards* for its intended use.
- F. Cabinet Liner shall be type CLS.
- G. Edgeband: High pressure decorative laminate.
- H. Adhesives used shall be Type 1.
- I. Hardware:
 - 1. Pulls: **ADA-compliant 5 inch center-to-center** metal handle pull, Stainless Steel.
 - 2. Drawer Guides shall be full extension AWS approved. Provide heavy duty commercial grade, self-closing stay-closed type.
 - a. Manufacturers:
 - 1). Accuride International, Inc: www accuride.com.
 - 2). Grass America Inc: www.grassusa.com.
 - 3). Knap & Vogt Manufacturing Company: www.knapeandvogt.com.
 - 4). Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
 - 3. Hinges: Five knuckle Grade I hinges. Hinges shall be AWS compliant.
 - a. Manufacturers:
 - 1). Rockford Process Control (Terry Hinge): www.rockfordprocess.com. 851 overlay brushed stainless steel.
 - 2). Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
 - 4. Door Catches: magnetic.
 - 5. Shelf Supports: Standard side-mounted system using recessed metal shelf ladder standards or multiple bored holes for pin supports and coordinated self rests, polished chrome, or satin chrome finish, for nominal 1 inch spacing adjustments. Shelf supports for adjustable shelves in wall-hung cabinets and the upper half of tall cabinets shall be designed to prevent shelves from sliding forward in a seismic event.
 - 6. Locks: Provide keyed door and drawer locks at each occurrence. At rooms used by multiple individuals, provide locks with unique keyways at each cabinet door. Verify with City through submittal process. Provide 2 copies of each – master key and each unique key pattern.

2.02 FABRICATION

- A. Wood Casework – STAFF OFFICE BUILDING, NEW CASEWORK:
1. Casework shall meet the requirements of the *Architectural Woodwork Standards Custom Grade*.
 2. Casework shall be *Architectural Woodwork Standards CONSTRUCTION TYPE B*, face frame and cabinet and door *INTERFACE STYLE 2*, flush inset.
 3. Exposed Surfaces shall be material suitable for opaque finish, meeting the requirements of the AWS for the Grade specified.
 4. Exposed interior surfaces shall be per the requirements of the AWS.
 5. Semi-exposed surfaces shall be per the requirements of the AWS.
 6. Doors, drawer fronts, and false fronts shall be flush inset.
 7. Factory Finishing: Finish shall be AWS **Custom Grade**, factory finished using *Architectural Woodwork Standards* finish system 12 – Water-based Polyurethane. Color to match existing casework.
- B. Wood Casework – STAFF OFFICE BUILDING, FIELD MODIFY EXISTING CASEWORK:
1. Provide new drawers, drawer guides, doors and door hardware in existing casework at locations indicated on Drawings. Provide new solid blocking and structural modifications as necessary to achieve **heavy duty commercial grade** loading requirements.
 1. Casework modifications shall meet the requirements of the *Architectural Woodwork Standards Custom Grade*.
 2. Casework modifications shall be *Architectural Woodwork Standards CONSTRUCTION TYPE B*, face frame and cabinet and door *INTERFACE STYLE 2*, flush inset.
 3. Exposed Surfaces shall be material suitable for opaque finish, meeting the requirements of the AWS for the Grade specified.
 4. Exposed interior surfaces shall be per the requirements of the AWS.
 5. Semi-exposed surfaces shall be per the requirements of the AWS.
 6. Doors, drawer fronts, and false fronts shall be flush inset.
 7. Factory Finishing: Finish shall be AWS **Custom Grade**, factory finished using *Architectural Woodwork Standards* finish system 12 – Water-based Polyurethane. Color to match existing casework.
 - a. Refinish all existing casework to match.
- C. Plastic Laminate Casework – CLUBHOUSE KITCHEN:
1. Casework shall meet the requirements of the *Architectural Woodwork Standards Custom Grade*.
 2. Casework shall be *Architectural Woodwork Standards CONSTRUCTION TYPE A*, frameless and cabinet and door *INTERFACE STYLE 1*, overlay.
 3. Exposed Surfaces shall be high pressure decorative laminate (HPDL) meeting the

requirements of the AWS for the Grade specified.

4. Exposed interior surfaces shall be high pressure laminate matching exposed surfaces.
5. Semi-exposed surfaces shall be cabinet liner.
6. Doors, drawer fronts, and false fronts shall be flush overlay.
 - a. Edgeband at doors, drawer fronts and false fronts shall be PVC.

D. Drawers shall meet the requirements of the AWS for the Grade specified.

E. Stainless Steel Countertops – CLUBHOUSE KITCHEN:

1. Stainless Steel shall be 14 GA minimum, seamless and continuous, all visible surfaces #4 brushed finish.
2. Core material shall be exterior grade hardwood plywood with non-telegraphing grain, manufactured with exterior glue.
3. Back splashes shall be ASSEMBLY 2 – Deck Mount, manufacturer assembled.
4. Back splashes shall be integral cove and shall match height of existing window sill – FIELD VERIFY REQUIRED.
5. Front edges shall be self edge with no-drip, narrow build-up.
6. All metal edges shall be eased or hemmed and shall not be sharp to the touch.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify the adequacy and proper location of any required backing or support framing.
- B. Verify that mechanical, electrical, plumbing and other building components affecting work in this Section are in place and ready.

3.02 INSTALLATION

- A. Install all work in conformance with the *Architectural Woodwork Standards*, latest edition.
 1. Installation shall conform to the AWS Grade of the items being installed.
- B. All work shall be secured in place, square, plumb, and level.
- C. All work abutting other building components shall be properly scribed. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- D. Secure cabinets to floor using appropriate angles and anchorages.
- E. Mechanical fasteners used at exposed and semi-exposed surfaces, excluding installation attachment screws and those securing cabinets end-to-end, shall be countersunk.
- F. Equipment cutouts shown on plans shall be cut by the installer. Coordinate with other trades for equipment cutouts not shown on plans.

3.03 ADJUSTING

- A. Before completion of installation, Installer shall adjust all moving and operating parts to

function smoothly and correctly.

- B. All nicks, chips and scratches in the finish shall be filled and retouched. Damaged items that cannot be repaired shall be replaced.

3.04 CLEANING

- A. Upon completion of installation, the Installer shall clean all installed items, including pencil and ink marks and broom clean the area of operation, depositing debris in containers provided by the general contractor.

END OF SECTION

SECTION 07 4233

PLASTIC WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Plastic wall panels and accessories for use as exterior skin.

1.02 RELATED REQUIREMENTS

- A. Section 09 9000 – Painting and Coating: Preparation and painting of panels.

1.02 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, current editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data: Provide manufacturer’s data on specified component products.
- C. Physical Data: Submit materials physical data:
 - 1. Impact resistance
 - 2. Flexural strength
 - 3. Modulus of Elasticity
 - 4. Tensile strength
 - 5. Density
 - 6. Resistance to wet conditions
- D. Shop Drawings: Indicate dimensions, adjacent construction, materials, thicknesses, fabrication details, required clearances, field jointing, tolerances, colors, finishes, methods of support and anchorages.
- E. Samples: Submit two samples, 8x16 inch in size, illustrating color, texture, and finish. Include samples properly prepared and painted to match custom color as specified in Section 09 9000 - Painting and Coating.
- F. Maintenance Data: Include instructions for stain removal, surface and gloss restoration.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Protect components from damage by retaining shipping protection in place until installation.

- B. Store at ambient temperatures. The material is combustible. Fire precautions similar to those appropriate for wood-based products should be observed.
- C. Wear heavy-duty work gloves to protect hands from sharp edges. This is particularly important when handling thinner gauges.
- D. Wear eye protection during handling and fabrication.
- E. Deliver, store and handle material per manufacturer's written instructions.

1.04 FIELD CONDITIONS

- A. Do not install site fabricated components when site conditions may be detrimental to successful installation.
- B. Maintain temperature and humidity conditions favorable to proper curing of resin during and after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer:
 - 1. TRESPA, Product: Meteon FR; www.trespa.com; or approved equal.
 - 2. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Substitutions.

2.02 MATERIALS

- A. Decorative high-pressure compact laminates according to EN 438-6:2005.
 - 1. Thickness: 12mm
 - 2. Size: Custom-sized panels. Joint lines as indicated on drawings.
- B. Material must be FR (fire-retardant) classification of product.
- C. Material Properties:

Properties / Test Method	Result
Resistance to impact by a large diameter ball per EN 438-2:21	≤ 10mm
Impact Resistance per ASTM D5420	1.0466 ft
Dimensional Stability of elevated temperature per EN 438-2:17	≤ 0.25mm any direction

Resistance to wet conditions per ASTM D2247 – Water resistance	No change
Resistance to wet conditions per ASTM D2842 – Water absorption	0.5%
Modulus of Elasticity per ASTM D638	≥ 1,305,000 psi
Flexural Strength per ASTM D790	≥ 17,500 psi
Tensile Strength per ASTM D638	≥ 10,150 psi
Density per ASTM D792	≥ 1.35 g/cm ³
Resistance to fixings per ISO 13894-1	≥ 0.3937 in : ≥ 4,000 N
Thermal Resistance / conductivity per EN 12524	0.3 W/mK
Resistance to climatic shock per EN 438-2:19	Flexural Strength Index: ≥ 0.95 Flexural Modulus Index: ≥ 0.95 Appearance: ≥ 4
Fire performance per ASTM E84/UL723	Classification: A Flame Spread Index: 0-25 Smoke Developed Index: 0-450

2.03 JOINTS

- A. Corners: Provide a Fixed Corner profile, as described in manufacturer instructions. Continuously mitered corners on joining pieces of wall panel. Aluminum backing angle fixed to the back of panels at corner joint. Panel lengths of 300mm (~12 inches) to each side of joint.
- B. Horizontal Joints: Halved Joint, per manufacturer’s literature and instructions.
- C. Vertical Joints: Tongue-and-Groove Joint, per manufacturer’s literature and instructions.

2.03 FINISH

- A. Color: Custom finished to match custom paint color as described in Section 09 9000 – Painting and Coating or Sherwin Williams RAL Color No. 7009.
- B. Prepare the panels as indicated in manufacturer’s literature for paint finish. All surfaces must be clean, dry and dull. If there is a sheen, it will need to be cleaned abraded and dust free.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate is ready to receive work and dimensions are as indicated on shop drawings.
- B. Examine site conditions, substrates and other conditions under which wall panels are to be installed, and notify the Engineer in writing of conditions detrimental to the proper and timely

installation of the panels and completion of the Work. The Work shall not proceed until unsatisfactory conditions have corrected.

- C. Refer to MSDS for additional information including but not limited to hazard identification, special protection, storage and handling, and toxicity of material.

3.02 INSTALLATION

- A. Install fabrications in accordance with design drawings and fabricator's instructions.
- B. Protect the surfaces during fabrication.
- C. Modify panels as necessary per manufacturer's instructions.
- D. Machining: Sawing, Drilling, Jig-sawing and Routing of material to be performed per manufacturer's instructions and recommendations.

3.03 TOLERANCES

- A. Maximum variation from true position: 1/8 inch.
- B. Maximum offset from true alignment: 1/16 inch.

3.04 CLEANING

- A. Clean components of foreign material without damaging finished surface.
- C. Clean panels in accordance with fabricator's Cleaning and Maintenance instructions.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Joint Sealants, and joint backing.
- B. Precompressed foam sealers.

1.02 RELATED REQUIREMENTS

- A. 2013 California Green Building Standards Code (CALGreen).

1.03 REFERENCE STANDARDS

- A. ASTM C 834 - Standard Specification for Latex Sealants.
- B. ASTM C 919 - Standard Practice for Use of Sealants in Acoustical Applications.
- C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
- D. ASTM C 1184 – Standard Specification for Structural Silicone Sealants.
- E. ASTM C 1193 - Standard Guide for Use of Joint Sealants.
- F. ASTM C 1247 – Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids.
- G. ASTM D 1056 - Standard Specification for Flexible Cellular Materials--Sponge or Expanded Rubber.
- H. ASTM D 1667 - Standard Specification for Flexible Cellular Materials--Poly(Vinyl Chloride) Foam (Closed-Cell).
- I. ASTM D 2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for concrete Pavements.
- J. SCAQMD 1168 - South Coast Air Quality Management Owner Rule No.1168; current edition; www.aqmd.gov.

1.04 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 2-5.3 for Shop Drawings and Submittals..
- B. Product Data:
 - 1. Sealant: Chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
 - 2. Primers.
 - 3. Bond Breakers.
 - 4. Backstops.

- C. Selection Samples: Provide manufacturer's set of available colors.
- D. Verification Samples: Submit two samples, 6 inch in size illustrating sealant colors for selection.
- E. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years experience.
- C. Verify that each of the sealants are compatible for use with project joint substrates.

1.06 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.07 COORDINATION

- A. Coordinate the work with all sections referencing this section.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Silicone Sealants:
 - 1. Bostik Inc; Product CHEM-CALK 1200: www.bostik-us.com.
 - 2. Pecora Corporation; Product 890 NST: www.pecora.com.
 - 3. BASF Construction Chemicals-Building Systems; Product Omniseal 50: www.chemrex.com.
 - 4. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
- B. Polyurethane Sealants:
 - 1. Sika Corporation; Product Sikaflex-1a: www.sikausa.com.
 - 2. Bostik Inc; Product CHEM-CALK 900 (vertical) and 955 SL (horizontal): www.bostik-us.com.
 - 3. Pecora Corporation; Product DynaTrol I-XL: www.pecora.com.
 - 4. BASF Construction Chemicals-Building Systems; Product NP-2: www.chemrex.com.
 - 5. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.

C. Polysulfide Sealants:

1. Pecora Corporation; Product Synthacalk GC2+: www.pecora.com.
2. BASF Construction Chemicals-Building Systems; Product Sonalastic Polysulfide Sealant: www.chemrex.com.
3. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.

D. Butyl Sealants:

1. Bostik Inc; Product CHEM-CALK 300: www.bostik-us.com.
2. Pecora Corporation; Product BC-158: www.pecora.com.
3. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.

E. Acrylic Emulsion Latex Sealants:

1. Bostik Inc; Product CHEM-CALK 600 ACRYLIC LATEX: www.bostik-us.com.
2. Pecora Corporation; Product AC-20 +SILICONE: www.pecora.com.
3. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.

F. Preformed Compressible Foam Sealers:

1. Sandell Manufacturing Company, Inc; Product Polyseal: www.sandellmfg.com.
2. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.

2.02 SEALANTS

A. Sealants and Primers - General: Provide products having volatile organic compound (VOC) content within limits as indicated in 2013 California Green Building Standards Code.

B. Type A - General Purpose Exterior Sealant: Polyurethane.

Vertical Applications: Provide ASTM C 920, Type S or M, Grade NS, Class 25, Use NT.

Horizontal Applications: Provide ASTM C 920, Type S or M, Grade P, Class 25, Use T.

1. Color: as selected.
2. Joint Locations:
 - a. Joints and recesses formed where frames and subsills of windows, doors, louvers and vents join masonry, concrete or metal frames. Use sealant at both exterior and interior surfaces of exterior wall penetrations.

- b. Joints between concrete and other materials.
 - c. Joints between new and existing exterior masonry walls.
 - d. Masonry joints where shelf angles occur.
 - e. Joints in wash surfaces of stone work.
 - f. Expansion and control joints.
 - g. Interior face of expansion joints in exterior concrete or masonry walls where metal expansion joint covers are not required.
 - h. Voids where items pass through exterior walls.
 - i. Metal reglets where flashing is inserted into masonry joints, and where flashing is penetrated by coping dowels.
 - j. Metal-to-metal joints where sealant is indicated or specified.
 - k. Joints between ends of gravel stops , fascias, copings and adjacent walls.
 - l. Other joints for which no other sealant is indicated.
- C. Type B - Exterior Expansion Joint Sealer: Precompressed foam sealer; urethane with water-repellent;
- 1. Size as required to provide weathertight seal when installed.
 - 2. Provide product recommended by manufacturer for traffic-bearing use.
 - 3. Applications: Use for:
 - a. Exterior wall expansion joints.
- D. Type C - Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
- 1. Applications: Use for:
 - a. Concealed sealant bead in sheet metal work.
 - b. Concealed sealant bead in siding overlaps.
- E. Type D - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, Type OP, Grade NF single component, paintable.
- 1. Color: Standard colors matching finished surfaces.
 - 2. Applications: Use for:
 - a. Interior wall and ceiling control joints.
 - b. Joints between door and window frames and wall surfaces.
 - c. Other interior joints for which no other type of sealant is indicated.
- F. Type E - Bathtub/Tile Sealant: White silicone; ASTM C 920, Uses I, M and A; single component, mildew resistant.

1. Applications: Use for:
 - a. Joints between plumbing fixtures and floor and wall surfaces.
 - b. Joints between kitchen and bath countertops and wall surfaces.
- G. Type F - Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Grade P, Class 25, Uses T; single or multi- component.
 1. Color: Standard colors matching finished surfaces.
 2. Applications: Use for:
 - a. Expansion joints in floors.
 - b. Seats of metal thresholds at exterior doors.
- H. Type G - Sealant for Continuous Water Immersion: Polysulfide; ASTM C 920, Grade NS, Class 25, Uses I, M, and A; approved by manufacturer for continuous water immersion; single, or multi- component.
 1. Applications: Use for:
 - a. Joints in pump pit.
- I. Type H - Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Class 25, Uses T; single or multi- component.
 1. Color: Color as selected.
 2. Applications: Use for:
 - a. Joints in sidewalks and vehicular paving.

2.03 ACCESSORIES

- A. Primer: Non-staining, type and consistency as recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Bond Breaker: Provide type and consistency as recommended by sealant manufacturer to prevent adhesion to backing or to bottom of joint.
- D. Joint Backing/Backstop: Provide neoprene, butyl, polyurethane, or polyethylene foams free from oil or other staining elements as recommended by sealant manufacturer. Provide 25 to 33 percent oversized backing for closed cell and 40 to 50 percent oversized backing for open cell material, unless otherwise indicated. Ensure backstop material is compatible with sealant. Do not use oakum and other types of absorptive materials as backstops.
 1. Rubber: Conform to ASTM D 1056, Type 1, open cell, Class A, round cross section cellular rubber sponge backing. Use Class B where exposed to oil or fuel. Use Type 2 closed cell in locations where moisture may migrate to backing.
 2. PVC: Conform to ASTM D 1667, Grade VO 12, open cell foam, round cross section for Polyvinyl chloride (PVC) backing. Do not use open cell foam in moist areas or below grade.

3. Synthetic Rubber: Conform to ASTM C 509, Option 1, Type 1 preformed rods for synthetic rubber backing.
4. Neoprene: Conform to ASTM D 1056, closed cell expanded neoprene cord Type 2, Class C, for neoprene backing.
5. Butyl Rubber Based: Provide butyl rubber based sealants of single component, solvent release, color as selected, conforming to ASTM C 1311.
6. Silicone Rubber Base: Provide silicone rubber based sealants of single component, solvent release, color as selected, conforming to ASTM C 920, non-sag, Class 25.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces and joint openings are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C 1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C 1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install backstops where indicated, and where not indicated by joint cavities exceed the acceptable maximum joint width-to-depth ratio as indicated by manufacturer for each product. Tightly pack the back or bottom of joint cavities with backstop material to provide a joint of the depth specified.
- E. Primer: Immediately prior to application of the sealant, clean out loose particles from joints. Where recommended by sealant manufacturer, apply primer to joints in concrete masonry units, wood and other porous surfaces in accordance with sealant manufacturer's instructions. Do not apply primer to exposed finish surfaces.
- F. Install bond breaker where joint backing is not used. Carefully apply bond breaker to avoid contamination of adjoining surfaces of breaking bond with surfaces other than those covered by the bond breaker.
- G. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- H. Apply sealant within recommended application temperature ranges. Consult manufacturer

when sealant cannot be applied within these temperature ranges.

- I. Tool joints concave.
- J. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.
- K. Compression Gaskets: Avoid joints except at ends, corners, and intersections; seal all joints with adhesive; install with face 1/8 to 1/4 inch below adjoining surface.

3.04 CLEANING

- A. Upon completion of sealant application, remove remaining smears and stains and leave the work in a clean and neat condition.
 - 1. Masonry and Other Porous Surfaces: Immediately scrape off fresh sealant that has been smeared on masonry and rub clean with a solvent as recommended by the sealant manufacturer. Allow excess sealant to cure for 24 hours, then remove by wire brushing or sanding.
 - 2. Metal and other Non-Porous Surfaces: Remove excess sealant with a solvent-moistened cloth.

3.05 PROTECTION

- A. Protect sealants until cured. Protect areas adjacent to joints from sealant smears. Masking tape may be used for this purpose if removed 5 to 10 minutes after the joint is filled.

END OF SECTION

SECTION 08 1400

WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Flush wood doors, non-rated.
- B. Stile and Rail Wood Doors, non-rated.
- C. True Divided Lite (TDL) Glazing.
- D. Factory finishing.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 – Rough Carpentry.
- B. Section 08 7100 - Door Hardware.

1.03 REFERENCE STANDARDS

- A. Architectural Woodwork Standards; latest edition, published jointly by the Architectural Woodwork Institute, the Architectural Woodwork Manufacturer Association of Canada, and the Woodwork Institute.

1.04 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, current editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Submit shop drawings in conformance to the requirements of the *Architectural Woodwork Standards*.
- D. Samples: Submit four finished samples of each species and cut of wood to be used. Veneer samples to be minimum 12” x 12”. Samples shall represent the range of color and grain expected to be provided.
- E. Warranty, executed in City’s name.

1.05 QUALITY ASSURANCE

- A. Work shall be in accordance with the Grade specified of the *Architectural Woodwork Standards*. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented production experience similar to this Project, whose qualifications indicate the ability to comply with the requirements of this Section.
 - 1. Company with at least one project in the past 5 years with value of woodwork within 20

percent of cost of woodwork for this Project.

- C. Single Source Responsibility: A single manufacturer shall provide and install the work of this Section.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard. Deliver materials only when the project is ready for installation and the Contractor has provided a clean storage area.
- B. Delivery of architectural millwork shall be made only when the area of operation is enclosed, all plaster and concrete work is dry and the area broom clean.
- C. Maintain indoor temperature and humidity within the range recommended by the *Architectural Woodwork Standards* for the location of the project.

1.07 WARRANTY

- A. Interior Doors: Provide manufacturer's warranty for life of original installation.
- B. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

1.08 SCHEDULING

- A. Coordinate fabrication, delivery and installation with the general contractor and other applicable trades.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wood Doors:
 - 1. Graham Wood Doors: www.grahamdoors.com.
 - 2. Eggers Industries; www.eggersindustries.com.
 - 3. Haley Brothers; www.haleybros.com.
 - 4. Marshfield Door Systems, Inc; www.marshfielddoors.com.
 - 5. GlassCraft Door Company; www.gcdoor.com.
 - 6. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.

2.02 COMPONENTS

- A. Flush Wood Doors:
 - 1. Doors shall meet the requirements of ANSI/WDMA Extra Heavy Duty performance level.
 - 2. Faces at doors for opaque finish shall be closed grain hardwood.
 - 3. Core shall be staved core lumber.

B. Stile and Rail Doors:

1. Doors shall meet the requirements of ANSI/WDMA Extra Heavy Duty performance level.
1. Lumber shall be closed grain hardwood.
2. Core material for panels shall be staved core lumber.
3. Core material for stiles and rails shall be staved core lumber.
4. Type I adhesive shall be used at exterior doors.
5. Lights shall be True Divided Light (TDL), and tempered safety glass.
 - a. Lights at exterior doors shall be dual-pane insulated glazing units.

2.03 FABRICATION

A. Slab doors shall be *Architectural Woodwork Standards* Custom Grade:

1. Doors shall be 7 ply construction.
2. Exterior doors shall be assembled with Type I glue.
3. Size of doors; type, size and location of lights and louvers; astagals, edging, flashing, and specialty hardware; x-ray and sound requirements, and transom panels shall be as indicated on the door schedule and in Section 08 7100 – Door Hardware.
4. Fire-rated doors shall be of the construction standard of the manufacturer and conform with the requirements of all applicable labeling agencies.
5. Provide blocking as required for surface mounted hardware to prevent the need for through bolting.

B. Stile and Rail Doors shall be *Architectural Woodwork Standards* Custom Grade.

1. Panels:
 - a. Shall be 3/4 inches thick.
2. Sticking and panel edge details shall match existing doors in each location exactly.

C. Factory Finishing:

1. All products provided in this Section shall be factory finished using Architectural Woodwork Standards finishing system. Paint Finish. Refer to Section 09 9000 – Painting and Coating.
2. Finish shall be *Architectural Woodwork Standards* Custom Grade.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that frames are set square, plumb, level and are in plane.
 1. Report openings that are not within tolerance to the Contractor for correction before hanging doors.
- B. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or

alignment.

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and *Architectural Woodwork Standards*, latest edition.
 - 1. Installation shall conform to the AWS Grade of the items being installed.
- B. Doors shall be secured in place, square, plumb and level.
- C. Hardware shall be installed complete and as recommended by the manufacturer.

3.03 ADJUSTING & TOUCH UP

- A. Before completion of the installation, the installer shall adjust all moving and operating parts to function smoothly and correctly.
- B. All nicks, chips and scratches in the finish shall be filled and retouched. Damaged items which cannot be repaired shall be replaced.
- C. Adjust door, hardware and closers for:
 - 1. Full closure
 - 2. To comply with California Building Code section 11B-404.2.8 – Closing Speed.
 - 3. To comply with California Building Code section 11B-404.2.9 – Door and Gate opening force.

3.05 CLEANUP

- A. Upon completion of installation, the installer shall clean all installed items of pencil and ink marks, and broom clean the area of operation, depositing debris in containers provided by the Contractor.

3.06 SCHEDULE - See Drawings

END OF SECTION

SECTION 08 3100
ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Non-fire rated wall access panels.
2. Non-fire rated ceiling access panels.
3. Related hardware and attachments.

B. Related Sections:

4. Section 09 2900 - Gypsum Board.
5. Section 09 9000 – Paints and Coatings.
6. Division 15 - Mechanical.
7. Division 16 – Electrical.

1.2 system description

A. Design Requirements:

8. **Verification:** Obtain specific locations and sizes for required access doors and frames from trades, including mechanical and electrical, requiring access to concealed equipment and indicate on submittal schedule.

1.3 SUBMITTALS

A. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 2-5.3 for Shop Drawings and Submittals.

B. Shop Drawings:

9. **Door and panel units:** Show types, elevations, thickness of metals, full size profiles of door members.
10. **Hardware:** Show materials, finishes, locations of fasteners, types of fasteners, locations and types of operating hardware, and details of installation.
11. **General:** Show connections of units and hardware to other Work. Include schedules showing location of each type and size of door and panel units.

C. Product Data: Manufacturer’s technical data for each type of access door and panel assembly, including setting drawings, templates, fire-resistive characteristics, finish requirements, and details of anchorage devices.

12. Include complete schedule, types, locations, construction details, finishes, latching or locking provisions, and other pertinent data.

- D. **Manufacturer's Installation Instructions:** Indicate installation requirements and rough-in dimensions.

1.4 QUALITY ASSURANCE

- A. **Single Source Responsibility:** Obtain access door and panel units, and frames for entire Project from 1 source and 1 single manufacturer.
- B. **Fire-Resistance Ratings:** Wherever a fire-resistance classification is indicated, provide access door and panel assemblies with panel door, frame, hinge, and latch from manufacturer listed in Underwriter's Laboratories (UL), "Building Materials Directory" for rating shown.
 - 13. Provide 90 minute UL label at 2-hour rated partitions.
 - 14. Provide 3 hour Warnock Hersey label at horizontal applications, up to 24 inch wide x 36 inch high.
 - 15. Provide 2 hour Warnock Hersey label at horizontal applications greater than 24 inch wide x 36 inch high.
- C. **Size Variations:** Obtain Engineer's acceptance and approval of manufacturer's standard size units that may vary slightly from sizes indicated on Drawings.
- D. **Coordination:** Provide inserts and anchoring devices that will be built into other Work for installation of access door assemblies. Coordinate delivery with other Work to avoid delay.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Package and ship per manufacturer's recommendations.
- B. Store per manufacturer's instructions.
 - 16. Store in dry area out of direct sunlight.

1.6 WARRANTY

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 6-8.3 for Warranty.
- B. Warrant materials and workmanship against defects after completion and final acceptance of Work.
 - 17. Repair defects, or replace with new materials, faulty materials or workmanship developed during the guarantee period at no expense to City.
 - 18. Access Panel Warranty: 1 year from date of shipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of design manufacturer:
 - 19. Babcock-Davis
9300 73rd Avenue North
Brooklyn Park, MN 55428

Toll Free Hotline: 888.412.3726

Toll Free Fax: 888.312.3726

Direct Phone: 763-488-9247

E-Mail: info@babcockdavis.com

Internet: <http://www.babcockdavis.com/>

- B. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.

2.2 MATERIALS

- A. Type: No. 304 stainless steel with No. 4 satin polish finish.

2.3 ACCESS PANELS

- A. Non rated flush access doors, Babcock-Davis Architectural N & P series.

- 20. Door: Fabricate from 14-gauge cold rolled stainless steel.
- 21. Frame: Fabricate from 16-gauge cold rolled sheet stainless steel. Provide 1/4 inch mounting holes.
 - a. PT – Stainless Steel – 1 inch flange at perimeter.
- 22. Hinge: PT – pin hinge.
- 23. Latching/Locking Mechanism:
 - a. Screwdriver cam latch, standard.
- 24. Finish: Type No. 304 stainless steel with No. 4 satin polish finish.

2.4 FABRICATION

- A. Manufacture each access panel assembly as an integral unit ready for installation.
- B. Welded construction: Furnish with a sufficient quantity of 1/4 inch mounting holes to secure access panels to types of supports indicated.
- C. Recessed panel: Form face of panel to provide specified recess for application of finish material. Reinforce panel as required to prevent buckling.
- D. Furnish number of latches required to hold door in flush, smooth plane when closed.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that rough openings for door and frame are correctly sized and located.
- B. Verify mechanical and electrical requirements for ceiling or wall access panels.

3.2 PREPARATION

- A. Advise installers of work relating to access panel installation including rough opening dimensions, locations of supports, and anchoring methods. Coordinate delivery with other work to avoid delay.

3.3 INSTALLATION

- A. Install access door and frame units per manufacturer's written instructions.
- B. Install frames plumb and level in opening. Secure rigidly in place.
- C. Position units to provide convenient access to concealed Work requiring access.

3.4 ADJUST AND CLEAN

- A. Adjust panel after installation for proper operation.
- B. Remove and replace panels or frames that are warped, bowed, or damaged.

END OF SECTION

SECTION 08 7100
DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Door Hardware, including electric hardware.
 - 2. Gate Hardware.

- B. Related Sections:
 - 1. Section 07 9200 - Joint Sealers – exterior thresholds
 - 2. Section 08 1400 – Wood Doors

- C. Specific Omissions: Hardware for the following is specified or indicated elsewhere.
 - 1. Windows.
 - 2. Cabinets, including open wall shelving and locks.
 - 3. Signs, except where scheduled.
 - 4. Toilet accessories, including grab bars.
 - 5. Installation.
 - 6. Rough hardware.
 - 7. Conduit, junction boxes & wiring.
 - 8. Folding partitions, except cylinders where detailed.
 - 9. Sliding aluminum doors, except cylinders where detailed.
 - 10. Access doors and panels, except cylinders where detailed.
 - 11. Corner Guards.
 - 12. Wrought Iron railing gates and supports.

1.2 REFERENCES:

Use date of standard in effect as of Bid date.

- A. American National Standards Institute – ANSI 156.18 – Materials and Finishes.
- B. BHMA – Builders Hardware Manufacturers Association
- C. DHI – Door and Hardware Institute
- D. NFPA – National Fire Protection Association
 - 1. NFPA 80 – Fire Doors and Windows
 - 2. NFPA 105 – Smoke and Draft Control Door Assemblies
 - 3. NFPA 252 – Fire Tests of Door Assemblies
 - 4. NFPA 101 – Life Safety Code
- E. UL – Underwriters Laboratories
 - 1. UL10C – Positive Pressure Fire Tests of Door Assemblies.
 - 2. UL 305 – Panic Hardware
- F. WHI – Warnock Hersey Incorporated
- G. 2013 State of California Building Code
- H. Local applicable codes
- I. SDI – Steel Door Institute
- J. WI – Woodwork Institute
- K. AWI – Architectural Woodwork Institute
- L. NAAMM – National Association of Architectural Metal Manufacturers

1.3 SUBMITTALS & SUBSTITUTIONS

- A. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, current editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Only submittals printed one sided will be accepted and reviewed. Organize vertically formatted schedule into “Hardware Sets” with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
 - 1. Type, style, function, size, quantity and finish of hardware items.

2. Use BHMA Finish codes per ANSI A156.18.
 3. Name, part number and manufacturer of each item.
 4. Fastenings and other pertinent information.
 5. Description of door location using space names and numbers as published in the drawings.
 6. Explanation of abbreviations, symbols, and codes contained in schedule.
 7. Mounting locations for hardware.
 8. Door and frame sizes, handing, materials, fire-rating and degrees of swing.
 9. List of manufacturers used and their nearest representative with address and phone number.
 10. Catalog cuts.
 11. Wiring Diagrams.
 12. Manufacturer's technical data and installation instructions for electronic hardware.
 13. Date of jobsite visit to review existing conditions.
- C. Bid and submit manufacturer's updated/improved item if scheduled item is discontinued.
- D. Deviations: Highlight, encircle or otherwise identify deviations from "Schedule of Finish Hardware" on submittal with notations clearly designating those portions as deviating from this section.
- E. If discrepancy between drawings and scheduled material in this section, bid the more expensive of the two choices, note the discrepancy in the submittal and request direction from Architect for resolution.
- F. Substitutions: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Substitutions. Include product data and indicate benefit to the Project. Furnish operating samples on request.
- G. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, wiring diagrams, manufacturers' installation, adjustment and maintenance information, and supplier's final inspection report.

1.4 QUALITY ASSURANCE:

- A. Qualifications:

1. Hardware supplier: direct factory contract supplier who employs a certified architectural hardware consultant (AHC), available at reasonable times during course of work for project hardware consultation to City, Architect and Contractor.
 - a) Responsible for detailing, scheduling and ordering of finish hardware. Detailing implies that the submitted schedule of hardware is correct and complete for the intended function and performance of the openings.
- B. Hardware: Free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.
- C. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
- D. Fire-Rated Openings: NFPA 80 compliant. Hardware UL10C / California State Fire Marshal Standard 12-7-4 (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved-bearing hinges, and resilient seals. Coordinate with wood door section for required intumescent seals. Furnish openings complete.
 1. Note: scheduled resilient seals may exceed selected door manufacturer's requirements.
 2. See article 2.6, line E for added information regarding resilient and intumescent seals.
- E. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Delivery: coordinate delivery to appropriate locations (shop or field).
 1. Permanent keys and cores: secured delivery direct to City's representative.
- B. Acceptance at Site: Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.
- C. Storage: Provide securely locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, dust, excessive heat and cold, etc.

1.6 PROJECT CONDITIONS AND COORDINATION:

- A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect's approval.

- B. Coordination: Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents. Furnish related trades with the following information:
1. Location of embedded and attached items to concrete.
 2. Location of wall-mounted hardware, including wall stops.
 3. Location of finish floor materials and floor-mounted hardware.
 4. Locations for conduit and raceways as needed for electrical, electronic and electro-pneumatic hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
 5. Manufacturer templates to door and frame fabricators.
- C. Check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation. Do not order hardware until the submittal has been reviewed by the frame and door suppliers for compatibility with their products.
- D. Prior to submittal, carefully inspect existing conditions at each opening to verify finish hardware required to complete Work, including sizes, quantities, existing hardware scheduled for re-use, and sill condition material. If conflict or incompatibility between the specified/scheduled hardware and existing conditions, submit request for direction from Engineer. Include date of jobsite visit in the submittal.
1. Submittals prepared without thorough jobsite visit by qualified hardware expert will be rejected as non-compliant.

1.7 WARRANTY:

- A. Comply with 2012 Standard Specifications for Public Works Construction ‘The GREENBOOK’ and 2012 City Supplement ‘The WHITEBOOK’, Section 6-8.3 for Warranty.
- B. In addition, provide the following long term warranty contracts as part of respective manufacturers’ regular terms of sale. Provide manufacturers’ written warranties:
 - 1. Locksets: Three years
 - 2. Extra Heavy Duty Cylindrical Lock: Seven Years
 - 3. Electronic Locks One Year
 - 4. Exit Devices: Three years mechanical
One year electrical
 - 5. Closers: Ten years mechanical
Two years electrical
 - 6. Hinges: One year
 - 7. Continuous Hinges Life of the Installation
 - 8. Other Hardware Two years

1.8 COMMISSIONING:

- A. Conduct these tests prior to request for certificate of substantial completion:
 - 1. With installer present, test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.
 - 2. With installer, access control contractor and electrical contractor present, test electrical, electronic and electro-pneumatic hardware systems for satisfactory operation.
 - 3. With installer and electrical contractor present, test hardware interfaced with fire/life-safety system for proper operation and release.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

- A. Listed acceptable alternate manufacturers: submit for review products with equivalent function and features of scheduled products.

ITEM:	MANUFACTURER:	ACCEPTABLE SUB:
Hinges	(IVE) Ives	Bommer
Key System	Best (verify)	
Locks	(SCH) Schlage	
Exit Devices	(VON) Von Duprin	
Closers	(LCN) LCN	
Auto Flush Bolts	(IVE) Ives	DCI
Coordinators	(IVE) Ives	DCI
Silencers	(IVE) Ives	Trimco
Push & Pull Plates	(IVE) Ives	Trimco
Kickplates	(IVE) Ives	Trimco
Stops & Holders	(IVE) Ives	Trimco
Overhead Stops	(GLY) Glynn-Johnson	None available
Thresholds	(NGP) NGP	Zero
Seals & Bottoms	(NGP) NGP	Zero

2.2 HINGING METHODS:

- A. Drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.
- B. Conform to manufacturer's published hinge selection standard for door dimensions, weight and frequency, and to hinge selection as scheduled. Where manufacturer's standard exceeds the scheduled product, furnish the heavier of the two choices, notify Architect of deviation from scheduled hardware.
- C. Conventional Hinges: Steel or stainless steel pins and concealed bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.
 - 1. Outswinging exterior doors: non-ferrous with non-removable (NRP) pins and security studs.
 - 2. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.
- D. Continuous Hinges:
 - 1. Pinned steel/stainless steel type: continuous stainless steel, 0.25-inch diameter stainless-steel hinge pin.
 - a) Use engineered application-specific wide-throw units as needed to provide maximum swing degree of swing, advise Engineer if required width exceeds 8 inches.
 - 2. At masonry construction, coordinate with the anchoring and hollow metal supplier prior to frame installation by placing a strip of insulation on the back of the hollow metal frame behind the rabbet section. When the frame is grouted in place, the backing will allow drilling and tapping without dulling or breaking the installer's bits.
- E. Pivots: high-strength forged bronze or stainless steel, tilt-on precision bearing and bearing pin.
 - 1. Bottom and intermediate pivots: adjustability of minus 1/16 inch, plus 1/8 inch.
- F. Floor Closers: hydraulically controlled, cement case, maximum degree dead stop permitted by trim or adjacent structure. Special pins, floor pans and longer spindles when needed to accommodate floor and jamb conditions.

2.3 LOCKSETS, LATCHSETS, DEADBOLTS:

- A. Mortise Locksets and Latchsets: Shall be Schlage L9000 Series as scheduled.

1. Chassis: cold-rolled steel, handing field-changeable without disassembly.
2. Latchbolts: 3/4 inch throw stainless steel anti-friction type.
3. Lever Trim: through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable.
 - a) Spindles: security design independent breakaway. Breakage of outside lever does not allow access to inside lever's hubworks to gain wrongful entry.
 - b) Inside lever applied by screwless shank mounting – no exposed trim mount screws.
 - c) Outside and inside trim thru-bolted together and through the door.
4. Spring-loaded fusible link provides fail secure mode in case of fire.
5. Universal lock case – 10 functions in one case.
6. Floating mounting tabs automatically adjusts to fit a beveled door edge.
7. Field reversible handing without opening lock case.
8. External spring cages allow for simple trim retrofit.
9. Lever rotation in both directions(up & down) for ease of use.
10. At Vandlgard locks, locked lever freely rotates down while remaining securely locked. This feature prevents damage to internal lock components when subjected to excessive force.
11. Independent lever rotation.
12. Furnish solid cylinder collars with wave springs. Wall of collar to cover rim of mortise cylinder.
13. Thumbturns: accessible design not requiring pinching or twisting motions to operate.
14. Deadbolts: stainless steel 1-inch throw.
15. Electric operation: Manufacturer-installed continuous duty solenoid.
16. Strikes: 16 gage curved steel, bronze or brass with 1 inch deep box construction, lips of sufficient length to clear trim and protect clothing.
17. Scheduled Lock Series and Design: Schlage L series, 17A design.

18. Certifications:
 - a) ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.
 - b) ANSI/ASTM F476-84 Grade 31 UL Listed.
- B. Extra Heavy Duty Cylindrical Locks and Latches: BEST 9K series.
 1. Chassis: cylindrical design, corrosion-resistant plated cold-rolled steel, through-bolted.
 2. Locking Spindle: stainless steel, integrated spring and spindle design.
 3. Latch Retractors: forged steel. Balance of inner parts: corrosion-resistant plated steel, or stainless steel.
 4. Latchbolt: solid steel.
 5. Backset: 2-3/4" typically, more or less as needed to accommodate frame, door or other hardware.
 6. At Vandlgard locks, locked lever freely rotates up and down while remaining securely locked. This feature prevents damage to internal lock components when subjected to excessive force.
 7. Lever Trim: accessible design, independent operation, spring-cage supported, minimum 2" clearance from lever mid-point to door face.
 8. Electric operation: Manufacturer-installed continuous duty solenoid.
 9. Strikes: 16 gage curved steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
 10. Certifications:
 - a) ANSI A156.2, 1994, Series 4000, Grade 1.
 - b) UL listed for A label and lesser class single doors up to 4ft x 8ft.

2.4 EXIT DEVICES / PANIC HARDWARE

- A. General features: Shall be Von Duprin 98 and 35A Series as scheduled.
 1. Independent lab-tested 1,000,000 cycles.
 2. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.

3. End caps: impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
4. No exposed screws to show through glass doors.
5. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
6. Releasable in normal operation with 15-lb. maximum operating force per California State Fire Marshal Standard 12-10-3, and with 32 lb. maximum pressure under 250-lb. load to the door.
7. Exterior doors scheduled with XP-series devices: Static load force resistance of at least 2000 pounds.
8. Where devices span over door lite frame and the face of the selected lite manufacturer's frame is raised from the face of the door, furnish panic hardware manufacturer's fitted shims or glass-bead kits at no additional cost to the project.
9. Comply with CBC Section 1003.3.1.9 and 1008.1.9.

B. Specific features:

1. Non-Fire Rated Devices: cylinder dogging.
2. Lever Trim: breakaway type, forged brass or bronze escutcheon min .130" thickness, compression spring drive, match lockset lever design.
3. Rod and latch guards with sloped full-width kickplates for doors fitted with surface vertical rod devices with bottom latches.
4. Fire-Labeled Devices: UL label indicating "Fire Exit Hardware". Vertical rod devices less bottom rod (LBR) unless otherwise scheduled.
5. California 5# Operational Force Labeled Devices: UL label indicating "Meets California Building Code (2013) Sec. 11B-309.4". Vertical rod devices less bottom rod (LBR) unless otherwise scheduled.
6. Impact recessed devices: 1-1/4 inch projection when push-pad is depressed. Sloped metal end caps to deflect carts, etc. No pinch points to catch skin between touchbar and door.
7. Delayed Egress Devices: Function achieved within single exit device component, including latch, delayed locking device, request-to-exit switch, nuisance alarm, remote alarm, key switch, indicator lamp, relay, internal horn, door position input, external inhibit input plus fire alarm input. NFPA 101 "Special Locking Arrangement" compliant.

8. Electrically Operated Devices: Single manufacturer source for electric latch retraction devices, electrically controlled trim, power transfers, power supplies, monitoring switches and controls.
9. Removable Mullions: Removable with single turn of building key. Securely reinstalled without need for key. Furnish storage brackets for securely stowing the mullion away from the door when removed.

2.5 CLOSERS

A. Surface Closers:

1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
2. ISO 2000 certified. Units stamped with date-of-manufacture code.
3. Independent lab-tested 10,000,000 cycles.
4. Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.
5. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
6. Adjustable to open with not more than 5.0lbs pressure to open at exterior doors and 5.0lbs at interior doors. As allowed per California Building Code, Section 1133B.2.5, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15lbs.
7. When provided, the sweep period of the closer shall be adjusted so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door.
8. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
9. Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units.
10. Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
11. Exterior doors: seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F, furnish checking fluid data on request.
12. Non-flaming fluid, will not fuel door or floor covering fires.
13. Pressure Relief Valves (PRV) not permitted.

14. Supply Special Rust Inhibitor(SRI) at corrosive environments. This special corrosion resistant pretreatment, when added to the powder coat finish, gives the closer a tremendous advantage over a potentially corrosive environment.

2.6 OTHER HARDWARE

- A. Automatic Flush Bolts: Low operating force design.
- B. Overhead Stops: Non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
- C. Kick Plates: Rounded and relieved edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.
- D. Door Stops: Provide stops to protect walls, casework or other hardware.
 1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.
 2. Locate overhead stops for maximum possible opening. Consult with City for furniture locations. Minimum: 90deg stop / 95deg deadstop. Note degree of opening in submittal.
- E. Seals: Finished to match adjacent frame color. Resilient seal material: polyurethane, polypropylene, nylon brush, silicone rubber or solid high-grade neoprene as scheduled. Do not furnish vinyl seal material. UL label applied to seals on rated doors. Substitute products: certify that the products equal or exceed specified material's thickness and durability.
 1. Proposed substitutions: submit for approval.
 2. Solid neoprene: MIL Spec. R6855-CL III, Grade 40.
 3. Non-corroding fasteners at in-swinging exterior doors.
 4. Sound control openings: Use components tested as a system using nationally accepted standards by independent laboratories. Ensure that the door leafs have the necessary sealed-in-place STC ratings. Fasten applied seals over bead of sealant.
 5. Fire-rated Doors, Resilient Seals: UL10C / UBC Standard 7-2 compliant. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements. Where rigid housed resilient seals are scheduled in this section and the selected door manufacturer only requires an adhesive-mounted resilient seal, furnish rigid housed seal at minimum, or both the rigid housed seal plus the adhesive applied seal. Adhesive applied seals alone are deemed insufficient for this project where rigid housed seals are scheduled.

6. Fire-rated Doors, Intumescent Seals: Furnished by selected door manufacturer. Furnish fire-labeled opening assembly complete and in full compliance with UL10C / UBC Standard 7-2. Where required, intumescent seals vary in requirement by door type and door manufacture -- careful coordination required
- F. Automatic door bottoms: low operating force units. Doors with automatic door bottoms plus head and jamb seals cannot require more than two pounds operating force to open when closer is disconnected.
- G. Thresholds: As scheduled and per details. Comply with CBC Section 11B-404.2.5. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
1. Exteriors: Seal perimeter to exclude water and vermin. Use sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Non-ferrous 1/4inch fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
 2. Flat saddle type thresholds shall have a minimum wall thickness of .125".
 3. Fire-rated openings, 90min or less duration: use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22 watts per square centimeter, per NFPA 253. Use threshold unit as scheduled. If none scheduled, request direction from Engineer.
 4. Fire-rated openings, 3hour duration: Thresholds, where scheduled, to extend full jamb depth.
 5. Acoustic openings: Set units in full bed of Division-7-compliant, leave no air space between threshold and substrate.
 6. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.
 7. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.
- H. Exposed Through-Bolts: Do not use SNB, grommet nuts, sleeve nuts or other such clamping type fasteners, intent is for minimal exposed hardware. Coordinate with wood doors; ensure provision of proper blocking to support wood screws for mounting panic hardware and door closers. Coordinate with metal doors and frames; ensure provision of proper reinforcement to support machine screws for mounting panic hardware and door closers.

- I. Silencers: Interior hollow metal frames, 3 for single doors, 2 for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.
- J. Wall- & Floor-mounted electromagnetic door holders: LCN's SEM series or approved equivalent. Incorporate into U.L. listed fire & life-safety system, doors release to allow closure and latching when door's zone is in alarm state. Use minimum projection required to allow door to open as widely as allowed by wall conditions and projection of door hardware.

2.7 FINISH:

- A. Generally BHMA 630 Satin Stainless or 626 Satin Chrome.
 - 1. Areas using BHMA 626 to have push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise noted.
- B. Door closers: factory powder coated to match other hardware, unless otherwise noted.
- C. Aluminum items: match predominant adjacent material. Seals to coordinate with frame color.

2.8 KEYING REQUIREMENTS:

- A. Key System: BEST 7 pin IC core System no substitute.
 - 1. Furnish 10 construction keys.
 - 2. Furnish 3 construction split control keys.
 - 3. Key Cylinders: furnish 6-pin solid brass construction.
- B. Cylinders/cores: keyed at factory of lock manufacturer where permanent records are maintained.
- C. Permanent keys: use secured shipment direct from point of origination to the City.
 - 1. For estimate: 4 keys per change combination, 5 master keys per group, 5 grand-master keys, 3 control keys.
 - 2. For estimate: VKC stamping plus "Do Not Duplicate".

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS:

- A. Can read and understand manufacturers' templates, suppliers' hardware schedules and printed installation instructions. Can readily distinguish drywall screws from manufacturers' furnished fasteners. Available to meet with manufacturers' representatives and related trades to discuss installation of hardware.

3.2 PREPARATION:

- A. Ensure that walls and frames are square and plumb before hardware installation. Make corrections before commencing hardware installation.
- B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.
 - 1. Notify Architect of code conflicts before ordering material.
 - 2. Locate levers, key cylinders, t-turn pieces, touchbars and other operable portions of latching hardware between 34 inches to 44 inches above the finished floor, per CBC Section 11B-404.2.7.
 - 3. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware.
- C. Overhead stops: before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.

3.3 INSTALLATION

- A. Install hardware per manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Engineer.
 - 1. Gaskets: install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
 - 2. When hardware is to be attached to existing metal surface and insufficient reinforcement exists, use RivNuts, NutSerts or similar anchoring device for screws.
 - 3. Use manufacturers' fasteners furnished with hardware items, or submit Request for Substitution with Architect.
 - 4. Replace fasteners damaged by power-driven tools.
- B. Locate floor stops no more than 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.
- C. Core concrete for exterior door stop anchors. Set anchors in approved non-shrink grout.

- D. Locate overhead stops for minimum 90 degrees and maximum allowable degree of swing.
- E. Drill pilot holes for fasteners in wood doors and/or frames. Centerpunch hole locations before using self-drilling type screws to prevent skating. Replace screws that are not centered in their holes.
- F. Lubricate and adjust existing hardware scheduled to remain. Carefully remove and give to City items not scheduled for reuse.
- G. Field verify existing conditions and measurements prior to ordering hardware. Fill existing hardware cut outs not being used by the new hardware. Remove existing hardware not being reused.
- H. Where existing wall conditions will not allow door to swing using the scheduled hinges, provide wide-throw hinges and if needed extended arms on closers.
- I. Provide proper brackets to accommodate the mounting of closers on doors with flush transoms.

3.4. ADJUSTING

- A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.
 - 1. Hardware damaged by improper installation or adjustment methods: repair or replace to City's satisfaction.
 - 2. Adjust doors to fully latch with no more than 1 pound of pressure.
 - 3. Adjust delayed-action closers on fire-rated doors to fully close from fully-opened position in no more than 10 seconds.
 - 4. Adjust door closers per 1.9 this section.
- B. Final inspection: Installer to provide letter to City that upon completion installer has visited the Project and has accomplished the following:
 - 1. Re-adjust hardware.
 - 2. Evaluate maintenance procedures and recommend changes or additions, and instruct City's personnel.
 - 3. Identify items that have deteriorated or failed.
 - 4. Submit written report identifying problems

3.5 DEMONSTRATION:

- A. Demonstrate mechanical hardware and electrical, electronic and pneumatic hardware systems, including adjustment and maintenance procedures.
- B. Certification, Testing and Quality Control: Comply with 2012 Standard Specifications for Public Works Construction ‘The GREENBOOK’ and 2012 City Supplement ‘The WHITEBOOK’, Section 2-11 for Inspection. . All doors hardware and installation will be inspected by the Engineer.

3.6 PROTECTION/CLEANING:

- A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.
- B. Clean adjacent wall, frame and door surfaces soiled from installation/reinstallation process.
- C. Hardware items specified to receive antimicrobial coating may be cleaned with a mild detergent, air-dry or dried with a soft cloth. Avoid harsh abrasive cleaners and abrasive cleaning pads.

3.7 SCHEDULE OF FINISH HARDWARE

- A. See door schedule in drawings for hardware set assignments.
- B. Manufacturers and their abbreviations used in this schedule:
 - IVE H.B. Ives
 - LCN LCN Closers
 - NGP National Guard Products
 - SCH Schlage Lock Company
 - VON Von Duprin
 - ZER Zero
- C. Schedule Groups:
 - DSA clarification notes on two-handed operation:
 - 1. Locks “80” function are only allowed on openings for mechanical and technical personnel (i.e. service, IT, mechanical rooms)
 - 2. Panic /exit hardware with “NL” function must have dogging function.

HARDWARE SCHEDULE:

SpeXtra # 193123

HEADING 001

1 SGL Door 101 EXTERIOR / ASSEMBLY 101
 1 SGL Door 102 EXTERIOR / ASSEMBLY 101
 3' 0" X 6' 8" X 1 3/4" X HMD X HMF X NONRTD

Each Assembly to have:					
1	EA	CONT. HINGE	224HD	628	IVE
1	EA	PANIC HARDWARE	AX-99-NL-OP-110MD-GBK-PH	626	VON
1	EA	RIM CYLINDER	1E72 S2 RP3	626	BES
1	EA	DOOR PULL	VR910 NL	630	IVE
1	EA	SURFACE CLOSER	4041 DEL SHCUSH	689	LCN
1	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
1	EA	BLADE STOP SPACER	4040-61	689	LCN
1	EA	RAIN DRIP	142A	AL	ZER
1	SET	SEALS	188S-CL-HEAD AND JAMBS	BLK	ZER
1	EA	DOOR SWEEP	8198AA	AL	ZER
1	EA	THRESHOLD	546A MSLA-10-E	AL	ZER

Free Egress at all times. Pressing Push Bar retracts latchbolts. Trim always locked, entrance by optional trim when key retracts latchbolt from pull side. Dogging by hex key, locks down the pushbar or crossbar so the latchbolt remains retracted.

Self-Closing. Templating allows Spring CUSH Arm to stop the door's swing between 85 and 110 degrees with hold-open feature. Delays closing from maximum opening to approximately 70 degrees. 1 minute maximum delay time.

HEADING 002

1 SGL Door 103 EXTERIOR / RESTROOM 103
 2' 6" X 6' 8" X 1 3/4" X XWDD X XWF X NONRTD

Each Assembly to have:					
1	EA	ENTRANCE/OFFICE LOCK	ND50HD RHO	626	SCH
1	EA	PERMANENT CORE	1C7	626	BES
1	EA	SURFACE CLOSER	1461 DEL HW/PA	689	LCN
1	EA	RAIN DRIP	142A	AL	ZER
1	SET	SEALS	188S-CL-HEAD AND JAMBS	BLK	ZER
1	EA	DOOR SWEEP	8198AA	AL	ZER
BALANCE OF HARDWARE TO REMAIN.					

Push-button locking. Push-button locks outside lever until unlocked with key or by turning inside lever. Inside lever is always free for immediate egress.

Self-Closing. Delays closing from maximum opening to approximately 70 degrees. 1 minute maximum delay time.

HEADING 003

1 SGL Door 106 ASSEMBLY 101 / RESTROOM 103
 2' 6" X 6' 8" X 1 3/4" X XWDD X XWF X NONRTD

Each Assembly to have:					
1	EA	ENTRANCE/OFFICE LOCK	ND50HD RHO	626	SCH
1	EA	PERMANENT CORE	1C7	626	BES
1	EA	OH STOP	90S	630	GLY
1	EA	DOOR EDGE GUARD	12-2-CW	630	DON
BALANCE OF HARDWARE TO REMAIN.					

Push-button locking. Push-button locks outside lever until unlocked with key or by turning inside lever. Inside lever is always free for immediate egress.

HEADING 004

1 SGL Door 105 ASSEMBLY 101 / RESTROOM 103
2' 6" X 6' 8" X 1 3/4" X XWDD X XWF X NONRTD

Each Assembly to have:					
1	EA	ENTRANCE/OFFICE LOCK	ND50HD RHO	626	SCH
1	EA	PERMANENT CORE	1C7	626	BES
1	EA	DOOR EDGE GUARD	12-2-CW	630	DON
1	EA	WALL STOP	WS406/407CVX	630	IVE
BALANCE OF HARDWARE TO REMAIN.					

Push-button locking. Push-button locks outside lever until unlocked with key or by turning inside lever. Inside lever is always free for immediate egress.

HEADING 005

1 SGL Door 104 ASSEMBLY 101 / RESTROOM 103
2' 6" X 6' 8" X 1 3/4" X XWDD X XWF X NONRTD

Each Assembly to have:					
1	EA	ENTRANCE/OFFICE LOCK	ND50HD RHO	626	SCH
1	EA	PERMANENT CORE	1C7	626	BES
1	EA	RAIN DRIP	142A	AL	ZER
1	SET	SEALS	188S-CL-HEAD AND JAMBS	BLK	ZER
1	EA	DOOR SWEEP	8198AA	AL	ZER
1	EA	THRESHOLD	546A MSLA-10-E	AL	ZER

BALANCE OF HARDWARE TO REMAIN.

Push-button locking. Push-button locks outside lever until unlocked with key or by turning inside lever. Inside lever is always free for immediate egress.

HEADING 6

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
1	EA	PANIC HARDWARE	CI-XP-98-NL-OP-110-WH PBAR	626	VON
1	EA	SFIC MORTISE CYL.	80-110	626	SCH
1	EA	SFIC RIM CYLINDER	80-116	626	SCH
1	EA	PRIMUS CORE	20-740-XP	626	SCH
1	EA	DOOR PULL	VR910 NL	630	IVE
1	EA	SURFACE CLOSER	4041 DEL SHCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B4E TEK	630	IVE

BALANCE OF HARDWARE BY GATE MFG

HEADING 7

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
			BALANCE OF HARDWARE BY DOOR MANUFACTURER		

GATE HINGING AND CANE BOLTS BY GATE MFG

END OF SECTION

SECTION 08 8000

GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. High performance architectural glass for storefronts, windows and doors.
- B. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealers: Sealant and back-up material.
- B. Section 08 1113 - Hollow Metal Doors and Frames: Glazed doors.
- C. Section 08 1400 - Wood Doors. True Divided Light Doors.
- D. Section 08 4113 – Aluminum-Framed Storefronts and Entrances.

1.03 REFERENCE STANDARDS

- A. ASTM C162 – Standard Terminology of Glass and Glass Products.
- B. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- D. ASTM C1036 - Standard Specification for Flat Glass.
- E. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.
- F. ASTM C1172 – Standard Specification for Laminated Architectural Flat Glass.
- G. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- H. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings.
- I. ASTM E2188 – Standard Test Method for Insulating Glass Unit Performance.
- J. ASTM E2189 – Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units.
- K. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
- L. GANA (GM) - GANA Glazing Manual; Glass Association of North America.
- M. GANA (SM) - FGMA Sealant Manual; Glass Association of North America.
- N. ANZI Z97.1 – American National Standard for Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test.
- O. ASCE 7 – “Minimum Design Loads for Buildings and Other Structures.”

1.04 DEFINITIONS

- A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both,

as defined in referenced glazing publications.

- B. Glass Thickness: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. Interspace: Space between lights of an insulating-glass unit that contains dehydrated air or other specified gas.
- D. Seal Insulating Glass Unit Surface Designations:
 - 1. Surface 1: Exterior surface of the outer glass light.
 - 2. Surface 2: Interspace surface of the outer glass light.
 - 3. Surface 3: Interspace surface of the inner glass light.
 - 4. Surface 4: Interior surface of the inner glass light.

1.05 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: Provide glazing that allows for thermal movements resulting from ambient and surface temperatures changes acting on glass framing members and glazing components.
- B. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
 - 1. For monolithic-glass lites, properties are based on units with lites 1/4 inch (6.0 mm) thick. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:
 - a. U-Factors: NFRC 100 expressed as Btu/sq. ft. per h per degree F.
 - b. Solar Heat Gain Coefficient: NFRC 200.
 - c. Solar Optical Properties: NFRC 300.

1.06 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- D. Manufacturer's certifications that sealed insulated glass meets or exceeds specified requirements.
- E. Glazing compound manufacturer's installation instructions.
- F. Three-inch-long beads of glazing sealant for color selection.

- G. Manufacturer's Warranty.
- H. Verification Samples: For the products specified in this section, in the form of 12 inch (305 mm) square samples for insulating glass units.
- I. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.
- J. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements. For solar-control low-e-coated glass, provide documentation demonstrating that manufacturer of coated glass is certified by coating manufacturer.
- K. Qualification Data: For installers.
- L. Product Test Reports: For each of the following types of glazing products:
 - 1. Tinted float glass.
 - 2. Coated float glass.
 - 3. Insulating glass.
- M. Warranties: Special warranties specified in this Section.

1.07 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.
- B. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance.
- C. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass, coated float glass and insulating glass.
- D. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- E. Glazing Publications: Comply with published recommendations of glass product manufacturers and industry organizations, including but not limited to those below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
 - 2. GANA Publications: "Laminated Glazing Reference Manual"; "Glazing Manual."
 - 3. AAMA: "Sloped Glazing Guidelines."
 - 4. IGMA: "Guidelines for Sloped Glazing."

- F. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:
 - 1. Insulating Glass Certification Council.
 - 2. Associated Laboratories, Inc.
- G. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
- H. Lites more than 9 square feet (sf) (0.84 sq. m) in area are required to be Category II materials.
- I. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sf in area, provide glazing products that comply with Category II materials, and for lites 9 sf or less in area, provide glazing products that comply with Category I or II materials.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.
- C. Deliver glass and glazing materials with manufacturer's labels intact.
- D. Do not remove labels until glass has been installed and inspected by the Project Inspector.
- E. Protect glass from staining, marking, and damage.
- F. Putty and glazing compound shall be delivered to the Project site in manufacturer's original unbroken containers labeled to identify contents.

1.09 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is lower than the minimum recommended in the glazing compound manufacturer's installation instructions.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.
- C. Perform glazing on clean, dry surfaces only.

1.10 WARRANTIES

- A. Manufacturer's Special Warranty on Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's

written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 GLAZING TYPES

- A. Type IG-1 - Sealed Insulating Glass Units: Vision glazing.
 1. Application(s): All exterior glazing unless otherwise indicated.
 2. Outboard Lite: Fully tempered float glass, 6mm thick, minimum.
 - a. Tint: Clear.
 - b. Low-e coating on #2 face. PPG Solarban 60, or approved equal meeting below performance requirements.
 3. Inboard Lite: Fully tempered float glass, 6mm thick, minimum.
 - a. Tint: Clear.
 4. Provide special acoustical spacer and edge seal.
 5. Total Thickness: 1 inch, nominal.
 6. Total Visible Light Transmittance: 27-35 percent, nominal.
 7. Total Solar Heat Gain Coefficient: 0.28 percent, nominal, or better.
 8. Glazing Method: Exterior wet/dry method, preformed tape and sealant.
 9. U-value: Winter 0.29, Summer 0.27

2.02 EXTERIOR GLAZING ASSEMBLIES

- A. Structural Design Criteria: Select type and thickness to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with 2013 California Building code.
 1. Use the procedure specified in ASTM E1300 to determine glass type and thickness.
 2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
 3. Thicknesses listed are minimum.
- B. Air and Vapor Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier:
 1. In conjunction with vapor retarder and joint sealer materials described in other sections.
 2. To maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

2.03 GLASS MATERIALS

- A. Float Glass Manufacturers:

1. AGC Flat Glass North America, Inc.
2. Guardian Industries Corp.
3. Pilkington North America Inc.
4. PPG Industries, Inc.
5. Approved equal.
 - a. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Substitutions.

B. Float Glass: All glazing is to be float glass unless otherwise indicated.

1. Annealed Type: ASTM C1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
2. Heat-Strengthened and Fully Tempered Types: ASTM C1048; Condition A (uncoated surfaces), Type I or II, Class 1, Quality q3 (glazing select), Kind FT (fully tempered glass), match color of clear or tinted glass as applicable; fully thermal tempered, heat strengthening or chemical tempering is not permitted. Perform tempering by horizontal oscillating roller hearth or high speed roller hearth process. Do not permit fabrication processes leaving gripper or tong marks. Handle and size glass according to manufacturer's written instructions.
3. Tinted Types: Color and performance characteristics as indicated.
4. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.

2.04 GLASS SETTING MATERIALS

- A. Setting Blocks: ASTM C864, channel shape; having ¼ inch internal depth, Shore A hardness of 80 to 90 Durometer. Blocks shall be a minimum 2 inch long. Block width shall be approximately 1/16 inch less than the full width of the rabbet. Block thickness shall be at least 3/16 inch, sized for rabbet depth as required.
- B. Spacers: ASTM C864, channel shape, with ¼ inch internal depth, 3/32 inch flanges, eb, 1/8 inch thick, one to 3 inches long. Spacers shall provide Shore A hardness of 40 to 50 Durometer.
- C. Vinyl Glazing Channels: Profile compatible with framing system and designed to accommodate glass of specified thickness, light gray in color. Provide for dry glazing aluminum frames where indicated or permitted.
- D. Glazing Tape: Poly-isobutylene based sealant tape, conforming to AAMA 804.1, with adhesive one side protected by temporary paper cover, Extru-Seal manufactured by Pecora Corp., No. 303 by Protective Treatments, Inc., or equal.
- E. Spring Steel Spacers: Galvanized steel wire or strip designed to position glazing in channel or rabbet sash with stops.
- F. Glazing Clips: Galvanized steel spring wire designed to hold glass in position in rabbet sash without stops.

- G. Glazing Points (Sprigs): Pure zinc stock, thin, flat, triangular or diamond-shaped pieces, 1/4 inch minimum size.
- H. Glazing Sealants for Metal Sash: GE Silicones Silglaze II 2800, GE Silicones Silpruf, GE Silicones 1200 Silicone, and Dow Corning 999A. Polybutylene, oleoresinous, asphalt, and oil base sealants are not permitted. Provide sealant of same color as structural silicone sealant unless otherwise required.
- I. Glazing Compound for Wood Sash: Provide acrylic latex glazing compound for bedding and sealing glass in wood frames
- J. Glazing Compounds and Sealants for Thermoplastic: Provide silicone, butyl, or polysulfide glazing compound.
- K. Mirror Setting Materials: Manufactured by Palmer Products Corporation, or equal, for installation of mirrors, and as follows:
 - 1. Mirror backing paint: Mirro-Bac Paint, or equal, formulated to protect mirror silvering.
 - 2. Mirror bond coat: Mirro-Mastic Bond, or equal, formulated to isolate deleterious backing materials from mastic and mirror.
 - 3. Mirror mastic: Mirro-Mastic, or equal, formulated for adhering mirrors and glass to substrates.

2.05 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 INSTALLATION, GENERAL

- A. Glazed cabinet doors, windows, transoms, and fixtures, not otherwise noted or indicated, shall be glazed with clear float glass.
- B. Obscure glass in exterior openings shall be installed with smooth side of glass to weather. Patterned glass shall be installed with pattern running vertically, unless otherwise indicated.
- C. Glazing tapes or sealants shall be installed wherever glass contacts wood or metal surfaces. Width of strips shall be as required.
- D. Glazing compound shall be neatly and cleanly installed in straight lines, even with inside edge of sash members. Thumb puttying is not permitted.
- E. Display Cases and Sliding Glass Doors in Casework: Glass in display cases shall be ¼ inch clear laminated glass as indicated. Edges of glass shall be rounded and polished.

- F. **Glazing Aluminum Sash:** Glazing material in aluminum sash shall be installed in compound and secured in place with aluminum glazing beads. In addition, horizontal beads shall be installed with 6-inch by 1 inch, type A, self-tapping, stainless steel, Phillips-head screws, installed into pre-drilled, counter-sunk holes and spaced 2 inches from each end and 9 inches on centers.

3.03 INSTALLATION OF GLASS

- A. Conform to requirements of GANA Glazing Manual.
- B. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.
- C. Provide compressible filler rods or equivalent back-up material to prevent sealant from extruding into glass channel weep systems, from adhering to back surface of joints and to control depth of sealant for optimum performance.
- D. Force sealants into glazing channels, in manner to eliminate voids and to ensure complete bond of sealant to glass and channel surfaces.
- E. Tool exposed surfaces of sealants to provide for drainage away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel to eliminate dirt and moisture pockets.
- F. Where dry glazing of aluminum frame is indicated or permitted, provide vinyl glazing channels installed in accordance with frame manufacturers written recommendations. Do not stretch channels. Miter corners.
- G. For tape glazing, furnish tape of thickness to provide approximately 30 percent compression. Cut tape to proper length and install to permanent stops, the entire length of the head and sill first, then to jambs. Butt tape together with no overlap and remove paper backing. Install glass on setting blocks at quarter points and maintain uniform glass edge clearance around entire perimeter of glass. Maintain manufacturer's recommended edge clearance and bite on glass. Install glass firmly into tape with a slight lateral movement to assure proper adhesion. Install tape to removable stop with evenly distributed firmness, smoothing out wrinkles in tape. Secure removable stop in proper position so tape makes contact with glass as stop is installed, forcing contact with glass and completely sealing joint. Remove excess tape from both sides at slight angle over sight line. Do not undercut.

3.04 PROTECTION AND CLEANING

- A. Protect exterior glass from breakage by furnishing crossed streamers attached to framing and away from glass surface. Do not directly install markers to glass surfaces. Remove non-permanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer. Glazing, which cannot be cleaned to a required condition, shall be deemed defective Work.

- D. Remove and replace glass, which is broken, chipped, cracked, abraded, or damaged during construction.
- E. Remove protective covering from thermoplastic not more than 4 days before Substantial Completion, and immediately before cleaning. Methods of final cleaning and finishing shall be as prescribed by thermoplastic glazing publications referenced above.
- F. Wash glass on both faces not more than four days before Substantial Completion. Wash glass by method recommended by glass manufacturer. Do not furnish harsh cleaning agents, caustics, abrasives, or acids for cleaning. Polish glass both sides and leave free of soil, streaks, and labels.

3.05 CLEAN UP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

3.06 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 09 0561

COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This section applies to all floors identified in the contract documents as to receive the following types of floor coverings:
 - 1. Ceramic, porcelain and stone tile.
 - 2. Resilient tile and sheet.
 - 3. Carpet, broadloom and carpet tile.
- B. Preparation of new and existing concrete floor slabs for installation of floor coverings.
- C. Testing of concrete floor slabs for moisture and pH.
- D. Remediation of concrete floor slabs due to unsatisfactory moisture or pH conditions.
 - 1. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.

1.02 RELATED REQUIREMENTS

- A. Section 09 3000 – Tiling.
- B. Section 09 6500 – Resilient Flooring.
- C. Section 09 6800 – Carpeting.

1.03 REFERENCES

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens).
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete.
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Slabs Using in-situ Probes.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

1.05 SUBMITTALS

- A. Visual Observation Report: For existing floor coverings to be removed.

- B. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
 - 1. Moisture and pH limits and test methods.
 - 2. Manufacturer's required bond/compatibility test procedure.
- C. Testing Agency's Report: Include:
 - 1. Description of areas tested; include floor plans and photographs if helpful.
 - 2. Summary of conditions encountered.
 - 3. Moisture and pH test reports.
 - 4. Copies of specified test methods.
 - 5. Recommendations for remediation of unsatisfactory surfaces.
 - 6. Submit report to Engineer.
 - 7. Submit report not more than two business days after conclusion of testing.
- D. Adhesive Bond and Compatibility Test Report.

1.06 QUALITY ASSURANCE

- A. Moisture and pH testing shall be performed by an independent testing agency employed and paid by Contractor.
- B. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
 - 1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project City's project contact information.
 - 2. Acceptable Testing Agencies:
 - a. Testing agency approved by City.
- C. Contractor's Responsibility Relating to Independent Agency Testing:
 - 1. Provide access for and cooperate with testing agency.
 - 2. Confirm date of start of testing at least 10 days prior to actual start.
 - 3. Allow at least 4 business days on site for testing agency activities.
 - 4. Achieve and maintain specified ambient conditions.
 - 5. Notify Engineer when specified ambient conditions have been achieved and when testing will start.

1.07 FIELD CONDITIONS

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
 - 1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
 - 2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
 - 3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
- B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.
- C. Remedial Floor Coating: Coating intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of pH found, and suitable for adhesion of flooring without further treatment or with only the addition of a skim coat of patching compound or adhesive.

PART 3 EXECUTION

3.01 CONCRETE SLAB PREPARATION

- A. Perform following operations in the order indicated:
 - 1. Preliminary cleaning.
 - 2. Moisture vapor emission tests per ASTM F 1869; 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.
 - 3. Internal relative humidity tests per ASTM F 2170; in same locations as moisture vapor emission tests, unless otherwise indicated.
 - 4. pH tests per ASTM F 710; in same locations as moisture vapor emission tests, unless otherwise indicated.
 - 5. Specified remediation, if required.
 - 6. Patching, smoothing, and leveling, as required.
 - 7. Other preparation specified.
 - 8. Adhesive bond and compatibility test.
 - 9. Protection.
- B. Remediations:

1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating over entire suspect floor area.
3. Excessive pH: If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

3.02 PRELIMINARY CLEANING

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

3.03 MOISTURE VAPOR EMISSION TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F1869 and as follows.
- D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
- F. Report: Report the information required by the test method.

3.04 pH TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Note: This procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
- C. Use a wide range pH paper, its associated chart, and distilled or deionized water.
- D. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the pH paper into the water, remove it, and compare immediately to chart to determine pH reading.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value is over

10.

3.05 PREPARATION

- A. See individual floor covering section(s) for additional requirements.
- B. Comply with requirements and recommendations of floor covering manufacturer.
- C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- D. Do not fill expansion joints, isolation joints, or other moving joints.

3.06 ADHESIVE BOND AND COMPATIBILITY TESTING

- A. Comply with requirements and recommendations of floor covering manufacturer.

3.07 APPLICATION OF REMEDIAL FLOOR COATING

- A. Comply with requirements and recommendations of coating manufacturer.

3.08 PROTECTION

- A. Cover prepared floors with building paper or other durable covering.

END OF SECTION

SECTION 09 2216

NON-STRUCTURAL METAL FRAMING

PART 4 - GENERAL

4.1 SUMMARY

- A. Section Includes:
 - 1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
 - 2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.
- B. Related Requirements:
 - 1. Section 09 2900 – Gypsum Board.

4.2 ACTION SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data: For each type of product.

4.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: Submit evaluation reports certified under an independent third party inspection program administered by an agency accredited by IAS to ICC-ES AC98, IAS Accreditation Criteria for Inspection Agencies.
- B. Manufacturer's Certification: Submit manufacturer's certification of product compliance with codes and standards along with product literature and data sheets for specified products.

4.4 QUALITY ASSURANCE

- A. Contractor shall provide effective, full time quality control over all fabrication and erection complying with the pertinent codes and regulations of government agencies having jurisdiction. Conduct pre-installation meeting to verify project requirements, substrate conditions, and manufacturer’s installation instructions.

4.5 DELIVERY, STORAGE, AND HANDLING

- A. Notify manufacturer of damaged materials received prior to installation.
- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI's "Code of Standard Practice".

PART 5 - PRODUCTS

5.1 PERFORMANCE / DESIGN CRITERIA

- A. Design framing systems in accordance with American Iron and Steel Institute Publication "North American Specification for the Design of Cold-Formed Steel Framing – NonStructural Members", except as otherwise shown or specified.
- B. Design loads: As indicated on the Architectural Drawings or 5 PSF minimum as required by the California Building Code.
- C. Design framing systems to accommodate deflection of primary building structure and construction tolerances and to withstand design loads with a maximum deflection of 1/240.

5.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 645 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: Comply with ASTM C 645; roll-formed from hot-dipped galvanized steel; complying with ASTM A 653/A 653M G40 (Z120) or having a coating that provides equivalent corrosion resistance. A40 galvanized products are not acceptable.
 - a. Coatings shall demonstrate equivalent corrosion resistance with an evaluation report acceptable to the authority having jurisdiction.
- B. Studs and Runners: ASTM C 645.
 - 1. Non-Structural Studs: Cold-formed galvanized steel C-studs as per ASTM C 645 for conditions indicated below:
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems, ProSTUD products named below, or a comparable product from the following:
 - 1) The Steel Network.
 - 2) Marino/WARE.
 - 3) Cemco.
 - 4) Approved equal. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
 - b. Flange Size: 1 1/4 inch (32mm).
 - c. Web Depth: 3-5/8 inches (92 mm).
 - d. Member Description: ProSTUD 20 (20 EQ) 65 ksi.
 - 1) Minimum Thickness: 0.019 inches (0.4826 mm).
 - 2) Design Thickness: 0.0200 inches (0.5080 mm).

2. Non-Structural Track: Cold-formed galvanized steel runner tracks, drywall track, in conformance with ASTM C 645 for conditions indicated below:
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; ProTRAK, or a comparable product from one of the following:
 - 1) The Steel Network.
 - 2) Marino/WARE.
 - 3) Cemco.
 - 4) Approved equal. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
 - b. Flange Size: 1-1/4 inch (32 mm).
 - c. Web Depth: Track web to match stud web size.
 - d. Minimum Material Thickness: Track thickness to match wall stud thickness or as per design.
3. "EQ" (Equivalent Gauge Thickness) Steel Studs and Runners: Members that can show certified third party testing with gypsum board in accordance with ICC ES AC86 (Approved May 2012) need not meet the minimum thickness limitation or minimum section properties set forth in ASTM C 645. The submission of a recognized evaluation report is acceptable to show conformance to this requirement.

C. Slip-Type Head Joints: Where indicated, provide[one of] the following:

1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging and spacer bar, manufacturer's proprietary bridging and spacer bar, or cold-formed channel with clip angles located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; MaxTrack (SLT) Slotted Deflection Track.
 - 1) The Steel Network.
 - 2) Marino/WARE.
 - 3) Cemco.
 - 4) Approved equal. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
 - b. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; Spazzer 9200 Bridging and Spacer Bar, or a comparable product by one of the following:

- 1) The Steel Network.
 - 2) Marino/WARE.
 - 3) Cemco.
 - 4) Approved equal. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
- c. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; Cold-Formed Channel and U-Series Easy Clip Angle, or a comparable product by one of the following:
- 1) The Steel Network.
 - 2) Marino/WARE.
 - 3) Cemco.
 - 4) Approved equal. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- a. Basis-of-Design Product: Subject to compliance with design requirements provide ClarkDietrich Building Systems; MaxTrak Slotted Deflection Track, or a comparable product from one of the following:
- 1) The Steel Network.
 - 2) Marino/WARE.
 - 3) Cemco.
 - 4) Approved equal. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
4. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; MaxTrak Slotted Deflection Track, or a comparable product by one of the following:
- 1) The Steel Network.
 - 2) Marino/WARE.
 - 3) Cemco.

- b. Approved equal. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
- D. Control Joint Backer: Metal profile which supports intumescent materials located inside and spanning gap between opposing drywall edge at control joint locations.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; BlazeFrame Control Joint Backer (CJB), or a comparable product by one of the following:
 - 1) The Steel Network.
 - 2) Marino/WARE.
 - 3) Cemco.
 - b. Approved equal. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
 - 2. 0.018 inch (0.45mm) x 3-1/4 inch (82.6 mm) width.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 - 3. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; Backing Plate, or a comparable product by one of the following:
 - 1) The Steel Network.
 - 2) Marino/WARE.
 - 3) Cemco.
 - b. Approved equal. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
 - 4. Minimum Base-Metal Thickness: 0.0296 inch (0.75 mm).
- G. Channel Bridging and Bracing: Steel, 0.0538-inch (1.37-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; Spazzer 9200 Bridging and Spacing Bar, or a comparable product by one of the following:
 - 1) The Steel Network.
 - 2) Marino/WARE.
 - 3) Cemco.

- b. Approved equal. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
 - 2. Depth: 7/8 inch by 7/8 inch by 50 inches (22.2 mm by 22.2 mm by 1270 mm).
- H. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 - 1. Minimum Base-Metal Thickness: 0.0296 inch (0.75 mm).
 - 2. Depth: 7/8 inch (22.2 mm).
- I. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; Resilient Channel RC Deluxe (RCSD), or a comparable product by one of the following:
 - 1) The Steel Network.
 - 2) Marino/WARE.
 - 3) Cemco.
 - b. Approved equal. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
 - 2. Configuration: Asymmetrical.
- J. Carrying Channels: 0.0538-inch (1.37-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
 - 1. Depth: 3/4 inch (19 mm).
 - 2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.0296 inch (0.75 mm).
 - 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.57-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- K. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-metal thickness of 0.018 inch (0.45 mm), and depth required to fit insulation thickness indicated.
- L. Headers and Jambs: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges and as follows:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; Heavy Duty Studs - HDS and RedHeader RO, or a comparable product by one of the following:
 - 1) The Steel Network.
 - 2) Marino/WARE.
 - 3) Cemco.

- b. Approved equal. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
 - 2. Minimum Base Metal Thickness: 0.0329 inch (0.84 mm).
 - 3. Web and Flange Widths, Type HDS: 3-5/8 by 3 by 1-1/16 by 3/4 inch (92.1 by 76.2 by 27.0 by 19.1 mm).
- M. Framed Openings: Galvanized steel one piece header and jamb studs meeting or exceeding the requirements of ASTM C 754 for conditions indicated below.
 - 1. Basis of Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; RedHeader RO, HDS Heavy Duty Stud and HDSC Header Bracket, or a comparable product from one of the following:
 - 1) The Steel Network.
 - 2) Marino/WARE.
 - 3) Cemco.
 - b. Approved equal. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
 - 2. Header Clip: RedHeader RO Drop 'N Lok Clip.
 - a. Attachment screw pattern per manufacturer's printed literature.
 - 3. Header Flange Length: 3 inch (76 mm) HS300 flange.
 - 4. Jamb Flange Length: 3 inch (76 mm) JS300 flange.
 - 5. Minimum Yield Strength: 33ksi (227 MPa).
 - 6. Minimum Material Thickness: 33 mil (20 gauge) (0.0329 inches).

5.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.57-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.064 mm) in diameter.
- C. Furring Channels (Furring Members):
 - 1. Cold-Formed Channels: 0.0538 inch (1.37 mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
- D. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
 - 1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:

- a. Armstrong World Industries, Inc.; Drywall Grid Systems.
- b. Chicago Metallic Corporation; Drywall Grid System.
- c. USG Corporation; Drywall Suspension System.
- d. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.

5.4 AUXILIARY MATERIALS

General: Provide auxiliary materials that comply with referenced installation standards.

- 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide[one of] the following:
 - 1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
 - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

PART 6 - EXECUTION

6.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

6.2 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

6.3 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- E. Direct Furring:
 - 1. Screw to wood framing.
 - 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
- F. Z-Furring Members:
 - 1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.
 - 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
 - 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

6.4 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Hangers: 48 inches (1219 mm) o.c.
 - 2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.

3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 5. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION

SECTION 09 2900

GYPSUM BOARD

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior gypsum wallboard:
 - a. Impact-Resistant Gypsum Board, Type X.
- B. Joint treatment and surface finishes.
- C. Cementitious backer board for ceramic tile.

1.02 RELATED REQUIREMENTS

- A. Section 08 3113 – Access Doors and Frames.
- B. Section 09 2116 – Non-structural Metal Framing.
- C. Section 09 9000 – Painting and Coating.

1.03 REFERENCE STANDARDS

- A. ASTM C 475/C 475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- B. ASTM C 840 - Standard Specification for Application and Finishing of Gypsum Board.
- C. ASTM C 954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
- D. ASTM C 1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- E. ASTM C 1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
- F. ASTM C 1396/C 1396M - Standard Specification for Gypsum Board.
- G. ASTM C 1658/C 1658M - Standard Specification for Glass Mat Gypsum Panels.
- H. ASTM D 3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- I. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
- J. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association.

1.04 PERFORMANCE REQUIREMENTS

- A. Low Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

1.05 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data: Provide data on gypsum board, accessories, and joint finishing system.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum 3 years of documented experience.
- B. Copies of Documents at Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.08 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Unless using gypsum products that are specifically manufactured for limited exposure, do not install interior products until installations areas are protected from moisture.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

1.09 WARRANTY

- A. Special Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of weather-resistant sheathing paper system that fail in materials or workmanship within specified warranty period.
 - 1. Six months of coverage against in-place weather exposure damage (delamination, deterioration, U-V exposure, and decay)
 - 2. Three years against manufacturing defects.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Moisture- and Mold-Resistant Assemblies: Provide and install moisture- and mold-resistant glass-mat gypsum wallboard products with moisture-resistant surfaces complying with ASTM C 1658 and ASTM C 1177 where indicated on Drawings and in all locations which might be subject to moisture exposure during construction.

1. Provide ASTM C 1658 board at ALL restroom wall surfaces, unless otherwise noted to receive ASTM C 1177.
 2. Provide within ASTM C 1658 board 48 inches minimum of any plumbing fixture in other rooms, unless otherwise noted.
- B. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- C. Low Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.02 GYPSUM BOARD - GENERAL

- A. Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent by weight.
- B. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.03 INTERIOR GYPSUM BOARD

- A. Basis-of-Design Product: The design for each type of gypsum board and related products is based on Georgia-Pacific Gypsum products named. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
1. American Gypsum.
 2. CertainTeed Corp.
 3. Lafarge North America Inc.
 4. National Gypsum Company.
 5. PABCO Gypsum.
 6. Temple-Inland.
 7. USG Corporation.
 8. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
- B. Gypsum Wallboard: ASTM C 1396/C 1396M.
1. Basis-of-Design Product: Georgia-Pacific Gypsum; "DensArmor Plus High-Performance Interior Panel."
 2. Thickness: 5/8 inch.
 3. Long Edges: Tapered.
- C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Basis-of-Design Product: Georgia-Pacific Gypsum; "DensArmor Plus High-Performance Interior Panel."
 2. Thickness: 1/2 inch.
 3. Long Edges: Tapered.
- D. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
1. Basis-of-Design Product: Georgia-Pacific-P Gypsum; "DensArmor Plus High-Performance Interior Panel."
 2. Core: 5/8 inch (15.9 mm), Type X.
 3. Long Edges: Tapered.
 4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.04 SPECIALTY GYPSUM BOARD

- A. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use:
1. Products: Subject to compliance with requirements, provide the following:
 - a. Georgia-Pacific Gypsum LLC; DensArmor Plus.
 - b. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
 2. Core: 1/2 inch (12.7 mm), regular type.
 3. Long Edges: Tapered.
 4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.05 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges:
1. Basis-of-Design Product: Subject to compliance with requirements, provide Georgia-Pacific Gypsum; "DensShield Tile Backer" or a comparable product by one of the following:
 - a. CertainTeed Corp.
 - b. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
 2. Core: 1/2 inch (12.7 mm), regular type.
 3. Long Edges: Square.
 4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.06 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, or Paper-faced galvanized steel sheet.
 - 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.
- B. Exterior Trim: ASTM C 1047.
 - 1. Material: Hot-dip galvanized steel sheet.
 - 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.
- C. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following.
 - a. Fry Reglet Corp.
 - b. Gordon, Inc.
 - c. Pittcon Industries.
 - d. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
 - 2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
 - 3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.07 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
 - 2. Exterior Gypsum Soffit Board: Paper.
 - 3. Exterior Glass Mat Gypsum Soffit: Fiberglass mesh.
 - 4. Glass-Mat Gypsum Wallboard: 10-by-10 fiberglass mesh.
 - 5. Glass-Mat Gypsum Sheathing Board: 10-by-10 fiberglass mesh.
 - 6. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - a. Basis-of-Design Product: Georgia-Pacific Gypsum; ToughRock Sandable Setting Compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Basis-of-Design Product: Georgia-Pacific Gypsum; ToughRock Sandable Setting Compound.
 - b. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 - a. Basis-of-Design Product: Georgia-Pacific Gypsum; ToughRock Sandable Setting Compound.
 - 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
 - a. Basis-of-Design Product: Georgia-Pacific Gypsum; ToughRock Sandable Setting Compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.
 - a. Basis-of-Design Product: Georgia-Pacific Gypsum; ToughRock Sandable Setting Compound.
- D. Joint Compound for Exterior Soffit Applications:
 - 1. Basis-of-Design Product: Georgia-Pacific Gypsum; ToughRock Setting Compound.
 - 2. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
 - 3. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.
- E. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
2. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.08 AUXILLIARY ACCESSORIES

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Laminating adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
 - b. Grabber Construction Products; Acoustical Sealant GSC.
 - c. Pecora Corporation; AIS-919.
 - d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - e. USG Corporation; SHEETROCK Acoustical Sealant.
 - f. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
 2. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

3. Acoustical joint sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 APPLYING AND FINISHING PANELS - GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc., except in chases braced internally).
 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 2. Fit gypsum panels around ducts, pipes, and conduits.
 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber,

including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

- J. **STC-Rated Assemblies:** Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- K. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.03 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Wallboard Type: Vertical surfaces unless otherwise indicated.
 - 2. Type X: Where required for fire-resistance-rated assembly.
 - 3. Ceiling Type: Ceiling surfaces.
 - 4. Moisture- and Mold-Resistant Type: Within restrooms.
- B. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 - 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application.
 - 1. On ceilings, apply gypsum board indicated for base layers before applying face layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 - 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
 4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- E. Curved Surfaces:
1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12 inch (300 mm) long straight sections at ends of curves and tangent to them.
 2. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

3.04 APPLYING EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

- A. Apply panels perpendicular to supports, with end joints staggered and located over supports:
1. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or structural penetrations. Provide sealant per Section 07 9200 "Joint Sealants".
 2. Fasten with corrosion-resistant screws.

3.05 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile, unless otherwise noted. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.06 INSTALLATION OF TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
1. Cornerbead: Use at outside corners.
 2. LC-Bead: Use at exposed panel edges.
 3. L-Bead: Use where indicated.

- 4. U-Bead: Use at exposed panel edges.
- 5. Curved-Edge Cornerbead: Use at curved openings.
- D. Exterior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners.
 - 2. LC-Bead: Use at exposed panel edges.
- E. Aluminum Trim: Install in locations indicated on Drawings.

3.07 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled panel edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 3: Not used.
 - 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in other Division 09 Sections.
 - 5. Level 5: Apply where indicated on Drawings.
 - a. Primer and its application to surfaces are specified in other Division 09 Sections.
- E. Glass-Mat Gypsum Sheathing Panel: Finish according to manufacturer's written instructions for use as exposed soffit board.
- F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
- G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.08 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and

overspray to prevent damage according to texture-finish manufacturer's written recommendations.

3.09 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 3000

TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Tile.
- B. Surface Preparation Products.
- C. Setting Materials.
- D. Colored Tile Grouts.
- E. Tile & Stone Care and Maintenance Products.
- F. Edge Protection and Transition Profiles.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 – Cast-in-place Concrete.
- B. Section 07 9200 – Joint Sealants.
- C. Section 09 2900 – Gypsum Board.
- D. Section 10 2800 – Toilet and Bath Accessories.

1.03 REFERENCE STANDARDS

- A. ANSI A 108 Series/A 118 Series – American National Standards for Installation of Ceramic Tile.
- B. ANSI A136.1 - American National Standard for Organic Adhesives for Installation of Ceramic Tile.
- C. ANSI A137.1 - American National Standard Specifications for Ceramic Tile.
- D. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation.

1.04 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: Tile on walkway surfaces shall be provided with the following values as determined by testing in conformance with ASTM C 1028.
 - 1. Level Surfaces (up to 2% grade): Minimum of 0.60 in wet condition.
 - 2. Step Treads: Minimum of 0.60 in wet condition.
 - 3. Ramp Surfaces: Minimum of 0.80 in wet condition.
- B. Static Coefficient of Friction: Tile on walkway surfaces shall be provided with the following values as determined by testing in conformance with DCOF AcuTest.
 - 1. Level Surfaces (up to 2% grade): Minimum of 0.42 in wet condition.
 - 2. Step Treads: Minimum of 0.42 in wet condition.

1.05 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. **Product Data:** Provide manufacturers' data sheets on each product to be used including; tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives. Include preparation instructions and recommendations, storage and handling requirements and recommendations, installation methods.
- C. **Shop Drawings:** Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- D. **Tile Samples:** Provide 3 full size tile samples of each product, size as specified below for each tile type; illustrating pattern, color variations, and grout joint size variations. Allow sufficient time for City to review colors/patterns prior to verification.
- E. **Installation Material Selection Samples:** For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- F. **Manufacturer's Certificate:** Certify that products meet or exceed specified requirements, including coefficient of friction on wet and dry surfaces. For each shipment, type and composition of tile provide a Master Grade Certificate signed by the manufacturer and the installer certifying that products meet or exceed the specified requirements of ANSI A137.1.
- G. **Maintenance Data:** Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.06 QUALITY ASSURANCE

- A. Maintain one copy of The Tile Council of North America Handbook and ANSI A108 Series/A118 Series on site.
- B. **Manufacturer Qualifications:** Company specializing in manufacturing the types of products specified in this section, with minimum 10 years of documented experience.
- C. **Installer Qualifications:** Company specializing in performing tile installation, with minimum of 2 years of documented experience.
- D. **Single Source Responsibility:** Obtain all types and color of tile from a single source. Obtain all types and color of mortar, adhesive and grout from the same source.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives and liquid additives from freezing or overheating in accordance with manufacturer's instructions.
- B. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements of ANSI A137.1 for labeling sealed tile packages.
- C. Store tile and setting materials on elevated platforms, under cover and in a dry location and protect from contamination, dampness, freezing or overheating.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

- E. Conduct pre-installation meeting at project site to comply with requirements of GREENBOOK and City 'WHITEBOOK' Supplement, latest editions; for Project Meetings.

1.08 FIELD CONDITIONS

- A. Do not install adhesives in an unventilated environment. Observe the manufacturer's safety instructions including those pertaining to ventilation.
- B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials and for at least 7 days after completion.
- C. Do not install mortar, set or grout tile exterior when inclement weather conditions are expected within 48 hours after work is completed unless properly protected.
- D. Protection: Protect adjacent work surfaces during tile work. Close rooms or spaces to traffic of all types until mortar and grout has set.
- E. Observe the manufacturer's safety instructions including those pertaining to ventilation.

1.09 EXTRA MATERIALS

- A. Supply an amount equal to 3 percent of each size, color, and surface finish of tile specified.

PART 2 PRODUCTS

2.01 TILE MANUFACTURERS

- A. Acceptable Manufacturer: DalTile Corporation, 7834 C.F. Hawn Fwy, P.O.Box 170130; Dallas, TX, 75217; tel: 800-933-TILE or 214-398-1411; www.daltileproducts.com. Or approved equal.
- B. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.

2.02 INSTALLATION MATERIAL MANUFACTURERS

- A. Acceptable Manufacturer: Custom® Building Products, which is located at: 13001 Seal Beach Blvd. ; Seal Beach, CA 90740; Toll Free Tel: 800-282-8786; Email: [request info \(jackiel@cbpmail.net\)](mailto:requestinfo@jackiel@cbpmail.net); Web: www.custombuildingproducts.com Or approved equal.
- B. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.

2.03 TILE

- A. General: Provide tile that complies with ANSI A137.1 for types, compositions and other characteristics indicated. Provide tile in the locations and of the types colors and pattern indicated on the Drawings and identified in the Schedule and the end of this Section. Tile shall also be provided in accordance with the following:
 - 1. Factory Blending: For tile exhibiting color variations within the ranges selected under Submittal of samples, blend tile in the factory and package so tile taken from one package shows the same range of colors as those taken from other packages.

2. Mounting: For factory mounted tile, provide back or edge mounted tile assemblies as standard with the manufacturer, unless otherwise specified.
3. Factory Applied Temporary Protective Coatings: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with a continuous film of petroleum paraffin wax applied hot. Do not coat unexposed tile surfaces.

B. Color Body Porcelain Tile – Type 1 at Shower Areas and associated Clear Areas:

1. Product: Daltile KEYSTONES, or approved equal.
2. Size and Shape: 2x2, To match existing.
3. Grout Joint Recommendation: 1/8 inch.
4. Colors: As selected from manufacturer's full range of colors for this product, at time of submittal.
5. Thickness: 1/4 inch
6. Edges: Square.
7. Surface Finish: Abrasive.
8. Moisture Absorption: 0 to 0.5 percent. ASTM C 373.
9. Breaking Strength: >300 lbs. ASTM C 648.
10. Chemical Resistance: Resistant. ASTM C 650.
11. Dynamic Coefficient of Friction: Wet ≥ 0.60 , per A 137.1-2012, section 9.6.

C. Color Body Porcelain Tile – Type 2 at Restroom Areas:

1. Product: Daltile PORCEALTO, or approved equal.
2. Size and Shape: 8 X 8.
3. Grout Joint Recommendation: 1/4 inch.
4. Colors: As selected from manufacturer's full range of colors for this product, at time of submittal.
5. Thickness: 5/16 inch.
6. Edges: Square.
7. Surface Finish: Textured.
8. Moisture Absorption: 0 to 0.5 percent. ASTM C 373.
9. Breaking Strength: >520 lbs. ASTM C 648.
10. Chemical Resistance: Resistant. ASTM C 650.
11. Dynamic Coefficient of Friction: Wet ≥ 0.42 , per A 137.1-2012, section 9.6.

D. Wall Glazed Tile:

1. Size and Shape: 4-1/4 x 4-1/4.
 2. Grout Joint Recommendation: 1/16 inch.
 3. Colors: As selected from manufacturer's full range of colors for this product, at time of submittal.
 4. Thickness: 5/16 inch.
 5. Edges: Square.
 6. Surface Finish: Semi-Gloss.
 7. Pattern: Stacked bond.
 8. Moisture Absorption: less than 20%. ASTM C 373.
 9. Chemical Resistance: Resistant, ASTM C 650.
- E. Tile Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
1. Applications: Use in the following locations:
 - a. Open Edges: Bullnose.
 - b. Inside Corners: Coved.
 - c. Outside Corners: Double bullnose.
 - d. Floor to Wall Joints: Cove base.
 2. Manufacturer: Same as for tile.

2.04 TILE INSTALLATION MATERIALS

- A. Anti-Fracture Membrane/Cleavage Membrane complying with ANSI A118.12: Where indicated on the drawings, and elsewhere as required for isolating the installation from cracking due to minor substrate movement and normal structural deflections as specified in ANSI A108.17.
1. Liquid-Applied Elastomeric Membrane: Custom Building Products RedGard® Waterproofing and Crack Prevention Membrane – Liquid Applied Membrane, or approved equal.
 2. Custom Building Products Custom® 9240 Waterproofing and Anti-Fracture Membrane – Fabric Reinforced Liquid Applied membrane for Extra Strength.
 3. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
- B. Waterproofing and Anti-Fracture Membrane complying with ANSI 118.10: Where indicated on the drawings, and elsewhere as required for waterproof tile assembly as specified in ANSI A108.13.
1. Liquid-Applied Elastomeric Membrane: Custom Building Products RedGard® Waterproofing and Crack Prevention Membrane – Liquid Applied Membrane, or approved

equal.

2. Custom Building Products Custom® 9240 Waterproofing and Anti-Fracture Membrane – Fabric Reinforced Liquid Applied Membrane for Extra Strength.
 3. Approved Equal: Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 4-1.6 for Trade Names or Equals.
- C. Uncoupling Membrane: 1/8 inch thick polyurethane matting with three-dimensional grid structure with dovetail shaped cavities and fleece webbing laminated to the underside to provide a mechanical bond to the substrate adhesive.
1. Schluter Systems ‘DITRA’.
 2. Custom Building Products ‘Spiderweb II’.
 3. Laticrete ‘Strata Mat’.
 4. Approved Equal: Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 4-1.6 for Trade Names or Equals.
- D. Moisture Barrier System: Where indicated on the drawings and elsewhere as required for thin-set tile installations.
1. RedGard® Waterproofing and Crack Prevention Membrane. See moisture barrier installation instructions for RedGard. Reduces MVT from 12 lbs/24 hr/1000 sq ft (305 m) to less than 3 lbs/24 hr/ 1000 sq ft (305 m).
 2. Approved Equal: Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 4-1.6 for Trade Names or Equals.
- E. Self-Leveling Underlayment: Where indicated on the drawings, and elsewhere as required to provide a flat, level surface for direct receipt of tile and other floor coverings on dry, interior installations.
1. Custom Building Products LevelQuik® Rapid Setting Self-Leveling Underlayment for fills up to 1 inch (25 mm) thick.
 2. Custom Building Products LevelQuik® Extended Setting Self-Leveling Underlayment for fills up to 1 inch (25 mm) thick and extended workability.
 3. Custom Building Products LevelLite® Self-Leveling Underlayment for fills up to 2 inches (51 mm) thick. Just 3 lbs / sq ft at ½” (13 mm) thick.
 4. Custom Building Products LevelQuik® Latex Primer for surface preparation when installing self-leveling underlayments.
 5. Approved Equal: Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 4-1.6 for Trade Names or Equals.
- F. Mortar Bed Materials:

1. Custom Building Products CustomFloat® Bedding Mortar.
- or-
1. Portland Cement: ASTM C 150, type 1, gray or white.
 2. Hydrated Lime: ASTM C 207, Type S.
 3. Sand: ASTM C 144, fine.
 4. Latex Additive: As approved.
 5. Water: Clean and potable.
- G. Mortar Bed Installations: Where indicated on the drawings, and elsewhere as required for mortar bed or brown coat as the substrate for tile work; work to conform to ANSI A108.1.
1. Provide mortar bed per Part F, above. Additionally, reinforcing per the following options:
 - a. Reinforcing Mesh: 2 by 2 inch (50 by 50 mm) size weave of 16/16 wire size; welded fabric, galvanized.
 - b. Metal Lath: ASTM C847, Flat expanded diamond mesh, not less than 2.5 lbs/SY, galvanized finish.
- H. Cementitious Backer Units: ANSI A118.9; High density, cementitious, glass fiber reinforced, 2 inch wide coated glass fiber tape for joints and corners. Where indicated on the drawings, and elsewhere as required for floors and walls, interior and/or exterior, wet areas, and dry as recommended substrate for tile, fire rated wall installations, heat shield with UL listing for floors and walls; installation to comply with ANSI A108.11 and manufacturer's installation instructions.
1. 1/2 inch (12 mm) WonderBoard Backerboard (Exterior or Interior Floors, Walls, Ceilings, Countertops).
 2. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
- I. Cementitious Tile Adhesives - ANSI A118.4 / A118.11: Polymer-Enhanced Mortars: Where indicated on the Drawings, and elsewhere as required for setting tile as specified by ANSI A108.5 or A108.12, Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar, over substrates prepared accordingly:
1. For Crack Prevention due to Movement in Substrate.
 - a. Custom Building Products MegaFlex® Crack Prevention Mortar. With Shear Bond Strengths greater than 625 psi, per ANSI A118.4 Section 5.2.4. To minimize crack propagation from the substrate through the tile assembly, from cracks up to 1/8" (3.3 mm) wide.
 - b. Custom Building Products FlexBond® Fortified Thin-Set Mortar. With Shear Bond Strengths greater than 400 psi, per ANSI A118.4 Section 5.2.4. To minimize crack propagation from the substrate through the tile assembly, from cracks up to 1/16" (1.6 mm) wide.

- c. **Approved Equal:** Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
- J. **Organic Tile Adhesives:**
 - 1. **ANSI A136.1:** Where indicated on the drawings, and elsewhere as required for setting tile as specified by ANSI 108.4, Organic Adhesives, over substrates prepared accordingly; thinset bond type; use Type I in areas subject to prolonged moisture exposure.
- K. **Epoxy Tile Adhesives:**
 - 1. **ANSI A118.3:** Where indicated on the drawings, and elsewhere as required for setting tile as specified by ANSI A108.6 Chemical Resistant, Water-Cleanable Tile Setting and Grouting Epoxy, over substrates prepared accordingly, thinset bond type.
- L. **Edge Protection and Transition Profiles:** Exposed edges of ceramic and natural stone tile are prone to chipping when left unprotected. Profiles should be selected to protect the edges and provide transitions from various surfaces.
 - 1. **Material and Finish:** Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
 - 2. **Height:** As indicated on drawings.
 - 3. **Manufacturer:**
 - a. Custom Building Products
 - b. Schluter Systems
 - c. **Approved Equal:** Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.
- M. **Tile Grout:** Where indicated on the drawings, and elsewhere as required for filling the joints between tiles. Where indicated on the Drawings, and elsewhere as required for grouting tile as specified by ANSI A108.10 Installation of Grout in tile work
 - 1. **Polymer-Modified Portland Cement Grout:** Sanded for joints 1/8" - 1/2", Unsanded for joints 1/8" or less; color as selected by Architect.
 - 2. **Chemical Resistant, Water-Cleanable Tile Setting and Grouting Epoxy;** ANSI A118.3: 100 percent solids epoxy grout; color as selected by Engineer.
- N. **Elastomeric Joint Caulk:** ANSI A108.01.3.7 where indicated on the drawings, and elsewhere as required provide at all joints between floors and walls and at joints between tile and dissimilar materials.
 - 1. **Polyblend Sanded/Unsanded Caulk,** in matching grout color.
 - 2. **Commercial 100% Silicone Caulk** – ideal for movement joints in traffic areas, moisture and mildew resistant type. Conforming to ASTM C 920 and ASTM C 794.
- O. **Ceramic and Natural Stone Tile Care and Maintenance:** Required for proper maintenance of the completed tile assembly. Manufacturer's premium product.

1. Aqua Mix® Sealer's Choice® Gold: Water-based, penetrating sealer to provide maximum stain protection.
2. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile. Subfloor shall be prepared to a maximum surface variation of ¼ inch in 10'-0".
- B. Verify that wall surfaces are smooth and flat within the tolerances specified in ANSI 137.1 unless otherwise indicated, are dust-free, free of substances that would impair bonding and are ready to receive tile. Wall studs, and backing surfaces, shall be prepared to a maximum surface variation of 1/8" in 8'-0".
- C. Verify that sub-floor surfaces are dust-free, free of substances that could impair bonding of setting materials to sub-floor surfaces and are smooth and flat within the tolerances specified in ANSI 137.1.
- D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.
- E. Verify that required floor-mounted and wall-mounted utilities are in correct location.
- F. Do not proceed with work until defects or conditions which would adversely affect quality, execution and permanence of finished tile work are corrected (ANSI A108.3).
- G. If substrate preparation is the responsibility of another installer, notify City of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Protect surrounding work from damage.
- B. Condition of surface to receive tile:
 1. All supporting surfaces shall be structurally sound, solid, stable, level, plumb, and true to a tolerance in plane of 1/4 inch (6 mm) in 10 feet 0 inch (3 m) for walls, 1/4 inch (6 mm) in 10 feet (3 m) for floors when specified for thin-set method. When installing large format tile (one side greater than 15 inches or 38 cm) the tolerance is reduced to 1/8 inch in 10 feet (3 mm in 3 m). ANSI A108.01 Section 2.6.2.
 2. They shall be clean and free of dust, oil, grease paint, tar, wax, curing compound, primer, sealer, form release agent, laitance, loosely bonded topping, loose particles or any deleterious substance and debris which may prevent or reduce adhesion.
 3. Mechanically sand and scarify the substrate to completely remove all paint, loosely bonded topping, loose particles and construction debris.
 4. Neutralize any trace of strong acid or alkali.

5. All substrates shall be dry. The moisture content shall not exceed 50 percent.
 6. Turn off all forced ventilation and radiant heating systems and protect work against drafts during installation and for a period of at least 72 hours after completion. Use indirect auxiliary heaters to maintain the temperatures in the area at the recommended workable level. Vent temporary heater to exterior to prevent damage to tile work from carbon dioxide build-up.
 7. Presswood, particleboard, chipboard, masonite, gypsum floor patching compounds, asbestos board, Luan and similar dimensionally unstable materials are not acceptable substrates.
 8. Before work commences examine the areas to be covered and report any flaw or adverse condition in writing to the City. Do not proceed with work until surfaces and conditions comply with the requirements indicated in ANSI A108 standard.
- C. Concrete: Concrete and Masonry surfaces must comply with ANSI A108.01 Section 3.2. All concrete substrates shall be at least 28 days old, completely cured and free of hydrostatic conditions, and/or moisture problems.
 - D. Plywood: Plywood subfloor and underlayment must comply with ANSI A108.01 Section 3.4.
 - E. OSB Panels: OSB panel is not a suitable surface for direct bonding ceramic tile. The OSB panel should be coated with Custom Building Products RedGard Waterproofing and Anti-fracture membrane prior to the installation of ceramic tile.
 - F. Cementitious Backer Board at Floors, Decks or Countertops: Install in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge. Use non-corrosive fasteners or screws. Bed fiberglass self-adhesive tape at all joints and corners with material used to set tiles.
 - G. Wall and Ceiling Installation: Wall and Ceiling surfaces must comply with ANSI A108.01 Section 2.5.
 - H. Gypsum Board Surfaces: Gypsum Board shall be installed per the guidelines of ANSI A108.01 Section 3.5.
 - I. Steel: Steel substrates shall be rigid, solidly fixed, dry, well sanded and free of dust, oil, grease, primer and deleterious substances, which may prevent or diminish the bond.
 - J. Tiling over existing substrates (only when specifically allowed per plan): Old cement terrazzo, ceramic tile paver, quarry tile, vinyl and vinyl composition floor coverings other than cushion vinyl shall be sound, solidly in place, flawless, stripped or sanded, clean, free of dust, wax, grease, sealers, soap residue and other deleterious substances which may prevent or reduce the adhesion. For further details see ANSI A108.01 Article 2.6.2.
 - K. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.
 - L. Condition of surface to receive tile:
 1. Assure that surfaces to receive tile are stable, flat, firm, dry, clean and free of oil, waxes and curing compounds.
 2. Deflection of substrate not to exceed 1/360th of the span 1/2 inch (12 mm) in 15 feet (4.6 m) in accordance with ANSI A108.01-2.3. Allow for live and impact load as well as dead

load weight of tile and setting bed.

3. Protect adjacent surfaces prior to beginning tile work.

3.03 INSTALLATION - GENERAL

- A. Install tile and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and The Tile Council of North America (TCA) Handbook recommendations.
- B. Lay tile to pattern indicated. Arrange pattern so that a full tile or joint is centered on each wall and that no tile less than 1/2 width is used. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor and wall joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install ceramic and non-ceramic trim in accordance with manufacturer's instructions.
- G. Install thresholds where indicated.
- H. Sound tile after setting. Replace hollow sounding units.
- I. Expansion joints, control joints, insulation joints, etc., must be located in compliance with TCNA EJ171 and filled with appropriate materials.
 1. Joints must be carried through layers of installation materials including tile, setting bed, mortar bed and reinforcing wire. Refer to TCNA Handbook, EJ171 and ANSI AN-3.8 for details on placement, size and specifications of materials.
- J. Allow tile to set for a minimum of 48 hours prior to grouting.
- K. Grout tile joints. Install grout in accordance with Grout ANSI A108.10 standard and manufacturer's directions.
- L. Install elastomeric tile caulk around sinks, tubs and showers and where tile meets tile or another surface. Surfaces should be clean, dry and free of contamination. Maximum joint width and depth should not exceed 1/4 inch (6 mm).
- M. Seal grout, stone and unglazed tile 48 - 72 hours after grout application.

3.04 INSTALLATION – FLOORS – THIN-SET METHODS

- A. Over interior concrete substrates:
 1. Where waterproofing membrane is indicated, install in accordance with TCA Handbook Method F122, with latex-portland cement grout.

3.05 INSTALLATION – SHOWER RECEPTORS (INCLUDING RECESSED SLAB/MORTAR BED AREA IDENTIFIED IN DRAWINGS)

- A. At tiled shower receptors install in accordance with TCA Handbook Method B414, mortar bed floor, mortar bed walls, over wood or metal studs.

- B. Grout with polymer modified grout as specified above.
- C. Seal joints between tile work and other work.

3.06 INSTALLATION - WALL TILE

- A. Over coated glass mat water-resistant gypsum backer board on studs, install in accordance with TCA Handbook Method W245, using membrane at toilet rooms.

3.08 CLEANING

- A. Clean tile and grout surfaces.

3.09 PROTECTION

- A. Do not permit traffic over finished floor surface for 4 days after installation.
- B. Cover floor with kraft paper and protect from dirt and residue from other trades until completion of project.
- C. Where floor will be exposed for prolonged periods cover with plywood or other similar type walkways.
- D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 09 6500
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient tile flooring.
- B. Resilient base.
- C. Installation accessories.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors.
- B. Section 09 0561 – Common Work Results for Flooring Preparation.

1.03 REFERENCE STANDARDS

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; current edition.
- B. ASTM F1066 – Standard Specification for Vinyl Composition Floor Tile.
- C. ASTM F1344 - Standard Specification for Rubber Floor Tile; current edition.
- D. ASTM F1861 - Standard Specification for Resilient Wall Base; current edition.
- E. BAAQMD 8-51 - Bay Area Air Quality Management District Regulation 8, Rule 51, Adhesive and Sealant Products; www.baaqmd.gov; current edition.
- F. CAL (CHPS LEM) - Low-Emitting Materials Product List; California Collaborative for High Performance Schools (CHPS); current edition at www.chps.net/.
- G. GEI (SCH) - GREENGUARD "Children and Schools" Certified Products; GREENGUARD Environmental Institute; current listings at www.greenguard.org.
- H. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.
- I. SCS (CPD) - SCS Certified Products; Scientific Certification Systems; current listings at www.scs-certified.com.

1.04 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Indicate layout, pattern.
- D. Selection Samples: Submit manufacturers complete set of color samples for Engineer's initial

selection, for each type of product indicated.

- E. **Verification Samples:** For each type of product indicated, in manufacturer's standard-size samples of each resilient product color, texture, and pattern required.
- F. **Concrete Testing Report,** per Section 09 0561 "Common Work Results for Flooring Preparation."
- G. **Submit the manufacturer's certification** that the flooring has been tested by an independent laboratory and complies with the required fire tests.
- H. **Certification:** Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of sub-floor is acceptable.
- I. **Maintenance Data:** Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.05 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** Company specializing in manufacturing the types of products specified in this section, with minimum 5 years of documented experience.
- B. **Installer Qualifications:** Select an installer who is competent in the installation of Manufacturer's solid vinyl flooring with acrylic adhesive or two part polyurethane.
- C. **Single Source Responsibility:** Obtain each type of flooring and accessories from a single source, including leveling and patching compounds, and adhesives.
- D. **Provide flooring material to meet the following fire test performance criteria as tested by a recognized independent testing laboratory:**
 - 1. ASTM E 648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I.
 - 2. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. **Deliver materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.**
- B. **Store materials in a clean, dry, enclosed space off the ground, and protected from the weather and from extremes of heat and cold. Protect adhesives from freezing. Store flooring, adhesives and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.**

1.07 FIELD CONDITIONS

- A. **Maintain a minimum temperature in the spaces to receive the flooring and accessories of 65°F (18°C) and a maximum temperature of [100°F (38°C)] [85°F (29°C)] for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 55°F (13°C) in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances.**
- B. **Maintain the ambient relative humidity between 40% and 60% during installation.**

- C. Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond and moisture tests.
- D. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer.

1.08 WARRANTY

- A. Comply with 2012 Standard Specifications for Public Works Construction ‘The GREENBOOK’ and 2012 City Supplement ‘The WHITEBOOK’, Section 6-8.3 for Warranty.
- B. Special Manufacturer’s Warranty: Provide Mannington Commercial Amtico 20-year Commercial Warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Armstrong World Industries: www.armstrong.com.
- B. Johnsonite, Inc.: www.johnsonite.com .
- C. Burke Flooring, a division of Burke Industries: www.burkeflooring.com .
- D. Mannington Commercial: www.mannington.com .
- E. Approved Equal: Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 4-1.6 for Trade Names or Equals.

2.02 RESILIENT TILE FLOORING

- A. Resilient Tile LVT-1 & LVT-2:
 - 1. Manufacturer: Mannington Commercial.
 - 2. Series: Amtico Collection – Wood; Luxury Vinyl Plank with Beveled Edges.
 - 3. Size:
 - LVT-1: 9 x 36 inch
 - LVT-2: 6 x 36 inch.
 At locations indicated on Drawings.
 - 4. Overall Thickness: 0.096 inch.
 - 5. Wearing Layer Thickness: 40 mil.
 - 6. Color: Oak Manor – AROW7970.
 - 7. Third Party Certification Required: FloorScore Certified.
 - 8. Rapidly Renewable Resource Content: 4% by total product weight.
 - 9. Slip Resistance: R9, Class DS, 1.0 (dry coefficient of friction), ADA compliant Residual.

10. Specification: ASTM F 1700 – Class 3 Type A & B.
11. Stain & Chemical Resistance (ASTM F-925): Excellent
12. Wear Group Classification (EN 685): 23/33/42
13. Flooring Radiant Panel (ASTM-E-648): Class 1 – Passes
14. N.B.S. Smoke Chamber (ASTM-E-662): <450 – Passes
15. Abrasion Resistance (EN 660): Group T, Volume Loss <2.0 mm³
16. Residual Indentation (ASTM F-1914): <0.08 mm, Passes
17. Dimensional Stability (ASTM F-2199): Passes
18. Flexibility (ASTM F-1700): Passes
19. IIC – Impact Insulation Class (ASTM E492): 1 ½” lightweight concrete – IIC 46
20. STC – Sound Transmission Class (ASTM E90): 1 ½” lightweight concrete – STC 53
21. Castor Chair Resistance (EN 425): Passes
22. FloorScore Indoor Air Quality: SCS Certified
23. Recycled Content: Approximately 30% Pre-Consumer by Total Product Weight
24. Warranty: 20 Year Warranty Against Wear-Out From Normal Foot Traffic

2.03 RESILIENT BASE

A. Resilient Base RB-1:

1. Manufacturer: Mannington Commercial.
2. Series: Optimum Edge Rubber Wall Base, Thermoset Vulcanized SBR, Type TS.
 - a. Meets ASTM F 1861, Type TS, Group 2 - Layered.
 - b. Solid, top set, Style B – Cove.
3. Size: 4 inch.
4. Length: 100’ Continuous Roll.
5. Color: As indicated on Drawings.
6. Accessories: Premolded external corners, internal corners, and end stops.

2.04 REDUCERS / EDGE STRIPS

- A. Provide Mannington Commercial resilient reducers and edge strip styles as needed and appropriate to the project specific application, of equal gauge to the flooring, homogeneous vinyl or rubber composition, tapered or bullnose edge, with color as selected by the City from manufacturer’s complete line.

2.05 ACCESSORIES

- A. Adhesive: Provide Amtico 373 Adhesive, Universal Two-Part Flooring Adhesive, or PS Flooring Adhesive under the flooring, or approved equal, as recommended by the Manufacturer

for the specific job site condition. Wall Base Adhesive at the wall base as recommended by manufacturer.

- B. For patching, smoothing, and leveling monolithic subfloors (concrete, terrazzo, quarry tile, ceramic tile, and certain metals), provide Mannington MVP-2023 Cement-Based Underlayment.
- C. Provide Primer for installing over porous concrete substrates, as recommended by flooring manufacturer.
- D. For sealing joints between the top of wall base or integral cove cap and irregular wall surfaces such as masonry, provide plastic filler applied according to the manufacturer's recommendations.
- E. LVT must have the ability to be chemically welded to adjoining broadloom carpet materials.
- F. Provide transition/reducing strips tapered to meet abutting materials.
- G. Provide threshold of thickness and width as shown on the drawings.
- H. Provide resilient edge strips of width shown on the drawings, of equal gauge to the flooring, homogeneous vinyl or rubber composition, tapered or bullnose edge, with color to match or contrast with the flooring, or as selected by the City from standard colors available.
- I. Provide metal edge strips of width shown on the drawings and of required thickness to protect exposed edges of the flooring. Provide units of maximum available length to minimize the number of joints. Use butt-type metal edge strips for concealed anchorage, or overlap-type metal edge strips for exposed anchorage. Unless otherwise shown, provide strips made of extruded aluminum with a mill finish.
- J. Provide aluminum flash cove cap strips.
- K. Provide flash cove cant sticks.
- L. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges; curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers and other defects and foreign materials that might prevent adhesive bond or impair durability or appearance of the flooring material.
- B. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.
- C. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- D. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. In accordance with Section 09 0561, perform the following testing:
1. Perform Relative Humidity testing: ASTM F 2170.
 2. Perform Moisture Vapor Emission testing: ASTM F 1869.
 3. Perform Alkalinity Testing: ASTM F 710.
- B. SPECIAL PREPARATION OVER EXISTING VCT FLOORING:
1. Strip existing VCT flooring to remove any floor finish, wax or polish by using JohnsonDiversey Freedom floor stripper or equivalent diluted and applied in accordance with the manufacturers' instructions.
 2. Remove all residues by rinsing the floor thoroughly with warm water and extracting with a wet vacuum or finish the cleaning in accordance with the manufacturers' instructions.
 3. Mechanically abrade the existing flooring to provide a suitable bonding surface.
WARNING: Asbestos & Silica – Refer to the current Resilient Floor Covering Institute (RFCI) document "Recommended Work Practices for Removal of Existing Resilient Floor Coverings" for guidance.
 4. Clean the floor surface and examine existing flooring to **ensure all tiles are intact and fully bonded.**
 5. Remove all loose or broken tiles.
 6. Patch affected areas with a high quality Portland cement based leveling or patching material (minimum 3000 psi compressive strength according to ASTM C109).
NOTE: Only use leveling or patching materials recommended by the manufacturer for this type of application. Apply leveling or patching materials in accordance with the manufacturers' instructions.
 7. Check that the surface of the existing floor is flat to 1/8" in 10 ft. Smooth the surface to prevent telegraphing and level with a high quality Portland cement based smoothing or leveling material.
 8. When all preparatory work is satisfactorily completed, proceed with the installation of Amtico flooring.
 9. Please contact Amtico International Technical Services at 877-238-7869 for additional information.
- C. Remove paint, varnish, oils, release agents, sealers, and waxes. Remove residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents.
- D. Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, and other defects with good quality Portland cement-based patch and underlayment as recommended by the flooring manufacturer.
- E. Do not install over OSB (Oriented Strand Board), particle board, chipboard, lauan or composite type underlayments.

- F. Floor covering shall not be installed over expansion joints.
- G. Do not install resilient products until they are same temperature as the space where they are to be installed.
- H. Vacuum or broom-clean surfaces to be covered immediately before the application of flooring. Make subfloor free from dust, dirt, grease, and all foreign materials.
- J. Prohibit traffic until filler is cured.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in strict accordance with manufacturer's written instructions and procedures.
- C. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.
- D. If required, install flooring on pan-type floor access covers. Maintain continuity of color and pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.
- E. Scribe, cut, and fit to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.
- F. Chemically weld LVT to adjoining broadloom carpet materials.
- G. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.
- H. Spread only enough adhesive to permit installation of materials before initial set.
- I. Where type of floor finish, pattern, or color is different on opposite sides of door, terminate flooring under centerline of door.
- J. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 - 1. Metal Strips: Attach to substrate before installation of flooring using stainless steel screws.

3.04 TILE AND PLANK FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless manufacturer's instructions say otherwise.
- B. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

3.05 RESILIENT BASE AND ACCESSORIES

- A. Apply top set wall base to walls, columns, casework, and other permanent fixtures in areas where top-set base is required. Install base in lengths as long as practical, with inside corners fabricated from base materials that are mitered or coped. Tightly bond base to vertical substrate with continuous contact at horizontal and vertical surfaces.

- B. Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.
- C. Place resilient and aluminum edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.
- D. Apply overlap metal edge strips where shown on the drawings, before flooring installation. Secure units to the substrate, complying with the edge strip manufacturer's recommendations.
- E. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- F. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- G. Install base on solid backing. Bond tightly to wall and floor surfaces.
- H. Scribe and fit to door frames and other interruptions.

3.06 CLEANING

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
 - 1. No traffic for 24 hours after installation.
 - 2. No heavy traffic, rolling loads, or furniture placement for 72 hours after installation.
- D. Wait 72 hours after installation before performing initial cleaning.
- E. A regular maintenance program must be started after the initial cleaning. Perform initial maintenance according to the latest edition of the manufacturer's maintenance and warranty literature. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings.

3.07 SCHEDULE - See Drawings

END OF SECTION

SECTION 09 6800

CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Work of this Section includes, but is not limited to, the following:
 - 1. Broadloom Carpet for adhesive installation.
 - 2. Installation materials and accessories.
- B. Labeling by manufacturers where visible to occupants is prohibited except where required by Federal law.

1.2 RELATED SECTIONS

- A. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors.
- B. Section 09 0561 – Common Work Results for Flooring Preparation.
- C. Section 09 6500 - RESILIENT FLOORING for reducer strips.

1.3 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data:
 - 1. Submit manufacturer's specifications and installation instructions for carpet and accessories.
 - 2. Describe in detail carpet construction, including method of backing and dying method.
- C. Shop Drawings: Submit Shop Drawings of areas to receive carpet showing cross-joints, seam locations and lengths, pile direction, details of seaming and installation of carpeting and accessories.
- D. Samples:
 - 1. Carpet:
 - a. Standard colors: Submit 12 inch x 16 inch production run samples for each type, pattern and color.
 - b. Custom colors: Submit 12 inch x 16 inch strike-offs for each type, pattern and color.
 - 2. Reducer strips:
 - a. Submit manufacturer's full range of color samples for selection by Engineer.
 - b. Following selections, submit 12 inch long samples for each type and color.

- E. Certificates:
1. Submit certification from carpet manufacturer that each type of carpet, with color and pattern matching approved samples, will be manufactured in required quantities within Project schedule.
 2. Submit certification from carpet manufacturer that for each carpet type, at least the quantity of carpet required for each floor will be manufactured in a single dye lot.
 3. On areas of underlayment to receive adhered finishes, submit joint certification signed by each adhesive manufacturer and underlayment manufacturer, stating that underlayment has been reviewed and is compatible with adhesive, and that underlayment will not interfere with adhesion of finish.
 4. Submit certification from carpet manufacturer that future production runs of each type of carpet, with color and pattern matching approved samples, will be available. Advise of minimum quantities required for future orders.
- F. Test Reports:
1. Submit certified test reports, preformed by a recognized independent testing laboratory, showing that carpets have been previously tested and meet or exceed manufacturer's published data for flammability performance criteria, static control and dimensional stability performance requirements.
 2. Submit certified test reports performed by a recognized independent testing laboratory showing that carpets have been previously tested and complies with requirements for bearing "Indoor Air Quality Carpet Testing" label.
- G. Qualification Data: Submit installer qualifications verifying years of experience; include list of projects having similar scope of work identified by name, location, date, reference names and phone numbers.
- H. Maintenance Data:
1. Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning carpet.
 2. Include instructions for removal of common stains.
 3. Include copy of submittal in Project information manual.
- I. Warranty: Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 6-8.3 for Warranty.

1.4 PERFORMANCE REQUIREMENTS

- A. Flammability Requirements - Carpet:
1. DOC-FF1-70 - Methenamine Pill Test: Passes.
 2. ASTM-E648 - Floor Radiant Panel Test: 0.45 Watts/cm² or greater.

3. Static generation: Not more than 3.0 KV, when tested in accordance with AATCC 134; measured at 70 F and 20% relative humidity.
 4. Static dissipation: 500 V potential no greater than 20,000 megaohm resistance from either the surface to building ground or between electrodes placed 3 feet apart anywhere on the surface, when tested in accordance with IBM test method.
 5. Flame Spread: 25 or less per ASTM E 84.
 6. Smoke Density: 450 or less per ASTM E 662.
- B. Dimensional Stability - Carpet Tile: Maximum $\pm 0.10\%$ change between initial and final measurements, when tested in accordance with ISO 2551 (Aachen Test).
- C. Carpet shall bear "Indoor Air Quality Carpet Testing" label indicating testing for Total Volative Organic Compounds (TVOC).

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:
1. Not less than 5 years documented successful experience with work comparable to Work of this Project.
 2. Certified by Floor Covering Installation Board (FCIB) or who can demonstrate compliance with FCIB certification program requirements.
 3. Installer must maintain full-time supervisor on job site during times that Work is in progress. Supervisor must have minimum of five years experience in work similar in nature and scope to Work of this Project.
- B. Regulatory Requirements:
1. Conform to applicable requirements of authorities having jurisdiction over Project.
 2. Except as may be modified by governing authorities, comply with applicable requirements and provisions of the Americans with Disabilities Act.
- C. Standards: Comply with standards established by the Carpet and Rug Institute.
- D. Inspection: Carpeting and accessories will be inspected to determine compliance with Contract Documents with respect to workmanship, materials, colors and installation.
- E. Dye Lots: For each carpet type, at least the quantity of carpet required for each floor shall be manufactured in a single dye lot.

1.6 PRE-INSTALLATION CONFERENCE

- A. Prior to commencing Work, meet at site to review materials, installation procedures and coordination with other Work.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver carpet and accessories completely identified.
- B. Use care in handling and storing to prevent damage and soiling.

- C. Schedule deliveries so that material is not allowed to stack up, but is installed without delay.
- D. Registered number tags shall be attached and intact on carpet when delivery is made.
- E. Comply with CRI 104, Section 5 "Storage and Handling."

1.8 PROJECT CONDITIONS

- A. After areas to receive carpet are completed and ready to receive carpet and prior to ordering carpet, verify required yardages with actual field measurements.
 - 1. If field measurements cannot be taken prior to ordering carpet, no additional compensation will be allowed on account of differences between actual measurements and dimensions on Drawings.
 - 2. Verify conditions including wall-to-wall, offset, door and other dimensions.
- B. Comply with CRI 104, Section 6 "Site Conditions".
- C. Environmental Requirements:
 - 1. Maintain temperature between 65°F and 95°F, and relative humidity between 12% and 65%, in spaces to receive carpet for at least 72 hours prior to installation, during installation and for not less than 72 hours after installation.
 - 2. Store carpet and adhesive in spaces to receive carpet for at least 48 hours before beginning installation.
 - 3. Roll out carpet at least 24 hours prior to installation to allow it to relax, as recommended by carpet manufacturer.
 - 4. After 72 hour period following installation, maintain minimum temperature of 50°F in areas where Work is completed.
 - 5. Comply with CRI 104 Guidelines for Indoor Air Quality.
- D. Substrate Requirements: Do not install carpet until concrete floors are within the following limits.
 - 1. Moisture content: 7% maximum.
 - 2. Alkalinity: pH between 5 and 9, for adhesive installation.
 - 3. Floor slab temperature: 65°F minimum.

1.9 SEQUENCING AND SCHEDULING

- A. Install carpet materials after other finishing operations, including painting, have been completed.
- B. Do not install over concrete slabs until they are cured, and moisture content, alkalinity and temperature are within specified limits.
- C. Coordinate installation of carpet in conference rooms with Custom Furniture Manufacturer's base in conference rooms as designated.

1.10 WARRANTY

- A. Comply with 2012 Standard Specifications for Public Works Construction ‘The GREENBOOK’ and 2012 City Supplement ‘The WHITEBOOK’, Section 6-8.3 for Warranty.
- B. Special Warranty: Provide manufacturer's ten-year written warranty for carpet materials and installation, covering defects in workmanship, materials and installation; delamination and edge ravel; and loss of more than 10% of carpet's pile surface.

1.11 EXTRA STOCK

- A. Remnants:
 - 1. Package and deliver usable remnants of carpet.
 - 2. Identify remnants by manufacturer, pattern and color.
 - 3. Store at job site where directed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Carpet: When matching existing installation, must meet the following minimum requirements:
 - 1. Roll goods, high traffic commercial grade, new materials only.
 - 2. Matching color, or complimentary color to existing installation.
 - 3. Nylon fiber is acceptable. Olefin, polypropylene, and polyester are not acceptable.

2.2 ACCESSORIES

- A. General: Provide only new materials, which are recommended by carpet manufacturers.
- B. Sub-Floor Filler: Pre-mixed latex; type recommended by carpet manufacturer.
- C. Adhesive (Direct Glue-Down Application):
 - 1. General: Provide premium type as recommended by carpet manufacturer.
 - 2. For carpet tile: Acrylic-based releasable pressure adhesive, or equivalent method recommended by carpet manufacturer and acceptable to Engineer.
 - 3. Petroleum-based adhesives or glues are not permitted.
 - 4. Water-resistant, mold-resistant, non-staining type to suit product and subfloor conditions, as recommended by carpet manufacturer.
- D. Seam Sealer (Carpet Seaming Cement):
 - 1. Water-resistant and flame-resistant seam sealer for sealing raw edges, seaming, reinforcing seams and patching.
 - 2. Provide fast drying, easy spreading sealer, latex or solvent type as recommended by carpet manufacturer for the application, having excellent aging characteristics.
 - 3. Petroleum-based adhesives or glues are not permitted

- E. Plastic-Coated Fabric Tape:
 - 1. Woven fabric impregnated with plastic and coated with adhesive having high-tack adhesion forming a secure bond.
 - 2. Provide water-resistant plastic-coated tape which will unwind without adhesive transfer.
 - 3. Provide products as recommended by manufacturer.
- F. Seaming Tapes:
 - 1. Hot melt, reinforced and backed tape, specifically manufactured for carpet seaming, and of type as recommended by carpet manufacturer.
 - 2. Tape shall provide maximum adhesive bond, with either flat or ribbed adhesive.
- G. Reducer Strips: See Section 09 6500 - RESILIENT FLOORING.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and adjacent construction for conditions that would adversely affect execution. Do not proceed until unsatisfactory conditions are corrected.
- B. Verify that concrete floors do not exhibit carbonization or dusting.
- C. Perform tests to verify that moisture content, alkalinity and temperature of concrete floors are within specified limits.

3.2 PREPARATION

- A. Remove sub-floor ridges and bumps.
- B. Remove existing adhesive, coatings, curing compounds and other substances that are incompatible with adhesives.
- C. Fill low spots, cracks, joints and holes with sub-floor filler. Provide substrate with maximum variation of 1/4 inch in 10 feet.
- D. Clear away debris and vacuum clean immediately before installation. Check surfaces to ensure no "dusting" through installed carpet.

3.3 INSTALLATION

- A. Tolerances:
 - 1. Carpet:
 - a. Maximum creepage of 1 inch in 400 feet.
- B. Carpet Installation:
 - 1. Direct glue-down: Comply with CRI 104, Section 8.
 - 2. For each carpet type, install all carpet for each floor from same dye lot.
 - 3. For patterned carpet:

- a. Use chalk lines or dry lines to ensure proper pattern alignment and squareness with room.
 - b. Dry lay all carpet pieces prior to spreading adhesive.
 - c. Pattern match at midpoint of seam so elongation can be corrected to each wall.
 - d. Stretch shorter patterns to match longer patterns.
 - e. Use stay nails to hold the stretched pattern in place until adhesive has reached adequate strength.
4. Install in accordance with manufacturer's instructions and in compliance with final Shop Drawings. Maintain pile lay and weave in same direction shown.
 5. Run carpet and cushion tight against walls.
 6. Roll carpet uniformly, removing air pockets or bubbles.
 7. Extend carpet under open-bottomed obstructions and under removable flanges and furnishings, and into alcoves and closets of each space.
 8. Install carpet in recessed covers, such as access doors and cleanouts.
 9. Center seams under doors, unless otherwise indicated. Do not place seams in traffic direction at doorways.
 10. Place seams inside offices and conference rooms to avoid chair placement.
 11. Provide cutting of seams in accordance with manufacturer's recommendations, using tools designed for carpet being installed.
 12. Install carpet reducer strips at openings and doors wherever carpet terminates and where edge of carpet is exposed.

3.4 CLEANING

- A. Vacuum carpet using commercial machine with face-beater element.
- B. Remove spots in accordance with manufacturer's instructions. Replace entire area of broadloom, where spots cannot be removed.

3.5 PROTECTION

- A. Avoid placement of equipment and furniture, and heavy traffic, for at least 48 hours after adhesive installation.
- B. Protect Work from damage during construction period so that it will be without evidence of damage or wear at completion.

END OF SECTION

SECTION 09 9000

PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints, stains, varnishes, and other coatings.
- C. Materials for backpriming woodwork.
- D. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Exposed surfaces of steel lintels and ledge angles.
 - 3. Prime surfaces to receive wall coverings.
 - 4. Mechanical and Electrical:
 - a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. In all areas, paint shop-primed items.
 - c. On the roof and outdoors, paint all equipment that is exposed to weather or to view, including that which is factory-finished.
 - d. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - e. Paint dampers exposed behind louvers, grilles, to match face panels.
- E. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.

4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 5. Non-metallic roofing and flashing.
 6. Stainless steel, anodized aluminum, bronze, terne, and lead items.
 7. Marble, granite, slate, and other natural stones.
 8. Floors, unless specifically so indicated.
 9. Ceramic and other tiles.
 10. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
 11. Glass.
 12. Acoustical materials, unless specifically so indicated.
 13. Concealed pipes, ducts, and conduits.
- F. See Schedule - Surfaces to be Finished, at end of Section.

1.02 RELATED REQUIREMENTS

- A. 2013 California Green Building Standards Code
- B. Section 05 5000 - Metal Fabrications: Shop-primed items.
- C. Section 08 1113 – Hollow Metal Doors and Frames.

1.03 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2011.
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.
- D. GreenSeal GS-11 - Paints; 1993.
- E. NACE (IMP) - Industrial Maintenance Painting; NACE International; Edition date unknown.

- F. SSPC (PM1) - Good Painting Practice: SSPC Painting Manual, Vol. 1; Society for Protective Coatings; Fourth Edition.
- G. SSPC (PM2) - Steel Structures Painting Manual, Vol. 2, Systems and Specifications; Society for Protective Coatings; 1995, Seventh Edition.
- H. SSPC-SP 1 - Solvent Cleaning.
- I. SSPC-SP 2 - Hand Tool Cleaning.
- J. SSPC-SP 3 - Power Tool Cleaning.
- K. SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete.
- L. EPA-Method 24
- M. CARB (California Air Resources Board)

1.05 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', current editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data: Provide data on all finishing products, including:
 - 1. Product characteristics
 - 2. Surface preparation instructions and recommendations
 - 3. Primer requirements and finish specification
 - 4. Storage and handling requirements and recommendations
 - 5. Application methods
 - 6. Cautions
 - 7. VOC Content
- C. Verification Samples: Submit two "draw-down" samples on paper, 8-1/2x11 inch in size illustrating actual color, texture and sheen for each product scheduled for use on the project.
- D. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. VOC content.

- D. Certification: By manufacturer that all paints and coatings comply with VOC limits specified.
- E. Certification: By manufacturer that all paints and coatings do not contain any of the prohibited chemicals specified; GreenSeal GS-11 certification is not required but if provided shall constitute acceptable certification.
- F. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.
- G. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.
- H. Maintenance Materials: Furnish the following for City's use in maintenance of project.
 - 1. Extra Paint and Coatings: 3 gallons of each color; store where directed.
 - 2. Label each container with color and type in addition to the manufacturer's label.

1.06 CLOSEOUT SUBMITTALS

- A. Record Drawings: At time of Substantial Completion, submit building floor plans, indicating all areas that have been painted, complete with legend identifying what colors were used on each type of substrate receiving paint (i.e. walls, doors, trim, etc.). Provide separate color chart, indicating all colors used throughout project.
- B. Record Samples: Provide sample paint draw downs of actual colors used. Identify color, formula, and gloss. Format sample draw downs on rigid backing, 8.5 x 11 inches, bound into a notebook binder,
- C. Contact Information: Provide contact information for painting contractor. Identify name, address, and phone number.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience.
- C. Paints used on project must comply with City General Services/Facilities Division Maintenance Standards.
- D. Anti-graffiti coating system must comply with City Parks and Recreation Division Guidelines.
- E. Quality: Paint shall be of manufacturer's highest, premium, or 'best', quality appropriate for the substrate and project conditions. No construction grade paint shall be used on City projects or facilities.

- F. Submit CARB (California Air Resources Board) complying products only.

1.08 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: City reserves the right to invoke the following procedure:
 - 1. City may engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. City may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove non-complying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

1.09 REGULATORY REQUIREMENTS

- A. Conform to current California Building Code for requirements for products and finishes.
- B. Submit CARB (California Air Resources Board) complying products only.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.11 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F

for exterior; unless required otherwise by manufacturer's instructions.

- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 - 1. Base Manufacturer: The Sherwin-Williams Company; 101 Prospect Avenue NW
Cleveland, OH 44115; Tel: (800) 321-8194; Fax: (216) 566-1392;
www.sherwin-williams.com; or approved equal.
- C. Transparent Finishes - Wood:
 - 1. Base Manufacturer: The Sherwin-Williams Company; 101 Prospect Avenue NW
Cleveland, OH 44115; Tel: (800) 321-8194; Fax: (216) 566-1392;
www.sherwin-williams.com; or approved equal.
- D. Transparent Finishes - Concrete/Masonry:
 - 1. Base Manufacturer: H & C Decorative Concrete Products: www.hcconcrete.com; or approved equal.
- E. Anti-Graffiti Coating System:
 - 1. Base Manufacturer: Monopole, Inc.: www.monopoleinc.com; or approved equal.
- F. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Substitutions.

2.02 PAINTS AND COATINGS - GENERAL

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
 - 1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.

2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 4. Supply each coating material in quantity required to complete entire project's work from a single production run.
 5. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" or "premium" by the manufacturer.
- C. Volatile Organic Compound (VOC) Content:
1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Architectural coatings VOC limits of California.
 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- D. Chemical Content: The following compounds are prohibited:
1. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 2. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride, ethylene glycol.
- E. Flammability: Comply with current California Building code for surface burning characteristics.
- F. Colors: As indicated on drawings
1. Extend colors to surface edges; colors may change at any edge as directed by Architect.

2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 SCHEDULE INDEX – EXTERIOR SURFACES

A. CONCRETE

1. See ANTI-GRAFFITI SYSTEM.

B. MASONRY/STONE

1. See ANTI-GRAFFITI SYSTEM.

C. STEEL

1. Rust inhibitive Acrylic Primer, Acrylic Latex Flat

D. WOOD - (Utility Backboards)

1. Latex System

E. ARCHITECTURAL PVC, PLASTIC, FIBERGLASS

1. Single Component Acrylic System

F. ANTI-GRAFFITI SYSTEM (Concrete, Masonry)

1. Silane/siloxane oligomeric and aliphatic polyurethane.

2.04 PAINT SYSTEMS – EXTERIOR

A. CONCRETE - See ANTI-GRAFFITI SYSTEM.

B. MASONRY - See ANTI-GRAFFITI SYSTEM.

C. STEEL

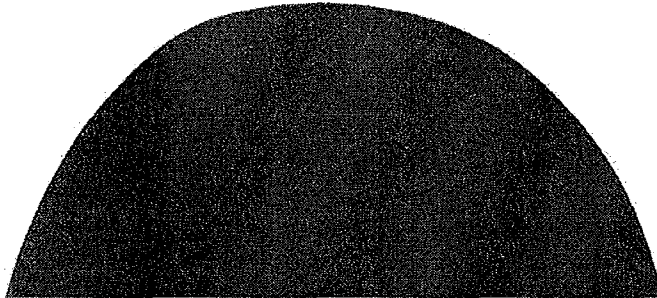
1. 1st Coat/Primer: SW ‘PRO-CRYL Universal Primer’ B66-310 Series (5-10 mils/wet, 2-4mils/dry)
 - a. Manufacturer Description: Advanced technology self cross-linking acrylic primer. Rust inhibitive, VOC compliant, single component, early moisture resistance, fast dry, low temperature application.
 - b. Color: As recommended by top coat manufacturer.
 - c. Finish: Low sheen.
 - d. VOC (EPA Method 24): Unreduced: <100g/L;<0.83 ob/gal

- e. Volume Solids: 39% +/- 2%
- f. Weight Solids: 53% +/- 2%
- g. Weight per Gallon: 10.8 lb.
- h. Performance: Comparable to products formulated to federal specification: AA50557 and Paint Specification: SSPC-Paint 23.
- i. Surface Preparation: SSPC-SP10
- j. Physical Properties:

Physical Performance Test + Method	Result
Adhesion per ASTM D4541	500 psi
Corrosion Weathering per ASTM D5894, 10 cycles, 3360 hours	Passes
Direct Impact Resistance per ASTM D2794	>140 in lbs
Dry Heat Resistance per ASTM D2485	200 degrees F
Flexibility per ASTM D522, 180 degree bend, 1/4 inch mandrel	Passes
Moisture Condensation Resistance per ASTM D4585, 100 degrees F, 1250 hours	Passes
Pencil Hardness per ASTM D3363	H
Salt Fog Resistance per ASTM B117, 1250 hours	Passes

2. 2nd and 3rd Coats: SW 'SuperPaint Exterior Latex Flat' A80-100 Series (4 mils/wet, 1.6 mils/dry)
 - a. Manufacturer's finest quality exterior flat finish.
 - b. Color: Custom color scanned by Sherwin Williams from existing sample. Order No. 8277-0060746 (see below for image of color formula).

SHERWIN-WILLIAMS 01/22/13
 Sher-Color (to) Order# 8277-0060746
 EXTERIOR ARCHITECTURAL
 RESILIENCE LATEX
 FLAT IFC 8012H
 PISTOL RANGE GREEN
 CUSTOM SHER-COLOR MATCH
 CC#COLORANT OZ 32 64 128
 W1-White - 11 - 1
 B1-Black - 33 1 1
 G2-New Green - - 1 1
 N1-Raw Umber - 14 - 1
 Y3-Deep Gold - 19 - 1
 QUART ULTRADEEP
 K42T00054 640413415



Non Returnable Tinted Color

CAUTION: To assure consistent color, always order enough paint to complete the job and integrate all containers of the same color before application. Mixed colors may vary slightly from color strip or color chip.



0060746-006

- c. Finish: Flat
- d. VOC (less exempt solvents): 49 g/L; 0.41 lb/gal
- e. Volume Solids: 36 +/- 2%
- f. Weight Solids: 54 +/- 2%
- g. Weight per Gallon: 11.4 lb
- h. Vehicle Type: Acrylic 'A80W01151'
- i. NOTE: Due to nature of acrylic coating and length of curing period. Top coat to be field applied to avoid damage that may otherwise occur during transportation from shop.

D. WOOD (Utility Backboards)

1. Latex Systems

a. Semi-Gloss

1st Coat: S-W Exterior Latex Wood Primer, B42W8041

(4 mils wet, 1.4 mils dry)

2nd Coat: S-W Sonoran Int/Ext Acrylic Latex Semi-Gloss, B40WJ9850 Series

3rd Coat: S-W Sonoran Int/Ext Acrylic Latex Semi-Gloss, B40WJ9850 Series

(4 mils wet, 1.5 mils dry per coat)

E. ARCHITECTURAL PVC, PLASTIC, FIBERGLASS (panels per Section 07 4233 – Plastic Wall Panels) (due to the variety of substrate, check for compatibility)

1. Latex Systems

a. Semi-Gloss

1st Coat: S-W DTM Bonding Primer

2nd Coat: S-W Pro-Industrial Zero VOC Semi-Gloss, B66-650 Series

3rd Coat: S-W Pro-Industrial Zero VOC Semi-Gloss, B66-650 Series

(6 mils wet, 2.5 mils dry per coat)

F. ANTI-GRAFFITI SYSTEM - Masonry/Concrete, Clear finish: Comply with 2012 City Supplement 'The WHITEBOOK', Section 210-6 for Anti-Graffiti Coating.

1. Base Coat: One flood coat silane/siloxane oligomeric; Monochem AQUASEAL ME 12 (#5200).

2. Coat 2: Aliphatic polyurethane; Monochem PERMA SHIELD BASE (#6100).

3. Coats 3 and 4: Two coats; Monochem PERMA SHIELD PREMIUM (#5600).

4. APPLY TO ALL CONCRETE/MASONRY WALL SURFACES, INTERIOR AND EXTERIOR.

a. Exceptions: Apply Concrete/Masonry sealer only at the following locations:

1) Interior walls of Storage Room.

5. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK'

and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Substitutions. Any proposed Substitutions MUST meet or exceed published performance criteria for the above graffiti control system AND be approved by City Police Department for use on project.

2.05 SCHEDULE INDEX – INTERIOR SURFACES

- A. CONCRETE
 - 1. See ANTI-GRAFFITI SYSTEM.
- B. MASONRY
 - 1. See ANTI-GRAFFITI SYSTEM.

2.06 PAINT SYSTEMS – INTERIOR

- A. CONCRETE - See ANTI-GRAFFITI SYSTEM.
- B. MASONRY - See ANTI-GRAFFITI SYSTEM.

2.07 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; premium quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of coatings until substrates have been properly prepared. Notify Engineer of unsatisfactory conditions before proceeding.
- B. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of Work.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.

- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
 - 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
 - 4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
- G. Proceed with work only after conditions have been corrected, and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing coatings that exhibit surface defects.
- D. Remove surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.
- F. Seal surfaces that might cause bleed through or staining of topcoat.
- G. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

- H. Aluminum:

Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.

- I. Block (Cinder and Concrete):

Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75°F, unless the manufactures products are designed for application prior to the 30 day period. The pH of the surface should be between 6 and 9, unless the products to be used are designed to be used in high pH environments. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.

J. Brick:

Brick must be free of dirt, loose and excess mortar, and foreign material. All brick should be allowed to weather for at least one year followed by wire brushing to remove efflorescence.

K. Concrete, SSPC-SP13 or NACE 6:

This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.

L. Cement Composition Siding/Panels:

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. The pH of the surface should be between 6 and 9, unless the products to be used are designed to be used in high pH environments such as Loxon-® .

M. Copper and Stainless Steel:

Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP 2, Hand Tool Cleaning.

N. Drywall—Exterior:

Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting. Exterior surfaces must be spackled with exterior grade compounds.

O. Exterior Composition Board (Hardboard):

Some composition boards may exude a waxy material that must be removed with a solvent prior to coating. Whether factory primed or unprimed, exterior composition board siding (hardboard) must be cleaned thoroughly and primed with an alkyd primer.

P. Galvanized Metal:

Clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP7 is necessary to remove these treatments.

Q. Steel: Structural, Plate, etc.:

Should be cleaned by one or more of the ten surface preparations described below. These methods were originally established by the Steel Structures Painting Council in 1952, and are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Steel Structures Painting Council; ask for SSPC-VIS 1-89. A brief description of these standards together with numbers by which they can be specified follow.

Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-PC 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).

Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.

1. Solvent Cleaning, SSPC-SP1:

Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.

2. Hand Tool Cleaning, SSPC-SP2:

Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.

3. Power Tool Cleaning, SSPC-SP3:

Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.

4. White Metal Blast Cleaning, SSPC-SP5 or NACE 1:

A White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

5. Commercial Blast Cleaning, SSPC-SP6 or NACE 3:

A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of

each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

6. Brush-Off Blast Cleaning, SSPC-SP7 or NACE 4:

A Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP 1 or other agreed upon methods.

7. Power Tool Cleaning to Bare Metal, SSPC-SP11:

Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.

8. Near-White Blast Cleaning, SSPC-SP10 or NACE 2:

A Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

9. High- and Ultra-High Pressure Water Jetting for Steel and Other Hard Materials

SSPC-SP12 or NACE 5:

This standard provides requirements for the use of high- and ultra-high pressure water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.

10. Water Blasting, NACE Standard RP-01-72:

Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.

R. Stucco:

Must be clean and free of any loose stucco. If recommended procedures for applying stucco are followed, and normal drying conditions prevail, the surface may be painted in 30 days. The pH

of the surface should be between 6 and 9, unless the products to be used are designed to be used in high pH environments such as Loxon® .

S. Wood:

Must be clean and dry. Prime and paint as soon as possible.

1. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
2. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.
3. Exterior Wood to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior calking compound after sealer has been applied. Prime concealed surfaces.

T. Vinyl Siding*, EIFS, Synthetic Stucco, Architectural Plastics, and Fiberglass:

Clean thoroughly by scrubbing with a warm, soapy water solution. Rinse thoroughly. Do not paint vinyl siding with any color darker than the original color, unless the product and color are designed for such use. Painting with darker colors may cause siding to warp.

U. Drywall—Interior:

Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting.

V. Plaster:

Must be allowed to dry thoroughly for at least 30 days before painting, unless the manufactures products are designed for application prior to the 30 day period. Room must be ventilated while drying; in cold, damp weather, rooms must be heated. Damaged areas must be repaired with an appropriate patching material. Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.

W. Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.

X. Metal Doors to be Painted: Prime metal door all sides and edge surfaces.

Y. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

WARNING! Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse

health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- F. If undercoats or other conditions show through topcoat, apply additional coats as necessary until cured film achieves complete hide and has a uniform paint finish, color, and appearance.
- G. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- H. Apply coatings at spreading rate required to achieve the manufacturer's recommended dry film thickness. A minimum total dry film thickness of 10-16 mils and a surface with 10 or less pinholes per square foot is required for a waterproofing system.
- I. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- J. Sand wood and metal surfaces lightly between coats to achieve required finish.
- K. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

- L. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- M. Exterior Woodwork: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 2 weeks.
- N. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
- O. Inspection: The coated surface must be inspected and approved by the Engineer just prior to each coat.

3.04 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Paint shop-primed equipment, where indicated.
- B. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- C. Finish equipment, piping, conduit, and exposed duct work in utility areas in colors according to the color coding scheme indicated.
- D. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.05 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: City may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
- B. Contractor shall touch up and restore painted surfaces damaged by testing.
- C. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.06 CLEANING

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Engineer, and leave in an undamaged condition.

- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces..

3.07 PROTECTION

- A. Protect finished coatings from damage until completion of project.
- B. Touch-up damaged coatings after Substantial Completion, following manufacturer's recommendation for touchup and repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

3.08 SCHEDULE - SURFACES TO BE FINISHED

- A. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically noted.
 - 2. Fire rating labels, equipment serial number and capacity labels.
 - 3. Stainless steel items.
- B. Paint the surfaces described below under Schedule - Paint Systems.
- C. Mechanical and Electrical: Use paint systems defined for the substrates to be finished.
 - 1. Paint all insulated and exposed pipes occurring in finished areas to match background surfaces, unless otherwise indicated.
 - 2. Paint shop-primed items occurring in finished areas.
- D. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

END OF SECTION

SECTION 10 1400

SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior metal, non-illuminated directional, control and information surface mount signage as complete integrated modular system.

1.02 RELATED REQUIREMENTS

- A. Section 08 1113 – Hollow Metal Doors and Frames.

1.03 REFERENCE STANDARDS

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2003.
- B. Federal Register Part II, Architectural and Transportation Barriers Compliance Board, 36 CFR Part 1191: Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities - Americans with Disabilities Act Accessibility Guidelines; 2010.

1.04 DEFINITIONS

- A. Braille: California 'Contracted Grade 2 Braille'. Tactile is required whenever braille is required.
- B. Letters and numbers: characters on signs with width-to-height ratio between 3:5 and 1:1 and stroke width ratio between 1:5 and 1:10 using upper case "X" to calculate ratios. Use typestyles with medium weight; upper and lower case lettering is permitted; serif typestyles are permitted.
- C. Symbols: Symbol itself is not required to be tactile but equivalent verbal description is required both in tactile letters and braille.
- D. Tactile: In addition to requiring Braille, 1/32" raised capital letters and numbers without serifs at least 5/8" height and not more than 2" height.

1.05 SYSTEM DESCRIPTION

- A. Signage under this section is intended to include items for identification, direction, control, and information of building where installed as complete integrated system from a single manufacturer.
- B. Access code and ADA design requirements:
 - 1. Signage requiring tactile graphics:
 - a. Wall mounted signs designating permanent rooms and spaces such as, room numbers and restroom, department, office, and fire exit identifications.
 - b. Individually applied characters are prohibited.
 - 2. Signage not requiring tactile graphics but require compliance to other ADA requirements: All other signs providing direction to or information about function of

space such as, directional signs (signs with arrow), informational signs (operating hours, policies, etc.), regulatory signs (no smoking, do not enter), ceiling and projected wall mount signs and International Symbol of Accessibility signs denoting the compliance of certain building features with current access code.

C. ADA performance requirements:

1. Tactile graphics signs mounting requirements:

- a. Single doors: Mount 60" to sign centerline above finish floor and on wall adjacent to latch side of door.
- b. Openings: Mount 60" to sign centerline above finish floor adjacent opening.
- c. No wall space adjacent latch side of door, opening, or double doors: Mount 60" to sign centerline above finish floor on nearest adjacent wall.

1.06 SUBMITTALS

A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', current editions, Section 2-5.3 for Shop Drawings and Submittals.

1. NOTE: Contractor to provide one additional complete signage submittal to the City Access Compliance Office for review and approval.

B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, colors and location.

1. When content of signs is indicated to be determined later, request such information from Engineer at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
2. Submit for approval by Engineer prior to fabrication.

D. Shop Drawings:

1. Indicate materials, sizes, configurations and applicable substrate mountings.
2. Typography sample for copy, for each sign.
3. Dimensions showing spacing of symbol, text and Braille blocks on each sign.
4. Signage schedule complete with location of each sign and required copy; include floor plans, if required.

E. Samples: Submit one sample, of size similar to that required for project, illustrating sign style, font, and method of attachment.

F. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.

G. Verification Samples: Submit samples showing colors specified. Samples will not be returned

for use on the Project.

- H. Manufacturer's Installation Instructions: Include installation templates and attachment devices.
- I. Manufacturer Statement: Manufacturer's signed statement regarding compliance with QUALITY ASSURANCE Article.
- I. Closeout Submittal: Furnish appropriate checklist for aiding in reordering after Date of Substantial Completion. Maintenance data and cleaning requirements for exterior surfaces.
- J. Closeout Submittal: Provide confirmation letter stating that the Braille used in fabricated signs has been inspected by the manufacturer for compliance with California's Contracted Grade 2 Braille specifications and requirements as specified above and in CBC 11B-703.3.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Performed work required under this section of this magnitude and scope for minimum of five years.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.

1.09 REGULATORY REQUIREMENTS

- A. Signage shall comply with requirements of the California Building Code and ADA Standards.
- B. Inspection: Signs and identification devices shall be field inspected after installation and approved by the enforcing agency prior to the issuance of a final certificate of occupancy per Chapter 1, Division II, Section 111, or final approval where no certificate of occupancy is issued. The inspection shall include, but not be limited to, verification that Braille dots and cells are properly spaced and the size, proportion and type of raised characters area in compliance with these regulations. CBC 11B-703.1.1.2.
- C. Raised Characters: Raised characters shall comply with ADA Stds 703.2 and CBC 11B-703.2 and shall be duplicated in Braille complying with ADA Stds 703.3 and CBC 11B-703.3. Raised characters shall be installed in accordance with ADA Stds 703.4 and CBC 11B-703.4.
 - 1. Depth: Raised characters shall be 1/32 inch minimum above their background.
 - 2. Case: Characters shall be uppercase.
 - 3. Style: Characters shall be sans serif. Characters shall not be italic, oblique, script, highly decorative or of other unusual forms.
 - 4. Character Proportions: Characters shall be selected from fonts where the width of the uppercase letter "O" is 60 percent minimum and 110 percent maximum of the height of the uppercase letter "I".
 - 5. Character Height: Character height measured vertically from the baseline of the character shall be 5/8 inch minimum and 2 inches maximum based on the height of the uppercase letter "I".

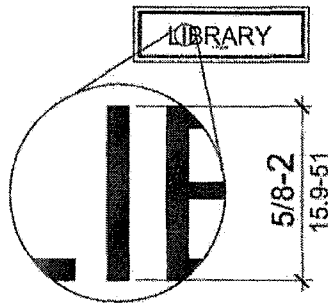


FIGURE 11B-703.2.5
HEIGHT OF RAISED CHARACTERS

6. Stroke Thickness: Stroke thickness of the uppercase letter “I” shall be 15 percent maximum of the height of the character.
 7. Character Spacing: Character spacing shall be measured between the two closest points of adjacent raised characters within a message, excluding word spaces. Where characters have rectangular cross sections, spacing between individual raised characters shall be 1/8 inch minimum and 4 times the raised character stroke width maximum. Where characters have other cross sections, spacing between individual raised characters shall be 1/16 inch minimum and 4 times the raised character stroke width maximum at the base of the cross sections, and 1/8 inch minimum and 4 times the raised character stroke width maximum at the top of the cross sections. Characters shall be separated from raised borders and decorative elements 3/8 inch minimum.
 8. Line Spacing: Spacing between the baselines of separate lines of raised characters within a message shall be 135 percent minimum and 170 percent maximum of the raised character height.
 9. Format: Text shall be in a horizontal format.
- D. Braille: Braille shall be contracted Grade 2 and shall comply with ADA Stds 703.3 and 703.4; and CBC 11B-703.3 and 11B-703.4.
1. Dimensions and Capitalization: Braille dots shall have a domed or rounded shape and shall comply with CBC Table 11B-703.3.1. The indication of an uppercase letter or letters shall only be used before the first word of sentences, proper nouns and names, individual letters of the alphabet, initials and acronyms.

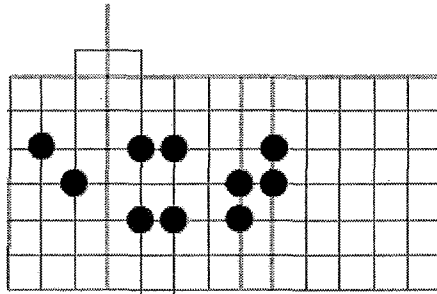
TABLE 11B-703.3.1
BRAILLE DIMENSIONS

MEASUREMENT RANGE	MINIMUM IN INCHES MAXIMUM IN INCHES
Dot base diameter.	0.059 (1.5 mm) to 0.063 (1.6 mm)
Distance between two dots in the same cell ¹	0.100 (2.5 mm)
Distance between corresponding dots in adjacent cells ¹	0.300 (7.6 mm)
Dot height	0.025 (0.6 mm) to 0.037 (0.9 mm)
Distance between corresponding dots from one cell directly below ¹	0.395 (10 mm) to 0.400 (10.2 mm)

1. Measured center to center.

Braille Cell

Inter-cell Spacing = .20"



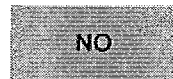
Inter-cell Spacing Within a Cell = .10"
(Vertical or horizontal)

Braille Dot

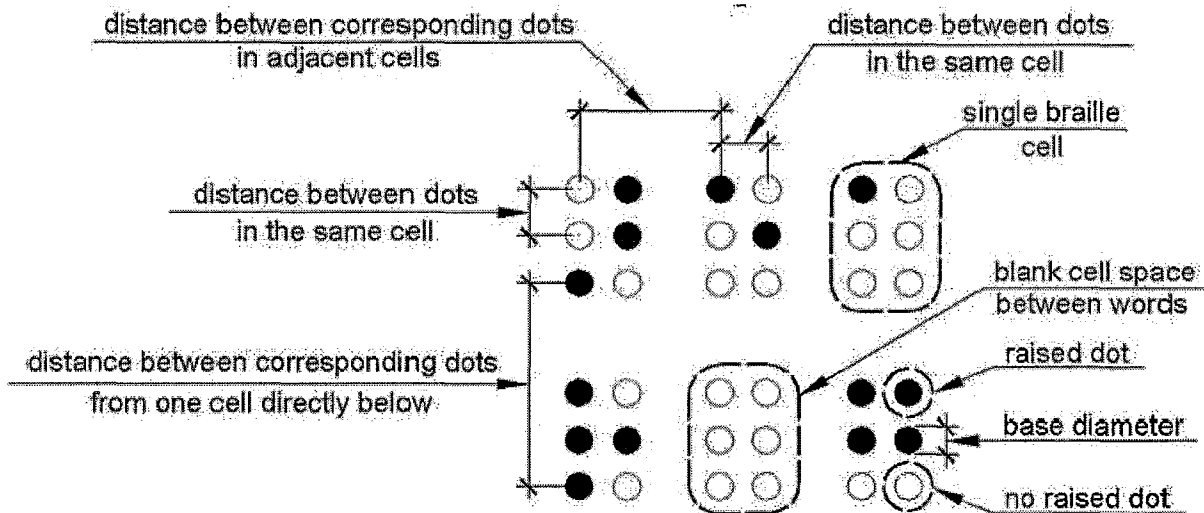
.025"
1/40"



Rounded Dot
(Acceptable)



NO
Squared Dot
(Not Acceptable)



NOTE: Prior to the final inspection and issuance of Notice of Completion, the manufacturer must provide a confirmation letter to the office and/or the Engineer stating that the Braille in the fabricated signs have been inspected by the manufacturer for compliance with California's Contracted Grade 2 Braille specifications and requirements as specified above and in CBC 11B-703.3.

2. Position: Braille shall be positioned below the corresponding text in a horizontal format, flush left or centered. If text is multi-lined, Braille shall be placed below the entire text. Braille shall be separated 3/8 inch minimum and 1/2 inch maximum from any other tactile characters and 3/8 inch minimum from raised borders and decorative elements.

Exception: Braille provided on elevator car controls shall be separated 3/16 inch minimum and shall be located directly below the corresponding raised characters or symbols.

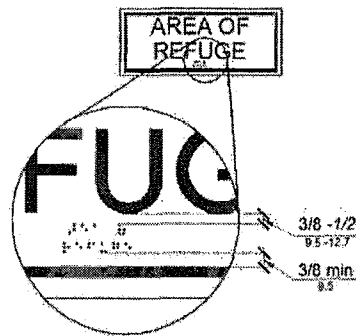


FIGURE 11B-703.3.2
POSITION OF BRAILLE

E. Installation height and location: Signs with tactile characters shall comply with ADA Stds 703.4 and CBC 11B-703.4.

1. Height above finish floor or ground: Tactile characters on signs shall be located 48 inches minimum above the finish floor or ground surface, measured from the baseline of the lowest Braille cells and 60 inches maximum above the finish floor or ground surface, measured from the baseline of the highest line of raised characters.

Exception: Tactile characters for elevator car controls shall not be required to comply with CBC 11B-703.4.1.

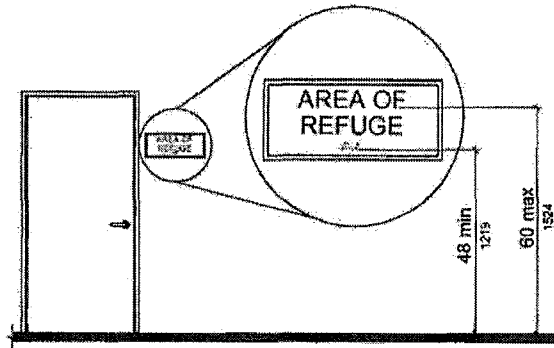


FIGURE 11B-703.4.1
HEIGHT OF TACTILE CHARACTERS
ABOVE FINISH FLOOR OR GROUND

2. Location: Where a tactile sign is provided at a door, the sign shall be located alongside the door at the latch side. Where a tactile sign is provided at double doors with one active leaf, the sign shall be located on the inactive leaf. Where a tactile sign is provided at double doors with two active leaves, the sign shall be located to the right of the right hand door. Where there is no wall space at the latch side of a single door or at the right side of double doors, signs shall be located on the nearest adjacent wall. Signs containing tactile characters shall be located so that a clear floor space of 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position. Where permanent identification signage is provided for rooms and spaces they shall be located on the approach side of the door as one enters the room or space. Signs that identify exits shall be located on the approach side of the door as one exits the room or space.

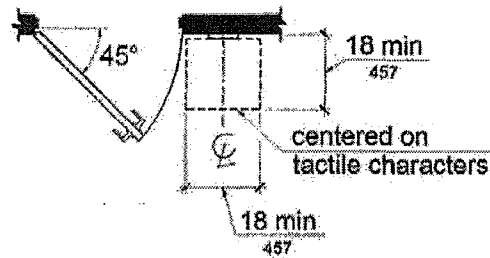


FIGURE 11B-703.4.2
LOCATION OF TACTILE SIGNS AT DOORS

F. Visual Characters: Visual characters shall comply with ADA Stds 703.5 and CBC 11B-703.5.

Exception: Where visual characters comply with CBC 11B-703.2 (Raised Characters) and are accompanied by Braille complying with CBC 11B-703.3 they shall not be required to comply with CBC 11B-703.5.2 through 11B-703.5.6, 11B-703.5.8 and 11B-703.5.9.

1. Finish and Contrast: Characters and their background shall have a non-glare finish. Characters shall contrast with their background with either light characters on a dark background or dark characters on a light background.

Research indicates that signs are more legible for persons with low vision when characters contrast with their background by at least 70%.

Contrast in percentage shall be determined by:

Contrast = $[(B1-B2)/B1] \times 100$. Where B1 = light reflectance value (LRV) of the lighter area and B2 = light reflectance value (LRV) of the darker area. Note that in any application both white and black are never absolute; thus, B1 never equals 100 and B2 is always greater than 0.

2. Case: Characters shall be uppercase or lowercase or a combination of both.
3. Style: Characters shall be conventional in form. Characters shall not be italic, oblique, script, highly decorative, or of other unusual forms.
4. Character Proportions: Characters shall be selected from fonts where the width of the uppercase letter "O" is 60 percent minimum and 110 percent maximum of the height of the uppercase letter "I".
5. Character Height: Minimum character height shall comply with ADA Stds Table 703.5.5 and CBC Table 11B-703.5.5. Viewing distance shall be measured as the horizontal distance between the character and an obstruction preventing further approach towards the sign. Character height shall be based on the uppercase letter "I".

Additionally, for signs suspended or projected above the finish floor in compliance with CBC 11B-307.4, the minimum character height shall be 3 inches.

Exception: Where provided, floor plans providing emergency procedures information in accordance with Title 19 shall not be required to comply with Section 11B-703.5.5.

Table 703.5.5 Visual Character Height

Height to Finish Floor or Ground From Baseline of Character:	Horizontal Viewing Distance	Minimum Character Height
40 inches (1015 mm) to less than or equal to 70 inches (1780 mm)	less than 72 inches (1830 mm)	5/8 inch (16 mm)
	72 inches (1830 mm) and greater	5/8 inch (16 mm), plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 72 inches (1830 mm)
Greater than 70 inches (1780 mm) to less than or equal to 120 inches (3050 mm)	less than 180 inches (4570 mm)	2 inches (51 mm)
	180 inches (4570 mm) and greater	2 inches (51 mm), plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 180 inches (4570 mm)
greater than 120 inches (3050 mm)	less than 21 feet (6400 mm)	3 inches (75 mm)
	21 feet (6400 mm) and greater	3 inches (75 mm); plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 21 feet (6400 mm)

6. Height from finish floor or ground: Visual characters shall be 40 inches minimum above the finish floor or ground.

Exceptions:

- a. Visual characters indicating elevator car controls shall not be required to comply with Section 11B-703.5.6.
 - b. Floor-level exit signs complying with Chapter 10, Section 1011.7 shall not be required to comply with Section 11B-703.5.6.
 - c. Where provided, floor plans providing emergency procedures information in accordance with Title 19 shall not be required to comply with Section 11B-703.5.6.
7. Stroke Thickness: Stroke thickness of the uppercase letter “I” shall be 10 percent minimum and 20 percent maximum of the height of the character.
 8. Character Spacing: Character spacing shall be measured between the two closest points of adjacent characters, excluding word spaces. Spacing between individual characters shall be 10 percent minimum and 35 percent maximum of character height.
 9. Line Spacing: Spacing between the baselines of separate lines of characters within a message shall be 135 percent minimum and 170 percent maximum of the character height.
 10. Format: Text shall be in a horizontal format.

- G. Pictograms: Pictograms shall comply with ADA Stds 703.6 and CBC 11B-703.6.

1. Pictograms shall have a field height of 6 inches minimum. Characters and Braille shall not be located in the pictogram field.

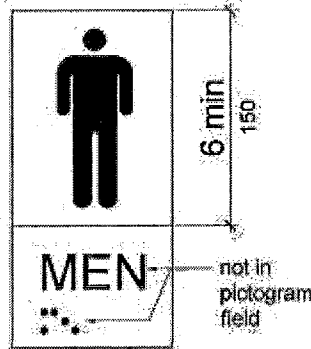


Figure 703.6.1
Pictogram Field

2. **Finish and Contrast:** Pictograms and their field shall have a non-glare finish. Pictograms shall contrast with the field with either a light pictogram on a dark field or a dark pictogram on a light field.
 3. **Text Descriptors:** Pictograms shall have text descriptors located directly below the pictogram field. Text descriptors shall comply with CBC 11B-703.2, 11B-703.3 and 11B-703.4.
- H. **Symbols of Accessibility:** Symbols of Accessibility shall comply with CBC 11B-703.7.
1. **Finish and Contrast:** Symbols of accessibility and their background shall have a non-glare finish. Symbols of accessibility shall contrast with their background with either a light symbol on a dark background or a dark symbol on a light background.
 2. **Symbol – International Symbol of Accessibility:** The International Symbol of Accessibility shall comply with Figure 11B-703.7.2.1. The symbol shall consist of a white figure on a blue background. The blue shall be Color No. 15090 in Federal Standard 595B.

Exception: The appropriate enforcement agency may approve other colors to complement décor or unique design. The symbol contrast shall be light on dark or dark on light.



Figure 703.7.2.1
International Symbol of Accessibility

3. **Symbol – International Symbol of TTY:** The International Symbol of TTY shall comply with Figure 11B-703.7.2.2.

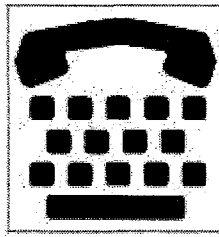


Figure 703.7.2.2
International Symbol of TTY

4. **Symbol – Volume Control Telephones:** Telephones with a volume control shall be identified by a pictogram of a telephone handset with radiating sound waves on a square field such as shown in Figure 11B-703.7.2.3.



Figure 703.7.2.3
Volume Control Telephone

5. **Symbol – Assistive Listening Systems:** Assistive listening systems shall be identified by the International Symbol of Access for Hearing Loss complying with Figure 11B-703.7.2.4.



Figure 703.7.2.4
International Symbol of Access for Hearing Loss

6. **Symbol – Cleaner Air Symbol:** Rooms, facilities and paths of travel that are accessible to and usable by people who are adversely impacted by airborne chemicals or particulates and/or the use of electrical fixtures and/or devices shall be identified by the Cleaner Air Symbol complying with Figure 11B-703.7.2.5. This symbol is to be used strictly for publicly funded facilities or any facilities leased or rented by State of California, not concessionaires.

The symbol, which shall include the text “Cleaner Air” as shown, shall be displayed either as a negative or positive image within a square that is a minimum of 6 inches on each side. The symbol may be showing in black and white or in color. When color is used, it shall be Color No. 15090 Federal Standard 595B on white or white on Color No. 15090

Federal Standard 595B. There shall be at least a 70-percent color contrast between the background of the sign from the surface that it is mounted on.



*FIGURE 11B-703.7.2.5
CLEANER AIR SYMBOL.*

7. Toilet and Bathing facilities geometric symbols: Doorways leading to toilet rooms and bathing rooms shall be identified by a geometric symbol complying with CBC 11B703.7.2.6. The symbol shall be mounted at 58 inches minimum and 60 inches maximum above the finish floor or ground surface measured from the centerline of the symbol. Where a door is provided the symbol shall be mounted within 1 inch of the vertical centerline of the door.
 - a. Men's: Equilateral triangle, 1/4 inch thick, with edges 12 inches long and a vertex pointing upward. The triangle shall contrast with the door, either light on dark background or dark on light background.
 - b. Women's: Circle, 1/4 inch thick, 12 inches in diameter. The circle shall contrast with the door, either light on dark background or dark on light background.
 - c. Unisex: Circle, 1/4 inch thick, 12 inches in diameter with a 1/4 inch thick triangle with a vertex pointing upward superimposed on the circle and within the 12 inch diameter. The triangle shall contrast with the circle, either light on dark background or dark on light background. The circle shall contrast with the door, either light on dark background or dark on light background.
 - d. Edges and Corners: Edges of signs shall be rounded, chamfered or eased. Corners of signs shall have a minimum radius of 1/8 inch.
 - e. Raised Characters: No raised characters, Braille or pictograms may be included on any geometric door sign.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Flat Signs:

1. APCO California; Metal Etch Signs; 1514 Avenida Oceano; Oceanside, CA 92056-6940, USA; Phone 760-732-3800; Contact: Kevin Immel. Or approved equal.
2. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.

2.02 SIGNAGE APPLICATIONS

- A. Room/Area Identification Signs: Provide a tactile sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
1. Sign Type: Type A - Flat metal signs with etched metal panel media.
 2. Provide tactile signage, with letters raised minimum 1/32 inch and California Contracted Grade II Braille.
 3. Copy Contents: Identify with Room Name, copy content to be verified at time of submittal and approved by Engineer prior to fabrication.
 4. Character Height: 1 inch.
 5. Sign Height: Per drawings, 6 inches minimum.
 6. See signage details on Drawings for more specific information on copy and preferred sign layout.
- B. Restroom/Locker Room/ Shower Room Identification Signs - WALL: Provide a tactile sign for every toilet or bathing room identified by WOMENS, MENS or UNISEX.
1. Sign Type: Type A - Flat metal signs with etched metal panel media.
 2. Provide tactile signage, with letters raised minimum 1/32 inch and California Contracted Grade II Braille.
 3. Copy Contents: Identify with male and female pictograms, International Symbol of Accessibility, the name WOMEN, MEN or UNISEX as applies; and Braille.
 4. Character Height: 1 inch.
 5. Sign Height: Per drawings, including 6 inches minimum height pictogram field.
 6. See signage details on Drawings for more specific information on copy and preferred sign layout.
- D. Restroom/Locker Room/ Shower Room Identification Signs – GEOMETRIC SYMBOL: Provide a sign for every room that can be identified by WOMENS, MENS or UNISEX. These signs are NON-Tactile and shall have no raised characters, Braille or pictograms.
1. Sign Type: Type B - Flat signs, cast acrylic with sub-surface printing.
 2. NON—tactile Signs: No raised characters, Braille or pictograms to be used on restroom door signs. Surface of sign to be completely flush.
 3. Copy Contents: Identify with male and female pictograms, International Symbol of Accessibility and the name WOMEN, MEN or UNISEX as applies.
 4. Character Height: 1 inch.
 5. Sign Height/Shape: Provide geometric shape as described in CBC Section 1115B.6.
 6. See signage details on Drawings for more specific information on copy and preferred sign layout.
- D. Interior Tactile “EXIT” Signs:
1. Sign Type: Type A - Flat metal signs with etched metal panel media.

2. Exit Wall Signs: Identify with the word EXIT and Braille.
3. See signage details on Drawings for more specific information on copy and preferred sign layout.

E. Exterior Directional and Informational Signs:

1. Sign Type: Type A - Flat metal zinc alloy signs with etched metal panel media.
2. Directional: Identify with the ISA symbol and directional arrow(s) in direction necessary.
3. See signage details on Drawings for more specific information on copy and preferred sign layout.

F. International Symbol of Accessibility (ISA):

1. Sign Type: Type A - Flat metal sign. Where glazing is the only available substrate, a self-adhesive vinyl decal is acceptable.
2. Locations:
 - a. At each primary entrance to facility. This will include main entry gates as well as building entry doors.
 - b. At each partition door to each accessible stall or compartment in toilet or changing rooms.
 - c. At area of reception counter meeting current access code requirements.
 - d. At other work counters or phone counters meeting current access code requirements.
 - e. At each locker door to locker meeting current access code requirements, IF the locker does not already have a manufacturer-applied ISA.
 - f. Where exterior entrances to single-user accessible restrooms occur. One sign at each entrance.
3. Size: 6 inch x 6 inch, minimum.

2.03 SIGN TYPES

A. Flat Signs – Type A: Metal signage media without frame, etched copy.

1. Material: Light weight zinc metal alloy, suitable for chemical etch.
2. Thickness: 3/32 inch minimum.
3. Edges: All edges rounded, chamfered or eased. No exposed sharp edges will be acceptable as part of work.
4. Corners: Radiused 1/8 inch minimum.
5. Tactile Copy: Individual 1/32" high raised characters, Braille and pictograms chemically etched into face material.
6. Finish: Characters, symbols and background of signs are to be eggshell non-glare finish. Eggshell finish = 11 to 19 degree gloss on 60 degree glossimeter.
7. Wall Mounting of One-Sided Signs: Double-sided Vinyl Tape adhesive AND vandal-

proof stainless steel fasteners.

B. Flat Signs – Type B: Cast acrylic media without frame.

1. Material: Clear non-glare, optically corrected, cast virgin acrylic sheet ready for second surface (backside) graphics application.
2. Thickness: 1/4 inch; unless Unisex, then 1/2 inch total thickness.
3. Edges: Rounded, chamfered or eased.
4. Corners: Radiused 1/8 inch minimum.
5. Graphics Media: 0.015" thickness clear non-glare optically correct scuff resistant plastic with computer generated photo screen printing chemically bonded to back surface with background surface subsequently applied.
6. Finish: Characters, symbols and background of signs are to be eggshell non-glare finish. Eggshell finish = 11 to 19 degree gloss on 60 degree glossimeter.
7. Door Mounting of One-Sided Signs: Tape adhesive AND vandal-proof concealed or exposed screws.

C. Color and Font:

1. Font: as chosen from manufacturer's standard sans-serif fonts, meeting ADA Stds and CBC requirements.
2. Case: Upper case only.
3. Background Color: as chosen from manufacturer's standard colors, to contrast with substrate and adjacent finish color.
4. Character Color: as chosen from manufacturer's standard colors, to contrast with sign background color.

2.04 ACCESSORIES

- A. Exposed Screws: Stainless steel. Vandal-proof.
- B. Tape Adhesive: Double sided tape, permanent adhesive.

2.05 FABRICATION

- A. Shop assembly:
 1. General:
 - a. Fabricate units to configurations indicated on reviewed shop drawings.
 - b. Apply copy or graphics to surface of plaque material using computer generated photographic images, chemically etched into photo-sensitized metal.
 - c. Graphics application after applying background color.
 2. Furnish required copy indicated on reviewed shop drawings.
 3. Wrap each individual unit with polyethylene.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of conditions:

1. Examine areas to receive signage; notify Engineer in writing of unacceptable substrate.
2. Beginning work indicates acceptance of substrate.
3. Subsequent modifications to substrate or signage becomes this section's complete responsibility.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions. Install plaques in locations with mounting types indicated on drawings in accord with reviewed shop drawings; square, plumb, and level units.
- B. Install neatly, with horizontal edges level.
- C. Locate signs per requirements of subsection 1.09 above.
- D. Protect from damage until Substantial Completion; repair or replace damage items.

3.03 CLEANING

- A. Clean exposed surfaces not more than 48 hours prior to Date of Substantial Completion in accord with manufacturers written cleaning instructions.

3.04 SCHEDULE

- A. See drawings for schedule.

END OF SECTION

SECTION 10 2113.13

METAL TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Stainless steel toilet compartment partitions and urinal screens.

1.02 RELATED SECTIONS

- A. Section 05 5000 - Metal Fabrications.
- B. Section 10 2800 - Toilet, Bath, and Laundry Accessories.

1.03 REFERENCES

- A. ASTM International: ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. National Fire Protection Association: NFPA 286 - Standard Methods of Fire Test for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

1.04 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Literature indicating typical panel, pilaster, door, hardware and fastening.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
- C. Shop Drawings:
 - 1. Dimensioned plans indicating layout of toilet compartments.
 - 2. Dimensioned elevations indicating heights of doors, pilasters, separation partitions, and other components; indicate locations and sizes of openings in compartment separation partitions for toilet and bath accessories to be installed in partitions; indicate floor and ceiling clearances.

3. Details indicating anchoring components (bolt layouts) and methods for project conditions; indicate components required for installation, but not supplied by toilet compartment manufacturer.
- D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, texture and pattern.
- E. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations and industry standards.
- B. Store products indoors in manufacturer's or fabricator's original containers and packaging, with labels clearly identifying product name and manufacturer. Protect from damage.

1.06 QUALITY ASSURANCE

- A. Toilet compartments for disabled persons shall have a flip-over style or sliding latch, with a loop or U-shaped handle immediately below the latch on both sides of the door and an automatic closing device. Door hardware shall be mounted at 30" to 44" above finished floor. CBC Section 1115B.3.1, Items 4.4 and 4.5

1.07 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Do not deliver materials or begin installation until building is enclosed, with complete protection from outside weather, and building temperature maintained at a minimum of 60 degrees F (15.6 degrees C).
- C. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings and other construction contiguous with toilet compartments by field measurements prior to fabrication.

1.08 WARRANTY

- A. Manufacturers Standard Warranty: For Stainless Steel Material: Against corrosion or discoloration for 5 years, assuming proper maintenance according to manufacturer's recommendations.

1.09 COORDINATION

- A. Coordinate Work with placement of support framing and anchors in walls and ceilings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Accurate Partitions Corp.; www.accuratepartitions.com .
 - 2. Bradley Corporation; www.bradleycorp.com .
 - 3. Hadrian Manufacturing Inc.; www.hadrian-inc.com .
- B. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 4-1.6 for Substitutions.

2.02 COMPARTMENTS AND SCREENS

- A. Toilet Compartments: Floor anchored/overhead braced.
 - 1. Compartment Depth and Width: As scheduled and indicated on Drawings.
 - 2. Door Width: non-ADA 24 inches (610 mm), minimum; at ADA accessible compartments 36 inches (915 mm) minimum.
 - 3. Height Above Floor: 12 inches (305 mm).
 - 4. Door/Panel Height: 58 inches (1473 mm).
 - 5. Pilaster Height: 82 inches (2083 mm).
- B. Privacy and Urinal Screens: Wall hung.
 - 1. Screen Panel Size: 18 inches (457 mm) wide by 42 inches (1067 mm) high.
 - 2. Height Above Floor: 18 inches (457 mm).

2.03 STAINLESS STEEL TOILET COMPARTMENTS

- A. Doors, Panels, Screens, and Pilasters: Tension leveled stainless steel face sheet with number 4 finish, bonded under pressure to honeycomb core with non-toxic adhesive.
 - 1. Doors, Screens, and Panels: 1 inch (25 mm) thick, 22 gage (0.793 mm) stainless steel.
 - 2. Pilasters: Floor Anchored, Overhead Braced, 1-1/4 inches (32 mm) thick, 18 gage (1.27 mm) stainless steel.

3. Edge Moldings: Continuous roll-formed, interlocking 22 gage (0.793 mm) stainless steel crown molding, welded and ground smooth at corners.
 4. Finish: Type 304 stainless steel No. 4 Satin finish.
- B. Door Hardware:
1. Finish: Type 304 Stainless Steel, No. 4 satin finish attached with theft resistant barrel nuts and shoulder screws.
 2. Hinges: Continuous spring loaded, stainless steel piano hinge.
 3. Strike and Keeper: With concealed latch assembly and provisions for external emergency access.
 4. Handicapped Access: ADA paddle handles on doors.
 5. Coat Hook and Bumper: Manufactures standard surface mounted. No tamper-resistant screws required.
 6. Door Pull: Standard on ADA compartments. As detailed per Drawings. Installed both on inside and outside of compartment door.
 7. Fastening Hardware: Theft resistant heads.
- C. Mounting Brackets: Type 304 Stainless Steel, No. 4 satin finish continuous bracket with theft resistant screws.
- D. Pilaster Shoes: Type 304 stainless steel with number 4 finish. Minimum 3 inches high secured to floor w/internal clips.
- E. Headrail: Manufactures standard, Anodized Aluminum; with anti-grip profile.
- F. Pilaster Anchors, Floor Anchored/Overhead Braced: One-piece mounting fork with integral leveling bolt in pilaster.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Inspect and prepare substrates using the methods recommended by the manufacturer for achieving best result for the substrates under project conditions. Clean surfaces thoroughly prior to installation.
- B. Do not proceed with installation until substrates have been prepared using the methods recommended by the manufacturer and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.

- C. If preparation is the responsibility of another installer, notify Engineer in writing of deviations from manufacturer's recommended installation tolerances and conditions.
 - 1. Verify dimensions of areas to receive compartments.
 - 2. Verify locations of built-in framing, anchorage, bracing, and plumbing fixtures.

3.02 INSTALLATION

- A. Install in accordance with approved shop drawings and manufacturer's instructions.
- B. Fasten components to adjacent materials and to other components using purpose-designed fastening devices.
- C. Adjust pilaster anchors for substrate variations; conceal anchors with pilaster shoes.
- D. Equip each compartment door with top and bottom hinges and door latch.
- E. Install door strike keeper on pilasters in alignment with door latch.
- F. Equip each compartment door with one coat hook and bumper.
- G. Installation Tolerances:
 - 1. Maximum variations from plumb or level: 1/8 inch (3 mm).
 - 2. Clearance between wall surface and panels or pilasters: 1-1/2 inch (38 mm) maximum.

3.03 ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors.
- B. Adjust adjacent components for consistency of line or plane.

3.04 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.
- C. Remove factory protective coverings and clean finish surfaces in accordance with manufacturer's instructions before substantial completion.

END OF SECTION

SECTION 10 2800

TOILET AND UTILITY ROOM ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Public-use toilet room accessories.
- B. Grab bars.
- C. Hand Dryers.
- D. Underlavatory Guards.
- E. Utility Room accessories.

1.02 RELATED REQUIREMENTS

- A. NOT USED.

1.03 REFERENCE STANDARDS

- A. ASTM A 269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2008.
- B. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2003.
- C. ASTM F 2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2004.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with the placement of reinforcement of toilet partitions to receive anchor attachments.

1.05 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', current editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data: For each type of product indicated. Include the following:
 - 1. Construction details and dimensions.

2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 3. Material and finish descriptions.
 4. Features that will be included for Project.
 5. Manufacturer's warranty.
- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
1. Identify locations using room designations indicated.
 2. Identify products using designations indicated.
- D. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.
- E. Maintenance Data: For toilet accessories to include in maintenance manuals.

1.06 QUALITY ASSURANCE

- A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.05 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.
- C. Toilet Accessories will comply with the San Diego Park and Recreation Department Standards.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Toilet Accessories:
1. Bobrick Washroom Equipment, Inc.: www.bobrick.com; and as indicated on Restroom Accessory Schedule on Drawings.

2. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Substitutions.
- B. All items of each type to be made by the same manufacturer.

2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
1. Grind welded joints smooth.
 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- B. Keys: Provide 4 keys for each accessory to City; master key all lockable accessories.
- C. Stainless Steel Sheet: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.
- D. Stainless Steel Tubing: ASTM A 269, Type 304 or 316.
- E. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- F. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.
- G. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.
- H. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- I. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- J. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- K. Adhesive: Two component epoxy type, waterproof.
- L. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FINISHES

- A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.
- B. Back paint components where contact is made with building finishes to prevent electrolysis.

2.04 TOILET ROOM ACCESSORIES

- A. Grab Bars: Stainless steel, 1-1/2 inches outside diameter, minimum 0.05 inch wall thickness, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar, satin finish.
1. Provide per schedule on plans, custom lengths fabricated where indicated.
 2. Compliance: Barrier-free accessibility guidelines, including ADA-ABA and ICC/ANSI for structural strength.
 - a. Capacity: Designed to support 900 lbs in compliant installations.
 3. Description: Grab bar with 90 degree return to flange. Clearance between grab bar and finished wall is 1-1/2 inches.
 4. Grab Bar Materials: 18-8 S, Type 316, 18 gauge stainless steel tubing with satin finish, ends of grab bar pass through flanges and are heliarc welded to flanges to form one structural unit, outside diameter 1-1/2 inches.
 5. Mounting Flanges: Concealed, 18-8 S, Type 316, 1/8 inch thick, stainless steel plate.
 - a. End Flanges: 2 inches x 3-1/8 inches with two holes for attachment to wall.
 - b. Intermediate Flanges: 2-5/8 inches x 3-1/8 inches wide x 3-1/8 inch diameter.
 6. Snap Flange Covers: 18-8 S, Type 316, 22 gauge drawn stainless steel with satin finish, 3-1/4 inch diameter x 1/2 inches deep; snap over mounting flange to conceal mounting screws.
 7. Mounting Accessories: Provide the following optional mounting accessories as scheduled and indicated on the Drawings and as required for complete installation.
 - a. Mounting Kits: Provide Bobrick Mounting Kit appropriate for project conditions and substrate.
- B. All other restroom accessories: as indicated on Restroom Accessory Schedule on Drawings.

2.05 HAND DRYERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the following or a comparable product, subject to compliance with requirements, and approval of substitution request by Engineer.
- B. Hand Dryer:
1. Excel Dryer Inc. (www.exceldryer.com) model XLERATOR XL-SB hand dryer. Cover shall be brushed stainless steel.
 2. Mounting: Surface Mount. No operable part shall be mounted higher than 40 inches above finished floor.

3. Operation: Activated by infrared optical sensor located next to air outlet.
 - a. Operation Time: The dryer shall operate as long as hands are under the air outlet. Dryer to stop after 35 seconds if hands not removed.
4. Electrical Requirements: 110/120 V AC, 12.5 Amp, 60 Hz. Entire unit shall be internally grounded.
5. All internal parts shall be coated according to Underwriter's Laboratories, Inc requirements.
6. Motor shall be a thermally protected, series commutated, through-flow discharge vacuum motor/blower (5/8hp / 20,000 rpm) which provides air velocity of up to 19,000 lfm (linear feet per minute) at the air outlet and 16,000 lfm at the hands (4 inches below air outlet).
7. Warranty: Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 6-8.3 for Warranty.
 - a. Special Warranty: In addition, the dryer shall be guaranteed to be free from defects for a period of five years. Special Warranty shall include labor performed at factory as well as the repair or exchange of defective parts, at manufacturer's option.

2.06 UNDERLAVATORY GUARD

- A. Lavatory Trap and Water Supply Protection: Insulated coverings for under lavatory waste and supply piping and valves.
 1. Material: Soft flexible 100% PVC cover.
 - a. Anti-micorbial / Anti-fungal: Interior and exterior result of 0, ASTM G21.
 - b. Water Absorption: ASTM D 570.
 - c. Tensile Strength and Elongation: ASTM D 412.
 - d. Weatherization and UV: ASTM G 153.
 - e. Density: 21.61 pcf.
 2. Color: White.
 3. Mounting: Smooth non-abrasive snap-lock fasteners and Velcro, tamper-resistant.
 4. Insulation: Complies with ASTM E-84.
 - a. Flame and Smoke Spread: 25 Flame Spread/450 Smoke Index, ASTM E 84-07.

- b. Thermal: Conductivity of 0.028 (K value), Resistance of 0.504 (R value); ASTM C 177.
 - c. Thermal: Conductivity of 0.358 (avg), Resistance of 0.346 (avg), Resistance of 2.790 ("R" per inch); ASTM C 518.
5. Manufacturers:
- a. Trap Gear: www.plumberex.com. Model: #396. 3-PART SET with P-Trap cover and 2 Valve and Supply covers.
 - b. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Substitutions.

2.07 FABRICATION AND KEYING

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to City.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. Verify that field measurements are as indicated on drawings.

3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

- C. Install plumb and level, securely and rigidly anchored to substrate.
- D. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

3.04 ADJUSTMENT AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION

SECTION 10 4400

FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fire extinguishers.
- B. Recessed Fire extinguisher cabinets.
- C. Accessories.

1.02 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Shop Drawings: Indicate cabinet physical dimensions and location.
- C. Product Data: Provide extinguisher operational features, color and finish, and anchorage details.
- D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.03 REGULATORY REQUIREMENTS

- A. Fire extinguishers and cabinets must comply with 2013 California Code of Regulations, Title 24 and 2010 ADA Standards for Accessible Design.
- B. Fire extinguishers and cabinets must be installed such that they are not considered a Protruding Object per 2013 CBC 11B-307. Install so that no part of extinguisher or cabinet protrudes greater than 4 inches from finished wall surface.
- C. Fire extinguishers and cabinets must be installed within accessible reach ranges per 2013 CBC 308. Install 48 inches maximum to top of cabinet, 40 inches maximum to any operable part.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fire Extinguishers:
 - 1. Ansul, Inc: www.ansul.com. Or approved equal.
 - 2. Pyro-Chem: www.pyrochem.com. Or approved equal.
- B. Fire Extinguisher Cabinets and Accessories:
 - 1. Ansul, Inc.: www.ansul.com. Or approved equal.

2. JL Industries, Inc: www.jlindustries.com. Or approved equal.
3. Larsen's Manufacturing Co: www.larsensmfg.com. Or approved equal.
4. Potter-Roemer: www.potterroemer.com. Or approved equal.
5. Pyro-Chem: www.pyrochem.com. Or approved equal.
6. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Substitutions.

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
 1. Provide extinguishers labeled by UL for the purpose specified and indicated.
- B. Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gage.
 1. Class: 2A:10B:C.
 2. Size: 5 pound.
 3. Finish: Baked polyester powder coat, red color.

2.03 FIRE EXTINGUISHER CABINETS

- A. Metal: Formed primed steel sheet; 0.059 inch thick base metal.
- B. Cabinet Configuration: Semi-recessed or Recessed type.
 1. Sized to accommodate accessories.
 2. Exterior nominal dimensions of 9 inch wide x 21 inch high x 6 inch deep.
 3. Trimless type.
- C. Door: 0.059 inch thick, reinforced for flatness and rigidity; lock with break glass access. Hinge doors for 180 degree opening with two butt hinges. Provide nylon catch.
- D. Door Glazing: Glass, clear, 1/8 inch thick tempered. Set in resilient channel gasket glazing.
- E. Cabinet Mounting Hardware: Appropriate to cabinet. Pre-drill for anchors.
- F. Weld, fill, and grind components smooth.
- G. Finish of Cabinet Exterior Trim and Door: Red baked enamel.
- H. Finish of Cabinet Interior: White enamel.

2.04 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, galvanized and enamel finished.
- B. Triangle Projection Sign: Cast acrylic media without frame. Per Drawings.
 1. Material: Clear non-glare, optically corrected, cast virgin acrylic sheet ready for second surface (backside) graphics application.
 2. Thickness: 1/4 inch.

3. Edges: Eased.
4. Corners: Radiused to eliminate any sharp edges or points.
5. Graphics Media: 0.015" thickness clear non-glare optically correct scuff resistant plastic with computer generated photo screen printing chemically bonded to back surface with background surface subsequently applied.
6. Mounting of Triangular Projection Signs: Tape adhesive AND vandal-proof concealed or exposed stainless steel screws.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level, 48 inches maximum above finished floor to top of cabinet, 40 inches maximum above finished floor to any operable part.
- C. Secure rigidly in place.
- D. Place extinguishers in cabinets.
- E. Position cabinet signage at centered vertically 80" above finish floor, centered horizontally over cabinet.

3.03 SCHEDULE

- A. Provide (1) Class 2A:10B:C, 5 pound extinguisher, suitable semi-recessed cabinet and sign in each location indicated per Drawings.

END OF SECTION

SECTION 13 0541

SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS

PART 1 GENERAL

1.01 DESCRIPTION:

- A. Provide seismic restraint in accordance with the requirements of this section in order to maintain the integrity of nonstructural components of the building so that they remain safe and functional in case of seismic event.
- B. Definitions: Non-structural building components are components or systems that are not part of the building's structural system whether inside or outside, above or below grade. Non-structural components of buildings include:
 - 1. Architectural Elements: Facades that are not part of the structural system and its shear resistant elements; cornices and other architectural projections and parapets that do not function structurally; glazing; nonbearing partitions; suspended ceilings; stairs isolated from the basic structure; cabinets; bookshelves; medical equipment; and storage racks.
 - 2. Electrical Elements: Power and lighting systems; substations; switchgear and switchboards; auxiliary engine-generator sets; transfer switches; motor control centers; motor generators; selector and controller panels; fire protection and alarm systems; special life support systems; and telephone and communication systems.
 - 3. Mechanical Elements: Heating, ventilating, and air-conditioning systems; medical gas systems; plumbing systems; sprinkler systems; pneumatic systems; boiler equipment and components.
 - 4. Transportation Elements: Mechanical, electrical and structural elements for transport systems, i.e., elevators and dumbwaiters, including hoisting equipment and counterweights.

1.02 QUALITY CONTROL:

- A. Shop-Drawing Preparation:
 - 1. Have seismic-force-restraint shop drawings and calculations prepared by a professional structural engineer experienced in the area of seismic force restraints. The professional structural engineer shall be registered in the state of California.
 - 2. Submit design tables and information used for the design-force levels, stamped and signed by a professional structural engineer registered in the State of California.
- B. Coordination:
 - 1. Do not install seismic restraints until seismic restraint submittals are approved by the Project Engineer.

2. Coordinate and install trapezes or other multi-pipe hanger systems prior to pipe installation.

1.03 SUBMITTALS:

- A. Submit prior to installation, a coordinated set of bracing drawings for seismic protection of piping, with data identifying the various support-to-structure connections and seismic bracing structural connections, include:
 1. Single-line piping diagrams on a floor-by-floor basis. Show all suspended piping for a given floor on the same plain.
 2. Type of pipe (Copper, steel, cast iron, insulated, non-insulated, etc.).
 3. Pipe contents.
 4. Structural framing.
 5. Location of all gravity load pipe supports and spacing requirements.
 6. Numerical value of gravity load reactions.
 7. Location of all seismic bracing.
 8. Numerical value of applied seismic brace loads.
 9. Type of connection (Vertical support, vertical support with seismic brace etc.).
 10. Seismic brace reaction type (tension or compression). Details illustrating all support and bracing components, methods of connections, and specific anchors to be used.
- B. Submit design calculations prepared and sealed by the registered structural engineer specified above in paragraph 1.3A.
- C. Submit for concrete anchors, the appropriate ICBC evaluation reports or lab test reports verifying compliance with Regulations 28-6.
- D. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', current editions, Section 2-5.3 for Shop Drawings and Submittals.

1.04 APPLICABLE PUBLICATIONS:

- A. The Publications listed below (including amendments, addenda revisions, supplements and errata) form a part of this specification to the extent referenced. The publications are referenced in text by basic designation only.
- B. American Concrete Institute (ACI):

355.2-07Qualification for Post-Installed Mechanical Anchors in Concrete and Commentary

C. American Institute of Steel Construction (AISC):

Load and Resistance Factor Design, Volume 1, Second Edition.

D. American Society for Testing and Materials (ASTM):

A36/A36M-05Standard Specification for Carbon Structural Steel.

A53/A53M-07Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

A307 (REV A-07)Standard Specification for Carbon Steel Bolts and Studs; 60,000 PSI Tensile Strength.

A325-07Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

A325M-05Standard Specification for High-Strength Bolts for Structural Steel Joints [Metric].

A490-06Standard Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength.

A490M (REV A-04)Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints [Metric].

A500/A500M-07Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

A501-07Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

A615/A615M-07Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

A992/A992M (REV A-06)Standard Specification for Steel for Structural Shapes for Use in Building Framing.

A996/A996M (REV A-06)Standard Specification for Rail-Steel and Axel-Steel Deformed Bars for Concrete Reinforcement.

E488-96(R2003)Standard Test Method for Strength of Anchors in Concrete and Masonry Elements.

- E. California Building Code (CBC) 2013 Edition.
- F. National Uniform Seismic Installation Guidelines (NUSIG).
- G. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
Seismic Restraint Manual - Guidelines for Mechanical Systems, 2008 Edition.

1.05 REGULATORY REQUIREMENT:

- A. CBC 2013.
- B. Exceptions: The seismic restraint of the following items may be omitted:
 - 1. Equipment weighing less than 400 pounds, which is supported directly on the floor or roof.
 - 2. Equipment weighing less than 20 pounds, which is suspended from the roof or floor or hung from a wall.
 - 3. All other piping less than 2 ½ inches inside diameter, except for automatic fire suppression systems.
 - 4. All piping suspended by individual hangers, 12 inches or less in length from the top of pipe to the bottom of the support for the hanger.

PART 2 – PRODUCTS

2.01 STEEL:

- A. Structural Steel: ASTM A36, A36M, A992.
- B. Structural Tubing: ASTM A500, Grade B.
- C. Structural Tubing: ASTM A501.
- D. Steel Pipe: ASTM A53/A53M, Grade B.
- E. Bolts & Nuts: ASTM A307, A325, A325M, A490, A490M.

PART 3 – EXECUTION

3.01 CONSTRUCTION, GENERAL:

- A. Provide piping, ceiling and light supports and anchoring devices to withstand the seismic design forces, so that when seismic design forces are applied, the piping, ceiling and lights cannot displace, overturn, or become inoperable.
- B. Construct seismic restraints and anchorage to allow for thermal expansion.

C. Testing Before Final Inspection:

1. Test 10-percent of anchors in masonry and concrete per ASTM E488, and ACI 355.2 to determine that they meet the required load capacity. If any anchor fails to meet the required load, test the next 20 consecutive anchors, which are required to have zero failure, before resuming the 10-percent testing frequency.
2. Before scheduling Final Inspection, submit a report on this testing indicating the number and location of testing, and what anchor-loads were obtained.

3.02 PIPING

- A. Support and brace piping to resist directional forces (lateral, longitudinal and vertical).
- B. Brace piping with a minimum of 1 brace per branch.
- C. Provide supports and anchoring so that, upon application of seismic forces, piping remains fully connected as operable systems which will not displace sufficiently to damage adjacent or connecting equipment, or building members.
- D. Seismic Restraint of Piping:
 1. Design criteria:
 - a. Piping resiliently supported: Restrain to support 120-percent of the weight of the systems and components and contents.
 - b. Piping not resiliently supported: Restrain to support 60-percent of the weight of the system components and contents.
- E. Piping Connections: Provide flexible connections where pipes connect to equipment. Make the connections capable of accommodating relative differential movements between the pipe and equipment under conditions of earthquake shaking.

3.03 CEILINGS AND LIGHTING FIXTURES

- A. At regular intervals, laterally brace suspended ceilings against lateral and vertical movements, and provide with a physical separation at the walls.
- B. Independently support and laterally brace all lighting fixtures. Refer to applicable portion of lighting specification, Section 26 0000, ELECTRICAL REQUIREMENTS.

END OF SECTION

SECTION 22 0000

PLUMBING, GENERAL PURPOSE

TABLE OF CONTENTS

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 STANDARD PRODUCTS
 - 1.3.1 Alternative Qualifications
 - 1.3.2 Service Support
 - 1.3.3 Manufacturer's Nameplate
 - 1.3.4 Modification of References
- 1.4 DELIVERY, STORAGE, AND HANDLING
- 1.5 REGULATORY REQUIREMENTS
- 1.6 PROJECT/SITE CONDITIONS
- 1.7 INSTRUCTION TO GOVERNMENT PERSONNEL
- 1.8 ACCESSIBILITY OF EQUIPMENT

PART 2 PRODUCTS

- 2.1 Materials
 - 2.1.1 Pipe Joint Materials
 - 2.1.2 Miscellaneous Materials
- 2.2 PIPE HANGERS, INSERTS, AND SUPPORTS
- 2.3 VALVES
 - 2.3.1 Backwater Valves
 - 2.3.2 Wall Faucets
 - 2.3.3 Wall Hydrants (Frostproof)
 - 2.3.4 Lawn Faucets
 - 2.3.5 Yard Hydrants

- 2.3.6 Relief Valves
- 2.4 FIXTURES
 - 2.4.1 Lavatories
 - 2.4.2 Automatic Controls
 - 2.4.3 Flush Valve Water Closets
 - 2.4.4 Flush Valve Urinals
 - 2.4.5 Wheelchair Flush Valve Type Urinals
 - 2.4.6 Wall Hung Lavatories
 - 2.4.9 Wheelchair Drinking Water fountain
- 2.6 DRAINS
 - 2.6.1 Floor Drains
- 2.7 TRAPS
- 2.9 MISCELLANEOUS PIPING ITEMS
 - 2.9.2 Pipe Sleeves
 - 2.9.3 Pipe Hangers (Supports)
 - 2.9.4 Nameplates

PART 3 EXECUTION

- 3.1 GENERAL INSTALLATION REQUIREMENTS
 - 3.1.1 Water Pipe, Fittings, and Connections
 - 3.1.2 Joints
 - 3.1.3 Dissimilar Pipe Materials
 - 3.1.4 Corrosion Protection for Buried Pipe and Fittings
 - 3.1.5 Pipe Sleeves and Flashing
 - 3.1.6 Fire Seal
 - 3.1.7 Supports
 - 3.1.8 Pipe Cleanouts
- 3.2 FIXTURES AND FIXTURE TRIMMINGS

- 3.2.1 Fixture Connections
- 3.2.2 Flushometer Valves
- 3.2.3 Height of Fixture Rims Above Floor
- 3.2.4 Fixture Supports
- 3.2.6 Backflow Prevention Devices
- 3.2.7 Access Panels
- 3.2.8 Traps
- 3.3 IDENTIFICATION SYSTEMS
 - 3.3.1 Identification Tags
- 3.4 ESCUTCHEONS
- 3.5 TESTS, FLUSHING AND DISINFECTION
 - 3.5.1 Plumbing System
 - 3.5.2 Defective Work
 - 3.5.3 System Flushing
 - 3.5.4 Operational Test
 - 3.5.5 Disinfection
- 3.6 WASTE MANAGEMENT
- 3.7 POSTED INSTRUCTIONS
- 3.8 TABLES

-- End of Table of Contents --

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE
(AHRI) AHRI 1010 (2002) Self-Contained, Mechanically

Refrigerated Drinking-Water Coolers

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z21.10.1/CSA 4.1 (2009; Addenda 2009) Gas Water Heaters Vol. I,
Storage Water Heaters with Input Ratings of 75,000
Btu Per Hour or Less

ANSI Z21.10.3/CSA 4.3 (2004; Addenda A 2007; Addenda B 2008) Gas Water
Heaters Vol.III, Storage Water Heaters With Input
Ratings Above 75,000
Btu Per Hour, Circulating and Instantaneous

ANSI Z21.22/CSA 4.4 (1999; Addenda A 2000, Addenda B 2001; R
2004) Relief Valves for Hot Water Supply
Systems

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR- CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 146 (2006) Method of Testing and Rating Pool
Heaters

ASHRAE 90.1 - IP (2010) Energy Standard for Buildings Except Low-Rise
Residential Buildings

ASHRAE 90.1 - SI (2007; Supplement 2008; Errata 2009; Errata 2009;
INT 1-3 2009; Errata 2010) Energy Standard for
Buildings Except Low-Rise Residential Buildings

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)

ASSE 1001 (2008) Performance Requirements for
Atmospheric Type Vacuum Breakers (ANSI
approved 2009)

ASSE 1003 (2009) Performance Requirements for Water Pressure
Reducing Valves for Domestic Water Distribution
Systems - (ANSI approved 2010)

ASSE 1005	(1999) Water Heater Drain Valves 3/4 Inch Size
ASSE 1010	(2004) Performance Requirements for Water Hammer Arresters (ANSI approved 2004)
ASSE 1011	(2004; Errata 2004) Performance Requirements for Hose Connection Vacuum Breakers (ANSI approved 2004)
ASSE 1012	(2009) Performance Requirements for Backflow Preventer with an Intermediate Atmospheric Vent - (ANSI approved 2009)
ASSE 1013	(2009) Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers - (ANSI approved 2010)
ASSE 1018	(2001) Performance Requirements for Trap Seal Primer Valves - Potable Water Supplied (ANSI Approved 2002)
ASSE 1019	(2004; Errata 2005) Performance Requirements for Vacuum Breaker Wall Hydrants, Freeze Resistant, Automatic Draining Type (ANSI Approved 2004)
ASSE 1020	(2004; Errata 2004; Errata 2004) Performance Requirements for Pressure Vacuum Breaker Assembly (ANSI Approved 2004)
ASSE 1037	(1990) Performance Requirements for Pressurized Flushing Devices (Flushometers) for Plumbing Fixtures

AMERICAN WATER WORKS ASSOCIATION
(AWWA)

AWWA 10084	(2005) Standard Methods for the Examination of Water and Wastewater
AWWA B300	(2010) Hypochlorites
AWWA B301	(2010) Liquid Chlorine
AWWA C203	(2008) Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied
AWWA C606	(2006) Grooved and Shouldered Joints
AWWA C651 Mains	(2005; Errata 2005) Standard for Disinfecting Water

AWWA C652	(2002) Disinfection of Water-Storage Facilities
AWWA C700	(2009) Standard for Cold Water Meters - Displacement Type, Bronze Main Case
AWWA C701	(2007) Standard for Cold-Water Meters - Turbine Type for Customer Service
AWWA D100 Storage	(2005; Errata 2007) Welded Steel Tanks for Water Storage

AMERICAN WELDING SOCIETY (AWS)

AWS A5.8/A5.8M	(2004) Specification for Filler Metals for Brazing and Braze Welding
AWS B2.2/B2.2M	(2010) Specification for Brazing Procedure and Performance Qualification

ASME INTERNATIONAL (ASME)

ASME A112.1.2	(2004) Standard for Air Gaps in Plumbing Systems (For Plumbing Fixtures and Water-Connected Receptors)
ASME A112.14.1	(2003; R 2008) Backwater Valves
ASME A112.19.1/CSA B45.2	(2008) Enameled Cast Iron and Enameled Steel Plumbing Fixtures
ASME A112.19.17	(2010) Manufactured Safety Vacuum Release Systems (SVRS) for Residential and Commercial Swimming Pool, Spa, Hot Tub, and Wading Pool Suction Systems
ASME A112.19.3/CSA B45.4	(2008) Stainless Steel Plumbing Fixtures
ASME A112.19.4M	(1994; Supplement 1-1998; Supplement 2-2000; R 2009) Porcelain Enameled Formed Steel Plumbing Fixtures
ASME A112.19.5	(2005) Trim for Water-Closet Bowls, Tanks and Urinals
ASME A112.19.8	(2007; Addenda A 2008; Addenda B 2009) Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, And Hot Tubs
ASME A112.36.2M	(1991; R 2008) Cleanouts
ASME A112.6.1M	(1997; R 2008) Floor Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use

ASME A112.6.3	(2001; R 2007) Standard for Floor and Trench Drains
ASME A112.6.4	(2003; R 2008) Roof, Deck and Balcony Drains
ASME B1.20.1	(1983; R 2006) Pipe Threads, General Purpose (Inch)
ASME B16.12	(2009) Cast Iron Threaded Drainage Fittings
ASME B16.15	(2006) Cast Bronze Alloy Threaded Fittings Classes 125 and 250
ASME B16.18	(2001; R 2005) Cast Copper Alloy Solder Joint Pressure Fittings
ASME B16.21	(2005) Nonmetallic Flat Gaskets for Pipe Flanges
ASME B16.22	(2001; R 2010) Standard for Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
ASME B16.23	(2002; R 2006) Cast Copper Alloy Solder Joint Drainage Fittings - DWV
ASME B16.24	(2006) Cast Copper Alloy Pipe Flanges and Flanged Fittings: Classes 150, 300, 600, 900, 1500, and 2500
ASME B16.29	(2007) Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV
ASME B16.3	(2006) Malleable Iron Threaded Fittings, Classes 150 and 300
ASME B16.34	(2009) Valves - Flanged, Threaded and Welding End
ASME B16.39	(2009) Standard for Malleable Iron Threaded Pipe Unions; Classes 150, 250, and 300
ASME B16.4	(2006) Standard for Gray Iron Threaded Fittings; Classes 125 and 250
ASME B16.5	(2009) Pipe Flanges and Flanged Fittings: NPS 1/2 Through NPS 24 Metric/Inch Standard

ASME B31.1	(2007; Addenda a 2008; Addenda b 2009) Power Piping
ASME B31.5	(2010) Refrigeration Piping and Heat Transfer Components
ASME B40.100	(2005) Pressure Gauges and Gauge Attachments
ASME BPVC SEC IX	(2010) BPVC Section IX-Welding and Brazing Qualifications
ASME BPVC SEC VIII D1	(2007; Addenda 2008; Addenda 2009) BPVC Section VIII-Rules for Construction of Pressure Vessels Division 1
ASME CSD-1	(2009) Control and Safety Devices for Automatically Fired Boilers

ASTM INTERNATIONAL (ASTM)

ASTM A 105/A 105M	(2010) Standard Specification for Carbon Steel Forgings for Piping Applications
ASTM A 183	(2003; R 2009) Standard Specification for Carbon Steel Track Bolts and Nuts
ASTM A 193/A 193M	(2010a) Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service and Other Special Purpose Applications
ASTM A 47/A 47M	(1999; R 2009) Standard Specification for Ferritic Malleable Iron Castings
ASTM A 515/A 515M	(2003; R 2007) Standard Specification for Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service
ASTM A 516/A 516M	(2010) Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service
ASTM A 518/A 518M	(1999; R 2008) Standard Specification for Corrosion-Resistant High-Silicon Iron Castings
ASTM A 53/A 53M	(2010) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 536	(1984; R 2009) Standard Specification for Ductile Iron Castings

ASTM A 733	(2003; R 2009e1) Standard Specification for Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
ASTM A 74	(2009) Standard Specification for Cast Iron Soil Pipe and Fittings
ASTM A 888	(2009) Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications
ASTM B 111/B 111M	(2009) Standard Specification for Copper and Copper-Alloy Seamless Condenser Tubes and Ferrule Stock
ASTM B 117	(2009) Standing Practice for Operating Salt Spray (Fog) Apparatus
ASTM B 152/B 152M	(2009) Standard Specification for Copper Sheet, Strip, Plate, and Rolled Bar ASTM B 306 (2009) Standard Specification for Copper Drainage Tube (DWV)
ASTM B 32	(2008) Standard Specification for Solder Metal
ASTM B 370	(2009) Standard Specification for Copper Sheet and Strip for Building Construction ASTM B 42 (2010) Standard Specification for Seamless Copper Pipe, Standard Sizes
ASTM B 43	(2009) Standard Specification for Seamless Red Brass Pipe, Standard Sizes
ASTM B 584	(2009a) Standard Specification for Copper Alloy Sand Castings for General Applications
ASTM B 75	(2002) Standard Specification for Seamless Copper Tube
ASTM B 75M	(1999; R 2005) Standard Specification for Seamless Copper Tube (Metric)
ASTM B 813	(2010) Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube
ASTM B 828	(2002) Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings
ASTM B 88	(2009) Standard Specification for Seamless Copper Water Tube

ASTM B 88M	(2005) Standard Specification for Seamless Copper Water Tube (Metric)
ASTM C 1053	(2000; R 2010) Standard Specification for Borosilicate Glass Pipe and Fittings for Drain, Waste, and Vent (DWV) Applications
ASTM C 564	(2009a) Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings
ASTM C 920	(2010) Standard Specification for Elastomeric Joint Sealants
ASTM D 1004	(2009) Initial Tear Resistance of Plastic Film and Sheeting
ASTM D 1248	(2005) Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
ASTM D 1785	(2006) Standard Specification for Poly(Vinyl Chloride) (PVC), Plastic Pipe, Schedules 40, 80, and 120
ASTM D 2000	(2008) Standard Classification System for Rubber Products in Automotive Applications
ASTM D 2235	(2004) Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings
ASTM D 2239	(2003) Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter
ASTM D 2241	(2009) Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
ASTM D 2447	(2003) Standard Specification for Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter
ASTM D 2464	(2006) Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D 2466	(2006) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
ASTM D 2467	(2006) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D 2564	(2004; R 2009e1) Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems

ASTM D 2657	(2007) Heat Fusion Joining Polyolefin Pipe and Fittings
ASTM D 2661	(2008) Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40, Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D 2665	(2009) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D 2672	(1996a; R 2009) Joints for IPS PVC Pipe Using Solvent Cement
ASTM D 2683	(2010) Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing
ASTM D 2737	(2003) Polyethylene (PE) Plastic Tubing
ASTM D 2822	(2005) Asphalt Roof Cement
ASTM D 2846/D 2846M	(2009b) Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems
ASTM D 2855	(1996; R 2010) Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings
ASTM D 2996	(2001; R 2007e1) Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe
ASTM D 3035	(2008) Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
ASTM D 3122	(1995; R 2009) Solvent Cements for Styrene-Rubber (SR) Plastic Pipe and Fittings
ASTM D 3138	(2004) Solvent Cements for Transition Joints Between Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Non-Pressure Piping Components
ASTM D 3139	(1998; R 2005) Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
ASTM D 3212	(2007) Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D 3261	(2010a) Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing

ASTM D 3311	(2009a) Drain, Waste, and Vent (DWV) Plastic Fittings Patterns
ASTM D 4101	(2010) Standard Specification for Polypropylene Injection and Extrusion Materials
ASTM D 4551	(1996; R 2008e1) Poly(Vinyl Chloride) (PVC) Plastic Flexible Concealed Water-Containment Membrane
ASTM D 638 Plastics	(2010) Standard Test Method for Tensile Properties of
ASTM E 1	(2007) Standard Specification for ASTM Liquid-in-Glass Thermometers
ASTM E 96/E 96M Transmission of Materials	(2005) Standard Test Methods for Water Vapor
ASTM F 1290 Fittings	(1998a; R 2004) Electrofusion Joining Polyolefin Pipe and
ASTM F 1760	(2001; R 2005e1) Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content
ASTM F 2387	(2004) Standard Specification for Manufactured Safety Vacuum Release Systems (SVRS) for Swimming Pools, Spas, and Hot Tubs
ASTM F 2389	(2010) Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems
ASTM F 409	(2002; R 2008) Thermoplastic Accessible and Replaceable Plastic Tube and Tubular Fittings
ASTM F 437	(2009) Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
ASTM F 438	(2009) Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40
ASTM F 439	(2009) Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
ASTM F 441/F 441M	(2009) Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules

40 and 80

ASTM F 442/F 442M (2009) Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)

ASTM F 477 (2010) Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

ASTM F 493 (2010) Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings

ASTM F 628 (2008) Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe with a Cellular Core

ASTM F 877 (2007) Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems

ASTM F 891 (2010) Coextruded Poly (Vinyl Chloride) (PVC) Plastic Pipe with a Cellular Core

CAST IRON SOIL PIPE INSTITUTE (CISPI)

CISPI 301 (2009) Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications

CISPI 310 (2009) Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications

COPPER DEVELOPMENT ASSOCIATION (CDA)

CDA A4015 (1994; R 1995) Copper Tube Handbook

INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS (IAPMO)

IAPMO PS 117 (2005) Press Type Or Plain End Rub Gasketed W/ Nail CU & CU Alloy Fittings for Install On CU Tubing

IAPMO UPC (2003) Uniform Plumbing Code

IAPMO Z124.1.2 (2005) Plastic Bathtub and Shower Units

IAPMO Z124.8 (1990) Plastic Bathtub Liners

INTERNATIONAL CODE COUNCIL (ICC)

ICC IPC (2009) International Plumbing Code

ICC/ANSI A117.1

(2003; Errata 2007) Accessible and Usable

Buildings and Facilities

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)

ANSI/ISEA Z358.1

(2009) American National Standard for
Emergency Eyewash and Shower Equipment

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND
FITTINGS INDUSTRY (MSS)

MSS SP-110	(2010) Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends
MSS SP-25	(2008) Standard Marking System for Valves, Fittings, Flanges and Unions
MSS SP-44	(2010) Steel Pipeline Flanges
MSS SP-58	(2009) Pipe Hangers and Supports - Materials, Design and Manufacture, Selection, Application, and Installation
MSS SP-67	(2002a) Butterfly Valves
MSS SP-69	(2003) Pipe Hangers and Supports - Selection and Application (ANSI Approved American National Standard)
MSS SP-70	(2006) Gray Iron Gate Valves, Flanged and Threaded Ends
MSS SP-71	(2005) Gray Iron Swing Check Valves, Flanged and Threaded Ends
MSS SP-72	(2010) Ball Valves with Flanged or Butt-Welding Ends for General Service
MSS SP-73	(2003) Brazing Joints for Copper and Copper Alloy Pressure Fittings
MSS SP-78	(2005a) Cast Iron Plug Valves, Flanged and Threaded Ends
MSS SP-80	(2008) Bronze Gate, Globe, Angle and Check Valves
MSS SP-83	(2006) Class 3000 Steel Pipe Unions Socket Welding and

Threaded

MSS SP-85 (2002) Gray Iron Globe & Angle Valves Flanged and Threaded Ends

NACE INTERNATIONAL (NACE)

NACE SP0169 (1992; R 2007) Control of External Corrosion on Underground or Submerged Metallic Piping Systems

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250 (2008) Enclosures for Electrical Equipment (1000 Volts Maximum)

NEMA MG 1 (2009) Motors and Generators

NEMA MG 11 (1977; R 2007) Energy Management Guide for Selection and Use of Single Phase Motors

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 31 (2006; Errata 06-1; Errata 07-2; Errata 10-3) Standard for the Installation of Oil-Burning Equipment

NFPA 54 (2009; TIA 10-3) National Fuel Gas Code

NFPA 90A (2009; Errata 09-1) Standard for the Installation of Air Conditioning and Ventilating Systems

NSF INTERNATIONAL (NSF)

NSF/ANSI 14 (2010) Plastics Piping System Components and Related Materials

NSF/ANSI 61 (2010a) Drinking Water System Components - Health Effects

PLASTIC PIPE AND FITTINGS ASSOCIATION (PPFA)

PPFA-01 (2004) Firestopping: Plastic Pipe in Fire Resistive Construction

PLUMBING AND DRAINAGE INSTITUTE (PDI)

PDI G 101 (2010) Testing and Rating Procedure for Hydro Mechanical Grease Interceptors with Appendix of Installation and Maintenance

PDI WH 201	(2010) Water Hammer Arresters Standard
SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)	
SAE J1508	(2009) Hose Clamp Specifications
U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)	
EPA SM 9223	(2004) Enzyme Substrate Coliform Test
Energy Star	(1992; R 2006) Energy Star Energy Efficiency Labeling System
PL 93-523 (1974; A 1999) Safe Drinking Water Act	
U.S. GREEN BUILDING COUNCIL (USGBC)	
LEED	(2002; R 2005) Leadership in Energy and Environmental Design(tm) Green Building Rating System for New Construction (LEED-NC)
U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)	
10 CFR 430	Energy Conservation Program for Consumer Products
21 CFR 175	Indirect Food Additives: Adhesives and Components of Coatings
40 CFR 50.12	National Primary and Secondary Ambient AirQuality Standards for Lead
PL 109-58	Energy Policy Act of 2005 (EPAct05) UNDERWRITERS LABORATORIES (UL)
UL 174	(2004; Reprint Apr 2009) Household Electric Storage Tank Water Heaters
UL 1951	(1994; Reprint Jun 2010) Electric Plumbing Accessories
UL 430	(2009) Standard for Waste Disposers
UL 499	(2005; Reprint Nov 2009) Electric Heating Appliances
UL 732	(1995; Reprint Apr 2010) Oil-Fired Storage Tank Water Heaters

1.2 SUBMITTALS

Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City

Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals

The following shall be submitted:

A. Shop Drawings

Plumbing System;

Detail drawings consisting of schedules, performance charts, instructions, diagrams, and other information to illustrate the requirements and operations of systems that are not covered by the Plumbing Code. Detail drawings for the complete plumbing system including piping layouts and locations of connections; dimensions for roughing-in, foundation, and support points; schematic diagrams and wiring diagrams or connection and interconnection diagrams. Detail drawings shall indicate clearances required for maintenance and operation. Where piping and equipment are to be supported other than as indicated, details shall include loadings and proposed support methods. Mechanical drawing plans, elevations, views, and details, shall be drawn to scale.

B. Product Data

1. Fixtures; List of installed fixtures with manufacturer, model, and flow rate.

- a. Flush valve water closets
- b. Flush valve urinals
- c. Flush tank water closets
Wall hung lavatories
Countertop lavatories
- d. Service sinks
- e. Drinking-water coolers;
- f. Pumps;
- g. Backflow prevention assemblies;

2. Plumbing System

Diagrams, instructions, and other sheets proposed for posting. Manufacturer's recommendations for the installation of bell and spigot and hubless joints for cast iron soil pipe.(If necessary)

C. Test Reports

1. Tests, Flushing and Disinfection

Test reports in booklet form showing all field tests performed to adjust each component and all field tests performed to prove compliance with the specified performance criteria, completion and testing of the installed system. Each test

report shall indicate the final position of controls.

2. Test of Backflow Prevention Assemblies;

Certification of proper operation shall be as accomplished in accordance with state regulations by an individual certified by the state to perform such tests. If no state requirement exists, the Contractor shall have the manufacturer's representative test the device, to ensure the unit is properly installed and performing as intended. The Contractor shall provide written documentation of the tests performed and signed by the individual performing the tests.

D. Certificates

1. Materials and Equipment

Where equipment is specified to conform to requirements of the

ASME Boiler and Pressure Vessel Code, the design, fabrication, and installation shall conform to the code.

2. Bolts

Written certification by the bolt manufacturer that the bolts furnished comply with the specified requirements.

1.3 STANDARD PRODUCTS

Specified materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacture of such products. Specified equipment shall essentially duplicate equipment that has

performed satisfactorily at least two years prior to bid opening. Standard products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year use shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2 year period.

1.3.1 Alternative Qualifications

Products having less than a two-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturer's factory or laboratory tests, can be shown.

1.3.2 Service Support

The equipment items shall be supported by service organizations. Submit a certified list of qualified permanent service organizations for support of the equipment which includes their addresses and qualifications. These service organizations shall be reasonably convenient to the equipment installation and able to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

1.3.3 Manufacturer's Nameplate

Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

1.3.4 Modification of References

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction", or words of similar meaning, to mean the Engineer.

1.3.4.1 Definitions

For the International Code Council (ICC) Codes referenced in the contract documents, advisory provisions shall be considered mandatory, the word "should" shall be interpreted as "shall." Reference to the "code official" shall be interpreted to mean the "Engineer." For leased facilities, references to the "City" shall be interpreted to mean the "lessor." References to the "permit holder" shall be interpreted to mean the "Contractor."

1.3.4.2 Administrative Interpretations

For ICC Codes referenced in the contract documents, the provisions of Chapter 1, "Administrator," do not apply. References in the ICC Codes to sections of Chapter 1, shall be applied appropriately by the Engineer as authorized by his administrative cognizance.

1.4 DELIVERY, STORAGE, AND HANDLING

Handle, store, and protect equipment and materials to prevent damage before and during installation in accordance with the manufacturer's recommendations, and as approved by the Contracting Officer. Replace damaged or defective items.

1.5 REGULATORY REQUIREMENTS

Unless otherwise required herein, plumbing work shall be in accordance with ICC IPC. Energy consuming products and systems shall be in accordance with PL 109-58 and ASHRAE 90.1 - SI ASHRAE 90.1 - IP

1.6 PROJECT/SITE CONDITIONS

The Contractor shall become familiar with details of the work, verify dimensions in the field, and advise the Engineer of any discrepancy before performing any work.

1.7 INSTRUCTION TO THE PERSONNEL

When specified in other sections, furnish the services of competent instructors to give full instruction to the designated personnel in the adjustment, operation, and maintenance, including pertinent safety requirements, of the specified equipment or system. Instructors shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work.

Instruction shall be given during the first regular work week after the equipment or system has been

accepted and turned over to the client for regular operation. The number of man-days (8 hours per day) of instruction furnished shall be as specified in the individual section. When more than 4 man-days of instruction are specified, use approximately half of the time for classroom instruction. Use other time for instruction with the equipment or system.

When significant changes or modifications in the equipment or system are made under the terms of the contract, provide additional instruction to acquaint the operating personnel with the changes or modifications.

1.8 ACCESSIBILITY OF EQUIPMENT

Install all work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Install concealed valves, expansion joints, controls, dampers, and equipment requiring access, in locations freely accessible through access doors.

PART 2 PRODUCTS

2.1 Materials

Materials for various services shall be in accordance with TABLES I and

II. PVC pipe shall contain a minimum of 25 percent recycled content

in accordance with ASTM F 1760. HDPE pipe shall contain a minimum of 50 percent post-consumer recycled content. Cement pipe shall contain recycled content. Steel pipe shall contain a minimum of 25 percent recycled content, with a minimum of 16 percent post-consumer recycled content. Pipe schedules shall be selected based on service requirements. Pipe fittings shall be compatible with the applicable pipe materials. Plastic pipe, fittings, and solvent cement shall meet NSF/ANSI 14 and shall be NSF listed for the service intended. Plastic pipe, fittings, and solvent cement used for potable hot and cold water service shall bear the NSF seal "NSF-PW." Polypropylene pipe and fittings shall conform to dimensional requirements of Schedule 40, Iron Pipe size and shall comply with NSF/ANSI 14, NSF/ANSI 61 and ASTM F 2389. Polypropylene piping that will be exposed to UV light shall be provided with a Factory applied UV resistant coating.

Pipe threads (except dry seal) shall conform to ASME B1.20.1. Grooved pipe couplings and fittings shall be from the same manufacturer. Material or equipment containing lead shall not be used in any potable water system. In line devices such as water meters, building valves, check valves, meter stops, valves, fittings and back flow preventers shall comply with PL 93-523 and NSF/ANSI 61, Section 8. End point devices such as drinking water fountains, lavatory faucets, kitchen and bar faucets, residential ice makers, supply stops and end point control valves used to dispense water for drinking must meet the requirements of NSF/ANSI 61, Section 9. Hubless cast-iron soil pipe shall not be installed underground, under concrete floor slabs, or in crawl spaces below kitchen floors. Plastic pipe shall not be installed in air plenums. Plastic pipe shall not be installed in a pressure piping system in buildings greater than three stories including any basement levels.

2.1.1 Pipe Joint Materials

Grooved pipe and hubless cast-iron soil pipe shall not be used underground. Solder containing lead shall not be used with copper pipe. Cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Institute. Joints and gasket materials shall conform to the following:

- a. Coupling for Cast-Iron Pipe: for hub and spigot type ASTM A 74, AWWA C606. For hubless type: CISPI 310
- b. Coupling for Steel Pipe: AWWA C606.
- c. Couplings for Grooved Pipe: Ductile Iron ASTM A 536 (Grade 65-45-12), Malleable Iron ASTM A 47/A 47M, Grade 32510 or Copper ASTM A 536.
- d. Flange Gaskets: Gaskets shall be made of non-asbestos material in accordance with ASME B16.21. Gaskets shall be flat, 1/16 inch thick, and contain Aramid fibers bonded with Styrene Butadiene Rubber (SBR) or Nitro Butadiene Rubber (NBR). Gaskets shall be the full face or self centering flat ring type. Gaskets used for hydrocarbon service shall be bonded with NBR.
- e. Brazing Material: Brazing material shall conform to AWS A5.8/A5.8M, BCuP-5.
- f. Brazing Flux: Flux shall be in paste or liquid form appropriate for use with brazing material. Flux shall be as follows: lead-free; have a 100 percent flushable residue; contain slightly acidic reagents; contain potassium borides; and contain fluorides.
- g. Solder Material: Solder metal shall conform to ASTM B 32.
- h. Solder Flux: Flux shall be liquid form, non-corrosive, and conform to ASTM B 813, Standard Test 1.
- i. PTFE Tape: PTFE Tape, for use with Threaded Metal or Plastic Pipe.
- j. Rubber Gaskets for Cast-Iron Soil-Pipe and Fittings (hub and spigot type and hubless type): ASTM C 564.
- k. Rubber Gaskets for Grooved Pipe: ASTM D 2000, maximum temperature 230 degrees F.
- l. Flexible Elastomeric Seals: ASTM D 3139, ASTM D 3212 or ASTM F 477.
- m. Bolts and Nuts for Grooved Pipe Couplings: Heat-treated carbon steel, ASTM A 183.
- n. Solvent Cement for Transition Joints between ABS and PVC Nonpressure Piping Components: ASTM D 3138.
- o. Plastic Solvent Cement for ABS Plastic Pipe: ASTM D 2235.
- p. Plastic Solvent Cement for PVC Plastic Pipe: ASTM D 2564 and ASTM D 2855.
- q. Plastic Solvent Cement for CPVC Plastic Pipe: ASTM F 493.
- r. Flanged fittings including flanges, bolts, nuts, bolt patterns, etc., shall be in accordance with ASME B16.5 class 150 and shall have the manufacturer's trademark affixed in accordance with MSS SP-25. Flange material shall conform to ASTM A 105/A 105M. Blind flange material shall conform to ASTM A 516/A 516M cold service and

ASTM A 515/A 515M for hot service. Bolts shall be high strength or intermediate strength with material conforming to ASTM A 193/A 193M.

- s. Plastic Solvent Cement for Styrene Rubber Plastic Pipe: ASTM D 3122.
- t. Press fittings for Copper Pipe and Tube: Copper press fittings shall conform to the material and sizing requirements of ASME B16.18 or ASME B16.22 and performance criteria of IAPMO PS 117. Sealing elements for copper press fittings shall be EPDM, FKM or HNBR. Sealing elements shall be factory installed or an alternative supplied fitting manufacturer. Sealing element shall be selected based on manufacturer's approved application guidelines.
- u. Copper tubing shall conform to ASTM B 88M ASTM B 88, Type K, L or M.
- v. Heat-fusion joints for polypropylene piping: ASTM F 2389.

2.1.2 Miscellaneous Materials

Miscellaneous materials shall conform to the following:

- a. Water Hammer Arrester: PDI WH 201.
- b. Copper, Sheet and Strip for Building Construction: ASTM B 370.
- c. Asphalt Roof Cement: ASTM D 2822.
- d. Hose Clamps: SAE J1508.
- e. Supports for Off-The-Floor Plumbing Fixtures: ASME A112.6.1M.
- f. Metallic Cleanouts: ASME A112.36.2M.
- g. Plumbing Fixture Setting Compound: A preformed flexible ring seal molded from hydrocarbon wax material. The seal material shall be nonvolatile nonasphaltic and contain germicide and provide watertight, gastight, odorproof and verminproof properties.
- h. Coal-Tar Protective Coatings and Linings for Steel Water Pipelines: AWWA C203.
- i. Hypochlorites: AWWA B300.
- j. Liquid Chlorine: AWWA B301.
- k. Gauges - Pressure and Vacuum Indicating Dial Type - Elastic Element: ASME B40.100.
- l. Thermometers: ASTM E 1. Mercury shall not be used in thermometers.

2.2 PIPE HANGERS, INSERTS, AND SUPPORTS

Pipe hangers, inserts, and supports shall conform to MSS SP-58 and MSS SP-69.

2.3 VALVES

Valves shall be provided on supplies to equipment and fixtures. Valves 2-1/2 inches and smaller shall be bronze with threaded bodies for pipe and solder-type connections for tubing. Valves 3 inches and larger shall have flanged iron bodies and bronze trim. Pressure ratings shall be based upon the application. Grooved end valves may be provided if the manufacturer certifies that the valves meet the performance requirements of applicable MSS standard. Valves shall conform to the following standards:

Description	Standard
Butterfly Valves	MSS SP-67
Cast-Iron Gate Valves, Flanged and Threaded Ends	MSS SP-70
Cast-Iron Swing Check Valves, Flanged and Threaded Ends	MSS SP-71
Ball Valves with Flanged Butt-Welding Ends for General Service	MSS SP-72
Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends	MSS SP-110
Cast-Iron Plug Valves, Flanged and Threaded Ends	MSS SP-78
Bronze Gate, Globe, Angle, and Check Valves	MSS SP-80
Steel Valves, Socket Welding and Threaded Ends	ASME B16.34
Cast-Iron Globe and Angle Valves, Flanged and Threaded Ends	MSS SP-85
Backwater Valves	ASME A112.14.1
Vacuum Relief Valves	ANSI Z21.22/CSA 4.4
Water Pressure Reducing Valves	ASSE 1003
Water Heater Drain Valves	ASSE 1005
Trap Seal Primer Valves	ASSE 1018

Temperature and Pressure Relief Valves
for Hot Water Supply Systems

ANSI Z21.22/CSA 4.4

Temperature and Pressure Relief Valves
Hot Water Boilers

ASME CSD-1 for Automatically Fired
Safety Code No., Part CW, Article 5

2.3.1 Backwater Valves

Backwater valves shall be either separate from the floor drain or a combination floor drain, P-trap, and backwater valve, as shown. Valves shall have cast-iron bodies with cleanouts large enough to permit removal of interior parts. Valves shall be of the flap type, hinged or pivoted, with revolving disks. Hinge pivots, disks, and seats shall be nonferrous metal. Disks shall be slightly open in a no-flow no-backwater condition. Cleanouts shall extend to finished floor and be fitted with threaded countersunk plugs.

2.3.2 Wall Faucets

Wall faucets with vacuum-breaker backflow preventer shall be brass with 3/4 inch male inlet threads, hexagon shoulder, and 3/4 inch hose connection. Faucet handle shall be securely attached to stem.

2.3.3 Wall Hydrants (Frostproof)

ASSE 1019 with vacuum-breaker backflow preventer shall have a nickel-brass or nickel-bronze wall plate or flange with nozzle and detachable key handle. A brass or bronze operating rod shall be provided within a galvanized iron casing of sufficient length to extend through the wall so that the valve is inside the building, and the portion of the hydrant between the outlet and valve is self-draining. A brass or bronze valve with coupling and union elbow having metal-to-metal seat shall be provided. Valve rod and seat washer shall be removable through the face of the hydrant. The hydrant shall have 3/4 inch exposed hose thread on spout and 3/4 inch male pipe thread on inlet.

2.4 FIXTURES

Fixtures shall be water conservation type, in accordance with ICC IPC. Fixtures for use by the physically handicapped shall be in accordance with ICC/ANSI A117.1. ASME A112.19.3/CSA B45.4 304 stainless steel nonabsorbent, hard-burned, and vitrified throughout the body shall be provided. Porcelain enameled ware shall have specially selected, clear white, acid-resisting enamel coating evenly applied on surfaces. No fixture will be accepted that shows cracks, crazes, blisters, thin spots, or other flaws. Fixtures shall be equipped with appurtenances such as traps, faucets, stop valves, and drain fittings. Each fixture and piece of equipment requiring connections to the drainage system, except grease interceptors, shall be equipped with a trap. Brass expansion or toggle bolts capped with acorn nuts shall be provided for supports, and polished chromium-plated pipe, valves, and fittings shall be provided where exposed to view. Fixtures with the supply discharge below the rim shall be equipped with backflow preventers. Internal parts of flush and/or flushometer valves, pop-up stoppers of lavatory waste drains, and pop-up stoppers and overflow tees and shoes of bathtub waste drains may contain acetal resin, fluorocarbon, nylon, acrylonitrile-butadiene-styrene (ABS) or other plastic material, if the material has provided satisfactory service under actual commercial or industrial operating conditions for not less than 2 years or shall be copper alloy with all visible surfaces chrome plated. Plastic in contact with hot water shall be suitable for 180 degrees F water temperature.

2.4.1 Lavatories

Lavatory bowl material shall be made from 304 Stainless steel with satin finish. The construction shall be resistant to chemicals, stains, burns and impact. The lavatory pedestal panel shall be stainless steel. All support frames shall be a heavy gauge stainless steel mounted to wall. All water supplies, valves, waste assembly and other optional items shall be concealed within the pedestal or frame to prevent vandalism.

2.4.2 Automatic Controls

Provide automatic, sensor operated faucets and flush valves to comply with ASSE 1037 and UL 1951 for lavatory faucets, urinals, and water closets. Flushing and faucet systems shall consist of solenoid-activated valves with light beam sensors. Flush valve for water closet shall include an override pushbutton. Flushing devices shall be provided as described in paragraph FIXTURES AND FIXTURE TRIMMINGS.

2.4.3 Flush Valve Water Closets

ASME A112.19.2/CSA B45.1, wall mounted, wall outlet. Top of toilet seat height above floor shall be 14 to 15 inches. Provide wax bowl ring including plastic sleeve. Provide solid plastic elongated open-front seat.

Water flushing volume of the water closet and flush valve combination shall not exceed an average of 1.28 gallons per flush.

Provide large diameter flush valve including angle control-stop valve, vacuum breaker, tail pieces, slip nuts, and wall plates; exposed to view components shall be chromium-plated or polished stainless steel. Flush valves shall be nonhold-open type. Mount flush valves not less than 11 inches above the fixture. Mounted height of flush valve shall not interfere with the hand rail in ADA stalls. Provide solenoid-activated flush valves including electrical-operated light-beam-sensor to energize the solenoid.

2.4.4 Flush Valve Urinals

ASME A112.19.2/CSA B45.1, 304 stainless steel with satin finish wall-mounted, wall outlet.

Provide urinal with the rim 24 inches above the floor. Water flushing volume of the urinal and flush valve combination shall not exceed 0.125 gallons per flush. Provide ASME A112.6.1M concealed chair carriers with vertical steel pipe supports. Provide large diameter flush valve including angle control-stop valve, vacuum breaker, tail pieces, slip nuts, and wall plates; exposed to view components shall be chromium-plated or polished stainless steel. Flush valves shall be nonhold-open type. Mount flush valves not less than 11 inches above the fixture. Provide solenoid-activated flush valves including electrical-operated light-beam-sensor to energize the solenoid.

2.4.5 Wheelchair Flush Valve Type Urinals

ASME A112.19.2/CSA B45.1, 304 stainless steel type with satin finish wall-mounted, wall outlet, 20 inches long from wall to front of flare, and ASME A112.19.5 trim. Provide large diaphragm (not less than 2.625 inches upper chamber inside diameter at the point where the diaphragm is sealed between the upper and lower chambers), nonhold-open flush valve of chrome plated cast brass conforming to ASTM B 584, including vacuum breaker and angle (control-stop) valve with back check. The water

flushing volume of the flush valve and urinal combination shall not exceed 0.125 gallon per flush. Furnish urinal manufacturer's certification of conformance. Provide ASME A112.6.1M concealed chair carriers. Mount urinal with front rim a maximum of 17 inches above floor and flush valve handle a maximum of 44 inches above floor for use by handicapped on wheelchair. Provide solenoid-activated flush valves including electrical-operated light-beam-sensor to energize the solenoid.

2.4.6 Institutional Wall Hung Lavatories

ASME A112.19.3/CSA B45.4 304 stainless steel with satin finish straight front dual-basin-ADA compliant. Internal basin shall be round with minimum dimensions of 15 inches in diameter and 5 inches in depth. Provide aerator with faucet. Provide sensor operated stainless steel tubular faucet with flow control of 0.5 gpm. Provide ASME A112.6.1M concealed chair carriers with vertical steel pipe supports and concealed arms for the lavatory. Mount lavatory with the front rim 34 inches above floor and with 29 inches minimum clearance from bottom of the front rim to floor. Provide top mounted washerless centerset lavatory faucets. Provide push button self closing metering valve.

2.4.9 Wheelchair Drinking Water fountain

AHRI 1010, ASME A112.6.1M Model 3500 superior-duty "Hi-Lo" barrier-free vandal-resistant pedestal drinking fountain shall include a 12 gauge Type 304 Stainless Steel pedestal with integral 3/8" (.95 cm) thick cast stainless steel basins, all powder-coated green, push-button operated stainless steel valves with front-accessible cartridge and flow adjustment, 100% lead free waterways, polished chrome-plated brass vandal-resistant bubbler heads, polished chrome-plated brass vandal-resistant waste strainers with top-down clean-out access, large access door with heavy duty hinges and square key locks, vandal-resistant bottom plate, integral mounting plate, and 1-1/2" slip waste. Provide concealed chair carrier, air-cooled condensing unit, 4.75 gph minimum capacity, stainless steel splash receptor, and all stainless steel cabinet, with 27 inch minimum knee clearance from front bottom of unit to floor and 36 inch maximum spout height above floor. Bubblers shall also be controlled by push levers, by push bars, or touch pads one on each side or one on front and both sides of the cabinet.

2.6 DRAINS

2.6.1 Floor Drains

Floor drains shall consist of a galvanized body, integral seepage pan, and adjustable perforated or slotted chromium-plated bronze, nickel-bronze, or nickel-brass strainer, consisting of grate and threaded collar. Floor drains shall be cast iron except where metallic waterproofing membrane is installed. Drains shall be of double drainage pattern for embedding in the floor construction. The seepage pan shall have weep holes or channels for drainage to the drainpipe. The strainer shall be adjustable to floor thickness. A clamping device for attaching flashing or waterproofing membrane to the seepage pan without damaging the flashing or waterproofing membrane shall be provided when required. Drains shall be provided with threaded connection. Between the drain outlet and waste pipe, a neoprene rubber gasket conforming to ASTM C 564 may be installed, provided that the drain is specifically designed for the rubber gasket compression type joint. Floor and shower drains shall conform to ASME A112.6.3. Provide drain with trap primer connection, trap primer, and connection piping. Primer shall meet ASSE 1018.

2.7 TRAPS

Unless otherwise specified, traps shall be plastic per ASTM F 409 or copper-alloy adjustable tube

type with slip joint inlet and swivel. Traps shall be with a cleanout. Provide traps with removable access panels for easy clean-out at sinks and lavatories. Tubes shall be copper alloy with walls not less than 0.032 inch thick within commercial tolerances, except on the outside of bends where the thickness may be reduced slightly in manufacture by usual commercial methods. Inlets shall have rubber washer and copper alloy nuts for slip joints above the discharge level. Swivel joints shall be below the discharge level and shall be of metal-to-metal or metal-to-plastic type as required for the application. Nuts shall have flats for wrench grip. Outlets shall have internal pipe thread, except that when required for the application, the outlets shall have sockets for solder-joint connections. The depth of the water seal shall be not less than 2 inches. The interior diameter shall be not more than 1/8 inch over or under the nominal size, and interior surfaces shall be reasonably smooth throughout. A copper alloy "P" trap assembly consisting of an adjustable "P" trap and threaded trap wall nipple with cast brass wall flange shall be provided for lavatories. The assembly shall be a standard manufactured unit and may have a rubber-gasketed swivel joint.

2.9 MISCELLANEOUS PIPING ITEMS

2.9.2 Pipe Sleeves

Provide where piping passes entirely through walls, ceilings, roofs, and floors. Sleeves are not required where drain, waste, and vent (DWV) piping passes through concrete floor slabs located on grade, except where penetrating a membrane waterproof floor.

2.9.2.1 Sleeves in Masonry and Concrete

Provide steel pipe sleeves or schedule 40 PVC plastic pipe sleeves. Sleeves are not required where drain, waste, and vent (DWV) piping passes through concrete floor slabs located on grade. Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in the core-drilled hole are completely grouted smooth.

2.9.2.2 Sleeves Not in Masonry and Concrete

Provide 26 gage galvanized steel sheet or PVC plastic pipe sleeves.

2.9.3 Pipe Hangers (Supports)

Provide MSS SP-58 and MSS SP-69, Type 1 with adjustable type steel support rods, except as specified or indicated otherwise. Attach to steel joists with Type 19 or 23 clamps and retaining straps. Attach to Steel W or S beams with Type 21, 28, 29, or 30 clamps. Attach to steel angles and vertical web steel channels with Type 20 clamp with beam clamp channel adapter. Attach to horizontal web steel channel and wood with drilled hole on centerline and double nut and washer. Attach to concrete with Type 18 insert or drilled expansion anchor. Provide Type 40 insulation protection shield for insulated piping.

2.9.4 Nameplates

Provide 0.125 inch thick melamine laminated plastic nameplates, black matte finish with white center core, for equipment, gages, thermometers, and valves; valves in supplies to faucets will not require nameplates. Accurately align lettering and engrave minimum of 0.25 inch high normal block lettering into the white core. Minimum size of nameplates shall be 1.0 by 2.5 inches. Key

nameplates to a chart and schedule for each system. Frame charts and schedules under glass and place where directed near each system. Furnish two copies of each chart and schedule.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

Installation of plastic pipe where in compliance with NFPA may be installed in accordance with PFFA-01. The plumbing system shall be installed complete with necessary fixtures, fittings, traps, valves, and accessories.

Water and drainage piping shall be extended 5 feet outside the building, unless otherwise indicated. A gate valve and drain shall be installed on the water service line inside the building approximately 6 inches above the floor from point of entry. Piping shall be connected to the exterior service lines or capped or plugged if the exterior service is not in place. Sewer and water pipes shall be laid in separate trenches, except when otherwise shown. Exterior underground utilities shall be at least 12 inches below the finish grade or as indicated on the drawings. If trenches are closed or the pipes are otherwise covered before being connected to the service lines, the location of the end of each plumbing utility shall be marked with a stake or other acceptable means. Valves shall be installed with control no lower than the valve body.

3.1.1 Water Pipe, Fittings, and Connections

3.1.1.1 Utilities

The piping shall be extended to fixtures, outlets, and equipment. The cold-water piping system shall be arranged and installed to permit draining. The supply line to each item of equipment or fixture, except faucets, flush valves, or other control valves which are supplied with integral stops, shall be equipped with a shutoff valve to enable isolation of the item for repair and maintenance without interfering with operation of other equipment or fixtures. Supply piping to fixtures, faucets, hydrants, shower heads, and flushing devices shall be anchored to prevent movement.

3.1.1.2 Cutting and Repairing

The work shall be carefully laid out in advance, and unnecessary cutting of construction shall be avoided. Damage to building, piping, wiring, or equipment as a result of cutting shall be repaired by mechanics skilled in the trade involved.

3.1.1.3 Protection of Fixtures, Materials, and Equipment

Pipe openings shall be closed with caps or plugs during installation. Fixtures and equipment shall be tightly covered and protected against dirt, water, chemicals, and mechanical injury. Upon completion of the work, the fixtures, materials, and equipment shall be thoroughly cleaned, adjusted, and operated. Safety guards shall be provided for exposed rotating equipment.

3.1.1.4 Mains, Branches, and Runouts

Piping shall be installed as indicated. Pipe shall be accurately cut and worked into place without springing or forcing. Structural portions of the building shall not be weakened. Aboveground piping

shall run parallel with the lines of the building, unless otherwise indicated. Branch pipes from service lines may be taken from top, bottom, or side of main, using crossover fittings required by structural or installation conditions.

Supply pipes, valves, and fittings shall be kept a sufficient distance from other work and other services to permit not less than 1/2 inch between finished covering on the different services. Bare and insulated water lines shall not bear directly against building structural elements so as to transmit sound to the structure or to prevent flexible movement of the lines. Water pipe shall not be buried in or under floors unless specifically indicated or approved. Changes in pipe sizes shall be made with reducing fittings. Use of bushings will not be permitted except for use in situations in which standard factory fabricated components are furnished to accommodate specific accepted installation practice. Change in direction shall be made with fittings, except that bending of pipe 4 inches and smaller will be permitted, provided a pipe bender is used and wide sweep bends are formed. The center-line radius of bends shall be not less than six diameters of the pipe. Bent pipe showing kinks, wrinkles, flattening, or other malformations will not be acceptable.

3.1.1.5 Pipe Drains

Pipe drains indicated shall consist of 3/4 inch hose bibb with renewable seat and gate valve ahead of hose bibb. At other low points, 3/4 inch brass plugs or caps shall be provided. Disconnection of the supply piping at the fixture is an acceptable drain.

3.1.1.6 Thrust Restraint

Plugs, caps, tees, valves and bends deflecting 11.25 degrees or more, either vertically or horizontally, in waterlines 4 inches in diameter or larger shall be provided with thrust blocks, where indicated, to prevent movement. Thrust blocking shall be concrete of a mix not leaner than: 1 cement, 2-1/2 sand, 5 gravel; and having a compressive strength of not less than 2000 psi after 28 days. Blocking shall be placed between solid ground and the fitting to be anchored. Unless otherwise indicated or directed, the base and thrust bearing sides of the thrust block shall be poured against undisturbed earth. The side of the thrust block not subject to thrust shall be poured against forms. The area of bearing will be as shown. Blocking shall be placed so that the joints of the fitting are accessible for repair. Steel rods and clamps, protected by galvanizing or by coating with bituminous paint, shall be used to anchor vertical down bends into gravity thrust blocks.

3.1.1.7 Water Hammer Arresters

Commercial-type water hammer arresters shall be provided on hot- and cold-water supplies and shall be located as generally indicated, with precise location and sizing to be in accordance with PDI WH 201. Water hammer arresters, where concealed, shall be accessible by means of access doors or removable panels. Commercial-type water hammer arresters shall conform to ASSE 1010. Vertical capped pipe columns will not be permitted.

3.1.2 Joints

Installation of pipe and fittings shall be made in accordance with the manufacturer's recommendations. Mitering of joints for elbows and notching of straight runs of pipe for tees will not be permitted. Joints shall be made up with fittings of compatible

material and made for the specific purpose intended.

3.1.2.1 Threaded

Threaded joints shall have American Standard taper pipe threads conforming to ASME B1.20.1. Only male pipe threads shall be coated with graphite or with an approved graphite compound, or with an inert filler and oil, or shall have a polytetrafluoroethylene tape applied.

3.1.2.2 Mechanical Couplings

Mechanical couplings may be used in conjunction with grooved pipe for aboveground, ferrous or non-ferrous, domestic hot and cold water systems, in lieu of unions, brazed, soldered, welded, flanged, or threaded joints.

Mechanical couplings are permitted in accessible locations including behind access plates. Flexible grooved joints will not be permitted, except as vibration isolators adjacent to mechanical equipment. Rigid grooved joints shall incorporate an angle bolt pad design which maintains metal-to-metal contact with equal amount of pad offset of housings upon installation to ensure positive rigid clamping of the pipe.

Designs which can only clamp on the bottom of the groove or which utilize gripping teeth or jaws, or which use misaligned housing bolt holes, or which require a torque wrench or torque specifications will not be permitted.

Rigid grooved pipe couplings shall be for use with grooved end pipes, fittings, valves and strainers. Rigid couplings shall be designed for not less than 125 psi service and appropriate for static head plus the pumping head, and shall provide a watertight joint.

Grooved fittings and couplings, and grooving tools shall be provided from the same manufacturer. Segmentally welded elbows shall not be used. Grooves shall be prepared in accordance with the coupling manufacturer's latest published standards. Grooving shall be performed by qualified grooving operators having demonstrated proper grooving procedures in accordance with the tool manufacturer's recommendations.

The Engineer shall be notified 24 hours in advance of test to demonstrate operator's capability, and the test shall be performed at the work site, if practical, or at a site agreed upon. The operator shall demonstrate the ability to properly adjust the grooving tool, groove the pipe, and to verify the groove dimensions in accordance with the coupling manufacturer's specifications.

3.1.2.3 Unions and Flanges

Unions, flanges and mechanical couplings shall not be concealed in walls, ceilings, or partitions. Unions shall be used on pipe sizes 2-1/2 inches and smaller; flanges shall be used on pipe sizes 3 inches and larger.

3.1.2.4 Cast Iron Soil, Waste and Vent Pipe

Bell and spigot compression and hubless gasketed clamp joints for soil, waste and vent piping shall be installed per the manufacturer's recommendations.

3.1.2.5 Copper Tube and Pipe

- a. Brazed. Brazed joints shall be made in conformance with AWS B2.2/B2.2M, MSS SP-73, and CDA A4015 with flux and are acceptable for all pipe sizes. Copper to copper joints shall include the use of copper-phosphorus or copper-phosphorus-silver brazing metal without flux. Brazing of dissimilar metals (copper to bronze or brass) shall include the use of flux with either a copper-phosphorus, copper-phosphorus-silver or a silver brazing filler metal.
- b. Soldered. Soldered joints shall be made with flux and are only acceptable for piping 2 inches and smaller. Soldered joints shall conform to ASME B31.5 and CDA A4015. Soldered joints shall not be used in compressed air piping between the air compressor and the receiver.
- c. Copper Tube Extracted Joint. Mechanically extracted joints shall be made in accordance with ICC IPC.
- d. Press connection. Copper press connections shall be made in **strict** accordance with the manufacturer's installation instructions for manufactured rated size. The joints shall be pressed using the tool(s) approved by the manufacturer **of that joint**. Minimum distance between fittings shall be in accordance with the manufacturer's requirements.

3.1.2.6 Plastic Pipe

Acrylonitrile-Butadiene-Styrene (ABS) pipe shall have joints made with solvent cement. PVC and CPVC pipe shall have joints made with solvent cement elastomeric, threading, (threading of Schedule 80 Pipe is allowed only where required for disconnection and inspection; threading of Schedule 40 Pipe is not allowed), or mated flanged.

3.1.2.7 Corrosive Waste Plastic Pipe

Joints for polyolefin pipe and fittings shall be made by mechanical joint or electrical fusion coil method in accordance with ASTM D 2657 and ASTM F 1290. Joints for filament-wound reinforced thermosetting resin pipe shall be made in accordance with manufacturer's instructions. Unions or flanges shall be used where required for disconnection and inspection.

3.1.2.8 Polypropylene Pipe

Joints for polypropylene pipe and fittings shall be made by heat fusion welding socket-type or butt-fusion type fittings and shall comply with ASTM F 2389.

3.1.3 Dissimilar Pipe Materials

Connections between ferrous and non-ferrous copper water pipe shall be made with dielectric unions or flange waterways. Dielectric waterways shall have temperature and pressure rating equal to or greater than that specified for the connecting piping. Waterways shall have metal connections on both ends suited to match connecting piping. Dielectric waterways shall be internally lined with an insulator specifically designed to prevent current flow between dissimilar metals. Dielectric flanges shall meet the performance requirements described herein for dielectric waterways. Connecting joints between plastic and metallic pipe shall be made with transition fitting for the specific purpose.

3.1.4 Corrosion Protection for Buried Pipe and Fittings

Ductile iron, cast iron, and steel pipe, fittings, and joints shall have a protective coating.

Additionally, ductile iron, cast iron, and steel pressure pipe shall have a cathodic protection system and joint bonding. Coatings shall be selected, applied, and inspected in accordance with NACE SP0169 and as otherwise specified. The pipe shall be cleaned and the coating system applied prior to pipe tightness testing. Joints and fittings shall be cleaned and the coating system applied after pipe tightness testing. For tape coating systems, the tape shall conform to AWWA C203 and shall be applied with a 50 percent overlap. Primer utilized with tape type coating systems shall be as recommended by the tape manufacturer.

3.1.5 Pipe Sleeves and Flashing

Pipe sleeves shall be furnished and set in their proper and permanent location.

3.1.5.1 Sleeve Requirements

Unless indicated otherwise, provide pipe sleeves meeting the following requirements:

Secure sleeves in position and location during construction. Provide sleeves of sufficient length to pass through entire thickness of walls, ceilings, roofs, and floors. A modular mechanical type sealing assembly may be installed in lieu of a waterproofing clamping flange and caulking and sealing of annular space between pipe and sleeve. The seals shall consist of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and sleeve using galvanized steel bolts, nuts, and pressure plates. The links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and each nut. After the seal assembly is properly positioned in the sleeve, tightening of the bolt shall cause the rubber sealing elements to expand and provide a watertight seal between the pipe and the sleeve. Each seal assembly shall be sized as recommended by the manufacturer to fit the pipe and sleeve involved.

Sleeves shall not be installed in structural members, except where indicated or approved. Rectangular and square openings shall be as detailed. Each sleeve shall extend through its respective floor, or roof, and shall be cut flush with each surface, except for special circumstances. Pipe sleeves passing through floors in wet areas such as mechanical equipment rooms, lavatories, kitchens, and other plumbing fixture areas shall extend a minimum of 4 inches above the finished floor.

Unless otherwise indicated, sleeves shall be of a size to provide a minimum of one inch clearance between bare pipe or insulation and inside of sleeve or between insulation and inside of sleeve. Sleeves in bearing walls and concrete slab on grade floors shall be steel pipe or cast-iron pipe. Sleeves in nonbearing walls or ceilings may be steel pipe, cast-iron pipe, galvanized sheet metal with lock-type longitudinal seam, or plastic.

Except as otherwise specified, the annular space between pipe and sleeve, or between jacket over insulation and sleeve, shall be sealed as indicated with sealants conforming to ASTM C 920 and with a primer, backstop material and surface preparation. The annular space between pipe and sleeve, between bare insulation and sleeve or between jacket over insulation and sleeve shall not be sealed for interior walls which are not designated as fire rated.

Sleeves through below-grade walls in contact with earth shall be recessed 1/2 inch from wall surfaces on both sides. Annular space between pipe and sleeve shall be filled with backing material and sealants in the joint between the pipe and wall as specified above. Sealant selected for the earth side of the wall shall be compatible with dampproofing/waterproofing materials that are to be applied over the joint sealant.

3.1.5.2 Flashing Requirements

Pipes passing through roof shall be installed through a 16 ounce copper flashing, each within an integral skirt or flange. Flashing shall be suitably formed, and the skirt or flange shall extend not less than 8 inches from the pipe and shall be set over the roof or floor membrane in a solid coating of bituminous cement. The flashing shall extend up the pipe a minimum of 10 inches. For cleanouts, the flashing shall be turned down into the hub and caulked after placing the ferrule. Pipes passing through pitched roofs shall be flashed, using lead

or copper flashing, with an adjustable integral flange of adequate size to extend not less than 8 inches from the pipe in all directions and lapped into the roofing to provide a watertight seal. The annular space between the flashing and the bare pipe or between the flashing and the metal-jacket-covered insulation shall be sealed as indicated. Flashing for dry vents shall be turned down into the pipe to form a waterproof joint. Pipes, up to and including 10 inches in diameter, passing through roof or floor waterproofing membrane may be installed through a cast-iron sleeve with caulking recess, anchor lugs, flashing-clamp device, and pressure ring with brass bolts. Flashing shield shall be fitted into the sleeve clamping device. Pipes passing through wall waterproofing membrane shall be sleeved as described above. A waterproofing clamping flange shall be installed.

3.1.5.3 Waterproofing

Waterproofing at floor-mounted water closets shall be accomplished by forming a flashing guard from soft-tempered sheet copper. The center of the sheet shall be perforated and turned down approximately 1-1/2 inches to fit between the outside diameter of the drainpipe and the inside diameter of the cast-iron or steel pipe sleeve. The turned-down portion of the flashing guard shall be embedded in sealant to a depth of approximately 1-1/2 inches; then the sealant shall be finished off flush to floor level between the flashing guard and drainpipe. The flashing guard of sheet copper shall extend not less than 8 inches from the drainpipe and shall be lapped between the floor membrane in a solid coating of bituminous cement. If cast-iron water closet floor flanges are used, the space between the pipe sleeve and drainpipe shall be sealed with sealant and the flashing guard shall be upturned approximately 1-1/2 inches to fit the outside diameter of the drainpipe and the inside diameter of the water closet floor flange. The upturned portion of the sheet fitted into the floor flange shall be sealed.

3.1.5.4 Optional Counterflashing

Instead of turning the flashing down into a dry vent pipe, or caulking and sealing the annular space between the pipe and flashing or metal-jacket-covered insulation and flashing, counterflashing may be accomplished by utilizing the following:

- a. A standard roof coupling for threaded pipe up to 6 inches in diameter.
- b. A tack-welded or banded-metal rain shield around the pipe.

3.1.5.5 Pipe Penetrations of Slab on Grade Floors

Where pipes, fixture drains, floor drains, cleanouts or similar items penetrate slab on grade floors, except at penetrations of floors with waterproofing membrane as specified in paragraphs Flashing Requirements and Waterproofing, a groove 1/4 to 1/2 inch wide by 1/4 to 3/8 inch deep shall be

formed around the pipe, fitting or drain. The groove shall be filled with a sealant.

3.1.5.6 Pipe Penetrations

Provide sealants for all pipe penetrations. All pipe penetrations shall be sealed to prevent infiltration of air, insects, and vermin.

3.1.7 Supports

3.1.7.1 General

Hangers used to support piping 2 inches and larger shall be fabricated to permit adequate adjustment after erection while still supporting the load. Pipe guides and anchors shall be installed to keep pipes in accurate alignment, to direct the expansion movement, and to prevent buckling, swaying, and undue strain. Piping subjected to vertical movement when operating temperatures exceed ambient temperatures shall be supported by variable spring hangers and supports or by constant support hangers. In the support of multiple pipe runs on a common base member, a clip or clamp shall be used where each pipe crosses the base support member. Spacing of the base support members shall not exceed the hanger and support spacing required for an individual pipe in the multiple pipe run. Threaded sections of rods shall not be formed or bent.

3.1.7.2 Pipe Supports and Structural Bracing, Seismic Requirements

Piping and attached valves shall be supported and braced to resist seismic loads. Structural steel required for reinforcement to properly support piping, headers, and equipment, but not shown, shall be provided.

3.1.7.3 Pipe Hangers, Inserts, and Supports

Installation of pipe hangers, inserts and supports shall conform to MSS SP-58 and MSS SP-69, except as modified herein.

- a. Types 5, 12, and 26 shall not be used.
- b. Type 3 shall not be used on insulated pipe.
- c. Type 18 inserts shall be secured to concrete forms before concrete is placed. Continuous inserts which allow more adjustment may be used if they otherwise meet the requirements for type 18 inserts.
- d. Type 19 and 23 C-clamps shall be torqued per MSS SP-69 and shall have both locknuts and retaining devices furnished by the manufacturer.

Field-fabricated C-clamp bodies or retaining devices are not acceptable.

- e. Type 20 attachments used on angles and channels shall be furnished with an added malleable-iron heel plate or adapter.
- f. Type 24 may be used only on trapeze hanger systems or on fabricated frames.

- g. Type 39 saddles shall be used on insulated pipe 4 inches and larger when the temperature of the medium is 60 degrees F or higher. Type 39 saddles shall be welded to the pipe.
- h. Type 40 shields shall:
 - (1) Be used on insulated pipe less than 4 inches.
 - (2) Be used on insulated pipe 4 inches and larger when the temperature of the medium is 60 degrees F or less.
 - (3) Have a high density insert for all pipe sizes. High density inserts shall have a density of 8 pcf or greater.
- i. Horizontal pipe supports shall be spaced as specified in MSS SP-69 and a support shall be installed not over 1 foot from the pipe fitting joint at each change in direction of the piping. Pipe supports shall be spaced not over 5 feet apart at valves. Operating temperatures in determining hanger spacing for PVC or CPVC pipe shall be 120 degrees F for PVC and 180 degrees F for CPVC. Horizontal pipe runs shall include allowances for expansion and contraction.
- j. Vertical pipe shall be supported at each floor, except at slab-on-grade, at intervals of not more than 15 feet nor more than 8 feet from end of risers, and at vent terminations. Vertical pipe risers shall include allowances for expansion and contraction.
- k. Type 35 guides using steel, reinforced polytetrafluoroethylene (PTFE) or graphite slides shall be provided to allow longitudinal pipe movement. Slide materials shall be suitable for the system operating temperatures, atmospheric conditions, and bearing loads encountered. Lateral restraints shall be provided as needed. Where steel slides do not require provisions for lateral restraint the following may be used:
 - (1) On pipe 4 inches and larger when the temperature of the medium is 60 degrees F or higher, a Type 39 saddle, welded to the pipe, may freely rest on a steel plate.
 - (2) On pipe less than 4 inches a Type 40 shield, attached to the pipe or insulation, may freely rest on a steel plate.
 - (3) On pipe 4 inches and larger carrying medium less than 60 degrees F a Type 40 shield, attached to the pipe or insulation, may freely rest on a steel plate.
- l. Pipe hangers on horizontal insulated pipe shall be the size of the outside diameter of the insulation. The insulation shall be continuous through the hanger on all pipe sizes and applications.
- m. Where there are high system temperatures and welding to piping is not desirable, the type 35 guide shall include a pipe cradle, welded to the guide structure and strapped securely to the pipe. The pipe shall be separated from the slide material by at least 4 inches or by an amount adequate for the insulation, whichever is greater.
- n. Hangers and supports for plastic pipe shall not compress, distort, cut or abrade the piping, and shall allow free movement of pipe except where otherwise required in the control of

expansion/contraction.

3.1.7.4 Structural Attachments

Attachment to building structure concrete and masonry shall be by cast-in concrete inserts, built-in anchors, or masonry anchor devices. Inserts and anchors shall be applied with a safety factor not less than 5. Supports shall not be attached to metal decking. Supports shall not be attached to the underside of concrete filled floor or concrete roof decks unless approved by the Engineer. Masonry anchors for overhead applications shall be constructed of ferrous materials only.

3.2 FIXTURES AND FIXTURE TRIMMINGS

Polished chromium-plated pipe, valves, and fittings shall be provided where exposed to view. Angle stops, straight stops, stops integral with the faucets, or concealed type of lock-shield, and loose-key pattern stops for supplies with threaded, sweat or solvent weld inlets shall be furnished and installed with fixtures.

Where connections between copper tubing and faucets are made by rubber compression fittings, a beading tool shall be used to mechanically deform the tubing above the compression fitting. Exposed traps and supply pipes for fixtures and equipment shall be connected to the rough piping systems at the wall, unless otherwise specified under the item. Floor and wall escutcheons shall be as specified. Drain lines and hot water lines of fixtures for handicapped personnel shall be insulated and do not require polished chrome finish. Plumbing fixtures and accessories shall be installed within the space shown.

3.2.1 Fixture Connections

Where space limitations prohibit standard fittings in conjunction with the cast-iron floor flange, special short-radius fittings shall be provided. Connections between earthenware fixtures and flanges on soil pipe shall be made gastight and watertight with a closet-setting compound or neoprene gasket and seal. Use of natural rubber gaskets or putty will not be permitted. Fixtures with outlet flanges shall be set the proper distance from floor or wall to make a first-class joint with the closet-setting compound or gasket and fixture used.

3.2.2 Flushometer Valves

Flushometer valves shall be secured to prevent movement by anchoring the long finished top spud connecting tube to wall adjacent to valve with approved metal bracket. Flushometer valves for water closets shall be installed 39 inches above the floor, except at water closets intended for use by the physically handicapped where flushometer valves shall be mounted at approximately 30 inches above the floor and arranged to avoid interference with grab bars. In addition, for water closets intended for handicap use, the flush valve handle shall be installed on the wide side of the enclosure. Bumpers for water closet seats shall be installed on the wall.

3.2.3 Height of Fixture Rims Above Floor

Lavatories shall be mounted with rim 31 inches above finished floor. Wall-hung drinking fountains and water coolers shall be installed with rim 42 inches above floor. Wall-hung service sinks shall be mounted with rim 28 inches above the floor. Installation of fixtures for use by the physically handicapped shall be in accordance with ICC/ANSI A117.1.

3.2.4 Fixture Supports

Fixture supports for off-the-floor lavatories, urinals, water closets, and other fixtures of similar size, design, and use, shall be of the chair-carrier type. The carrier shall provide the necessary means of mounting the fixture, with a foot or feet to anchor the assembly to the floor slab. Adjustability shall be provided to locate the fixture at the desired height and in proper relation to the wall.

Support plates, in lieu of chair carrier, shall be fastened to the wall structure only where it is not possible to anchor a floor-mounted chair carrier to the floor slab.

3.2.4.2 Support for Concrete-Masonry Wall Construction

Chair carrier shall be anchored to floor slab. Where a floor-anchored chair carrier cannot be used, a suitable wall plate shall be fastened to the concrete wall using through bolts and a back-up plate.

3.2.4.3 Support for Steel Stud Frame Partitions

Chair carrier shall be used. The anchor feet and tubular uprights shall be of the heavy duty design; and feet (bases) shall be steel and welded to a square or rectangular steel tube upright. Wall plates, in lieu of floor-anchored chair carriers, shall be used only if adjoining steel partition studs are suitably reinforced to support a wall plate bolted to these studs.

3.2.5 Backflow Prevention Devices

Plumbing fixtures, equipment, and pipe connections shall not cross connect or interconnect between a potable water supply and any source of nonpotable water. Backflow preventers shall be installed where indicated and in accordance with ICC IPC or IAPMO UPC at all other locations necessary to preclude a cross-connect or interconnect between a potable water supply and any nonpotable substance. In addition backflow preventers shall be installed at all locations where the potable water outlet is below the flood level of the equipment, or where the potable water outlet will be located below the level of the nonpotable substance. Backflow preventers shall be located so that no part of the device will be submerged. Backflow preventers shall be of sufficient size to allow unrestricted flow of water to the equipment, and preclude the backflow of any nonpotable substance into the potable water system. Bypass piping shall not be provided around backflow preventers. Access shall be provided for maintenance and testing. Each device shall be a standard commercial unit.

3.2.6 Access Panels

Access panels shall be provided for concealed valves and controls, or any item requiring inspection or maintenance. Access panels shall be of sufficient size and located so that the concealed items may be serviced, maintained, or replaced.

3.2.8 Traps

Each trap shall be placed as near the fixture as possible, and no fixture shall be double-trapped. Traps installed on cast-iron soil pipe shall be cast iron. Traps installed on steel pipe or copper tubing shall be recess-drainage pattern, or brass-tube type. Traps installed on plastic pipe may be plastic conforming to ASTM D 3311. Traps for acid-resisting waste shall be of the same material as the pipe.

3.3 IDENTIFICATION SYSTEMS

3.3.1 Identification Tags

Identification tags made of brass, engraved laminated plastic, or engraved anodized aluminum, indicating service and valve number shall be installed on valves, except those valves installed on supplies at plumbing fixtures. Tags shall be 1-3/8 inch minimum diameter, and marking shall be stamped or engraved. Indentations shall be black, for reading clarity. Tags shall be attached to valves with No. 12 AWG, copper wire, chrome-plated beaded chain, or plastic straps designed for that purpose.

3.4 ESCUTCHEONS

Escutcheons shall be provided at finished surfaces where bare or insulated piping, exposed to view, passes through floors, walls, or ceilings, except in boiler, utility, or equipment rooms. Escutcheons shall be fastened securely to pipe or pipe covering and shall be satin-finish, corrosion-resisting steel, polished chromium-plated zinc alloy, or polished chromium-plated copper alloy. Escutcheons shall be either one-piece or split-pattern, held in place by internal spring tension or setscrew.

3.5 TESTS, FLUSHING AND DISINFECTION

3.5.1 Plumbing System

The following tests shall be performed on the plumbing system in accordance with ICC IPC or IAPMO UPC, except that the drainage and vent system final test shall include the smoke test. The Contractor has the option to perform a peppermint test in lieu of the smoke test. If a peppermint test is chosen, the Contractor must submit a testing procedure to the Engineer for approval.

- a. Drainage and Vent Systems Test. The final test shall include a smoke test.
- b. Building Sewers Tests.
- c. Water Supply Systems Tests.

3.5.1.1 Test of Backflow Prevention Assemblies

Backflow prevention assembly shall be tested using gauges specifically designed for the testing of backflow prevention assemblies.

Backflow prevention assembly test gauges shall be tested annually for accuracy in accordance with the requirements of State or local regulatory agencies. If there is no State or local regulatory agency requirements, gauges shall be tested annually for accuracy in accordance with the requirements of University of Southern California's Foundation of Cross Connection Control and Hydraulic Research or the American Water Works Association Manual of Cross Connection (Manual M-14), or any other approved testing laboratory having equivalent capabilities for both laboratory and field evaluation of backflow prevention assembly test gauges. Report form for each assembly shall include, as a minimum, the following:

Data on Device

Data on Testing Firm

Type of Assembly

Name

Manufacturer	Address
Model Number	Certified Tester
Serial Number	Certified Tester No.
Size	Date of Test
Location	
Test Pressure Readings	Serial Number and Test Data of Gauges

If the unit fails to meet specified requirements, the unit shall be repaired and retested.

3.5.2 Defective Work

If inspection or test shows defects, such defective work or material shall be replaced or repaired as necessary and inspection and tests shall be repeated. Repairs to piping shall be made with new materials. Caulking of screwed joints or holes will not be acceptable.

3.5.3 System Flushing

3.5.3.1 During Flushing

Before operational tests or disinfection, potable water piping system shall be flushed with [hot] potable water. Sufficient water shall be used to produce a water velocity that is capable of entraining and removing debris in all portions of the piping system. This requires simultaneous operation of all fixtures on a common branch or main in order to produce a flushing velocity of approximately 4 fps through all portions of the piping system. In the event that this is impossible due to size of system, the Contracting Officer (or the designated representative) shall specify the number of fixtures to be operated during flushing. Contractor shall provide adequate personnel to monitor the flushing operation and to ensure that drain lines are unobstructed in order to prevent flooding of the facility. Contractor shall be responsible for any flood damage resulting from flushing of the system. Flushing shall be continued until entrained dirt and other foreign materials have been removed and until discharge water shows no discoloration. All faucets and drinking water fountains, to include any device considered as an end point device by NSF/ANSI 61, Section 9, shall be flushed a minimum of 1 L 0.25 gallons per 24 hour period, ten times over a 14 day period.

3.5.3.2 After Flushing

System shall be drained at low points. Strainer screens shall be removed, cleaned, and replaced. After flushing and cleaning, systems shall be prepared for testing by immediately filling water piping with clean, fresh potable water. Any stoppage, discoloration, or other damage to the finish, furnishings, or parts of the building due to the Contractor's failure to properly clean the piping system shall be repaired by the Contractor. When the system flushing is complete, the hot-water system shall be adjusted for uniform circulation. Flushing devices and automatic control systems shall be adjusted for proper operation according to manufacturer's instructions. Comply with ASHRAE 90.1 - SI ASHRAE 90.1 - IP for minimum efficiency requirements. Unless more stringent local requirements exist, lead levels shall not exceed limits established by 40 CFR 50.12 Part 141.80(c)(1). The water supply to the building shall be tested separately to ensure that any lead contamination found during potable water system testing is due to work being performed inside the building.

3.5.4 Operational Test

Upon completion of flushing and prior to disinfection procedures, the Contractor shall subject the plumbing system to operating tests to demonstrate satisfactory installation, connections, adjustments, and functional and operational efficiency. Such operating tests shall cover a period of not less than 8 hours for each system and shall include the following information in a report with conclusion as to the adequacy of the system:

- a. Time, date, and duration of test.
- b. Water pressures at the most remote and the highest fixtures.
- c. Operation of each fixture and fixture trim.
- d. Operation of each valve, hydrant, and faucet.
- e. Pump suction and discharge pressures.
- f. Temperature of each domestic hot-water supply.
- g. Operation of each floor and roof drain by flooding with water.
- h. Operation of each vacuum breaker and backflow preventer.
- i. Complete operation of each water pressure booster system, including pump start pressure and stop pressure.
- j. Compressed air readings at each compressor and at each outlet. Each indicating instrument shall be read at 1/2 hour intervals. The report of the test shall be submitted in quadruplicate. The Contractor shall furnish instruments, equipment, and personnel required for the tests; the Government will furnish the necessary water and electricity.

3.5.5 Disinfection

After all system components are provided and operational tests are complete, the entire domestic hot- and cold-water distribution system shall be disinfected. Before introducing disinfecting chlorination material, entire system shall be flushed with potable water until any entrained dirt and other foreign materials have been removed.

Water chlorination procedure shall be in accordance with AWWA C651 and AWWA C652 as modified. The chlorinating material shall be hypochlorites or liquid chlorine. The chlorinating material shall be fed into the water piping system at a constant rate at a concentration of at least 50 parts per million (ppm).

Test the chlorine residual level in the water at 6 hour intervals for a continuous period of 24 hours. If at the end of a 6 hour interval, the chlorine residual has dropped to less than 25 ppm, flush the piping including tanks with potable water, and repeat the above chlorination procedures. During the chlorination period, each valve and faucet shall be opened and closed several times.

After the second 24 hour period, verify that no less than 25 ppm chlorine residual

remains in the treated system. The 24 hour chlorination procedure must be repeated until no less than 25 ppm chlorine residual remains in the treated system.

Upon the specified verification, the system including tanks shall then be flushed with potable water until the residual chlorine level is reduced to less than one part per million. During the flushing period, each valve and faucet shall be opened and closed several times.

Take addition samples of water in disinfected containers, for bacterial examination, at locations specified by the Engineer Test these samples for total coliform organisms (coliform bacteria, fecal coliform, streptococcal, and other bacteria) in accordance with EPA SM 9223 or AWWA 10084. The testing method used shall be EPA approved for drinking water systems and shall comply with applicable local and state requirements.

Disinfection shall be repeated until bacterial tests indicate the absence of coliform organisms (zero mean coliform density per 100 milliliters) in the samples for at least 2 full days. The system will not be accepted until satisfactory bacteriological results have been obtained.

3.6 WASTE MANAGEMENT

Place materials defined as hazardous or toxic waste in designated containers. Return solvent and oil soaked rags for contaminant recovery and laundering or for proper disposal. Close and seal tightly partly used sealant and adhesive containers and store in protected, well-ventilated, fire-safe area at moderate temperature. Place used sealant and adhesive tubes and containers in areas designated for hazardous waste. Separate copper and ferrous pipe waste in accordance with the Waste Management Plan and place in designated areas for reuse.

3.7 POSTED INSTRUCTIONS

Framed instructions under glass or in laminated plastic, including wiring and control diagrams showing the complete layout of the entire system, shall be posted where directed. Condensed operating instructions explaining preventive maintenance procedures, methods of checking the system for normal safe operation, and procedures for safely starting and stopping the system shall be prepared in typed form, framed as specified above for the wiring and control diagrams and posted beside the diagrams. The framed instructions shall be posted before acceptance testing of the systems.

3.8 TABLES

TABLE I: PIPE AND FITTING MATERIALS FOR DRAINAGE, WASTE, AND VENT PIPING SYSTEMS							
Item #	Pipe and Fitting Materials	SERVICE					
		A	B	C	D	E	F
1	Cast iron soil pipe and fittings, hub and spigot, ASTM A 74 with compression gaskets. Pipe and fittings shall be marked with the CISPI trademark.	X	X	X	X	X	X

2	Cast iron soil pipe and fittings hubless, CISPI 301 and ASTM A 888. Pipe and fittings shall be marked with the CISPI trademark.		X	X	X	X	
3	Cast iron drainage fittings, threaded, ASME B16.12 for use with Item 10	X		X	X		
4	Cast iron screwed fittings (threaded) ASME B16.4 for use with Item 10				X	X	
5	Grooved pipe couplings, ferrous and non-ferrous pipe ASTM A 536 and ASTM A 47/A 47M	X	X		X	X	
6	Ductile iron grooved joint fittings for ferrous pipe ASTM A 536 and ASTM A 47/A 47M for use with Item 5	X	X		X	X	
7	Bronze sand casting grooved joint pressure fittings for non-ferrous pipe ASTM B 584, for use with Item 5	X	X		X	X	
8	Wrought copper grooved joint pressure fittings for non-ferrous pipe ASTM B 75M ASTM B 75 C12200, ASTM B 152/B 152M, C11000, ASME B16.22 ASME B16.22 for use with Item 5	X	X				
9	Malleable-iron threaded fittings, galvanized ASME B16.3 for use with Item 10				X	X	
10	Steel pipe, seamless galvanized, ASTM A 53/A 53M, Type S, Grade B	X			X	X	
11	Seamless red brass pipe, ASTM B 43		X	X			
12	Bronzed flanged fittings, ASME B16.24 for use with Items 11 and 14				X	X	
13	Cast copper alloy solder joint pressure fittings, ASME B16.18 for use with Item 14				X	X	

14	Seamless copper pipe, ASTM B 42				X		
15	Cast bronze threaded fittings, ASME B16.15				X	X	
16	Copper drainage tube, (DWV), ASTM B 306	X	X	X	X	X	
17	Wrought copper and wrought alloy solder-joint drainage fittings. ASME B16.29	X	X	X	X	X	
18	Cast copper alloy solder joint drainage fittings, DWV, ASME B16.23	X	X	X	X	X	
19	Acrylonitrile-Butadiene-Styrene (ABS) plastic drain, waste, and vent pipe and fittings ASTM D 2661, ASTM F 628	X	X	X	X	X	X
20	Polyvinyl Chloride plastic drain, waste and vent pipe and fittings, ASTM D 2665, ASTM F 891, (Sch 40) ASTM F 1760	X	X	X	X	X	X
21	Process glass pipe and fittings, ASTM C 1053						X
22	High-silicon content cast iron pipe and fittings (hub and spigot, and mechanical joint), ASTM A 518/A 518M		X			X	X
23	Polypropylene (PP) waste pipe and fittings, ASTM D 4101						X
24	Filament-wound reinforced thermosetting resin (RTRP) pipe, ASTM D 2996						X
	<p>SERVICE:</p> <p>A - Underground Building Soil, Waste and Storm Drain</p> <p>B - Aboveground Soil, Waste, Drain In Buildings</p> <p>C - Underground Vent</p> <p>D - Aboveground Vent</p> <p>E - Interior Rainwater Conductors Aboveground</p> <p>F - Corrosive Waste And Vent Above And Belowground</p>						

	* - Hard Temper
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TABLE II: PIPE AND FITTING MATERIALS FOR PRESSURE PIPING SYSTEMS					
Item #	Pipe and Fitting Materials	SERVICE			
		A	B	C	D
1	Malleable-iron threaded fittings,	X	X	X	X
	a. Galvanized, ASME B16.3 for use with Item 4a				
	b. Same as "a" but not galvanized for use with Item 4b			X	
2	Grooved pipe couplings, ferrous pipe ASTM A 536 and ASTM A 47/A 47M, non-ferrous pipe, ASTM A 536 and ASTM A 47/A 47M,	X	X	X	
3	Ductile iron grooved joint fittings for ferrous pipe ASTM A 536 and ASTM A 47/A 47M, for use with Item 2	X	X	X	
4	Steel pipe:	X	X	X	X
	a. Seamless, galvanized, ASTM A 53/A 53M, Type S, Grade				
	b. Seamless, black, ASTM A 53/A 53M, Type S, Grade B			X	
5	Seamless red brass pipe, ASTM B 43	X	X		X
6	Bronze flanged fittings, ASME B16.24 for use with Items 5 and 7	X	X		X
7	Seamless copper pipe, ASTM B 4	X	X		X
8	Seamless copper water tube, ASTM B 88, ASTM B 88M	X**	X**	X**	X***

9	Cast bronze threaded fittings, ASME B16.15 for use with Items 5 and 7	X	X		X
10	Wrought copper and bronze solder-joint pressure fittings, ASME B16.22 for use with Items 5, 7 and 8	X	X	X	X
11	Cast copper alloy solder-joint pressure fittings, ASME B16.18 for use with Item 8	X	X	X	X
12	Bronze and sand castings grooved joint pressure fittings for non-ferrous pipe ASTM B 584, for use with Item 2	X	X	X	
13	Polyethylene (PE) plastic pipe, Schedules 40 and 80, based on outside diameter ASTM D 2447	X			X
14	Polyethylene (PE) plastic pipe (SDR-PR), based on controlled outside diameter, ASTM D 3035	X			X
15	Polyethylene (PE) plastic pipe (SIDR-PR), based on controlled inside diameter, ASTM D 2239	X			X
16	Butt fusion polyethylene (PE) plastic pipe fittings, ASTM D 3261 for use with Items 14, 15, and 16	X			X
17	Socket-type polyethylene fittings for outside diameter-controlled polyethylene pipe, ASTM D 2683 for use with Item 15	X			X
18	Polyethylene (PE) plastic tubing, ASTM D 2737	X			X
19	Chlorinated polyvinyl chloride (CPVC) plastic hot and cold water distribution system, ASTM D 2846/D 2846M	X	X		X
20	Chlorinated polyvinyl chloride (CPVC) plastic pipe, Schedule 40 and 80, ASTM F 441/F 441M	X	X		X
21	Chlorinated polyvinyl chloride (CPVC) plastic pipe (SDR-	X	X		X

	PR) ASTM F 442/F 442M				
22	Threaded chlorinated polyvinyl chloride (chloride CPVC) plastic pipe fittings, Schedule 80, ASTM F 437, for use with Items 20, and 21	X	X		X
23	Socket-type chlorinated polyvinyl chloride (CPVC) plastic pipe fittings, Schedule 40, ASTM F 438 for use with Items 20, 21, and 22	X	X		X
24	Socket-type chlorinated polyvinyl chloride (CPVC) plastic pipe fittings Schedule 80, ASTM F 439 for use with Items 20, 21, and 22	X	X		X
25	Polyvinyl chloride (PVC) plastic pipe, Schedules 40, 80, and 120, ASTM D 1785	X			X
26	Polyvinyl chloride (PVC) pressure-rated pipe (SDR Series), ASTM D 2241	X			X
27	Polyvinyl chloride (PVC) plastic pipe fittings, Schedule 40, ASTM D 2466	X			X
28	Socket-type polyvinyl chloride (PVC) plastic pipe fittings, schedule 80, ASTM D 2467 for use with Items 26 and 27	X			X
29	Threaded polyvinyl chloride (PVC) plastic pipe fittings, schedule 80, ASTM D 2464	X			X
30	Joints for IPS PVC pipe using solvent cement, ASTM D 2672	X			X
31	Polypropylene (PP) plastic pipe and fittings; ASTM F 2389	X	X		X
32	Steel pipeline flanges, MSS SP-44	X	X		
33	Fittings: brass or bronze; ASME B16.15, and ASME B16.18	X	X		

	ASTM B 828				
34	Carbon steel pipe unions, socket-welding and threaded, MSS SP-83	X	X	X	
35	Malleable-iron threaded pipe unions ASME B16.39	X	X		
36	Nipples, pipe threaded ASTM A 733	X	X	X	
37	Crosslinked Polyethylene (PEX) Plastic Pipe ASTM F 877	X	X		X
38	Press Fittings	X	X		
	<p>A - Cold Water Service Aboveground</p> <p>B - Hot and Cold Water Distribution 82 degrees C 180 degrees F Maximum Aboveground</p> <p>C - Compressed Air Lubricated</p> <p>D - Cold Water Service Belowground</p> <p>Indicated types are minimum wall thicknesses.</p> <p>** - Type L – Hard</p> <p>*** - Type K - Hard temper with brazed joints only or type K-soft temper without joints in or under floors</p> <p>**** - In or under slab floors only brazed joints</p>				

END OF SECTION

SECTION 26 0500
GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.
- B. All Specification Sections under Division 26.

1.2 SUMMARY

- A. This Section includes:
 - 1. Definitions.
 - 2. Excavation.
 - 3. Coordination of work.
 - 4. Warranties.
 - 5. Field test.

1.3 REFERENCES

- A. American National Standards Institute, Inc. (ANSI) Publications:
 - 1. C2 - National Electrical Safety Code.
- B. California Code of Regulations (CCR) Publications:
 - 1. Title 8, Industrial Relations.
 - 2. Title 19, State Fire Marshal Regulations.
 - 3. Title 24, Part 2, Energy Conservation Standards.
 - 4. Title 24, Part 3, CCR, 2013 California Electrical Code.
 - 5. Title 24, Part 9, CCR, 2013 California Fire Code.
- C. National Electrical Manufacturers Association (NEMA) Publication: ICS6-93 Enclosures for Industrial Controls and Systems.
- D. National Fire Protection Association (NFPA) Publications:
 - 1. 70 National Electrical Code
 - 2. 70B Recommended Practice for Electrical Equipment Maintenance.
 - 3. NFPA 101 Life Safety Code.
- E. State of California Public Utilities Commission (Cal. P.U.C.) Publications:

1. G.O. 128 Rules for Construction of Underground Electrical Supply and Communications Systems.

1.4 DEFINITIONS

The following definitions apply to terms used in these standards.

- A. The words "work" or "electrical work" include products, labor, equipment, tools, appliances, transportation, and all related items directly or indirectly required to complete the specified and indicated electrical installation.
- B. The word "concealed" shall mean that the installation will not be visible when all permanent or removable elements of the construction are in place. The word "exposed" shall mean that the installation is visible when all permanent or removable elements of the construction are in place.
- C. The word "code" shall mean any and all regulations and requirements of regulatory bodies, public and private, having jurisdiction over the work involved.
- D. The word "product" used in Division 26 means all material, equipment, machinery, and/or appliances directly or indirectly required to complete the specified and/or indicated electrical work.
- E. The words "standard product" shall mean a manufactured product, illustrated and/or described in catalogs or brochures, which is in general distribution prior to the date of issue of construction documents. Products will generally be identified by means of a specific catalog number and manufacturer's name.
- F. "Provide" means furnish, install, connect and test unless otherwise noted.
- G. The words "conduit" and "duct" are used interchangeably, and have the same meaning.
- H. "UFER" Ground: See Section 260526, "Grounding and Bonding".

1.5 DRAWINGS AND SPECIFICATIONS

- A. Electrical drawings are diagrammatic but shall be followed as closely as actual construction and work of the other sections shall permit. Size and location of equipment is drawn to scale wherever possible.
- B. Drawings and specifications are for the assistance and guidance of the Contractor. Exact locations, distances, and levels will be governed by the site. The Contractor shall make use of data in all the contract documents to verify information at the building site.
- C. In any case where there appears to be a conflict or ambiguity between that which is shown on the electrical drawings or in the electrical specifications and any other part of the Contract Documents, the Contractor shall notify and secure directions from the Engineer.
- D. Drawings and specifications are intended to complement each other. Where a conflict or ambiguity exists between the requirements of the drawings and the specifications, request clarification. Do not proceed with work without direction.
- E. The Engineer shall interpret the drawings and the specifications. The interpretation by the Engineer as to the true intent and meaning thereof and the quality, quantity, and sufficiency of the materials and workmanship furnished thereunder shall be accepted as final and conclusive.

- F. In the case of conflicts or ambiguities not clarified prior to the bidding deadline, use the most costly alternative (better quality, greater quantity, and larger size) in preparing the bid. A clarification will be issued to the successful bidder as soon as feasible after the award and, if appropriate, a deductive change order will be issued.
- G. Where items are specified in the singular, this division shall provide the quantity as shown on drawings plus any spares or extras indicated on the drawings or in the specifications.
- H. Record Drawings:
 - 1. On one (1) set of contract drawings, kept at the site during construction, mark all work that is installed differently from that shown on plans, including revised circuitry, material or equipment. Sufficient dimensions shall be provided to locate all materials installed beneath and outside the building including, but not limited to, underground conduits, cabling, ground rods, and stubouts.
 - 2. All changes or revisions to the contract drawings including, but not limited to, those indicate by amendment, change order, field order, written response to RFI/RFC or other contractual means shall be kept current as the work progresses and shall be incorporated onto the final record drawings.
 - 3. Accurately locate and dimension all underground and embedded conduit runs on the record drawings.
 - 4. The marked drawings shall be kept current as the work progresses and shall be available for inspection upon request. At the close of construction, prepare a set of accurate reproducible record drawings and turn them over to the Engineer. The correct and completed record drawings are a prerequisite to final contract payment.
 - a. As part of the reproducible record drawings, the Contractor shall produce full size reproducible drawings with the final panelboard schedules as modified during construction and final light fixture schedule as modified during construction.
 - b. These drawings shall be on Engineering base sheets and numerically sequenced to follow the last "E" sheet.

1.6 EXAMINATION OF SITE

- A. Examination of the building site shall be made by the Contractor. The Contractor shall compare it with the drawings and specification to satisfy himself as to the conditions under which work is to be performed. The Contractor shall, at such time, ascertain and check the locations of existing structures or equipment which may affect his work.

1.7 EXCAVATION

- A. Prior to starting excavation or trenching, the Contractor shall perform an underground Site Survey utilizing an electronic locator to verify the exact location of all existing underground utility piping, conduits and conductors. The Contractor shall submit for approval a site survey report to the Engineer within five (5) working days after the survey is performed. The Site Survey Report shall show the horizontal location for existing utilities and identify any possible conflicts between the new work and existing utilities.

- B. All existing utilities that are disturbed by the contractor shall be immediately repaired at no cost to the City.

1.8 PERMITS, FEES AND INSPECTIONS

- A. Permits, fees, and inspections including all utility fees shall be arranged for and paid by the Contractor.
- B. The Contractor shall present to the Engineer properly signed certificates of the final inspection before work will be accepted.

1.9 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals except as modified herein. All time requirements shall be based on the notice to proceed date of the General Contract. All materials and equipment furnished under Division 26 shall be submitted to the Engineer for approval. Such approval shall be in writing from the Engineer including that, which is exactly as specified. Any materials or equipment installed without written approval shall be subject to immediate removal. Approval of material or equipment shall in no way obviate compliance with the contract documents.
- B. Submittals shall be packaged separately for each system or major piece of equipment and reviewed by the Contractor for verification of compliance with the contract documents prior to submitting to the Engineer. Separate, bound submittals shall be provided for each specification section to the Engineer. Authorization to combine equipment or systems must be in writing from the Engineer. All interfaces between specification sections shall be indicated in each submittal.
- C. All materials and equipment shall be new and shall bear the inspection label of the Underwriters Laboratories (UL) where applicable. Materials and equipment shall be the latest standard product and shall be of the grade indicated by the trade names given.
- D. The work shown on the contract drawings is engineered and designed to accommodate the equipment described hereinafter in these specifications.
- E. Equipment submittals shall include manufacturer's name, model, type, number, finish, size and capacity of the equipment at the given conditions. This information shall be provided in bound submittals, each containing an index and all submittals. Provide seven (7) copies of each submittal. The title shall provide the project name, system identity, the specification number, and the Contractor's name and address. This submittal shall be in addition to the shop drawings hereinafter specified. Partial submittals of material submitted from time to time are not acceptable and may be returned without review.
- F. Submittals shall be reviewed by the Engineer for compliance with the contract documents. Submittals found to be incomplete or not in compliance with the contract documents shall be returned for resubmittal. The Engineer shall review the original submittal and one (1) resubmittal per section (if required). The Contractor shall reimburse the Engineer for all subsequent submittal reviews.
- G. Shop drawings for service entrance equipment shall be submitted to and approved by the San Diego Gas and Electric Company metering shop prior to submittal to the Engineer.

- H. Equipment Layout Drawings: "Equipment Layout Drawings" shall be provided for each equipment room, yard or area containing equipment items furnished under Division 26. Layout drawings shall consist of a plan view of the room or area (to a ¼ inch =1'-0" minimum scale) showing projected outlines of all equipment, complete with dotted lines indicating all required clearances, including all clearances needed for removal or service. Location of all conduit and pull boxes shall be indicated. Drawings shall indicate any and all conflicts with other trades.
- I. All electrical submittals shall also be routed through and reviewed by the City of San Diego Facilities Division electrical crew. All City comments will be prepared and forwarded within five (5) working days.

1.10 SUBSTITUTIONS

- A. Approved Equal: Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals, except as modified herein.
- B. Equipment submitted for substitution must fit the space conditions shown on the drawings, leaving adequate room for maintenance around all equipment. A minimum of 36 inches (or more if required by Code) must be maintained clear in front of all electrical panels, starters, gutters or other electrical apparatus. Submit drawings showing the layout, size, and exact method of interconnection of conduit, wiring and controls, which shall conform to the manufacturer's recommendations and these specifications. The scale of these drawings shall be the scale of the contract drawings. The Contractor shall bear the excess costs, by any and all crafts, for fitting the equipment into the space and the system designated. Where additional labor or material is required to permit equipment submitted for substitution to function in an approved manner, this shall be furnished and installed by the Contractor without additional cost to the Owner.
- C. No substitutions will be allowed for materials or equipment if three (3) or more manufacturers are indicated.
- D. An item submitted for substitution does not constitute an "equal" unless approval by the Engineer has been given in writing.
- E. Equipment submitted for substitution shall be approved in writing by the Engineer and shall be accompanied by the following:
 - 1. A sample of each item submitted for substitution shall accompany the submittal if requested by the Engineer.
 - 2. A unit price quotation shall be provided with each item intended for substitution. This quote shall include a unit price for the specified item and a unit price for the intended substitute item. The Contractor shall also provide a total (per item) of the differential payback to the City should the intended substitute item be approved as equivalent to that which is specified.
 - 3. The Contractor shall reimburse the City for the additional services required by the Engineer to review and process substitutions.

- F. Substitutions shall be approved in writing by the Engineer. The determination of the Engineer shall be final.

1.11 WARRANTY

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 6-8.3 for Warranty except as modified herein.
- B. All materials and equipment provided shall be warranted for a minimum period of one (1)-year from the official date of completion. In addition, provide two (2)-year extended warranty, for a total of three (3)-years, for the following items:
 - 1. Service Entrance and Metering Equipment.
 - 2. Circuit Breakers.
- C. Refer to Section 265668, "Exterior Athletic Lighting" for additional warranty requirements.
- D. The Contractor shall provide all labor and materials required to correct problems which develop during the warranty period due to defective materials of faulty workmanship. The labor and materials to do this work shall be provided at no additional cost to the City.
- E. Within one (1)-month prior to the expiration of the warranty period, the Contractor shall correct any and all defects covered by the warranty. This shall include tightening to original specifications of all bolted connections.
- F. Warranty certificates shall be made out to the City and shall be delivered to the Engineer at the completion of the installation.
- G. All equipment shall be guaranteed to be supported in such a way as to be free from objectionable vibration and noise.
- H. Additional warranty requirement shall be as indicated in the following sections of Division 26.

1.12 OPERATION AND MAINTENANCE MANUALS

- A. The Contractor shall furnish operation and maintenance manuals for each electrical system and for each piece of equipment. The complete manual, bound in hardback binders, or an approved equivalent, shall be provided to the Engineer. Provide Seven (7) copies of each manual. One (1) manual shall be furnished prior to the time that system or equipment tests are performed, and the remaining manuals shall be furnished one (1) week before the final job visit is made. The following identification shall be inscribed on the cover; the words "OPERATION AND MAINTENANCE MANUAL", the name and location of the building, the name of the Contractor, and the contract number.
- B. The parts list for equipment shall indicate the sources of supply, recommended spare parts, and the service organization that is reasonably convenient to the building site. The manual shall be complete in all respects for all equipment, controls, and accessories provided.
- C. One (1) copy shall be forwarded to the City Facilities Maintenance Electrical Department prior to the final walk-through

Send to: City of San Diego

General Services/Facilities Division
Electrical Crew, Suite A, Bldg 38
San Diego, CA 92102

1.13 COORDINATION OF ALL WORK

A. Job Visits by the Engineer:

1. Periodic visits to the job by the Engineer are for the express purpose of verifying compliance with the contract documents.
2. Such visits shall not be construed as construction supervision. Neither shall such visits be construed as making the Engineer responsible for providing a safe place for the performance of the work by the Contractor or the Contractor's employees or the safety of the supplies of the Contractor or his Subcontractors.

B. Temporary Electrical Service:

1. The Contractor shall provide labor and materials required for the installation and maintenance of temporary lighting and required power sources for the Contractor's equipment inside the building or construction site and for pedestrian walkways during the period of construction.
2. The construction site shall be sufficiently illuminated so that construction work can be safely performed. Special attention shall be given to adequately lighting stairs, ladders, pedestrian walkways, floor openings, etc. Walkway lights shall be controlled by a switch within the building or construction site.

C. New Utility Services:

1. The Contractor shall provide all required labor and material for the installation and connection of new utility services including, but not limited to the following:
 - a. Electrical Service Entrance Equipment.

D. Posted Operating Instructions:

1. Operating instructions shall be provided by the Contractor at the conclusion of the project for each system and each principal piece of equipment for the use of operating and maintenance personnel. The operating instructions shall include wiring and control diagrams showing the entire system, including, but not limited to, equipment, devices, and control sequences. The Engineer shall approve all operating instructions.
2. Operating instructions shall be typewritten or engraved and shall be framed under glass or in approved laminated plastic and posted adjacent to each principal piece of equipment and shall include such instructions as start up, proper adjustment, operation, lubrication, shutdown, safety-precautions, procedure in the event of equipment failure, and any other necessary items of instructions as recommended by the manufacturer of unit.

3. Operating instructions exposed to the weather shall be made of weather-resisting materials or shall be suitably enclosed to be weather protected. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

1.14 TRAINING

- A. User staff and maintenance personnel shall be thoroughly trained (minimum four (4)-hours) in the use of each system or major piece of equipment installed. This training shall be provided a part of the Contractors bid to supply the system or equipment. Additional training requirements, shall be as specified in the subsequent sections of Division 26.

1.15 DELIVERY AND STORAGE

- A. Equipment and materials shall be properly stored, adequately protected, and carefully handled to prevent damage before and during installation. Equipment and materials shall be handled, stored, and protected in accordance with the manufacturer's recommendations and as approved by the Engineer. Electrical conduit shall be stored to provide protection from the weather and accidental damage. Plastic conduit shall be stored on even supports and in locations not subject to direct sunrays or excessive heat. Cables shall be sealed, stored, and handled carefully to avoid damage to the outer covering or insulation and damage from moisture and weather. Damaged or defective items shall be replaced with new items at no cost to the City. The Engineer shall determine if a damaged or defective item is to be replaced with a new item. The decisions by the Engineer in these matters shall be final.

1.16 FIELD TESTS

- A. As an exception to requirements that may be stated elsewhere in the contract, the Engineer shall be given five (5) working days notice prior to each test. The Contractor shall provide all test equipment, personnel and incidentals including, but not limited to, water, fuel, and lubricants necessary to perform the required tests. The Owner shall provide electrical power required for all tests. The Contractor shall submit five (5) typewritten copies of all test results to the Engineer within five (5) working days after each test.

1. The information submitted shall include, but not limited to, the following:

- a. Scope of the test.
- b. Name and type of instrument used.
- c. Calibration date of instrument and name of calibration firm.
- d. Name and signature of testing personnel.
- e. Name of signature of Engineer.
- f. Analysis of test results.

2. The Contractor shall demonstrate to the Engineer the operation of all equipment and systems. All tests shall be completed to the satisfaction of the Engineer. Each test shall be performed the number of time indicated in the individual specification section. In the event the number of times the tests are to be completed is omitted, the Engineer shall determine the number.

1.17 SINGLE LINE DIAGRAM DISPLAY

- A. Provide a 24” wide x 18” high metal frame to display an “As-Built” single line diagram of the entire final electrical distribution system. It shall be dated and the “As-Built” condition notated. Mount securely on wall as directed by City Facilities Electrical Department.

1.18 FINAL WALK THROUGH

- A. The final project walk-through will be attended by the Architect, engineer, Contractor, and City Facilities Electrical Department personnel. At that time an operational test of at least the following systems shall occur to verify correct operation:

- 1. Emergency Systems
- 2. Time clocks/Photocell controls
- 3. Occupancy sensors and lighting switching
- 4. Mechanical equipment and thermostat settings
- 5. Other systems/components at the direction of the City.

- B. Project close-out submittals will include:

- 1. As-Built drawings
- 2. A spec book
- 3. A book of final product submittals
- 4. O&M manuals
- 5. Signed off inspection reports and certificated

END OF SECTION 260500

SECTION 26 0510

BASIC ELECTRICAL MATERIALS AND METHODS

PART - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.
- B. All specification Sections under Division 26.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Supporting devices for electrical components.
 - 2. Cutting and patching for electrical construction.
 - 3. Touch-up painting.
 - 4. Tests of all electrical systems.
 - 5. Equipment Identification

1.3 ABBREVIATIONS

- EMT: Electrical metallic tubing.
- FMC: Flexible metal conduit.
- IMC: Intermediate metal conduit.
- LFMC: Liquid tight flexible metal conduit.
- RNC: Rigid nonmetallic (PVC) conduit.
- RMC: Rigid metallic conduit.
- RGS: Rigid Galvanized Steel conduit.

1.4 REFERENCES

- A. National Fire Protection Association (NFPA) Publication 70 – National Electrical Code (NEC).
- B. California Code of Regulations (CCR) Publications:
 - 1. Title 24, Part 2, CCR California Building Code (CBC)
 - 2. Title 24, Part 3, CCR, California Electrical Code. (CEC)
 - 3. Title 24, Part 6, CCR, California Energy Code

C. Underwriters Laboratories, Inc. (U.L.) Publications

1. Standard for Flexible Metal Conduit.
2. Rigid Metallic Conduit.
3. Cabinet and Boxes.
4. Panelboards.
5. Thermoplastic Insulated Wires.

D. National Electrical Manufacturers Association (NEMA) – Wiring Devices (NEMA WD)

1.5 SUBMITTALS

A. The following information shall be submitted for review and approval in accordance with Section 260500, "General Electrical Requirements".

B. Shop Drawings:

1. Provide shop drawing details, furnished by the manufacturer of the fire stop material, which show complete conformance to the U.L. system listing. These drawings shall be available to the Fire Marshal on site. The shop drawing shall be specific for each penetration with all variables defined.

C. Field Test Reports: Indicate and interpret test results for compliance with performance requirement

1.6 REGULATORY REQUIREMENTS

A. The Contractor shall conform to the requirements of the California Electrical Code and the City of San Diego Electrical Code, except where requirements herein are more stringent.

B. The Contractor shall furnish products listed and classified by Underwriters Laboratories, Inc. or as testing firm acceptable to the City as suitable for purpose specified and shown.

1.7 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with California Electrical Code.

C. Comply with City of San Diego Electrical Code.

1.8 COORDINATION

A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.

1. ~~Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.~~
- B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.
- C. Coordinate electrical service connections to components furnished by utility companies.
 1. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for electricity-metering components.
 2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.
- D. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.
- E. Where electrical identification markings and devices will be concealed by acoustical ceilings and similar finishes, coordinate installation of these items before ceiling installation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Products and materials shall be as specified in the pertinent sections of Division 26.
- B. All products and materials shall be new and bear UL label whenever subject to such approval. Comply with ANSI, IEEE and NEMA standards where applicable.
- C. Wherever possible, all materials and equipment used in this installation shall be of the same manufacturer throughout for each class of material or equipment.

2.2 TOUCHUP PAINT

- A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.
- B. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

2.3 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.
- C. Baked-Enamel Warning Signs:
 1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.

2. 1/4-inch (6.4-mm) grommets in corners for mounting.
 3. Nominal size, 7 by 10 inches (180 by 250 mm).
- D. Warning label and sign shall include, but are not limited to, the following legends:
1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)".
 3. Emergency Stop Warning: "EMERGENCY SHUTOFF".
 4. Electrical Room Warning: "NOTICE - ELECTRICAL ROOM - NO STORAGE PERMITTED".
 5. Electrical Substation Yard: "DANGER - HIGH VOLTAGE - KEEP OUT".
- 2.4 INSTRUCTION SIGNS AND EQUIPMENT IDENTIFICATION LABELS
- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. inches (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.
1. Engraved legend with black letters on white face.
 2. Punched or drilled for mechanical fasteners.

PART 3 - EXECUTION

3.1 INSTALLATION AND CONNECTION OF ELECTRICAL EQUIPMENT

- A. Equipment furnished by others shall be completely connected to the electrical system as required for correct operation. All conduit, wire, junction boxes, etc., shall be provided for proper connection and all required grounding shall be installed. Verify actual requirements with equipment supplier or Engineer prior to rough-in.
- B. All outlets, devices and equipment furnished under Division 26 shall be fully installed and connected.
- C. Provide all required flexible conduit, boxes, fittings, receptacles, caps, cords, and other material that may be required for the proper installation of all equipment. Refer to manufacturer's directions where applicable.
- D. Coordinate the work carefully to ensure that all electrical requirements of equipment are met and all systems are made complete and operational.
- E. All equipment shall be installed recessed (flush) unless otherwise noted or shown on plans.
- F. Install equipment to permit easy access for all maintenance.
 1. Maintain easy access to switches, motors, drives, pull boxes, receptacles, etc.

2. Relocate items which interfere with access.

3.2 SEISMIC RESTRAINTS

- A. All electrical equipment shall be braced or anchored in accordance with the requirements of CBC.
 1. Horizontal seismic forces shall be determined from the applicable equations of the governing code.
 2. Provide all required seismic bracing, supports, bolts, washers, nuts, etc. for conduits and conduit supports.

3.3 MISCELLANEOUS WORK

- A. Do all miscellaneous metal and concrete work required; all cutting and patching; and provide all hangers, anchors, chases, supports, etc., required for the installation of the electrical systems.
- B. Touch-up or refinish damaged surfaces including, but not limited to, meter pedestal, light fixtures, etc., to the satisfaction of the Engineer.
- C. All work shall be in accordance with applicable sections of the specifications.

3.4 CLEANING AND PROTECTION OF PRODUCTS AND PREMISES

- A. At frequent intervals during the time on the site, the Contractor shall clean up after his work and remove his debris from the premises. The building and grounds shall be cleaned to the satisfaction of the Engineer. All equipment and material resulting from demolition for this project shall be removed.
- B. The Contractor shall take all necessary precautions to protect all materials, equipment and property, whether electrical or not, from damage as result of his work.
- C. The Contractor shall provide adequate protection for all material and equipment provided under Division 26. Material and equipment shall be stored in a clean dry place and shall be covered or protected from damage or contamination during storage and after installation.
- D. Before final inspection, all material and equipment furnished under Division 26 shall be thoroughly cleaned of cement, plaster, paint spatters and other foreign materials. All surfaces shall be carefully wiped clean. Boxes, cabinets and enclosures shall be cleaned, inside and out.

3.5 CHECKING AND TESTING OF EQUIPMENT

- A. Switchboards, panelboards, and all other operable equipment worked on under this contract shall be inspected for defects, and tested for proper operation.
- B. Systems shall be tested for short circuits, open circuits, wrong connections, and grounds. All system shall be free from mechanical and electrical defects.
- C. Circuits shall be tested for proper neutral and ground connections.
- D. Where required or directed, systems shall be tested in the presence of the Engineer to demonstrate that equipment furnished, installed, or connected functions in the manner intended.

- E. The contractor shall furnish all necessary instruments and equipment required for testing and shall immediately correct any defective work at no additional charge. Should the Contractor refuse or neglect to make tests necessary to satisfy the Engineer that he has carried out the true intent and meaning of the specifications, the Engineer may have such tests made and charge the expense thereof to the Contractor to be retained out of full final payment.
- F. Bolted connections shall be torque-tightened to manufacturer's specifications. The Contractor shall torque all connections with a wrench that has been calibrated within the last three (three) months. Submit proof of calibration to the Owner's Representative.
- G. Ground-Fault Circuit Interrupter Tests: Test each branch circuit having ground fault circuit protection to ensure that the ground fault circuit interrupter will not operate when subjected to a ground fault current of less than 4 milliamperes and will operate when subjected to ground fault current exceed 6 milliamperes. Perform tests using an instrument specifically designed and manufactured for testing ground fault circuit interrupters. Apply the test to the receptacle which is at the greatest distance from the ground fault interrupter. If ground-fault interrupter type receptacles are installed, test each receptacle for proper operation. "TEST" button operation will not be acceptable as a substitute for this test.
- H. For additional checking and testing of special systems, see the section where those systems are specified.

END OF SECTION 26 0510

SECTION 26 0519

WIRES AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.
- B. Section 260500 – General Electrical Requirements.
- C. Section 260510 – Basic Electrical Materials and Methods.

1.2 SUMMARY

- A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.3 REFERENCES

- A. NEC National Electrical Code.
- B. NECA (National Electrical Contractors Association) – Standard of Installation.
- C. NETA (International Electrical Testing Association) – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- D. ANSI/UL – Insulation of Conductors.

1.4 SUBMITTALS

- A. The following information shall be submitted for review and approval in accordance with Section 260500, "General Electrical Requirements".
- B. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
- C. Product data: Submit for building wire and each cable assembly type.
- D. Select each length to complete set of manufacturer markings.
- E. Attach tag indicating cable size and application information.
- F. Product Record Documents: Record actual locations of components and circuits.
- G. Provide manufacturer's instruction for use of ground megger with proposed method indicated.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Shall be specialized in manufacturing products specified in this section with minimum ten years (documented) experience.

- B. Testing Agency: Company shall be a member of International Electrical Testing Association and specializing in testing products specified in this section with minimum three years.
- C. Listing and Labeling: Provide wires and cables specified in this Section as defined in CEC, Article 100.

1.6 REGULATORY REQUIREMENT

- A. Conform to ANSI/NFPA 7
- B. Conform to CCR Title 24, Part 6, California Energy Code.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Product Requirements: Products storage and handling requirements.
- B. Deliver wires and cables according to NEMA WC 26.

1.8 SCHEDULING OR COORDINATION

- A. Where wire and cable destination is indicated and routing is not shown, determine routing and lengths required.
- B. Coordinate layout and installation of wiring and cables with other installations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Wires and Cables:
 - a. American Insulated Wire Corp.; Leviton Manufacturing Co.
 - b. Carol Cable Co., Inc.
 - c. Senator Wire & Cable Company.
 - d. Southwire Company.
 - 2. Connectors for Wires and Cables:
 - a. AMP Incorporated.
 - b. General Signal; O-Z/Gedney Unit.
 - c. Monogram Co.; AFC.
 - d. Square D Co.; Anderson.

2.2 BUILDING WIRES AND CABLES

- A. Conductor Material: Copper

- B. All conductor sizes shall be designated by American Wire Gauge (AWG) or Thousand Circular Mills (kcmil).
- C. The date of manufacture shall not exceed six months prior to delivery to the site.
- D. All conductors shall be stranded. Minimum wire size shall be No. 12 AWG unless otherwise specified.
- E. Branch circuit conductors shall be type THWN-2 (90 degrees C).
- F. Feeder conductors 6 AWG and larger shall be type XHHW-2 (90 degrees C).
- G. All conductors shall be color-coded as follows:

	120/208 Volts	240/120 Volts
Phase "A"	Black	Match Existing
Phase "B"	Red	Match Existing
Phase "C"	Blue	-
Neutral	White	White
Ground	Green	Green

Where color other than black is not an integral part of insulation use 3M No. 35 tapes in the same color code to identify both ends on conductors No. 8 and larger. Use other colors as required to identify control or other special circuits. Ground conductor will have green insulation for 1/0 or smaller conductors, green tapes on other colors of insulation are NOT acceptable. All neutral wires shall be white with phase color strip running along entire length.

- H. Flat under carpet wire shall not be used.

2.3 CONNECTORS AND SPLICES

- A. UL-listed, factory-fabricated wiring connectors of size, ampacity rating, material, type, and class for application and service indicated. Comply with Project's installation requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine raceways and building finishes to receive wires and cables for compliance with requirements for installation tolerances and other conditions affecting performance of wires and cables. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 WIRE AND CABLE INSTALLATION

- A. All wiring shall be installed in accordance with the California Electrical Code. All wiring shall be installed in conduit except where other raceway systems or methods are specifically shown on the drawings or required by the specifications.
- B. Provide a dedicated neutral for each branch circuit phase conductor. Neutrals shall not be shared except where multi-wire circuits are specifically indicated. Branch circuit neutral color stripe shall match color of phase wire to which it is associated.
- C. Thoroughly clean out all wireways and see that all parts are perfectly dry before pulling any wires. Lubricants shall be designed for use with the insulation type used and the temperature conditions. A mechanical wire puller may be used where directed, in which case a lubricant shall be used. Any wire damaged as a result of installation under this section shall be pulled out and replaced with new at no additional cost to the City.
- D. Make all connections necessary to properly complete the electrical wiring. Connections shall be made only in outlet boxes, or in switchboards, or panels having sufficient code-sized gutter space.
- E. Connections to equipment or busbars shall be made with approved solderless compression type copper lugs for all wires No. 8 AWG and larger. Special lugs or connections shall be as shown on the plans. Binding screws may be used for size No. 10 and smaller. Where stranded wire is connected to binding screws, nylon, self-insulated, ring tongue, pressure type terminals or equal, shall be used on the wire. Soldering will not be an acceptable method of connecting any power conductors. Clipping of wires from standard cable to fit connectors and terminal lugs shall not be permitted.
- F. All conductors shall be continuous from outlet to outlet and no splices shall be made except within outlet or junction boxes. At least 8" of wire shall be left at outlet boxes for connecting fixtures and devices.
- G. No wire smaller than No. 12 AWG shall be used, except for signal or control systems, or where otherwise indicated. No. 10 AWG wire shall be used for 20 ampere 120 volt branch circuits in excess of 100 feet in length. This is intended to reduce branch circuit voltage drop and takes precedence over No. 12 branch circuitry indicated in drawings. Record drawings shall indicate installed wire size.
- H. Wires entering switchboards, panelboards and control panels shall be of sufficient length for proper termination without splicing within the equipment enclosure. Any wires installed that require splicing for terminating shall be removed and replaced with ones of the proper length. Wires shall be trained and supported in neat bundles.
- I. Wiring Bundles or Harnesses:
 - 1. Multiple wires in bundles or harnesses terminating in control panels, switchboards, panelboards, etc. shall be bundled, trained and laced to achieve a neat and workmanlike appearance.
 - 2. Surplus wire protruding from the harness for termination shall be trimmed to proper length. Do not fold and stuff surplus wires into wiring gutters.

3. Wires exiting the bundle or harness shall be carefully trained at a 90 degree angle to the termination point.

- J. Permanent tags shall be connected to all feeders in intermediate pullboxes (where used) to provide identification for future use.
- K. Cable Terminating: Terminations of insulated power and lighting cables shall be protected from accidental contact, deterioration of coverings, and moisture by the use of terminating devices and materials. Terminations shall be made using materials and methods as indicated or specified herein or as designated by the written instruction of the cable manufacturer and termination kit manufacturer.
- L. Neutrals shall not be shared (except multi-wire systems furniture feeds). All neutrals shall include a stripe matching the respective phase color installed.
- M. Identification: Provide wire markers on each conductor in electrical panel, switchboard, pull box, outlet and junction box. This includes all disconnects and terminations. If more than one neutral conductor is present, mark each related circuit and panel number.

3.3 CONNECTIONS

- A. Conductor Splices: Avoid splices wherever possible.
- B. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches (300 mm) of slack.
- C. Connect outlets and components to wiring and to ground as indicated and instructed by manufacturer.
- D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD TESTS

- A. As an exception to requirements that may be stated elsewhere in the contract, the Engineer shall be given five (5) working days notice prior to each test.
- B. Testing Equipment: The testing equipment and devices used in performing the required tests shall have a calibration sticker affixed to the device stating the date when calibrated, date due for re-calibration, and the signature of the individual who did the calibration. In addition to the sticker a certificate shall also contain the brand name and the serial number of the device.
- C. Insulation Resistance Test for System 600 Volts and Less: After all wiring is completed and connected ready for operation, but prior to placing system in service and before any branch circuit breakers are closed, insulation resistance tests shall be made in all feeder and subfeeder circuits. The insulation resistance between conductors and between each conductor and ground shall be measured. Measurements shall be made with an instrument capable of marking measurements at an applied potential of 500 volts. Readings shall be taken after the voltage has been applied for a minimum of one minute. The minimum insulation resistance for circuits of No. 12 AWG conductors shall be 1,000,000 ohms. For circuits of No. 10 AWG or larger conductors, a resistance based on the allowable ampacity of the conductor as fixed by the CEC shall be as follows:

1. 25 through 40 amperes 250,000 ohms
2. 51 through 100 amperes 100,000 ohms
3. 101 through 200 amperes 50,000 ohms
4. 201 through 400 amperes 25,000 ohms
5. 401 through 800 amperes 12,000 ohms
6. Over 800 amperes 5,000 ohms

D. Test Report (Submit four (4) copies in writing):

1. 600 volt cables (identify each cable and test results).

END OF SECTION 26 0519

SECTION 26 0526

GROUNDING AND BONDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.
- B. Section 260500 – General Electrical Requirements.
- C. Section 260510 – Basic Materials and Methods.
- D. Section 260519 – Wires and Cables

1.2 SUMMARY

- A. This Section specifies the minimum materials and performance standards for grounding and bonding.
- B. Sections include:
 - 1. Grounding electrodes and conductors.
 - 2. Grounding electrodes.
 - 3. Equipment grounding conductors.
 - 4. Bonding.

1.3 REFERENCES

- A. American National Standards Institute (ANSI) Publication C2-97 – National Electrical Safety Code.
- B. Institute of Electrical and Electronic Engineers (IEEE) Publication 142 – Recommended Practice for Grounding of Industrial and Commercial Power Systems.
- C. National Fire Protection Association (NFPA) Publication:
 - 1. 70 – National Electrical Code.
 - 2. 780 – Lightning Protection Code.
- D. Underwriters Laboratories, Inc. (U.L.) Publication:
 - 1. 83 - Thermoplastic Insulated Wires.
 - 2. 467 - Grounding and Bonding Equipment.
 - 3. 486A - Wire Connectors and Soldering Lugs for Use with Copper Conductors.

1.4 REGULATORY REQUIREMENTS

- A. The Contractor shall conform to requirements of the California Electrical Code
- B. The Contractor shall furnish products listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to the City as suitable for purpose specified and shown.

1.5 PERFORMANCE REQUIREMENTS

- A. Grounding system resistance shall be 5 ohms or less unless otherwise indicated. Lengthen rods or provide additional rods where necessary to meet this requirement.

1.6 SUBMITTALS

- A. The following information shall be submitted for review and approval in accordance with Section 260500, "General Electrical Requirements".
 - 1. Catalog Cut:
 - a. Ground Rod.
 - a. Ground Connectors
 - 2. Ground resistance from each major piece of equipment to the ground electrode. Equipment shall include, but not be limited to the following:
 - b. Main Switchboard
 - c. Transformers
 - 3. Thermal (or Exothermic) Weld Process

1.7 WARRANTY

- A. Warranty shall comply with the provisions of Section 260500, "General Electrical Requirements".

PART 2 - PRODUCTS

2.1 A grounding electrode conductor, sized in accordance with Section 250.66 of CEC for the derived phase conductors, shall be used to bond the grounded conductor of the derived system to the grounding electrodes.

2.2 GROUND RODS

- A. Provide copper clad steel rods with adequate diameter to permit driving full length of the rod in the earth but not less than ¾-inch. Length shall be 10-feet unless otherwise indicated. Provide couplings and driving pins where required.

2.3 EXOTHERMIC WELDS

- A. Provide exothermic welds which require no outside source of heat or power. Welds shall be accomplished by reduction of copper oxide and aluminum powered metals in a mold. Weld shall provide connection of conductor to device, device to device or conductor to conductor as required. Weld shall be of proper size to provide continuous rating of devices or conductors which are connected.

2.4 GROUNDING AND BONDING CONDUCTORS

- A. Grounding and bonding conductors shall be sized in accordance with CEC Table 250.122 for equipment grounding conductors and with CEC Table 250.66 for grounding electrode and equipment bonding conductors.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Make mechanical and electrical contact at all panelboards, outlet boxes, junction boxes, and wherever the conduit run is connected. Permanently and effectively ground all conduit and other equipment as required by all applicable codes, regulations and standards.
- B. Install a code sized green insulated equipment ground wire in all feeder and branch circuit conduits unless a larger size is indicated on plans.
- C. System neutrals shall only be grounded at the main service and separately derived systems. The service neutral shall be connected to the grounding electrodes indicated. Neutral conductors of separately derived systems shall be connected to the grounding electrodes indicated.
- D. Drive ground rods full length in a depression at least six (6)-inches below finished grade. When more than one (1) rod is driven, space them at least the full length of the rod.
- E. Make all grounding connections which are to be buried or otherwise normally inaccessible by thermal welds or by using a mechanical connector and brazing over completely. Thermal welds which have puffed up or shown convex surfaces (indicating improper cleaning at the surfaces) are not acceptable. No mechanical connector is required at the thermal weldments.
- F. Provide a "UFER" ground for electrical service, consisting of a minimum of a minimum of 20 feet of reinforcing bar meeting the requirements of CEC 250.52 (A) (3). Alternative if reinforcing bar is not available: 25 feet of bare stranded No. 4 AWG copper wire embedded in concrete (at switchboard slab,) so that all portions of the cable are between 2 inches and 4 inches from the earth and with the center of the cable bonded to the ground rod or pipe.
- G. The green insulated ground (bond) wire shall be spliced together within all outlet boxes. A green insulated bonding jumper shall be provided from the splice to the box body. Attachment to the box body shall be provided using a tapped #10-31 x 3/8" screw minimum. A green insulated bonding jumper shall be provided from the splice to the receptacle ground screw including all self-grounding receptacle.

3.2 TESTS

- A. All testing shall be performed by an independent testing agency.
- B. As an exception to requirements that may be stated elsewhere in the contract, the Engineer shall be given five (5) working days notice prior to each test.
- C. The testing equipment and devices used in performing the required tests shall have a calibration sticker affixed to the device stating the date when calibrated, date due for re-calibration, and the signature of the individual who did the calibration. In addition to the sticker, a certificate shall also contain the brand name and the serial number of the device.

- D. Ground Rod Test: Test ground rods for ground resistance value before any wire is connected. A portable testing megger shall be used to test each ground or group of grounds. The auxiliary or reference ground rods shall be 3/4-inch copper clad steel, not less than 4-feet in length and driven 3-1/2 feet deep, and shall be installed in a straight line from the ground being tested. Number 14 AWG stranded wire leads with at least 600 volt rubber insulation shall be connected to binding post on the instrument.
1. When there is more than one (1) ground within a circle of 10-feet at a particular location, the reference rods as driven for the "first" test shall be used for tests on the other rods without changing their location. The instrument shall be equipped with a meter reading directly in ohms or fractions thereof to indicate the ground value of the ground electrode under test. Provide one (1) copy of the megger manufacturer's directions for use of the ground megger indicating the methods to be used.
- E. Test Report (Submit four (4) copies in writing):
1. Grounding electrodes and systems (identifying electrodes and systems, each test).

END OF SECTION 26 0526

SECTION 260533

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal conduits, tubing, and fittings.
2. Nonmetal conduits, tubing, and fittings.
3. Metal wireways and auxiliary gutters.
4. Boxes, enclosures, and cabinets.
5. Handholes and boxes for exterior underground cabling.

B. Related Requirements:

6. Section 260543 "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.

1.2 ACTION SUBMITTALS

- A. The following information shall be submitted for review and approval in accordance with Section 260500, "General Electrical Requirements".
- B. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. GRC: Comply with ANSI C80.1 and UL 6.
- C. IMC: Comply with ANSI C80.6 and UL 1242.
- D. EMT: Comply with ANSI C80.3 and UL 797.
- E. FMC: Comply with UL 1; zinc-coated steel
- F. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- G. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
 7. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
 8. Fittings for EMT:
 - a. Material: Steel

- b. Type: Compression
 - 9. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
 - H. Joint Compound for IMC or GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.
- 2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS
- A. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - B. ENT: Comply with NEMA TC 13 and UL 1653.
 - C. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
 - D. LFNC: Comply with UL 1660.
 - E. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
 - F. Fittings for LFNC: Comply with UL 514B.
 - G. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - H. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- 2.3 METAL WIREWAYS AND AUXILIARY GUTTERS
- A. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 or Type 3R unless otherwise indicated, and sized according to NFPA 70.
 - 1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- 2.4 BOXES, ENCLOSURES, AND CABINETS
- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
 - B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
 - C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
 - D. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

- E. Exterior boxes for light fixtures shall be cast iron type.
- F. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb (23 kg). Outlet boxes designed for attachment of luminaires weighing more than 50 lb (23 kg) shall be listed and marked for the maximum allowable weight.
- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- I. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- J. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep)
- K. Gangable boxes are allowed.
- L. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 or Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures: Plastic.
 - 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- M. Cabinets:
 - 1. NEMA 250, Type 1 or Type 3 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.
 - 3. Key latch to match panelboards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.
 - 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.5 PRECAST CONCRETE HANDHOLES AND PULL BOXES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 7. Christy Concrete Products.
 - 8. Elmhurst-Chicago Stone Co.
 - 9. Oldcastle Precast Group.
 - 10. Rinker Group, Ltd.

11. Riverton Concrete Products.
 12. U.S. Precast Group
 13. Utility Concrete Products, LLC.
 14. Utility Vault Co.
 15. Wausau Tile Inc.
- B. Comply with ASTM C 858 for design and manufacturing processes.
- C. Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom unless open-bottom enclosures are indicated. Frame and cover shall form top of enclosure and shall have load rating consistent with that of handhole or pull box.
16. Frame and Cover: Weatherproof cast-iron frame, with cast-iron cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing stainless steel bolts.
 17. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 18. Cover Legend: Molded lettering, "ELECTRIC."
 19. Configuration: Units shall be designed for flush burial and have precast bottom unless otherwise indicated. Exception: Units smaller than 24 inches wide by 36 inches long shall have open bottom.
 20. Duct Entrances in Handhole Walls: Cast end-bell or duct-terminating fitting in wall for each entering duct.
 - a. Type and size shall match fittings to duct or conduit to be terminated.
 - b. Fittings shall align with elevations of approaching ducts and be located near interior corners of handholes to facilitate racking of cable.
 21. Handholes and pull boxes 12 inches wide by 24 inches long and larger shall have inserts for pulling-in irons installed before concrete is poured.
 22. Provide grounding lug on underside of metallic cover. Lug shall be bronze and attached to cover with stainless steel bolt. Cast iron covers shall be drilled and tapped for attachment bolt.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed Conduit: GRC.
 2. Concealed Conduit, Aboveground: EMT.

3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.
 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
 5. Conduits exposed to salt air shall be GRC type with PVC coating.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated.
1. Exposed, Not Subject to Physical Damage: EMT.
 2. Exposed, Not Subject to Severe Physical Damage: EMT.
 3. Exposed and Subject to Severe Physical Damage: GRC.
 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 5. Flexible metal conduit shall only be used for transformer and motor connections and light fixture whips. None shall be more than 6'-0" in length
 6. Damp or Wet Locations: GRC.
 7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.
 8. BX or MC type cables are not permitted.
- C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 3. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
 4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Install surface raceways only where indicated on Drawings.
- F. Conduits installed on roof-tops shall be GRC only, neatly grouped and routed parallel to building lines. Support conduits on composite Firestone Red Pipe Support brackets (or approved equals) at maximum 5'-0" spacing.
- 3.2 INSTALLATION
- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

- B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- D. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.
- E. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- F. Support conduit within 12 inches (300 mm) of enclosures to which attached.
- G. Conduit run above suspended ceilings will be supported from the building structure independently and will be run with sufficient clearance from the ceiling system to permit the tiles to be removed and to allow full access.
- H. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot (3-m) intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 1 inch (25 mm) of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
- I. Stub-ups to Above Recessed Ceilings:
 - 1. Use EMT for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- J. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- K. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- L. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35-mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- M. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

- N. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces.
- O. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where an underground service raceway enters a building or structure.
 - 2. Where otherwise required by NFPA 70.
- P. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
- Q. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- R. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between the box and cover plate or the supported equipment and box.
- S. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- T. Locate boxes so that cover or plate will not span different building finishes.
- U. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- V. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
 - 1. Provide trenching and backfill in accordance with City Standard Drawings SDG-107, SDG-108, SDG-116, SDG-117 and SDG-118.
 - 2. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom.
 - 3. Install backfill.
 - 4. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches

(300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction.

5. Install manufactured duct elbows for stub-up at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
6. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete for a minimum of 12 inches (300 mm) on each side of the coupling.
 - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
7. Underground Warning Tape: Comply with requirements in Section 260553 "Identification for Electrical Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Handholes and Pull Boxes for 600 V and Less:
 1. Units in Roadways and Other Deliberate Traffic Paths: Precast concrete, AASHTO HB 17, H-20 structural load rating.
 2. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Precast concrete, AASHTO HB 17, H-20 structural load rating.
 3. Units in Sidewalk and Similar Applications with a Safety Factor for Non-deliberate Loading by Vehicles: Precast concrete, AASHTO HB 17, H-10 structural load rating.
 4. Cover design load shall not exceed the design load of the handhole or pull box.
- C. Unless otherwise indicated or required by manufacturer's installation instructions, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.
- D. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch (25 mm) above finished grade.
- E. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 26 0533

SECTION 26 0553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Equipment identification labels.
6. Miscellaneous identification products.

1.2 ACTION SUBMITTALS

- A. The following information shall be submitted for review and approval in accordance with Section 260500, "General Electrical Requirements".
- B. Product Data: For each electrical identification product indicated.

1.3 QUALITY ASSURANCE

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

PART 2 - PRODUCTS

3.2 POWER RACEWAY IDENTIFICATION MATERIALS

- B. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- C. Colors for Raceways Carrying Circuits at 600 V or Less:
 1. Black letters on an orange field.
 2. Legend: Indicate voltage and system or service type.

- D. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- E. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- F. Write-On Tags: Polyester tag, 0.010 inch (0.25 mm) thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 - 2. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

3.3 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

- B. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- D. Write-On Tags: Polyester tag, 0.010 inch (0.25 mm) thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 - 2. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
- E. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

3.4 UNDERGROUND-LINE WARNING TAPE

- B. Tape:
 - 1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
 - 2. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - 3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.
- C. Color and Printing:
 - 1. Comply with ANSI Z535.1 through ANSI Z535.5.
 - 2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.
 - 3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

D. Tag: Type I:

1. Pigmented polyolefin, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
2. Thickness: 4 mils (0.1 mm).
3. Weight: 18.5 lb/1000 sq. ft. (9.0 kg/100 sq. m).
4. 3-Inch (75-mm) Tensile According to ASTM D 882: 30 lbf (133.4 N), and 2500 psi (17.2 MPa).

3.5 EQUIPMENT IDENTIFICATION LABELS

- B. Name plates: Furnish and install a minimum size of 1" high and 3" wide by 3/32 thick matte white (for normal power) and red (for emergency power) laminated phenolic nameplates with 1/4" white characters engraved in the plastic for all items of electrical equipment including, but not limited to switchboards, panel boards, automatic transfer switches, motor control centers, feeder circuit breakers, relays, time switches, disconnect switches, exposed pull or junction boxes, and all control equipment. Name plates will be attached with 2 cadmium-plates screws. Adhesive attachment will be acceptable. Punch strip tape type name plates with card holders in any form are prohibited.

3.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

- B. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).
- C. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 4 - EXECUTION

4.1 INSTALLATION

- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Attach signs and plastic labels with mechanical cadmium plated screw fasteners appropriate to the location and substrate.
- E. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- F. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade.

G. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

H. Provide wire marker on each conductor in electrical panel pull box, outlet, and junction box. This includes all disconnects and connections. * If more than one neutral conductor is present, mark each related circuit and panel.

I. Label outside of all cover plates of wiring devices and junction boxes with circuit and panel number. Each branch circuit device cover plate will be labeled (engraved or silk screen) to indicate the branch circuit and panel number. Devices will include, but not be limited to, the following: toggle switches, dimmer switches and receptacles.

4.2 IDENTIFICATION SCHEDULE

B. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.

a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.

b. Colors for 120/208-V Circuits:

1) Phase A: Black.

2) Phase B: Red.

3) Phase C: Blue.

c. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

C. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

D. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.

1. Install underground-line warning tape for cables in raceway.

- E. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.
1. Comply with 29 CFR 1910.145.
 2. Identify system voltage with black letters on an orange background.
 3. Apply to exterior of door, cover, or other access.
 4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
 - a. Controls with external control power connections.
- F. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
1. Labeling Instructions:
 - a. Indoor Equipment: Adhesive film label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
 - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
 - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

END OF SECTION 26 0553

SECTION 26 0573

OVERCURRENT PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.

1.2 REFERENCES

- A. National Electrical Manufacturers Association FU 1.
- B. National Electrical Code (NEC).

1.3 SUMMARY

- A. Circuit breakers (each type and style).
- B. Circuit breaker handle padlock assembly.
- C. Enclosures (each type and style).

1.4 WARRANTY

- A. Warranty shall comply with the provisions of Section 260500, "General Electrical Requirements".

PART 2 - PRODUCTS

2.1 CIRCUIT BREAKERS

- A. Circuit breakers for main service equipment and panelboards shall be bolt-on type. Handle ties and dual, quad or tandem breakers are not acceptable. Mounting hardware, accessories, faceplates, enclosures, etc., shall be provided as required. Each and every circuit breaker shall be provided with a handle padlock attachment. This attachment shall allow the circuit breaker to be padlocked in either the "ON" or "OFF" position.
- B. Circuit breakers shall be quick-break on manual and automatic operation, and the handle mechanism shall be trip-free to prevent holding contact closed against a short circuit or sustained overload. Contacts shall be of high pressure butt-type and shall be made of a silver alloy material. Arc chutes shall be provided. Automatic thermal and magnetic tripping devices shall be located in each pole for the breaker.
- C. Short circuit interrupting capacity shall be as indicated on the plans and shall in no case be less than 10,000A symmetrical at 120/240 volts, or 14,000A symmetrical at 277/480 volts. Series-rated devices are not acceptable.
- D. Circuit breakers with frame sizes 225A through 350A shall have adjustable magnetic trip setting.

- E. Circuit breakers with frame sizes 400A and larger shall have electronic trip units with adjustable long time and short time pickup, long time and short time delay and instantaneous trip.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Bolted connections shall be torque-tightened to manufacturer's specifications.
- B. Clipping of wires from standard cable to fit connector shall not be permitted. Appropriate connecting device shall be provided for multiple or oversized cable connections.

3.2 TESTS

- A. Each and every circuit breaker shall be operated under load a minimum of three (3) times.
- B. Test switches a minimum of three (3) times to ensure correct operation.
- C. Measure contact resistance and perform trip unit test on all circuit breakers 100A trip and larger. Submit typewritten report to City. Correct all deficiencies and retest. Test report entries shall identify each circuit breaker and metering pedestal.

END OF SECTION 26 0573

SECTION 26 0913

ELECTRICAL POWER MONITORING AND CONTROL

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.

1.2. GENERAL REQUIREMENTS

- A. Provide a complete and operable system in accordance with the letter and intent of this specification section and with applicable Codes and Regulations as interpreted by the Authorities having jurisdiction. This Section is a performance specification and the detailed system design shall be done by the system manufacturer. The system shall comprise all necessary component parts to provide the functions and facilities described. The system layout indicated on the drawings is only tentative and the types, quantities, and sizes of system components and raceways shall be revised as required by the system to be provided.
- B. Meters shall comply with the requirements of CCR Title 24 Energy Code for building metering.

1.3. DEFINITIONS

- A. CEC: California Electrical Code (CCR Title 24, Part 3) based on the National Electrical Code.
- B. I/O: Input/output

1.4. QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Components listed and labeled as defined by the CEC.

1.5. SUBMITTALS

- A. The following information shall be submitted for review and approval in accordance with Section 260500, "General Electrical Requirements".
- B. Product Data
 - 1. Material List: A material list with names of manufacturers, model numbers, and technical information on all equipment proposed.
 - 2. Product technical information sheets for each principal component in the proposed system. Identify by arrow, circle or similar means products being proposed. Submittals consisting of unmodified catalog pages with no markings will be rejected.
- C. Shop Drawings
 - 1. System block diagrams.

2. Complete point-to-point wiring schematic diagrams. Show all components in the communications path from the central control through all intervening system components, including terminal boards and data collectors to the individual end devices. Document the lines and associated equipment required to complete a transmission path. The intent of this requirement is to provide a document that will permit end to end tracing of the system wire and cabling.
- D. Test Procedures: A written document detailing the proposed test procedures of the system shall be supplied. These procedures shall include all tests required by the equipment manufacturer and by this specification.
 - E. Test Results Report: Test Results Report: The results of the execution of the testing procedure, including the items tested or inspected, the date, and by whom.
 - F. Operating Sequences: Provide a complete written description of the Sequence of Operation of each of the systems including startup and recovery procedures
 - G. Operation and Maintenance (O&M) Manuals: Furnish composite "Systems Operation and Maintenance" manuals in indexed three-ring binders, sized to hold the material below, plus 50% excess. Each manual shall contain, but not be limited to:
 1. Operational procedures for the overall systems including the "Sequence of Operation".
 2. Test procedures and test results.
 3. Instruction for the proper operation and maintenance of the system.
 4. Factory issued technical, installation, and maintenance manuals.
 5. Factory issued operations and programming (software) manuals.
 6. A replacement parts list complete with part numbers and name, address, and phone number of suppliers used by the Contractor. A spare parts list recommended for purchase by the District shall be included.
 7. All portions of the material list and shop drawings which are not included in the foregoing.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. The system shall be fully integrated with the power distribution equipment.
 - a. Cutler Hammer
 - b. Siemens
 - c. Square D
 - d. Electro Industries/Gauge Tech
- B. Source Limitations: Obtain materials and accessories from single source from single manufacturer.

2.2 SYSTEM DESCRIPTION

- A. The power management system shall provide the following electrical distribution monitoring and report capabilities.
 - 1. Full-function metering.
 - 2. System and device status, alarm and event monitoring, logging and managing.
 - 3. Data collecting and trending.
 - 4. Communication with the site energy management system (EMS).
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, by a qualified testing agency, and marked for intended location and application.
- C. Comply with CEC.

2.3 TOOLS

- A. Provide all special tools needed for proper operation and routine adjustment and maintenance of system. Deliver tools to Owner's representative and obtain a receipt for same

2.4 SUPPORT AND UPGRADE

- A. Provide telephone support, software upgrades and manual updates, as they become available for 12 months after District's acceptance of the Power Management System, at no additional cost to the District.

2.5 GENERAL

- A. Provide all necessary products required for a complete and properly operable system including; sources of control power, AC and DC power supplies, control transformers, instrument transformers, transducers, I/O boards, relays, and similar items.
- B. Raceways: Provide additional raceways within buildings as necessary for the system cabling requirements.
- C. Provide appropriate surge protection for all vulnerable electronic system equipment.

2.6 SYSTEM SOFTWARE

- A. The system software shall provide the following functions and features:
 - 1. Metered data collection on a scheduled or interactive basis.
 - 2. Historical database of scheduled data collections of energy, demand, and user-selectable device parameters for future use in trend plots or tables.
 - 3. Capability of exporting data to other software applications with Microsoft Windows Dynamic Data Exchange capabilities.
- B. System administration features shall include:
 - 1. Assignment of one of three security levels and password protection to each system user.
 - 2. File-management capabilities including file backup and restore features.

2.7 SYSTEM COMMUNICATION NETWORK

- A. The communication network shall provide the following features and capabilities:
 - 1. Connections among devices by dedicated, shielded, twisted-pair cable, of up to 12,000 feet of wire, with multi-drop capabilities.
 - 2. Connection of up to 250 devices with daisy-chain or star connection, or a combination of both.
 - 3. Repeater technology to maintain communication network continuity.
 - 4. Communication protocol shall be BACnet/IP compatible with the site energy management system (EMS) provided under Division 25.
 - 5. Individual equipment lineups fully wired and tested at the manufacturer, with all external connection points for communication cables clearly marked.
 - 6. Routing the communication network cable between equipment lineups.

PART 3 - EXECUTION

3.1. INSTALLATION

- A. Install equipment in strict accordance with manufacturer's recommendations. Equipment shall be mounted with sufficient clearance to meet all applicable codes and facilitate observation and testing. Securely fasten with appropriate fittings to ensure positive grounding, free of ground loops, throughout the entire system units shall be installed parallel and square to building lines. Locations shall be approved by District's representative.
- B. Wiring:
 - 1. All wiring shall be in conduit except plenum rated signal and communication cables may be run above accessible lay-in ceiling. All wires shall be gathered and tied up to create an orderly installation.
 - 2. Routing shall be approved by District's representative.
 - 3. Visually inspect wire and cable for faulty insulation prior to installation. Protect cable ends at all times with acceptable end caps except during actual termination.
 - 4. Protect wire and cable from kinks. Provide grommets and strain relief material where necessary, to avoid abrasion of wire and excess tension on wire and cable.
- C. Grounding: Properly ground each piece of electronic equipment prior to applying power. Properly ground all shielded wire shields to the appropriate earth ground.
- D. Identification and Tagging
 - 1. All cables, wires, wiring forms, terminal blocks and terminals shall be identified by labels, tags or other permanent markings. The markings shall clearly indicate the function, source, and destination of all cabling, wiring and terminals. All cables and wires shall be identified utilizing heat-shrink, pre-printed, polyolefin wire markers.
 - 2. All terminal points shall be appropriately labeled.

3.2. SYSTEM SETUP

- A. Database: Assist the District in setting up the system data base requirements and formats. Provide forms to be utilized in collecting and entering all data. Written instructions on the use of all forms shall be included. Provide examples of the sequence of completion for all related forms. The District's key employees shall be directly involved in the actual data collection and entry to ensure a complete understanding of the system and its contents by District's personnel.
- B. Graphics data shall be inputted from the District's AutoCAD generated single-line diagram drawing. The single-line diagram drawing shall be modified during the training session to illustrate all the capabilities of the drawings graphic features.
- C. Initialize and configure the system in accordance with the system requirements. All the monitoring and control requirements, point definitions, in/out relationships, individual component descriptions, and any other user programmable parameters required shall be as described herein except as modified by the District as to the text to be used.

3.3. SYSTEM STARTUP

- A. Initiate system operation. Competent factory trained start-up personnel shall be provided until the system is fully functional and ready to start the test phase. Start-up shall include a complete working demonstration of the system with simulation of possible operating conditions which may be encountered.

3.4. SYSTEM TESTING

- A. Required: In accordance with the "Test Procedures" approved by the District's representative.
 - 1. Activate all devices that are in the system for proper operation, including supervisory and trouble circuit tests.
 - 2. Perform all tests recommended by the equipment manufacturer and required by this specification.
 - 3. Wire and Cable: After installation, and before termination, all wiring and cabling shall be checked and tested to insure there are no grounds, opens, or shorts on any conductors or shields. A megohmmeter (Megger) shall be utilized to accomplish these tests and a reading of greater than 20 megohms shall be required to successfully complete the test.

3.5. TRAINING

- A. Provide manufacturer authorized personnel to train a group of five of the Owner's key employees in the operation and maintenance of the system provided. The training program shall be designed to provide a comprehensive understanding and functional level of competence with the system. It shall include hands-on exercises and be sufficiently detailed to allow Owner's personnel to operate the system independently of any outside assistance.
 - 1. The training plan shall include detailed session outlines and related reference materials for each of the attending employees. The District's personnel shall be able to utilize these materials in the subsequent training of their co-workers.

2. Training time shall be two sessions totaling not be less than eleven hours. The first seven hour session shall be split into a 4-hour morning segment and a 3 hour afternoon segment with a 1-hour break for lunch.
- B. The first training session shall be scheduled on a normal M-F workday which is acceptable to the District. It is desirable that the training be done within a two or three week period after completion of system startup, and the availability of the District's employees shall be a prime consideration in working out the training schedule. The second four hour session will be scheduled by the District on a normal M-F workday sometime during the warranty period.
 - C. The District will provide a conference room suitable for the training sessions.

END OF SECTION 26 0913

SECTION 26 0923

LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.

1.2 SUMMARY

- A. Section Includes:

- 1. Photoelectric control.

- B. Related Requirements:

- 1. Section 262726 "Wiring Devices" for wall-box dimmers, and receptacles.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show installation details for light-level sensors.
 - 1. Interconnection diagrams showing field-installed wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of lighting control device to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 PHOTOELECTRIC CONTROL

- A. UL 773, designed to respond to natural daylight with 15- second inherent delay to prevent functioning due to sudden bright light such as vehicle lights or lighting and to operate in ambient temperature from minus 50o C to plus 60o C.
- B. Adjust to turn lights ON at two plus or minus one foot candles, unless otherwise specified ON to OFF ratio: One to Three.
- C. Rating: 1,800 VA at 120 Volts or 277 volts, 60 Hertz, as shown.
- D. Contacts:
 - 1. For control of outdoor lights: SPST, NC contact.
- E. Cells: Hermetically sealed.

- F. Enclosure: Weatherproof and tamperproof aluminum enclosure equipped with locking receptacle when mounted on fixture or designed for mounting on outlet box as shown and as necessary.
- G. Acceptable Manufacturer: Paragon, ALR or Approved Equal.

2.2 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of device: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Wires and Cables."

PART 3 - EXECUTION

3.1 WIRING INSTALLATION

- A. Wiring Method: Comply with Section 260519 "Wires and Cables." Minimum conduit size is 1/2 inch.
- B. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes, terminal cabinets, or equipment enclosures.

3.2 IDENTIFICATION

- A. Identify components and power and control wiring.
 - 1. Identify circuits or luminaires controlled by photoelectric sensors at each sensor.
- B. Label photoelectric controls with a unique designation.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate photoelectric control devices and perform tests and inspections.
- B. Shield devices from external devices that might cause unreliable operation.
- C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Operational Test: After installing photoelectric controls, and after electrical circuitry has been energized, energize units to confirm proper unit operation.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Lighting control devices will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.4 ADJUSTING

- A. Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual field conditions.
 - 1. For daylighting controls, adjust setpoints and deadband controls to suit City's operations.

3.5 DEMONSTRATION

- A. Train City's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION 26 0923

SECTION 26 0924
DIGITAL LIGHTING & PLUG CONTROL SYSTEM

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Digital Lighting and Plug Load Controls

B. Related Sections:

1. Section 26 2726 - Wiring Devices.
2. Section 26 5100 –Lighting Fixtures
3. Drawings and general provision of the Contract, including General and Supplementary Conditions
4. Electrical Sections, including wiring devices, apply to the work of this Section.

C. Control Intent – Control Intent includes, but is not limited to:

1. Defaults and initial calibration settings for such items as time delay, sensitivity, fade rates, etc.
2. Initial sensor and switching zones
3. Initial time switch settings.

1.02 REFERENCES

- A. American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE)
- B. International Electrotechnical Commission (IEC)
- C. International Organization for Standardization (ISO)
- D. National Electrical Manufacturers Association (NEMA)
- E. WD1 (R2005) - General Color Requirements for Wiring Devices.
- F. Underwriters Laboratories, Inc. (UL)
 1. 20 – Plug Load Controls
 2. 916 – Energy Management Equipment

3. 924 – Emergency Lighting

1.03 SYSTEM DESCRIPTION & OPERATION

A. The Lighting Control and Automation system as defined under this section covers the following equipment:

1. Digital Lighting system local network – Free topology, plug-in wiring system (Cat 5e) for power and data to room devices.
2. Digital Room Controllers – Self-configuring, digitally addressable one, two or three relay plenum-rated controllers for on/off control. Selected models include 0-10 volt or line voltage forward phase control dimming outputs and integral current monitoring capabilities.
3. Digital Plug Load Controllers – Self-configuring, digitally addressable, single relay, plenum-rated application-specific controllers. Selected models include integral current monitoring capabilities.
4. Digital Fixture Controllers – Self-configuring, digitally addressable one relay fixture-integrated controllers for on/off/0-10V dimming control.
5. Digital Occupancy Sensors – Self-configuring, digitally addressable, calibrated occupancy sensors with two-way active infrared (IR) communications.
6. Digital Switches – Self-configuring, digitally addressable pushbutton on/off, dimming, and scene switches with two-way active infrared (IR) communications.
7. Handheld remotes for personal control – On/Off, dimming and scene remotes for control using infrared (IR) communications. Remote may be configured in the field to control selected loads or scenes without special tools.
8. Digital Daylighting Sensors – Single-zone closed loop, multi-zone open loop and single-zone dual-loop daylighting sensors with two-way active infrared (IR) communications for daylight harvesting using integrated dimming control.
9. Configuration Tools – Handheld remote for room configuration and relay panel programming provides two way infrared (IR) communications to digital devices and allows complete configuration and reconfiguration of the device / room from up to 30 feet away.

1.04 LIGHTING CONTROL APPLICATIONS

A. Unless relevant provisions of the applicable local energy codes are more stringent, provide a minimum application of lighting controls as follows:

1. Space Control Requirements – Provide occupancy/vacancy sensors with Manual- or Partial-ON functionality in all spaces where hands-free operation is desirable and Automatic-ON occupancy sensors are appropriate. Provide Manual-ON occupancy/vacancy sensors for other areas. For spaces with multiple occupants, or where line-of-sight may be obscured, provide ceiling- or corner-mounted sensors and

Manual-ON switches.

2. Dimmable Lighting – Provide dimmable lighting controls in all spaces where variable dimming is used and required by the 2013 Title 24 Building Energy Efficiency Standards.
3. Task Lighting / Plug Loads – Provide automatic shut off of non-essential plug loads where indicated and /or required. Provide Automatic-ON of plug loads whenever spaces are occupied. For spaces with multiple occupants a single shut off consistent with the overhead lighting may be used for the area.
4. Daylit Areas – Provide daylight-responsive automatic control in all spaces (conditioned or unconditioned) where daylight contribution is available as defined by relevant local building energy code:
 - a. All luminaires within code-defined daylight zones shall be controlled separately from luminaires outside of day lit zones.
 - b. Daytime set points for total ambient illumination (combined daylight and electric light) levels that initiate dimming shall be programmed in compliance with relevant local building energy codes.
 - c. Provide smooth and continuous dimming for areas marked on drawings. Daylighting control system may be designed to turn off electric lighting when daylight is at or above required lighting levels, only if system functions to turn light fixtures back on at dimmed level, rather than turning full-on prior to dimming.
 - d. Provide the ability to adjust the high end and low end trim of the dimmers to ensure the lighting automatically provides energy when daylighting calls for full illumination.

1.05 SUBMITTALS

- A. The following information shall be submitted for review and approval in accordance with Section 26 0500, "General Electrical Requirements".
- B. Submittals Package: Submit the shop drawings, and the product data specified below at the same time as a single package.
- C. Shop Drawings:
 1. Composite wiring and/or schematic diagram of each control circuit as proposed to be installed.
 2. Show exact location of all digital devices, including at minimum sensors, load controllers, and switches for each area on reflected ceiling plans. (Engineer will provide AutoCAD format reflected ceiling plans for contractor use.)
 3. Provide room/area details including products and sequence of operation for each room or area. Illustrate typical acceptable room/area connection topologies.
 4. Network riser diagram including floor and building level details. Include network

cable specification and end-of-line termination details, if required. Illustrate points of connection to integrated systems. Coordinate integration with mechanical and/or other trades.

D. Product Data: Catalog sheets, specifications and installation instructions.

E. Include data for each device which:

1. Indicates where sensor is proposed to be installed.
2. Prove that the sensor is suitable for the proposed application.

1.06 QUALITY ASSURANCE.

1.07 MANUFACTURER: Minimum 10 years' experience in manufacture of digital lighting controls.

1.08 PROJECT CONDITIONS

A. Do not install equipment until following conditions can be maintained in spaces to receive equipment:

1. Ambient temperature: 0° to 40° C (32° to 104° F).
2. Relative humidity: Maximum 90 percent, non-condensing.

1.09 WARRANTY

A. Provide a five year limited manufacturer's warranty on all room control devices.

1.10 MAINTENANCE

A. Spare Parts:

1. Provide spares of each product to be used for maintenance as listed below: Three (3) or 5 % (whichever is greater) of each digital lighting control; device installed on this project specifically:
 - a. Digital room controllers
 - b. Digital plug load controllers.
 - c. Digital occupancy sensors.
 - d. Digital dimming switches.
 - e. Digital daylight sensors.
 - f. Cat 5e cable terminated at both ends and tested- three (3) 10'-0" lengths for maintenance use.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer:

1. WattStopper
 - a. System: Digital Lighting Management (DLM)
2. Basis of design product: WattStopper Digital Lighting Management (DLM) or subject to compliance and prior approval with specified requirements of this section, one of the following:
 - a. N-Light
 - b. Eaton Cooper – Greengate.
 - c. Douglas Lighting Controls.
3. Substitutions:
 1. All proposed substitutions (clearly delineated as such) must be submitted in writing for approval by the design professional a minimum of 10 working days prior to the bid date and must be made available to all bidders. Proposed substitutes must be accompanied by a review of the specification noting compliance on a line-by-line basis.
 2. By using pre-approved substitutions, the contractor accepts responsibility and associated costs for all required modifications to circuitry, devices, and wiring. The contractor shall provide complete engineered shop drawings (including power and control wiring) with deviations from the original design highlighted for review and approval prior to rough-in
 3. Any substituted system(s) shall not incur any additional costs to the Owner. All Additional costs (if any) shall be fully borne by the contractor.

2.02 DIGITAL LIGHTING CONTROLS

- A. Furnish the Company's system which accommodates the square-footage coverage requirements for each area controlled, utilizing room controllers, digital occupancy sensors, switches, daylighting sensors and accessories which suit the lighting and electrical system parameters.

2.03 DLM LOCAL NETWORK (Room Network)

- A. The DLM local network is a free topology lighting control physical connection and communication protocol designed to control a small area of a building.
- B. Features of the DLM local network include:
 1. Plug n' Go™ automatic configuration and binding of occupancy sensors, switches and lighting loads to the most energy-efficient sequence of operation based upon the device attached.
 2. Simple replacement of any device in the local DLM network with a standard off the shelf unit without requiring significant commissioning, configuration or setup.

3. Push n' Learn™ configuration to change the automatic configuration, including binding and load parameters without tools, using only the buttons on the digital devices in the local network.
 4. Two-way infrared communications for control by handheld remotes, and configuration by a handheld tool including adjusting load parameters, sensor configuration and binding, within a line of sight of up to 30 feet from a sensor, wall switch or IR receiver.
- C. Digital room devices connect to the local network using pre-terminated Cat 5e cables with RJ-45 connectors, which provide both data and power to room devices. Systems that utilize RJ-45 patch cords but do not provide serial communication data from individual end devices are not acceptable.
- D. If manufacturer's pre-terminated Cat5e cables are not used for the installation, the contractor is responsible for testing each cable following installation and supplying manufacturer with test results.
- E. WattStopper Product Number: LMRJ-Series

2.04 DIGITAL LOAD CONTROLLERS (ROOM, PLUG LOAD AND FIXTURE CONTROLLERS)

- A. Digital controllers for lighting and plug loads automatically bind the room loads to the connected devices in the space without commissioning or the use of any tools. Room and plug load controllers shall be provided to match the room lighting and plug load control requirements. The controllers will be simple to install, or require special configuration for standard Plug n' Go applications. The control units will include the following features:
1. Automatic room configuration to the most energy-efficient sequence of operation based upon the devices in the room, and room use.
 2. Simple replacement – Using the default automatic configuration capabilities, a room controller may be replaced with an off-the-shelf identical device.
 3. Multiple room controllers connected together in a local network must automatically arbitrate with each other, without requiring any configuration or setup, so that individual load numbers are sequentially assigned using each controller's device ID's from highest to lowest.
 4. Device Status LEDs to indicate:
 - a. Data transmission
 - b. Device has power
 - c. Status for each load
 - d. Configuration status
 5. Quick installation features including:
 - a. Standard junction box mounting
 - b. Quick low voltage connections using industry standard RJ-45 patch

cable.

6. Based on individual configuration, each load shall be capable of the following behavior on power up following the loss of normal power:
 - a. Turn on to 100%
 - b. Turn off
 - c. Turn on to last level
 7. Each load shall at a minimum be configurable to operate in the following sequences based on occupancy:
 - a. Auto-on/Auto-off (Follow on and off)
 - b. Manual-on/Auto-off (Follow off only)
 8. The polarity of each load output shall be reversible, via digital configuration, so that on is off and off is on.
 9. UL 2043 plenum rated
 10. Manual override and LED indication for each load
 11. Dual voltage (120/277 VAC, 60 Hz), 60 Hz models rated for 20A total load, derating to 16A required for dimmed loads. Plug load controllers carry application-specific UL 20 rating for receptacle control.
 12. Zero cross circuitry for each load.
 13. All digital parameter data programmed into an individual room controller or plug load controller shall be retained in non-volatile FLASH memory within the controller itself. Memory shall have an expected life of no less than 10 years.
 14. A Demand response feature shall be incorporated integrally within all systems controlling projects of 10,000 SF in area or greater. This demand response feature may be integral to the room controller, or external. It shall fully comply with all requirements of the 2013 Title 24 Building Energy Efficiency Standards.
- B. On/Off/Dimming Room Controllers shall include:
1. Real time current monitoring.
 2. Multiple relay configurations.
 - a. One, two or three relays (LMRC-21x series)
 - b. One or two relays (LMRC-22x series)
 3. Efficient 250 mA switching power supply.
 4. Four RJ-45 DLM local network ports with integral strain relief and dust cover
 5. One dimming output per relay

- a. 0-10V Dimming - Where indicated, one 0-10 volt analog output per relay for control of compatible LED drivers. The 0-10 volt output shall automatically open upon loss of power to the Room Controller to assure full light output from the controlled lighting. (LMRC-21x series)
 - b. Each dimming output channel shall have an independently configurable minimum and maximum calibration trim level to set the dimming range to match the true dynamic range of the connected driver.
 - c. The LED level indicators on bound dimming switches shall utilize this new maximum and minimum trim.
 - d. Each dimming output channel shall have an independently configurable minimum and maximum trim level to set the dynamic range of the output within the new 0-100% dimming range defined by the minimum and maximum calibration trim.
 - e. Calibration and trim levels must be set per output channel.
 - f. Devices that set calibration or trim levels per controller are not acceptable.
 - g. All configurations shall be digital. Devices that set calibration or trim levels per output channel via trim pots or dip-switches are not acceptable.
6. Each load shall have an independently configurable preset on level for Normal Hours and After Hours events to allow different dimmed levels to be established at the start of both Normal Hours and After Hours events.
 7. Fade rates for dimming loads shall be specific to bound switch buttons, and the load shall maintain a default value for any bound buttons that do not specify a unique value.
 8. The following dimming attributes may be changed or selected using a wireless configuration tool:
 - a. Establish preset level for each load from 0-100%
 - b. Set high and low trim for each load
 9. Override button for each load provides the following functions:
 - a. Press and release for on/off control
 - b. Press and hold for dimming control
 10. WattStopper product numbers: LMRC-211, LRMC-212, LRMC-213, LMRC-221, LMRC-222

C. Plug Load Controllers shall include:

1. One relay configuration with additional connection for unswitched load.
2. Configurable additive time delay to extend plug load time delay beyond occupancy

sensor time delay (e.g. a 10 minute additive delay in a space with a 20 minute occupancy sensor delay ensures that plug loads turn off 30 minutes after the space is vacated).

3. Factory default operation is Auto-on/Auto-off, based on occupancy.
4. Real time current monitoring of both switched and un-switched load (LMPL-201 only)
5. Efficient switching power supply
 - a. 150mA (LMPL-101)
 - b. 250mA (LMPL-201)
6. RJ-45 DLM local network ports
 - a. Three RJ-45 ports (LMPL-101)
 - b. Four RJ-45 ports (LMPL-201)
7. WattStopper product numbers: LMPL-101, LMPL-201

D. Fixture Controllers shall include:

1. A form factor and product ratings to allow various OEM fixture manufacturers to mount the device inside the driver cavity of standard-sized LED general lighting fixtures.
2. One 3A 120/277V rated mechanically held relay.
3. Programmable behavior on power up following the loss of normal power:
 - a. Turn on to 100%
 - b. Turn off
 - c. Turn on to last level
4. Requirement for 7 mA at 24VDC operating power from the DLM local network.
 - a. The Fixture Controller does not require a connection to a neutral conductor to operate, and unlike other types of Load Controllers it does not contribute power to the DLM local network to drive accessory devices.
 - b. Power to drive the LMFC Fixture Controller electronics can come from any Room or Plug Load Controller, LMPB-100 Power Booster and/or LMZC-301 Zone Controller (described later in the LMCP LIGHTING CONTROL PANELS specification section).
5. 0-10V dimming capability via a single 0-10 volt analog output from the device for control of compatible LED drivers. The 0-10 volt output shall automatically open upon loss of power to the Fixture Controller.

6. Terminals to connect an RJ-45 adaptor with 24” leads, mountable in a ½” knock –out for connection to the DLM local network.
 - a. The adaptor leads are insulated for use in a fixture cavity, and the lead length allows the OEM fixture manufacturer flexibility to position the Fixture Controller and the RJ45 jack in the best locations on each fixture.
7. A complete set of dimming features described above in the section detailing On/Off/Dimming Enhanced Room Controllers.
8. WattStopper product numbers: Fixture Controller: LMFC-011, DLM Cable Connector: LMFC-RJ-50-24, Power Booster: LMPB-100

2.05 DIGITAL WALL OR CEILING MOUNTED OCCUPANCY SENSOR

- A. Wall or ceiling mounted (to suit installation) passive infrared (PIR), ultrasonic or dual technology digital (passive infrared and ultrasonic) occupancy sensor.
- B. Digital Occupancy Sensors shall provide graphic LCD display for digital calibration and electronic documentation. Features include the following:
 1. Digital calibration and pushbutton configuration for the following variables:
 - a. Sensitivity – 0-100% in 10% increments
 - b. Time delay – 1-30 minutes in 1 minute increments
 - c. Test mode –15 second time delay or less.
 - d. Detection technology – PIR, Ultrasonic or Dual Technology activation and/or re-activation.
 - e. Walk-through mode
 2. Load parameters including Auto/Manual-ON, blink warning, and daylight enable/disable when photosensors are included in the DLM local network.
 3. Programmable control functionality including:
 - a. Each sensor may be programmed to control specific loads within a local network.
 - b. Sensor shall be capable of activating one of 16 user-definable lighting scenes.
 - c. Adjustable retrigger time period for manual-on loads. Load will retrigger (turn on) automatically within a configurable period of time (default 10 seconds) after turning off.
 - d. On dual technology sensors, independently configurable trigger modes are available for both Normal (NH) and After Hours (AH) time periods. The retrigger mode can be programmed to use the following technologies:
 - e. Ultrasonic and Passive Infrared

- f. Ultrasonic or Passive Infrared
 - g. Ultrasonic only
 - h. Passive Infrared only
 - i. Independently configurable sensitivity settings for passive infrared and ultrasonic technologies (on dual technology sensors) for both Normal (NH) and After Hour (AH) time periods.
4. One or two RJ-45 port(s) for connection to DLM local network.
 5. Two-way infrared (IR) transceiver to allow remote programming through handheld commissioning tool and control by remote personal controls.
 6. Device Status LEDs, which may be disabled for selected applications, including:
 - a. PIR detection
 - b. Ultrasonic detection
 - c. Configuration mode
 - d. Load binding
 7. Assignment of occupancy sensor to a specific load within the room without wiring or special tools.
 8. Manual override of controlled loads.
 9. All digital parameter data programmed into an individual occupancy sensor shall be retained in non-volatile FLASH memory within the sensor itself. Memory shall have an expected life of no less than 10 years.
- C. Multiple occupancy sensors may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required.
- D. WattStopper product numbers: LMPX, LMDX, LMPC, LMUC, LMDC

2.06 DIGITAL WALL SWITCHES

- A. Low voltage momentary pushbutton switches in 1, 2, 3, 4, 5 and 8 button configurations as indicated. Wall switches shall include the following features:
1. Two-way infrared (IR) transceiver for use with personal and configuration remote controls.
 2. Removable buttons for field replacement with engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.
 3. Configuration LED on each switch that blinks to indicate data transmission.
 4. Load/Scene Status LED on each switch button with the following characteristics:

- a. Dim locator level indicates power to switch
 - b. Bright status level indicates that load or scene is active
 - c. Dimming switches shall include seven bi-level LEDs to indicate load levels using multiple steps.
5. Programmable control functionality including:
- a. Button priority may be configured to any BACnet priority level, from 1-16, corresponding to networked operation allowing local actions to utilize life safety priority
 - b. Scene patterns may be saved to any button. Once set, buttons may be digitally locked to prevent overwriting of the preset levels.
6. All digital parameter data programmed into an individual wall switch shall be retained in non-volatile FLASH memory within the wall switch itself. Memory shall have an expected life of no less than 10 years.
- B. Two RJ-45 ports for connection to DLM local network.
- C. Multiple digital wall switches may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration shall be required to achieve multi-way control.
- D. The following switch attributes may be changed or selected using a wireless configuration tool:
- E. Load and Scene button function may be reconfigured for individual buttons (from Load to Scene, and vice versa).
- 1. Individual button function may be configured to Toggle, On only or Off only.
 - 2. Individual scenes may be locked to prevent unauthorized change.
 - 3. Fade Up and Fade Down times for individual scenes may be adjusted from 0 seconds to 2 hours (minimum).
 - 4. Ramp rate may be adjusted for each dimmer switch.
 - 5. Switch buttons may be bound to any load on any load controller or relay panel and are not load type dependent; each button may be bound to multiple loads.
 - 6. WattStopper product numbers: LMSW-101, LMSW-102, LMSW-103, LMSW-104, LMSW-105, LMSW-108, LMDM-101. Available in white, light almond, ivory, grey, red and black; compatible with wall plates with decorator opening.

2.07 DLM HANDHELD USER INTERFACE REMOTES

- A. Battery-operated handheld devices in 1, 2 and 5 button configurations for remote switching or dimming control. Remote controls shall include the following features:

1. Two-way infrared (IR) transceiver for line of sight communication with DLM local network within up to 30 feet.
 2. LED on each button confirms button press.
 3. Load buttons may be bound to any load on a load controller or relay panel and are not load type dependent; each button may be bound to multiple loads.
 4. Inactivity timeout to save battery life.
- B. A wall mount holster and mounting hardware shall be included with each remote control
- C. WattStopper part numbers: LMRH-101, LMRH-102, LMRH-105.

2.08 DIGITAL DAYLIGHTING SENSORS

- A. Digital daylighting sensors shall work with load controllers and relay panels to provide automatic switching or dimming daylight harvesting capabilities for any load type connected to the controller or panel. Daylighting sensors shall be interchangeable without the need for rewiring.
1. Closed loop sensors measure the ambient light in the space and control a single lighting zone.
 2. Open loop sensors measure incoming daylight in the space, and are capable of controlling up to three lighting zones.
 3. Dual loop sensors measure both ambient and incoming daylight in the space to insure that proper light levels are maintained as changes to reflective materials are made in a single zone.
- B. Digital daylighting sensors shall include the following features:
1. The sensor's internal photodiode shall only measure lightwaves within the visible spectrum. The photodiode's spectral response curve shall closely match the entire photopic curve. The photodiode shall not measure energy in either the ultraviolet or infrared spectrums. The photocell shall have a sensitivity of less than 5% for any wavelengths less than 400 nanometers or greater than 700 nanometers.
 2. The capability of ON/OFF, or dimming, for each controlled zone, depending on the selection of load controller(s) and load binding to controller(s).
 3. For switching daylight harvesting, the photosensor shall provide a field-selectable deadband, or a separation, between the "ON Setpoint" and the "OFF Setpoint" that will prevent the lights from cycling excessively after they turn off.
 4. For dimming daylight harvesting, the photosensor shall provide the option, when the daylight contribution is sufficient, of turning lights off or dimming lights to a field-selectable minimum level.
 5. Photosensors shall have a digital, independently configurable fade rate for both increasing and decreasing light level in units of percent per second.

6. Photosensors shall provide adjustable cut-off time. Cut-off time is defined by the number of selected minutes the load is at the minimum output before the load turns off. Selectable range between 0-120 minutes (minimum).
7. Optional wall switch override shall allow occupants to reduce lighting level to increase energy savings or, if permitted by system administrator, raise lighting levels for a selectable period of time or cycle of occupancy.
8. Integral infrared (IR) transceiver for configuration and/or commissioning with a handheld configuration tool, to transmit detected light level to wireless configuration tool, and for communication with personal remote controls.
9. Configuration LED status light on device that blinks to indicate data transmission.
10. Status LED indicates test mode, override mode and load binding.
11. Recessed switch on device to turn controlled load(s) ON or OFF.
12. One RJ-45 port for connection to DLM local network.
13. A choice of accessories to accommodate multiple mounting methods and building materials. The photosensors may be mounted on a ceiling tile, skylight light well, suspended lighting fixture or backbox. Standard tube photosensors accommodate mounting materials from 0-0.62" thickness (LMLS-400, LMLS-500). Extended tube photosensors accommodate mounting materials from 0.62"-1.25" thickness (LMLS-400-L, LMLS-500-L). Mounting brackets are compatible with J boxes (LMLS-MB1) and wall mounting (LMLS-MB2). LMLS-600 photosensor to be mounted on included bracket below skylight well.
14. Any load or group of loads in the room can be assigned to a daylighting zone
15. Each load within a daylighting zone can be individually enabled or disabled for discrete control (load independence).
16. All digital parameter data programmed into a photosensor shall be retained in non-volatile FLASH memory within the photosensor itself. Memory shall have an expected life of no less than 10 years.

C. Closed loop digital photosensors shall include the following additional features:

1. An internal photodiode that measures light in a 100-degree angle, cutting off the unwanted light from bright sources outside of this cone.
2. Automatic self-calibration, initiated from the photosensor, a wireless configuration tool or a PC with appropriate software.
3. Automatically establishes application-specific setpoints following self-calibration. For switching operation, an adequate deadband between the ON and OFF setpoints shall prevent the lights from cycling; for dimming operation a sliding setpoint control algorithm with separate Day and Night setpoints shall prevent abrupt ramping of loads.

4. WattStopper Product Number: LMLS-400, LMLS-400-L.

D. Open loop digital photosensors shall include the following additional features:

1. An internal photodiode that measures light in a 60-degree angle (cutting off the unwanted light from the interior of the room).
2. Automatically establishes application-specific setpoints following manual calibration using a wireless configuration tool or a PC with appropriate software. For switching operation, an adequate deadband between the ON and OFF setpoints for each zone shall prevent the lights from cycling; for dimming operation, a proportional control algorithm shall maintain the design lighting level in each zone.
3. Each of the three discrete daylight zones can include any non-overlapping group of loads in the room.
4. WattStopper Product Number: LMLS-500, LMLS-500-L.

E. Dual loop digital photosensors shall include the following additional features:

1. Close loop portion of dual loop device must have an internal photodiode that measures light in a 100 degree angle, cutting off the unwanted light from sources outside of this con
2. Open loop portion of dual loop device must have an internal photodiode that can measure light in a 60 degree angle, cutting off the unwanted light from the interior of the room.
3. Automatically establishes application-specific set-points following self-calibration. For switching operation, an adequate deadband between the ON and OFF setpoints shall prevent the lights from cycling; for dimming operation a sliding setpoint control algorithm with separate Day and Night setpoints shall prevent abrupt ramping of load.
4. Device must reference closed loop photosensor information as a base line reference. The device must be able to analyze the open loop photosensor information to determine if an adjustment in light levels is required.
5. Device must be able to automatically commission setpoints each night to provide adjustments to electrical lighting based on changes in overall lighting in the space due to changes in reflectance within the space or changes to daylight contribution based on seasonal changes.
6. Device must include extendable mounting arm to properly position sensor within a skylight well.
7. WattStopper product number LMLS-600.

2.09 HANDHELD AND COMPUTER CONFIGURATION TOOLS

- A. A wireless configuration tool facilitates optional customization of DLM local networks using two-way infrared communications, while PC software connects to each local network via a

USB interface.

- B. Features and functionality of the wireless configuration tool shall include but not be limited to:
1. Two-way infrared (IR) communication with DLM IR-enabled devices within a range of approximately 30 feet.
 2. High visibility LED display, pushbutton user interface and menu-driven operation.
 3. Must be able to read and modify parameters for load controllers and relay panels, occupancy sensors, wall switches, daylighting sensors, network bridges, and identify DLM devices by type and serial number.
 4. Save up to eight occupancy sensor setting profiles, and apply profiles to selected sensors.
 5. Temporarily adjust light level of any load(s) on the local network, and incorporate those levels in scene setting. Set room mode for testing of Normal Hours (NH) and After Hours (AH) parameter settings.
 6. Adjust or fine-tune daylighting settings established during auto-configuration, and input light level data to complete configuration of open loop daylighting controls.
 7. Set room mode for testing of Normal Hours (NH) and After Hours (AH) parameter settings.
 8. Verify status of building level network devices.
- C. WattStopper Product Numbers: LMCT-100, LMCI-100/LMCS-100.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. The control system shall be installed and fully wired by the installed contractor as shown on the contract drawings and accept submittal drawings. The contractor shall complete all electrical connections to all control circuits.
- B. All low voltage smart devices shall connect using QuickConnect plenum rated wire provided by the manufacturer. When using wire for connections other than the QuickConnect low voltage wire, provide detailed point to point wiring diagrams for every termination. Provide wire specifications and wire colors to simplify contractor termination requirements.
- C. Install the work of this Section in accordance with manufacturer's printed instructions.
- D. Provide written or computer-generated documentation on the commissioning of the system including room by room description including:
1. Sensor parameters, time delays, sensitivities and daylighting setpoints.
 2. Sequence of operation, (e.g. manual ON, Auto OFF. etc.).
 3. Load parameters (e.g. blink warning, etc.).

- E. Prior to project completion contractor shall test / set /adjust the following lighting control components to the satisfaction of the owner:
 - a. Dimming controls and fade rates.
 - b. Engraved dimming switch nomenclature.
 - c. Controlled receptacles marked per code.

3.02 PRODUCT SUPPORT AND SERVICE

- A. Factory telephone support shall be available at no cost to the owner. Factory assistance shall consist of solving programming or application questions concerning the control equipment.

3.03 FACTORY COMMISSIONING

- A. Upon completion of the installation, the system shall be commissioned by the manufacturer's factory authorized representative who will verify correct installation and provide network programming to enhance the out-of-the-box configuration to meet the site requirements and all requirements to fully meet and comply with the California 2013 Title 24 Energy Efficiency Standards. Systems that do not function without commissioning shall not be acceptable.
- B. The electrical contractor shall provide both the owner and the electrical engineer with twenty one working days written notice of the system startup and adjustment date.
- C. The electrical shall perform basic Room Controller system checkout per documentation within the system installation instructions to confirm out-of-the-box configurations.

3.04 PRE-INSTALLATION MEETING

- A. A factory authorized manufacturer's representative shall provide the electrical contractor a functional overview of the lighting control system prior to installation. The contractor shall schedule the pre-installation site visit after receipt of approved submittals to review the following:
 - 1. Confirm the location and mounting of all digital devices, with special attention to placement of occupancy and daylighting sensors.
 - 2. Review the specifications for low voltage control wiring and termination.
 - 3. Discuss the functionality and configuration of all products, including sequences of operation, per design requirements.
 - 4. Discuss requirements for integration with other trades.

3.05 CONTRACTOR INSTALLATION AND SERVICES

- A. Contractor shall install all devices and wiring in a professional manner. All line voltage connections shall be tagged to indicate circuit and switched legs.
- B. Contractor shall install all room/area devices using manufacturer's factory-tested Cat 5e cable with pre-terminated RJ-45 connectors. If pre-terminated cable is not used for room/area wiring, the contractor is responsible for testing each field-terminated cable following

installation, and shall supply the lighting controls manufacturer with test results. Contractor shall install any room to room network devices using manufacturer-supplied LM-MSTP network wire. Network wire substitution is not permitted and may result in loss of product warranty per DLM SEGMENT NETWORK section of specification. Low voltage wiring topology must comply with manufacturer's specifications. Contractor shall route network wiring as shown in submittal drawings as closely as possible, and shall document final wiring location, routing and topology on as built drawings.

- C. Install the work of this Section in accordance with manufacturer's printed instructions unless otherwise indicated. Before start up, contractor shall test all devices to ensure proper communication.
- D. Calibrate all sensor time delays and sensitivity to guarantee proper detection of occupants and energy savings.
 - 1. Adjust time delay so that controlled area remains lighted while occupied.
- E. Provide written or computer-generated documentation on the configuration of the system including room by room description including:
 - 1. Sensor parameters, time delays, sensitivities, and daylighting setpoints.
 - 2. Sequence of operation, (e.g. manual ON, Auto OFF. etc.)
 - 3. Load Parameters (e.g. blink warning, etc.)
- F. Post start-up tuning – After 30 days from occupancy contractor shall adjust sensor time delays and sensitivities to meet the Owner's requirements. Provide a detailed report to the Architect / Owner of post start-up activation.

3.06 ACCEPTANCE TESTING SUPPORT SERVICES

- A. On all California projects, a certified lighting controls acceptance test technician (CLCATT) must verify the installation of the lighting control system. Manufacturer should include an extra day of factory technician's time to assist the CLCATT review the functionality and settings of the lighting control hardware per the requirements in the California State forms. It will be the CLCATT's responsibility to create and complete any forms required for the commissioning process, although the manufacturer or contractor may offer spreadsheets and/or printouts to assist the CLCATT with this task.

END OF SECTION 26 0924

SECTION 26 0943.23

RELAY-BASED LIGHTING CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.

1.2 SUMMARY

- A. Section Includes: Lighting control panels using mechanically held relays for switching.
- B. Section Includes: Networked lighting control panels using control-voltage relays for switching and that are interoperable with BAS.

1.3 DEFINITIONS

- A. BAS: Building automation system.
- B. CBC: California Building Code (CCR Title 24, Part 2).
- C. CEC: California Electrical Code (CCR Title 24, Part 3).
- D. IP: Internet protocol.
- E. Monitoring: Acquisition, processing, communication, and display of equipment status data, metered electrical parameter values, power quality evaluation data, event and alarm signals, tabulated reports, and event logs.
- F. PC: Personal computer; sometimes plural as "PCs."
- G. RS-485: A serial network protocol, similar to RS-232, complying with TIA-485-A.

1.4 ACTION SUBMITTALS

- A. The following information shall be submitted for review and approval in accordance with Section 260500, "General Electrical Requirements".
- B. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for control modules, power distribution components, relays, manual switches and plates, and conductors and cables.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- C. Shop Drawings: For each relay panel and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
 - 2. Detail enclosure types and details for types other than NEMA 250, Type 1.

3. Detail wiring partition configuration, current, and voltage ratings.
4. Short-circuit current rating of relays.
5. Include diagrams for power, signal, and control wiring.
6. Block Diagram: Show interconnections between components specified in this Section and devices furnished with power distribution system components. Indicate data communication paths and identify networks, data buses, data gateways, concentrators, and other devices to be used. Describe characteristics of network and other data communication lines.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Submit evidence that lighting controls are compatible with connected monitoring and control devices and systems specified in other Sections.
 1. Show interconnecting signal and control wiring, and interface devices that prove compatibility of inputs and outputs.
 2. For networked controls, list network protocols and provide statements from manufacturers that input and output devices comply with interoperability requirements of the network protocol.
- B. Qualification Data: For testing agency.
- C. Field quality-control reports.
- D. Software licenses and upgrades required by and installed for operation and programming of digital and analog devices.
- E. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For lighting controls to include emergency, operation, and maintenance manuals.
- B. Software and Firmware Operational Documentation:
 1. Software operating and upgrade manuals.
 2. Program Software Backup: On magnetic media or compact disk, complete with data files.
 3. Device address list.
 4. Printout of software application and graphic screens.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Lighting Control Relays: Equal to ten percent of amount installed for each size indicated, but no fewer than three.

1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA or an NRTL.
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Handle and prepare panels for installation according to NECA 407 "Recommended Practice for Installing and Maintaining Panelboards".

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Input signal from field-mounted manual switches, or digital signal sources, shall open or close one or more lighting control relays in the lighting control panels. Any combination of inputs shall be programmable to any number of control relays.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, by a qualified testing agency, and marked for intended location and application.
- C. Comply with 47 CFR, Subparts A and B, for Class A digital devices.
- D. Comply with UL 916 "Energy Management Equipment".

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Lighting control panels shall withstand the effects of earthquake motions determined according to CBC.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified."
 - 2. Component Importance Factor: As indicated on drawings
- B. BAS Interface: Provide hardware and software to enable the BAS to monitor, control, display, and record data for use in processing reports.
 - 1. Hardwired Points:
 - a. Monitoring: On-off status
 - b. Control: On-off operation
 - 2. Communication Interface: Comply with ASHRAE 135 BACnet A Data Communication Protocol for Building Automation and Control Networks The communication interface shall enable the BAS operator to remotely control and monitor lighting from a BAS operator workstation. Control features and monitoring points displayed locally at lighting panel shall be available through the BAS.

2.3 NETWORKED LIGHTING CONTROL PANELS

- A. Products: Subject to compliance with requirements, provide one of the following
 - 1. Acuity Brands, Inc., Lighting Control & Design, Inc.; GR2400.

2. General Electric Company, GE Consumer & Industrial - Electrical Distribution; LVRC.
 3. Touch-Plate Technologies; Control Plus.
 4. WattStopper, a Legrand Group brand; Lighting Integrator.
- B. Description: Lighting control panels using mechanically latched relays to control lighting and appliances. The panels shall be capable of being interconnected with digital communications to appear to the operator as a single lighting control system.
- C. Lighting Control Panels:
1. A single enclosure with incoming lighting branch circuits, control circuits, switching relays, and on-board timing and control unit.
 2. A vertical barrier separating branch circuits from control wiring.
- D. Main Control Unit: Installed in the main lighting control panel only; powered from the branch circuit of the standard control unit.
1. Ethernet Communications: Comply with MS Windows TCP/IP protocol. The main control unit shall provide for programming of all control functions of the main and all networked slave lighting control panels including timing, sequencing, and overriding.
 2. Compliance with ASHRAE 135: Controllers shall support serial RS-485 and Ethernet IP communications, and shall be able to communicate directly via BAS RS-485 serial networks and Ethernet 10Base-T networks as a native device.
 3. Web Server: Display information listed below over a standard Web-enabled server for displaying information over a standard browser.
 - a. A secure, password-protected login screen for modifying operational parameters, accessible to authorized users via Web page interface.
 - b. Panel summary showing the master and slave panels connected to the controller.
 - c. Controller diagnostic information.
 - d. Show front panel mimic screens for setting up controller parameters, input types, zones, and operating schedules. These mimic screens shall also allow direct breaker control and zone overrides.
 4. Timing Unit:
 - a. 365-day calendar, astronomical clock, and automatic adjustments for daylight savings and leap year.
 - b. Clock configurable for 12-hour (A.M./P.M.) or 24-hour format.
 - c. Four independent schedules, each having 24 time periods.
 - d. Schedule periods settable to the minute.
 - e. Day-of-week, day-of-month, day-of-year with one-time or repeating capability.
 - f. 16 special date periods.

5. Time Synchronization: The timing unit shall be updated not less than every 12 hour(s) with the network time server.
6. Sequencing Control with Override:
 - a. Automatic sequenced on and off switching of selected relays at times set at the timing unit, allowing timed overrides from external switches.
 - b. Sequencing control shall operate relays one at a time, completing the operation of all connected relays in not more than 10 seconds.
 - c. Override control shall allow any relay connected to it to be switched on or off by a field-deployed manual switch or by an automatic switch, such as an occupancy sensor.
 - d. Override control "blinking warning" shall warn occupants approximately five minutes before actuating the off sequence.
 - e. Activity log, storing previous relay operation, including the time and cause of the change of status.
 - f. Download firmware to the latest version offered by manufacturer.
- E. Standard Control Unit, Installed in All Lighting Control Panels: Contain electronic controls for programming the operation of the relays in the control panel, contain the status of relays, and contain communications link to enable the digital functions of the main control unit. Comply with UL 916.
 1. Electronic control for operating and monitoring individual relays, and display relay on-time.
 2. Nonvolatile memory shall retain all setup configurations. After a power failure, the controller shall automatically reboot and return to normal system operation.
 3. Integral keypad and digital-display front panel for local setup, including the following:
 - a. Blink notice, time adjustable from software.
 - b. Ability to log and display relay on-time.
 - c. Capability for accepting downloadable firmware so that the latest production features may be added in the future without replacing the module.
- F. Relays: Electrically operated, mechanically held single-pole switch, rated at 20 A at 277 V. Short-circuit current rating shall be not less than 5 kA. Control shall be digital control network.
- G. Relays: Electrically operated, mechanically held single-pole switch, rated at 20 A at 120-V tungsten, 30 A at 277-V ballast, 1.5 hp at 120 V, and 3 hp at 277 V. Short-circuit current rating shall be not less than 14 kA. Control shall be digital control network.
- H. Power Supply: NFPA 70, Class 2, UL listed, sized for connected equipment, plus not less than 20 percent spare capacity. Powered from a dedicated branch circuit of the panelboard that supplies power to the line side of the relays, sized to provide control power for the local panel-

mounted relays, bus system, low-voltage inputs, field-installed occupancy sensors, and low-voltage photo sensors.

- I. Operator Interface: At the main control unit, provide interface for a tethered connection of a portable PC running MS Windows for configuring all networked lighting control panels using setup software designed for the specified operating system. Include one portable device for initial programming of the system and training of City's personnel. That device shall remain the property of the City.
- J. Software:
 - 1. Menu-driven data entry.
 - 2. Online and offline programming and editing.
 - 3. Provide for entry of the room or space designation for the load side of each relay.
 - 4. Monitor and control all relays, showing actual relay state and the name of the automatic actuating control, if any.
 - 5. Size the software appropriate to the system.

2.4 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Class 2 Power Source: Not smaller than No. 12 AWG, complying with Section 260519 "Wires and Cables."
- B. Classes 2 and 3 Control Cables: Multiconductor cable with copper conductors not smaller than No. 22 AWG, complying with Section 260519 "Wires and Cables."
- C. Class 1 Control Cables: Multiconductor cable with copper conductors not smaller than No. 16 AWG, complying with Section 260519 "Wires and Cables."
- D. Digital and Multiplexed Signal Cables: Unshielded, twisted-pair cable with copper conductors, complying with TIA/EIA-568-B.2, Category 6 for horizontal copper cable and with Section 271500 "Communications Horizontal Cabling."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Receive, inspect, handle, and store panels according to NECA 407.
- B. Examine panels before installation. Reject panels that are damaged or rusted or have been subjected to water saturation.
- C. Examine elements and surfaces to receive panels for compliance with installation tolerances and other conditions affecting performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 WIRING INSTALLATION

- A. Comply with NECA 1 and CEC.

- B. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters. Conceal raceway and cables except in unfinished spaces.
 1. Install plenum cable in environmental air spaces, including plenum ceilings.
 2. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- D. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

3.3 PANEL INSTALLATION

- A. Comply with NECA 1 and CEC.
- B. Install panels and accessories according to NECA 407.
- C. Mount top of trim 90 inches above finished floor unless otherwise indicated.
- D. Mount panel cabinet plumb and rigid without distortion of box.
- E. Install filler plates in unused spaces.

3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 260553 "Identification for Electrical Systems."
- C. Create a directory to indicate loads served by each relay; incorporate City's final room designations. Obtain approval before installing. Use a PC or typewriter to create directory; handwritten directories are not acceptable.
- D. Lighting Control Panel Nameplates: Label each panel with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Acceptance Testing Preparation:
1. Test continuity of each circuit.
- E. Lighting control panel will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports, including a certified report that identifies lighting control panels and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations made after remedial action.
- 3.6 STARTUP SERVICE
- A. Engage a factory-authorized service representative to perform startup service.
1. Complete installation and startup checks according to manufacturer's written instructions.
 2. Confirm correct communications wiring, initiate communications between panels, and program the lighting control system according to approved configuration schedules, time-of-day schedules, and input override assignments.
- 3.7 ADJUSTING
- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
- 3.8 SOFTWARE SERVICE AGREEMENT
- A. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.
- B. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within [two] years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.
1. Upgrade Notice: At least 30 days to allow City to schedule and access the system and to upgrade computer equipment if necessary.
- 3.9 DEMONSTRATION
- A. Engage a factory-authorized service representative to train City's maintenance personnel to adjust, operate, and maintain the control unit and operator interface.

END OF SECTION 26 0943.23

SECTION 26 2413
SWITCHBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Service and distribution switchboards rated 600 V and less.
2. Disconnecting and overcurrent protective devices.
3. Accessory components and features.
4. Identification.

1.2 ACTION SUBMITTALS

- A. The following information shall be submitted for review and approval in accordance with Section 260500, "General Electrical Requirements".
- B. Product Data: For each type of product indicated.
- C. Shop Drawings: For each switchboard and related equipment.
 1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings.
 2. Include time-current coordination curves for each type and rating of overcurrent protective device included in switchboards.
 3. Include schematic and wiring diagrams for power, signal, and control wiring.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NEMA PB 2.
- C. Comply with NFPA 70.
- D. Comply with UL 891.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following.
 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 3. Siemens Energy & Automation, Inc.
 4. Square D; a brand of Schneider Electric.
- B. Front-Connected, Front-Accessible Switchboards:
 1. Main Devices: Panel mounted.
 2. Branch Devices: Panel mounted.
 3. Sections front and rear aligned.
- C. Nominal System Voltage: 208Y/120 V.
- D. Main-Bus Continuous: 400 A.
- E. Seismic Requirements: Fabricate and test switchboards according to IEEE 344 to withstand local seismic forces.
- F. Enclosure: Steel, NEMA 250, Type 3R.
 1. Enclosure Finish: Factory-applied finish in manufacturer's standard gray finish over a rust-inhibiting primer on treated metal surface.
 2. Enclosure: Downward, rearward sloping roof; bolt-on rear covers for each section, with provisions for padlocking.
- G. Utility Metering Compartment: Fabricated, barrier compartment and section complying with utility company's requirements. If separate vertical section is required for utility metering, match and align with basic switchboard. Provide service entrance label and necessary applicable service entrance features. Submit shop drawings to the Utility Company for their review, and receive sign-off from their Meter Dept. prior to ordering equipment.
- H. Bus Transition and Incoming Pull Sections: Matched and aligned with basic switchboard.
- I. Hinged Front Panels: Allow access to circuit breaker, metering, accessory, and blank compartments.
- J. Phase and Neutral Buses and Connections: Three phase, four wire unless otherwise indicated. Tin-plated, high-strength, electrical-grade copper alloy with tin-plated copper circuit-breaker line connections.

1. Ground Bus: 1/4-by-2-inch- (6-by-50-mm-) minimum size, hard-drawn copper of 98 percent conductivity, equipped with pressure connectors for feeder and branch-circuit ground conductors.
 2. Main Phase Buses and Equipment Ground Buses: Uniform capacity for entire length of switchboard's main and distribution sections. Provide for future extensions from both ends.
 3. Neutral Buses: 100 percent of the ampacity of phase buses unless otherwise indicated, equipped with pressure connectors for outgoing circuit neutral cables.
- K. Future Devices: Equip compartments with mounting brackets, supports, bus connections, and appurtenances at full rating of circuit-breaker compartment.

2.2 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.
1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
 3. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:
 - a. Standard frame sizes, trip ratings, and number of poles.
 - b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor material.
 - c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
- B. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.
- C. Fuses are specified in Section 262813 "Fuses."

2.3 ACCESSORY COMPONENTS AND FEATURES

- A. Spare-Fuse Cabinet: Suitably identified, wall-mounted, lockable, compartmented steel box or cabinet. Arrange for wall mounting.

2.4 IDENTIFICATION

- A. Service Equipment Label: NRTL labeled for use as service equipment for switchboards with one or more service disconnecting and overcurrent protective devices.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Receive, inspect, handle, store and install switchboards and accessories according to NECA 400.
- B. Equipment Mounting: Install switchboards on concrete base, 4-inch (100-mm) nominal thickness.
 - 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
 - 2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 4. Install anchor bolts to elevations required for proper attachment to switchboards.
- C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from switchboard units and components.
- D. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- E. Install filler plates in unused spaces of panel-mounted sections.
- F. Install overcurrent protective devices, transient voltage suppression devices, and instrumentation.
 - 1. Set field-adjustable switches and circuit-breaker trip ranges.
- G. Install spare-fuse cabinet.
- H. Comply with NECA 1.

3.2 IDENTIFICATION

- A. Switchboard Nameplates: Label each switchboard compartment with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Device Nameplates: Label each disconnecting and overcurrent protective device and each meter and control device mounted in compartment doors with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each switchboard bus, component, connecting supply and feeder.
 - 2. Test continuity of each circuit.
- B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 3. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Switchboard will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports, including a certified report. Include notation of deficiencies detected, remedial action taken and observations after remedial action.

END OF SECTION 26 2413

SECTION 26 2416

PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.

1.2 SUMMARY

- A. Section Includes:

- 1. Lighting and appliance branch-circuit panelboards.

- B. Related Sections:

- 1. Section 260573 - Overcurrent Protective Devices

1.3 DEFINITIONS

- A. CBC: California Building Code (CCR Title 24, Part 2)
- B. CEC: California Electrical Code (CCR Title 24, Part 3)

1.4 ACTION SUBMITTALS

- A. The following information shall be submitted for review and approval in accordance with Section 260500, "General Electrical Requirements".
- B. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- C. Shop Drawings: For each panelboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
 - 2. Detail enclosure types and details for types other than NEMA 250, Type 1.
 - 3. Detail bus configuration, current, and voltage ratings.
 - 4. Short-circuit current rating of panelboards and overcurrent protective devices.
 - 5. Include evidence of NRTL listing for series rating of installed devices.
 - 6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - 7. Include wiring diagrams for power, signal, and control wiring.

8. Include time-current coordination curves, including manufacturer's curve numbers for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graph paper; include selectable ranges for each type of overcurrent protective device.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Field Quality-Control Reports:
 1. Test procedures used.
 2. Test results that comply with requirements.
 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- C. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Keys: Two spares for each type of panelboard cabinet lock.
 2. Circuit Breakers Including GFCI and Ground Fault Equipment Protection (GFEP) Types: Two spares for each panelboard.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member Company of NETA or an NRTL.
 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
- B. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.
- C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, by a qualified testing agency, and marked for intended location and application.
- E. Comply with NEMA PB 1.
- F. Comply with CEC.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Handle and prepare panelboards for installation according to NECA 407 "Recommended Practice for Installing and Maintaining Panelboards."

1.9 PROJECT CONDITIONS

A. Environmental Limitations:

- 1. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - a. Ambient Temperature: Not exceeding 23 deg F to plus 104 deg F.
 - b. Altitude: Not exceeding 6600 feet.

B. Service Conditions: NEMA PB 1, usual service conditions, as follows:

- 1. Ambient temperatures within limits specified.
- 2. Altitude not exceeding 6600 feet.

C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by City or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

- 1. Notify Engineer no fewer than five days in advance of proposed interruption of electric service.
- 2. Do not proceed with interruption of electric service without Engineer's written permission.
- 3. Comply with NFPA 70E.

1.10 COORDINATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- C. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

1.11 WARRANTY

- A. When warranties are required, verify the City's counsel that special warranties stated in this article are not less than remedies available to City under prevailing local laws.

- B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

- 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

- A. Enclosures: Flush- and/or surface-mounted cabinets as indicated on drawings.
 - 1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
 - b. Outdoor Locations: NEMA 250, Type 3R.
 - 2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
 - 3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
 - 4. Finishes:
 - a. Panels and Trim: Steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
 - b. Back Boxes: Galvanized steel.
 - c. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components.
 - 5. Directory Card: Inside panelboard door, mounted in metal frame with transparent protective cover.
- B. Incoming Mains Location: As indicated on drawings.
- C. Phase, Neutral, and Ground Buses:
 - 1. Material: Hard-drawn copper, 98 percent conductivity.
 - 2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
- D. Conductor Connectors: Suitable for use with conductor material and sizes.
 - 1. Material: Tin-plated copper.
 - 2. Main and Neutral Lugs: Mechanical type.
 - 3. Ground Lugs and Bus-Configured Terminators: Mechanical type.
- E. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

- F. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.
- G. Supply a minimum 10% spare breaker space in all panels.
- H. Provide 10% more ampacity for electrical panel above calculated load requirements.
- I. Provide one ¾ inch conduit for three spares or spaces in all flush mounted power or lighting panel boards. Routed conduits to accessible space above ceiling.
- J. All panels shall have bolt on breakers. For additional requirements refer to Section 260573 - Overcurrent Protective Devices.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to CBC and SEI/ASCE 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified"

2.3 ACCEPTABLE MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit
 - 2. General Electric Company; GE Consumer & Industrial – Electrical Distribution
 - 3. Siemens Energy and Automation
 - 4. Square D; a brand of Schneider Electric

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
- B. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- C. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.5 ACCESSORY COMPONENTS AND FEATURES

- A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.
- B. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Receive, inspect, handle, and store panelboards according to NECA 407.

- B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.
- C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install panelboards and accessories according to NECA 407.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.
- C. Comply with mounting and anchoring requirements specified in Section 260548 "Vibration and Seismic Controls for Electrical Systems."
- D. Mount top of trim 72 inches above finished floor unless otherwise indicated.
- E. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- F. Install overcurrent protective devices and controllers not already factory installed.
 - 1. Set field-adjustable, circuit-breaker trip ranges using settings determined by the Architect. Provide 5 day notice to Engineer before adjusting trip settings.
- G. Install filler plates in unused spaces.
- H. Comply with NECA 1.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 260553 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads; incorporate City's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

E. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

F. Panelboards will be considered defective if they do not pass tests and inspections.

G. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action. Infrared testing reports shall include color photos indicating device temperature test results.

3.5 ADJUSTING

A. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges.

C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.

1. Measure as directed during period of normal system loading.
2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

END OF SECTION 26 2416

SECTION 26 2726
WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Weather-resistant receptacles.
3. Wall box dimmers.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Receptacles for Owner-Furnished Equipment: Match plug configurations.

1.3 ACTION SUBMITTALS

- A. The following information shall be submitted for review and approval in accordance with Section 260500, "General Electrical Requirements".
- B. Product Data: For each type of product.
- C. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).

- B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:

1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
2. Devices shall comply with the requirements in this Section.

2.3 STRAIGHT-BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.
 1. Products: Subject to compliance with requirements, provide the following:
 - a. Hubbell; HBL5351 (single), HBL5352 (duplex), or approved equal.

2.4 GFCI RECEPTACLES

- A. General Description:
 1. Straight blade, feed-through type.
 2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
 3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
 1. Products: Subject to compliance with requirements, provide the following:
 - a. Hubbell; GFR5352L or approved equal.
 2. Where installed outdoors, the flush mounted enclosures shall be stainless steel CW Cole TL-310-WCS type only, all keyed alike.

2.5 DECORATOR-STYLE DEVICES

- A. Convenience Receptacles: Square face, 125 V, 20 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, and UL 498.
 1. Products: Subject to compliance with requirements, provide the following:
 - a. Hubbell; DR20, or approved equal.
- B. GFCI, Feed-Through Type, Convenience Receptacles: Square face, 125 V, 20 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and UL 943 Class A.
 1. Products: Subject to compliance with requirements, provide the following:
 - a. Hubbell; GF15LA, or approved equal.

C. Toggle Switches, Square Face, 120/277 V, 15 A: Comply with NEMA WD 1, UL 20, and FS W-S-896.

1. Products: Subject to compliance with requirements, provide the following:

a. Hubbell; DS120 (single pole), DS320 (three way), or approved equal.

2.6 DIMMER SWITCHES

A. Dimmer Switches:

1. Provide 120/277 volt Lutron Diva style manual wall box dimmers that are fully compatible with the LED light fixture being controlled.

2.7 WALL PLATES

A. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.

2. Material for Finished Spaces: Steel with white baked enamel, suitable for field painting.

3. Material for Unfinished Spaces: Galvanized steel.

4. Material for Damp Locations: Thermoplastic with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

2.8 FINISHES

A. Device Color:

1. Wiring Devices Connected to Normal Power System: White unless otherwise indicated or required by NFPA 70 or device listing.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.

2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.

3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pig tailing existing conductors is permitted, provided the outlet box is large enough.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
5. Use clamp style side/back wiring with binding-head screw terminals. Wrap stranded conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

H. Locking weatherproof boxes shall be hinged at the top, and on this project all boxes shall be keyed alike.

3.2 GFCI RECEPTACLES

A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

3.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Test Instruments: Use instruments that comply with UL 1436.
2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

C. Wiring device will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

END OF SECTION 26 2726

SECTION 26 2813

FUSES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Cartridge fuses rated 600-V ac and less for use in enclosed switches and switchboards.

1.2 ACTION SUBMITTALS

- A. The following information shall be submitted for review and approval in accordance with Section 260500, "General Electrical Requirements".
- B. Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NEMA FU 1 for cartridge fuses.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper Bussmann, Inc.
 - 2. Edison Fuse, Inc.
 - 3. Ferraz Shawmut, Inc.
 - 4. Littelfuse, Inc.

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

PART 3 - EXECUTION

3.1 FUSE APPLICATIONS

- A. Service Entrance: Class L, time delay.
- B. Feeders: Class RK1, fast acting.

3.2 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

3.3 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information on inside door of each fused switch and adjacent to each fuse block and holder.

END OF SECTION 26 2813

SECTION 26 5100
LIGHTING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.

1.2 SUMMARY

- A. Provide U.L. listed and labeled lighting fixtures complete with light engines at light outlets indicated on the drawings. Each fixture shall bear the U.L. Label, and shall comply with Code Requirements.
- B. Fixtures are listed and described in the Lighting Fixture Schedule and in the following paragraphs. Fixture catalog numbers are to be used as a guide only and shall be understood to be followed by the words "except as modified by the total fixture description". Provide all accessories, features and adaptations necessary to meet the requirements of the description.
- C. Related Sections:
 - 1. Section 260924 "Digital Lighting and Plug Load Control" for automatic control of lighting.

1.3 DEFINITIONS

- A. CEC: Latest adopted version of California Electrical Code (CCR Title 24, Part 3) based on the National Electrical Code.

1.4 QUALITY ASSURANCE

- A. Products shall be UL listed and labeled.
- B. Comply with CEC.

1.5 SUBMITTALS

- A. The following information shall be submitted for review and approval in accordance with Section 260500, "General Electrical Requirements".
- B. Product Data
 - 1. Material List: A material list with names of manufacturers, model numbers, and technical information on all equipment proposed.
 - 2. Catalog cuts for each fixture including complete photometric data in IES format.
 - 3. Weight and dimensions.

4. Product technical information sheets for each principal component in the proposed system. Identify by arrow, circle or similar means products being proposed. Submittals consisting of unmodified catalog pages with no markings will be rejected.
- C. Samples: when requested by Architect.
 - D. Operation and Maintenance (O&M) Manuals: Furnish composite "Systems Operation and Maintenance" manuals in indexed three-ring binders, sized to hold the material below, plus 50% excess. Each manual shall contain, but not be limited to:
 1. Operational procedures for the overall lighting systems including the "Sequence of Operation".
 2. Test procedures and test results.
 3. Instruction for the proper operation and maintenance of the lighting system.
 4. Factory issued technical, installation, and maintenance manuals.
 5. A replacement parts list complete with part numbers and name, address, and phone number of suppliers used by the Contractor. A spare parts list recommended for purchase by the District shall be included.
 6. All portions of the material list and shop drawings which are not included in the foregoing.
- 1.6 LAMP REPLACEMENT
- A. Replace light engines which burn out after Owner's use or acceptance of the project (or of an area in the case of beneficial occupancy).
 - B. Light engines which burn out within 120 days.
- 1.7 FIELD REPLACEMENT LIGHT ENGINE
- A. Integrate LEDs, driver, power supply, thermal management components, and optical mixing components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products indicated on Drawings.

2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

- A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
- B. Metal Parts: Free of burrs and sharp corners and edges.
- C. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.

2.3 EXIT SIGNS

- A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

2.4 LIGHTING FIXTURE SUPPORT COMPONENTS

- A. Comply with Section 260510 "Basic Electrical Materials and Methods".
- B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
- C. Support Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).

PART 3 - EXECUTION

3.1 ACCEPTANCE TESTING

- A. Complete the testing and documentation requirements of Title 24 Energy Code Acceptance Testing procedures. Complete and sign the Acceptance Testing Forms and submit to District and DSA Inspector (IOR).

3.2 UTILITY DESIGN INCENTIVE PROGRAM

- A. Furnish the Utility Company representative with the itemized, paid proof of purchase/invoice for the purchase and installation of energy efficient equipment.
- B. Assist the Utility in the verification by Utility representative of both the purchase and installation of the energy efficient equipment, including providing the representative access to the Construction Project, at reasonable times, for verification of installation of the equipment.
- C. Provide the Utility with a written request for payment of the Incentives calculated, when the Construction Project is completed and occupied.

3.3 INSTALLATION

- A. Lighting fixtures:
 - 1. Set level, plumb, and square with ceilings and walls unless otherwise indicated.
 - 2. Install each luminaire to be fully operational.
- B. Suspended Lighting Fixture Support:
 - 1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
- C. Connect wiring according to Section 260519 "Wires and Cables."

3.4 IDENTIFICATION

- A. Install labels with panel and circuit numbers on concealed junction and outlet boxes. Comply with requirements for identification specified in Section 260510 "Basic Electrical Materials and Methods."

3.5 FIELD QUALITY CONTROL

- A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.
- B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting aimable luminaires to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose. Some of this work may be required after dark.
 - 1. Adjust aimable luminaires in the presence of Architect.

END OF SECTION 26 5100

SECTION 26 5600
EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.

1.2 SUMMARY

A. Section Includes:

- 1. Exterior luminaires.
- 2. Poles and accessories.

B. Related Sections:

- 1. Section 265100 "Interior Lighting" for exterior luminaires normally mounted on exterior surfaces of buildings.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CEC: California Electrical Code (CCR Title 24, Part 3).
- C. CRI: Color-rendering index.
- D. LER: Luminaire efficacy rating.
- E. Luminaire: Complete lighting fixture.
- F. Pole: Luminaire support structure, including tower used for large area illumination.
- G. Standard: Same definition as "Pole" above.

1.4 INFORMATIONAL SUBMITTALS

- A. The following information shall be submitted for review and approval in accordance with Section 260500, "General Electrical Requirements".
- B. Pole and Support Component Certificates: Signed by manufacturers of poles, certifying that products are designed for indicated load requirements in AASHTO LTS-4-M and that load imposed by luminaire and attachments has been included in design. The certification shall be based on design calculations by a professional engineer.
- C. Qualification Data: For qualified agencies providing photometric data for lighting fixtures.
- D. Field quality-control reports.
- E. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires, poles and luminaire lowering devices to include in operation and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Glass and Plastic Lenses, Covers, and Other Optical Parts: One for every 100 of each type and rating installed. Furnish at least one of each type.
 - 2. Globes and Guards: One for every 20 of each type and rating installed. Furnish at least one of each type.

1.7 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with IEEE C2, "National Electrical Safety Code."
- D. Comply with CEC.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Package poles for shipping according to ASTM B 660.
- B. Store poles on decay-resistant-treated skids at least 12 inches above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.
- C. Retain factory-applied pole wrappings on metal poles until right before pole installation. For poles with nonmetallic finishes, handle with web fabric straps.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within specified warranty period. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs or alterations from special warranty coverage.
 - 1. Warranty Period for Luminaires: Five years from date of Substantial Completion.
 - 2. Warranty Period for Metal Corrosion: Five years from date of Substantial Completion.
 - 3. Warranty Period for Color Retention: Five years from date of Substantial Completion.

4. Warranty Period for Poles: Repair or replace lighting poles and standards that fail in finish, materials, and workmanship within manufacturer's standard warranty period, but not less than three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements.

2.2 GENERAL REQUIREMENTS FOR LUMINAIRES

- A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction.
- B. Metal Parts: Free of burrs and sharp corners and edges.
- C. Sheet Metal Components: Corrosion-resistant aluminum unless otherwise indicated. Form and support to prevent warping and sagging.
- D. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.
- E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses. Designed to disconnect ballast when door opens.
- F. Light Shields: Metal baffles, factory installed and field adjustable, arranged to block light distribution to indicated portion of normally illuminated area or field.
- G. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:
 1. White Surfaces: 85 percent.
 2. Specular Surfaces: 83 percent.
 3. Diffusing Specular Surfaces: 75 percent.
- H. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.
- I. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.
- J. Factory-Applied Finish for Steel Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."

2. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.
 - a. Color: As indicated on drawings.
- K. Factory-Applied Finish for Aluminum Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
 2. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20; and seal aluminum surfaces with clear, hard-coat wax.
 3. Class I, Clear Anodic Finish: AA-M32C22A41 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.
 4. Class I, Color Anodic Finish: AA-M32C22A42/A44 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.
 - a. Color: As indicated on drawings.
- L. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps and ballasts. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles.
1. Label shall include the following LED/driver and ballast characteristics:
 - a. "USES ONLY" and include specific lamp type.
- 2.3 COMPONENTS
- A. Structural Characteristics: Comply with AASHTO LTS-4-M.
1. Wind-Load Strength of Poles: Adequate at indicated heights above grade without failure, permanent deflection, or whipping in steady winds of speed indicated in "Structural Analysis Criteria for Pole Selection" Article.
 2. Strength Analysis: For each pole, multiply the actual equivalent projected area of luminaires and brackets by a factor of 1.1 to obtain the equivalent projected area to be used in pole selection strength analysis.
- B. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use vandal resistant stainless-steel fasteners and mounting bolts unless otherwise indicated.
- C. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.
1. Materials: Shall not cause galvanic action at contact points.

2. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication unless otherwise indicated.
 3. Anchor-Bolt Template: Plywood or steel.
- D. Handhole: Oval-shaped, with minimum clear opening of 2-1/2 by 5 inches, with cover secured by stainless-steel captive screws.
 - E. Concrete Pole Foundations: Cast in place, with anchor bolts to match pole-base flange. Concrete, reinforcement, and formwork are specified in Section 033000 "Cast-in-Place Concrete."
- 2.4 STEEL POLES
- A. Poles: Comply with ASTM A 500, Grade B, carbon steel with a minimum yield of 46,000 psig; one-piece construction up to 40 feet in height with access handhole in pole wall.
 1. Shape: Square, straight.
 2. Mounting Provisions: Butt flange for bolted mounting on foundation or breakaway support.
 - B. Brackets for Luminaires: Detachable, cantilever, without underbrace.
 1. Adapter fitting welded to pole, allowing the bracket to be bolted to the pole mounted adapter, then bolted together with galvanized-steel bolts.
 2. Cross Section: Tapered oval, with straight tubular end section to accommodate luminaire.
 3. Match pole material and finish.
 - C. Grounding and Bonding Lugs: Welded 1/2-inch threaded lug, complying with requirements in Section 260526 "Grounding and Bonding for Electrical Systems," listed for attaching grounding and bonding conductors of type and size listed in that Section, and accessible through handhole.
 - D. Cable Support Grip: Wire-mesh type with rotating attachment eye, sized for diameter of cable and rated for a minimum load equal to weight of supported cable times a 5.0 safety factor.
 - E. Prime-Coat Finish: Manufacturer's standard prime-coat finish ready for field painting.
 - F. Factory-Painted Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or with SSPC-SP 8, "Pickling."
 2. Interior Surfaces of Pole: One coat of bituminous paint, or otherwise treat for equal corrosion protection.
 3. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.
 - a. Color: As indicated on drawings.

2.5 POLE ACCESSORIES

- A. Base Covers: Manufacturers' standard metal units, arranged to cover pole's mounting bolts and nuts. Finish same as pole.

PART 3 - EXECUTION

3.1 LUMINAIRE INSTALLATION

- A. Install LED/drivers in each luminaire.
- B. Fasten luminaire to indicated structural supports.
 - 1. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

3.2 POLE INSTALLATION

- A. Alignment: Align pole foundations and poles for optimum directional alignment of luminaires and their mounting provisions on the pole.
- B. Clearances: Maintain the following minimum horizontal distances of poles from surface and underground features unless otherwise indicated on Drawings:
 - 1. Fire Hydrants and Storm Drainage Piping: 60 inches.
 - 2. Water, Gas, Electric, Communication, and Sewer Lines: 10 feet.
 - 3. Trees: 15 feet from tree trunk.
- C. Concrete Pole Foundations: Set anchor bolts according to anchor-bolt templates furnished by pole manufacturer. Concrete materials, installation, and finishing requirements are specified in Section 033000 "Cast-in-Place Concrete."

3.3 CORROSION PREVENTION

- A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.
- B. Steel Conduits: Comply with Section 260533 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.4 GROUNDING

- A. Ground metal poles and support structures according to Section 260526 "Grounding and Bonding for Electrical Systems."
 - 1. Install grounding electrode for each pole unless otherwise indicated.
 - 2. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.

3.5 FIELD QUALITY CONTROL

- A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

- B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.
 - 1. Verify operation of photoelectric controls.
- C. Illumination Tests:
 - 1. Measure light intensities at night. Use photometers with calibration referenced to NIST standards. Comply with the following IESNA testing guide(s):
 - a. IESNA LM-5, "Photometric Measurements of Area and Sports Lighting Installations."
 - b. IESNA LM-64, "Photometric Measurements of Parking Areas."
- D. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION 26 5600

SECTION 27 5116

PUBLIC ADDRESS AND MASS NOTIFICATION SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions.

1.2 SUMMARY

- A. Section Includes:

1. Power amplifiers.
2. Microphones.
3. Volume limiter/compressors.
4. Equipment rack.
5. Telephone paging adapters.
6. Tone generator.
7. Loudspeakers.
8. Noise-operated gain controllers.
9. Microphone and headphone outlets.

1.3 DEFINITIONS

- A. Channels: Separate parallel signal paths, from sources to loudspeakers or loudspeaker zones, with separate amplification and switching that permit selection between paths for speaker alternative program signals.
- B. VU: Volume unit.
- C. Zone: Separate group of loudspeakers and associated supply wiring that may be arranged for selective switching between different channels.

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports and seismic restraints for control consoles, equipment cabinets and racks, and components, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1.5 ACTION SUBMITTALS

- A. The following information shall be submitted for review and approval in accordance with Section 260500, "General Electrical Requirements".

- B. **Product Data:** For each type of product indicated.
- C. **Shop Drawings:** For supports and seismic restraints for control consoles, equipment cabinets and racks, and components. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Console layouts.
 - 3. Rack arrangements.
 - 4. Calculations: For sizing backup battery.
 - 5. **Wiring Diagrams:** For power, signal, and control wiring.
 - a. Identify terminals to facilitate installation, operation, and maintenance.
 - b. Single-line diagram showing interconnection of components.
 - c. Cabling diagram showing cable routing.
- D. **Delegated-Design Submittal:** For supports and seismic restraints for control consoles, equipment cabinets and racks, and components indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Detail fabrication and assembly of supports and seismic restraints for control consoles, equipment cabinets and racks, and components.

1.6 INFORMATIONAL SUBMITTALS

- A. **Coordination Drawings:** Reflected ceiling plans, drawn to scale, on which ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings are shown and coordinated with each other, using input from installers of the items involved.
- B. **Qualification Data:** For qualified Installer
- C. **Field quality-control reports.**

1.7 CLOSEOUT SUBMITTALS

- A. **Operation and Maintenance Data:** For public address and mass notification systems to include in emergency, operation, and maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. **Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.**

1. Microphone: Two
2. Desk Stand(s): Two

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
 1. Personnel certified by NICET as Audio Systems Level II Technician.
- B. Testing Agency Qualifications: Qualified agency, with the experience and capability to conduct testing indicated.
 1. Testing Agency's Field Supervisor: Currently certified by NICET at Level III to supervise on-site testing.
- C. Source Limitations: Obtain public address and mass notification systems from single source from single manufacturer.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Comply with NFPA 70.

1.10 COORDINATION

- A. Coordinate layout and installation of system components and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements:
 1. Alpha Communications.
 2. Altec Lansing Technologies, Inc.
 3. Atlas Sound LP.
 4. Bogen Communications, Inc.
 5. Dukane Communication Systems; part of GE Infrastructure, Security.
 6. Edwards Signaling & Security Systems; part of GE Infrastructure, Security.
 7. Electro-Voice; Telex Communications, Inc.
 8. Federal Signal Corporation; Electrical Products Division.
 9. Peavey Electronics.

10. Rauland-Borg Corporation.

11. Whelen Engineering Company, Inc.

2.2 FUNCTIONAL DESCRIPTION OF SYSTEM

A. System Functions:

1. Selectively connect any zone to any available signal channel.
2. Selectively control sound from microphone outlets and other inputs.
3. "All-call" feature shall connect the all-call sound signal simultaneously to all zones regardless of zone or channel switch settings.
4. Telephone paging adapter shall allow paging by dialing an extension from any local telephone instrument and speaking into the telephone.
5. Produce a program-signal tone that is amplified and sounded over all speakers, overriding signals currently being distributed.
6. Reproduce high-quality sound that is free of noise and distortion at all loudspeakers at all times during equipment operation including standby mode with inputs off; output free of nonuniform coverage of amplified sound.

2.3 GENERAL EQUIPMENT AND MATERIAL REQUIREMENTS

- A. **Compatibility of Components:** Coordinate component features to form an integrated system. Match components and interconnections for optimum performance of specified functions.
- B. **Equipment:** Comply with UL 813. Equipment shall be modular, using solid-state components, and fully rated for continuous duty unless otherwise indicated. Select equipment for normal operation on input power usually supplied at 110 to 130 V, 60 Hz.
- C. **Equipment Mounting:** Where rack, cabinet, or console mounting is indicated, equipment shall be designed to mount in a 19-inch (483-mm) housing complying with TIA/EIA-310-D.
- D. **Weather-Resistant Equipment:** Listed and labeled by a qualified testing agency for duty outdoors or in damp locations.

2.5 POWER AMPLIFIERS

- A. **Mounting:** Rack.
- B. **Output Power:** 70-V balanced line. 80 percent of the sum of wattage settings of connected for each station and speaker connected in all-call mode of operation, plus an allowance for future stations.
- C. **Total Harmonic Distortion:** Less than 3 percent at rated power output from 50 to 12,000 Hz.
- D. **Minimum Signal-to-Noise Ratio:** 60 dB, at rated output.

- E. Frequency Response: Within plus or minus 2 dB from 50 to 12,000 Hz.
- F. Output Regulation: Less than 2 dB from full to no load.
- G. Controls: On-off, input levels, and low-cut filter.
- H. Input Sensitivity: Matched to preamplifier and to provide full-rated output with sound-pressure level of less than 10 dynes/sq. cm impinging on speaker microphone or handset transmitter.

2.6 TRANSFER TO STANDBY AMPLIFIER

- A. Monitoring Circuit and Sensing Relay: Detect reduction in output of power amplifier of 40 percent or more and, in such event, transfer load and signal automatically to standby amplifier.

2.7 MICROPHONES

- A. Paging Microphone:
 1. Type: Dynamic, with cardioiodpolar characteristic.
 2. Impedance: 150 ohms.
 3. Frequency Response: Uniform, 50 to 14,000 Hz.
 4. Output Level: Minus 58 dB, minimum.
 5. Finish: Satin chrome.
 6. Cable: C25J.
 7. Mounting: Desk stand with integral-locking, press-to-talk switch.

2.8 VOLUME LIMITER/COMPRESSOR

- A. Minimum Performance Requirements:
 1. Frequency Response: 45 to 15,000 Hz, plus or minus 1 dB minimum.
 2. Signal Reduction Ratio: At least a 10:1 and 5:1 selectable capability.
 3. Distortion: 1 percent, maximum.
 4. Rated Output: Minimum of plus 14 dB.
 5. Inputs: Minimum of two inputs with variable front-panel gain controls and VU or decibel meter for input adjustment.
 6. Rack mounting.

2.9 CONTROL CONSOLE

- A. Cabinet: Modular, desktop complying with TIA/EIA-310-D.
- B. Housing: Steel, 0.0478 inch (1.2 mm) minimum, with removable front and rear panels. Side panels are removable for interconnecting side-by-side mounting.

- C. Panel for Equipment and Controls: Rack mounted.
- D. Controls:
 - 1. Switching devices to select signal sources for distribution channels.
 - 2. Program selector switch to select source for each program channel.
 - 3. Switching devices to select zones for paging.
 - 4. All-call selector switch.
- E. Indicators: A visual annunciation for each distribution channel to indicate source being used.
- F. Self-Contained Power and Control Unit: A single assembly of basic control, electronics, and power supply necessary to accomplish specified functions.
- G. Spare Positions: 20 percent spare zone control and annunciation positions on console.
- H. Microphone jack.

2.10 EQUIPMENT RACK

- A. Racks: 19 inches (483 mm) standard, complying with TIA/EIA-310-D.
- B. Power-Supply Connections: Compatible plugs and receptacles.
- C. Enclosure Panels: Ventilated rear and sides and solid top. Use louvers in panels to ensure adequate ventilation.
- D. Finish: Uniform, baked-enamel factory finish over rust-inhibiting primer.
- E. Power-Control Panel: On front of equipment housing, with master power on-off switch and pilot light; and with socket for 5-A cartridge fuse for rack equipment power.
- F. Service Light: At top rear of rack with an adjacent control switch.
- G. Vertical Plug Strip: Grounded receptacles, 12 inches (300 mm) o.c.; the full height of rack.
- H. Maintenance Receptacles: Duplex convenience outlets supplied independent of vertical plug strip and located in front and bottom rear of rack.
- I. Spare Capacity: 20 percent in rack for future equipment.

2.11 TELEPHONE PAGING ADAPTER

- A. Adapters shall accept voice signals from telephone extension dialing access and automatically provide amplifier input and program override for preselected zones.
 - 1. Minimum Frequency Response: Flat, 200 to 2500 Hz.
 - 2. Impedance Matching: Adapter matches telephone line to public address equipment input.

3. Rack mounting.

2.12 TONE GENERATOR

- A. Generator shall provide clock and program interface with public address and mass notification system.
- B. Signals: Minimum of seven distinct, audible signal types including wail, warble, high/low, alarm, repeating and single-stroke chimes, and tone.
- C. Pitch Control: Chimes and tone.
- D. Volume Control: All outputs.
- E. Activation-Switch Network: Establishes priority and hierarchy of output signals produced by different activation setups.
- F. Mounting: Rack.

2.13 MONITOR PANEL

- A. Monitor power amplifiers.
- B. Components: VU or dB meter, speaker with volume control, and multiple-position rotary selector switch.
- C. Selector Switch and Volume Control: Selective monitoring of output of each separate power amplifier via VU or dB meter and speaker.
- D. Mounting: Rack.

2.14 LOUDSPEAKERS

- A. Cone-Type Loudspeakers:
 - 1. Minimum Axial Sensitivity: 91 dB at one meter, with 1-W input.
 - 2. Frequency Response: Within plus or minus 3 dB from 50 to 15,000 Hz.
 - 3. Size: 8 inches (200 mm) with 1-inch (25-mm) voice coil and minimum 5-oz. (140-g) ceramic magnet.
 - 4. Minimum Dispersion Angle: 100 degrees.
 - 5. Rated Output Level: 10 W.
 - 6. Matching Transformer: Full-power rated with four taps. Maximum insertion loss of 0.5 dB.
 - 7. Surface-Mounting Units: Ceiling, wall, or pendant mounting, as indicated, in steel back boxes, acoustically dampened. Front face of at least 0.0478-inch (1.2-mm) steel and whole assembly rust proofed and shop primed for field painting.
 - 8. Flush-Ceiling-Mounting Units: In steel back boxes, acoustically dampened. Metal ceiling grille with white baked enamel.

B. Horn-Type Loudspeakers:

1. Type: Single-horn units, double-reentrant design, with minimum full-range power rating of 15 W.
2. Matching Transformer: Full-power rated with four standard taps. Maximum insertion loss of 0.5 dB.
3. Frequency Response: Within plus or minus 3 dB from 250 to 12,000 Hz.
4. Dispersion Angle: 130 by 110 degrees.
5. Mounting: Integral bracket.
6. Units in Hazardous (Classified) Locations: Listed and labeled for environment in which they are located.

2.15 NOISE-OPERATED GAIN CONTROLLER

- A. Gain controller shall be designed to continuously sense space noise level and automatically adjust signal level to local speakers.
- B. Frequency Response: 20 to 20,000 Hz, plus or minus 1 dB.
- C. Level Adjustment Range: 20 dB minimum.
- D. Maximum Distortion: 1 percent.
- E. Control: Permits adjustment of sensing level of device.

2.16 OUTLETS

- A. Volume Attenuator Station: Wall-plate-mounted autotransformer type with paging priority feature.
 1. Wattage Rating: 10 W unless otherwise indicated.
 2. Attenuation per Step: 3 dB, with positive off position.
 3. Insertion Loss: 0.4 dB maximum.
 4. Attenuation Bypass Relay: Single pole, double throw. Connected to operate and bypass attenuation when all-call, paging, program signal, or prerecorded message features are used. Relay returns to normal position at end of priority transmission.
 5. Label: "PA Volume."
- B. Microphone Outlet: Three-pole, polarized, locking-type, microphone receptacles in single-gang boxes. Equip wall outlets with brushed stainless-steel device plates. Equip floor outlets with gray tapered rubber or plastic cable nozzles and fixed outlet covers.
- C. Headphone Outlet (for the Hearing Impaired): Microphone receptacles in single-gang boxes. Equip wall outlets with brushed stainless-steel device plates. Equip floor outlets with gray tapered rubber or plastic cable nozzles and fixed-outlet covers.

2.17 BATTERY BACKUP POWER UNIT

- A. Unit shall be rack mounted, consisting of time-delay relay, sealed lead-calcium battery, battery charger, on-off switch, "normal" and "emergency" indicating lights, and adequate capacity to supply maximum equipment power requirements for one hour of continuous full operation.
- B. Unit shall supply public address equipment with 12- to 15-V dc power automatically during an outage of normal 120-V ac power.
- C. Battery shall be on float charge when not supplying system and to transfer automatically to supply system after three to five seconds of continuous outage of normal power, as sensed by time-delay relay.
- D. Unit shall automatically retransfer system to normal supply when normal power has been reestablished for three to five seconds continuously.

2.18 CONDUCTORS AND CABLES

- A. Jacketed, twisted pair and twisted multipair, untinned solid copper.
 - 1. Insulation for Wire in Conduit: Thermoplastic, not less than 1/32 inch (0.8 mm) thick.
 - 2. Microphone Cables: Neoprene jacketed, not less than 2/64 inch (0.8 mm) thick, over shield with filled interstices. Shield No. 34 AWG, tinned, soft-copper strands formed into a braid or approved equivalent foil. Shielding coverage on conductors is not less than 60 percent.
 - 3. Plenum Cable: Listed and labeled for plenum installation.

2.20 RACEWAYS

- A. Conduit and Boxes: Comply with Section 260533 "Raceway and Boxes for Electrical Systems"

PART 3 - EXECUTION

3.1 WIRING METHODS

- A. Wiring Method: Install cables in raceways except within consoles, cabinets, desks, and counters. Conceal raceway and cables except in unfinished spaces.
 - 1. Install plenum cable in environmental air spaces, including plenum ceilings.
 - 2. Comply with requirements for raceways and boxes specified in Section 260533 "Raceway and Boxes for Electrical Systems."
- B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

- C. Wiring within Enclosures: Bundle, lace, and train cables to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.2 INSTALLATION OF RACEWAYS

- A. Comply with requirements in Section 260533 "Raceway and Boxes for Electrical Systems" for installation of conduits and wireways.
- B. Install manufactured conduit sweeps and long-radius elbows whenever possible.

3.3 INSTALLATION OF CABLES

- A. Comply with NECA 1.
- B. General Cable Installation Requirements:
 - 1. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at outlets and terminals.
 - 2. Splices, Taps, and Terminations: Arrange on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Cables may not be spliced.
 - 3. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 - 4. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.
 - 5. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
- C. Open-Cable Installation:
 - 1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
 - 2. Suspend speaker cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceiling by cable supports not more than 60 inches apart.
 - 3. Cable shall not be run through structural members or be in contact with pipes, ducts, or other potentially damaging items.
- D. Separation of Wires: Separate speaker-microphone, line-level, speaker-level, and power wiring runs. Install in separate raceways or, where exposed or in same enclosure, separate conductors at least 12 inches (300 mm) apart for speaker microphones and adjacent parallel power and telephone wiring. Separate other intercommunication equipment conductors as recommended by equipment manufacturer.

3.4 INSTALLATION

- A. Match input and output impedances and signal levels at signal interfaces. Provide matching networks where required.
- B. Identification of Conductors and Cables: Color-code conductors and apply wire and cable marking tape to designate wires and cables so they identify media in coordination with system wiring diagrams.
- C. Equipment Cabinets and Racks:
 - 1. Group items of same function together, either vertically or side by side, and arrange controls symmetrically. Mount monitor panel above the amplifiers.
 - 2. Arrange all inputs, outputs, interconnections, and test points so they are accessible at rear of rack for maintenance and testing, with each item removable from rack without disturbing other items or connections.
 - 3. Blank Panels: Cover empty space in equipment racks so entire front of rack is occupied by panels.
- D. Volume Limiter/Compressor: Equip each zone with a volume limiter/compressor. Install in central equipment cabinet. Arrange to provide a constant input to power amplifiers.
- E. Wall-Mounted Outlets: Flush mounted.
- F. Floor-Mounted Outlets: Conceal in floor and install cable nozzles through outlet covers. Secure outlet covers in place. Trim with carpet in carpeted areas.
- G. Conductor Sizing: Unless otherwise indicated, size speaker circuit conductors from racks to loudspeaker outlets not smaller than No. 18 AWG and conductors from microphone receptacles to amplifiers not smaller than No. 22 AWG.
- H. Weatherproof Equipment: For units that are mounted outdoors, in damp locations, or where exposed to weather, install consistent with requirements of weatherproof rating.
- I. Speaker-Line Matching Transformer Connections: Make initial connections using tap settings indicated on Drawings.
- J. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.5 GROUNDING

- A. Ground cable shields and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.
- B. Signal Ground Terminal: Locate at main equipment cabinet. Isolate from power system and equipment grounding.
- C. Install grounding electrodes as specified in Section 260526 "Grounding and Bonding for Electrical Systems."

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Tests and Inspections:
 - 1. Schedule tests with at least seven days' advance notice of test performance.
 - 2. After installing public address and mass notification systems and after electrical circuitry has been energized, test for compliance with requirements.
 - 3. Operational Test: Perform tests that include originating program and page messages at microphone outlets, preamplifier program inputs, and other inputs. Verify proper routing and volume levels and that system is free of noise and distortion.
 - 4. Signal-to-Noise Ratio Test: Measure signal-to-noise ratio of complete system at normal gain settings as follows:
 - a. Disconnect microphone at connector or jack closest to it and replace it in the circuit with a signal generator using a 1000-Hz signal. Replace all other microphones at corresponding connectors with dummy loads, each equal in impedance to microphone it replaces. Measure signal-to-noise ratio.
 - b. Repeat test for each separately controlled zone of loudspeakers.
 - c. Minimum acceptance ratio is 50 dB.
 - 5. Distortion Test: Measure distortion at normal gain settings and rated power. Feed signals at frequencies of 50, 200, 400, 1000, 3000, 8000, and 12,000 Hz into each preamplifier channel. For each frequency, measure distortion in the paging and all-call amplifier outputs. Maximum acceptable distortion at any frequency is 3 percent total harmonics.
 - 6. Acoustic Coverage Test: Feed pink noise into system using octaves centered at 500 and 4000 Hz. Use sound-level meter with octave-band filters to measure level at five locations in each zone. For spaces with seated audiences, maximum permissible variation in level is plus or minus 2 dB. In addition, the levels between locations in same zone and between locations in adjacent zones must not vary more than plus or minus 3 dB.

7. Power Output Test: Measure electrical power output of each power amplifier at normal gain settings of 50, 1000, and 12,000 Hz. Maximum variation in power output at these frequencies must not exceed plus or minus 1 dB.

8. Signal Ground Test: Measure and report ground resistance at public address equipment signal ground. Comply with testing requirements specified in Section 260526 "Grounding and Bonding for Electrical Systems."

- E. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified. Prepare a list of final tap settings of paging speaker-line matching transformers.
- F. Public address and mass notification systems will be considered defective if they do not pass tests and inspections.
- G. Prepare test and inspection reports.
 - 1. Include a record of final speaker-line matching transformer-tap settings, and signal ground-resistance measurement certified by Installer.

3.7 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements.
 - 2. Complete installation and startup checks according to manufacturer's written instructions.

3.8 ADJUSTING

- A. On-Site Assistance: Engage a factory-authorized service representative to provide on-site assistance in adjusting sound levels, resetting transformer taps, and adjusting controls to meet occupancy conditions.
- B. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.9 DEMONSTRATION

- A. Engage a factory-authorized service representative to train City's maintenance personnel to adjust, operate, and maintain the public address and mass notification systems and equipment.

END OF SECTION 27 5116

SECTION 31 1000
SITE CLEARING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Clearing and protection of vegetation.
- B. Removal of existing debris.

1.02 RELATED REQUIREMENTS

- A. Section 02 4100 - Demolition: Removal of built elements and utilities.
- B. Section 31 2200 - Grading: Rough grading, removal of topsoil.
- C. Section 31 2323 - Fill: Fill material for filling holes, pits, and excavations.
- D. 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 300-1 for Clearing and Grubbing.

1.03 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Site Plan: Showing:
 - 1. Vegetation removal limits.
 - 2. Areas for temporary construction and field offices.

1.04 QUALITY ASSURANCE

- A. Clearing Firm: Company specializing in the type of work required.
 - 1. Minimum of 3 years of documented experience.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 SITE CLEARING

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 300-1 for Clearing and Grubbing .
- B. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.02 EXISTING UTILITIES AND BUILT ELEMENTS

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits..

- B. Do not disrupt public utilities without permit from authority having jurisdiction.

3.03 VEGETATION

- A. Scope: Remove trees, shrubs, brush, and stumps in areas to be covered by building structure, paving, lawns, planting beds and other improvements within limits of work.
- B. Do not begin clearing until vegetation to be relocated has been removed.
- C. Install substantial, highly visible fences at least 3 feet high to prevent inadvertent damage to vegetation to remain:
 - 1. At vegetation removal limits.
- D. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.
- E. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
 - 1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
 - 2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
 - 3. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
 - 4. Sod: Re-use on site if possible; otherwise sell if marketable, and if not, treat as specified for other vegetation removed.
 - 5. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.
- F. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.
- G. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to City.

3.04 DEBRIS

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 31 2200

GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General exterior grading, cutting and filling, including grading for building area, paving, planting areas, banks and hillsides.

1.02 RELATED REQUIREMENTS

- A. Section 31 1000 - Site Clearing.
- B. Section 31 2316.13 Trenching.
- C. Section 31 2323 - Fill: Filling and compaction.
- D. 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 300 for Earthwork.

1.03 PROJECT REQUIREMENTS

- A. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.
- B. Before grading, contact Underground Service Alert for information on public buried utilities and pipelines. Retain the services of an underground utility locator for on-site utilities.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 300 for Earthwork.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- B. Protect and maintain installed stakes until their removal is required for the Work. Provide replacement grade or location stakes lost or disturbed.

3.02 PREPARATION

- A. Install grade stakes and compare to indicated grades. If discrepancies are found between existing grades and grades indicated on Drawings, do not proceed until discrepancies are resolved.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect from damage above- and below-grade utilities to remain.

- D. Notify utility company to remove and relocate utilities, as necessary, and as required by the project.
- E. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.
- F. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.
- G. Protect plants and other features to remain as a portion of final landscaping.
- H. Prior to grading, the project area is to be cleared of all rubble, trash and debris. Any buried organic debris or other unsuitable contaminated material encountered during subsequent excavation and grading work to also be removed.
- I. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.03 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - 2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.04 ROUGH AND FINE GRADING

- A. Rough grade area sufficiently high to require cutting by fine grading:
 - 1. Grade area for bituminous surfacing and other paving to the indicated grades, equal to the section of the indicated base and pavement.
 - 2. Slope banks to required finish grades as cut progresses or leave cuts full and finish grade by mechanical equipment to provide grades and soil densities indicated on the Drawings.
 - 3. Rough grade, fill and compact banks beyond indicated finish grades. Finish grade banks and slopes to indicated grades and specified soil densities.
 - 4. Grade Only Areas: In areas not indicated to receive pavement, rough grade to approximate finish grades and then scarify, moisten and roll to obtain required density and indicated finish grades.
 - 5. Tolerances: Finish grades shall be within a tolerance of 0.05 inch per foot above or below grades indicated. Provide an average grade as indicated.
- B. Base or Subgrade:

1. After subgrade has been constructed to approximate required grades, scarify to a depth of at least 6 inches:
 - a. After scarifying, process loosened material to a finely divided condition and adjust moisture content to optimum condition by addition of water, addition and blending of dry suitable material, or by drying of existing material.
 - b. Subgrade material shall be compacted by tamping, sheepsfoot rollers or pneumatic tire rollers. Required relative compaction shall be **95** percent minimum for the top 6 inches below subgrade, except as allowed by 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 301-1.3.
2. Tolerance of completed grades of base or subgrade shall not vary more than 0.03 inch per foot from grades indicated. Provide an average grade as indicated.

3.05 SHORING

- A. Provide shoring as necessary to properly and safely support earth sides of excavations, and existing curbs, sidewalks, gutter, drives and stairs, against movement and collapse.
- B. Design and Calculations: Provide to Engineer in accordance with requirement of CalOHSA.
- C. Remove shoring upon completion of the Work of this section or when no longer needed unless required otherwise by authorities having jurisdiction.

3.07 SOIL REMOVAL

- A. Remove unused soil, topsoil, rubbish, debris, and waste materials and legally dispose of off the Project site.

3.08 CLEANING AND PROTECTION

- A. Leave site clean and raked, ready to receive landscaping.
- B. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 31 2316.13

TRENCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Excavation, backfilling and compacting for utilities outside the building to utility main connections, or as indicated on Drawings.

1.02 RELATED REQUIREMENTS

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 306 for Underground Conduit Construction.
- B. Section 31 2200 - Grading: Site grading.
- C. Section 31 2323 – Fill.

PART 2 PRODUCTS

2.01 BEDDING AND FILL MATERIALS

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 306 for Underground Conduit Construction, or imported fill per Section 300-3.5 Structure Backfill.

PART 3 EXECUTION

3.01 TRENCHING

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 306 for Underground Conduit Construction.
- B. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- C. Remove large stones, lumped subsoil, boulders, and rock over 6 inches diameter that could damage piping or impede consistent backfilling or compaction.
- D. Remove excavated material that is unsuitable for re-use from site.

3.02 BEDDING, BACKFILL AND RESURFACING

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 306 for Underground Conduit Construction.

3.03 INSPECTION AND TESTING

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 306 for Underground Conduit Construction.
- B. If tests indicate work does not meet specified requirements, remove work, replace and retest.

C. Frequency of Tests: Per Engineer's request.

END OF SECTION

SECTION 31 2323

FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fill materials.
- B. Backfill and compaction for buildings and structures.

1.02 RELATED REQUIREMENTS

- A. Section 31 1100 – Site Clearing.
- B. Section 31 2200 - Grading.
- C. Section 31 2316.13 – Trenching.
- D. 2012 Standard Specifications for Public Works Construction ‘The GREENBOOK’ and 2012 City Supplement ‘The WHITEBOOK’, Section 300-3.5 for Structure Backfill.

1.03 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Material Source: Submit name of imported material source.
- C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- D. Compaction Density Test Reports.

1.04 PROJECT CONDITIONS

- A. Information on Drawings not constitute a guarantee of accuracy or uniformity of soil conditions over the Project site.

PART 2 PRODUCTS

2.01 FILL MATERIALS

- A. General Fill: Comply with 2012 Standard Specifications for Public Works Construction ‘The GREENBOOK’ and 2012 City Supplement ‘The WHITEBOOK’, Section 300-4 for Unclassified Fill.
 - 1. If excavated materials are not of suitable quality, dispose of offsite per 2012 Standard Specifications for Public Works Construction ‘The GREENBOOK’ Section 300-2.2 for Unsuitable Material.
 - 2. If excavated materials are not of sufficient quantity, import additional materials as necessary.
 - 3. Comply with instructions, requirements and considerations as indicated in project soils report.

B. Imported Fill Material:

1. Structural Fill: Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 300-3 for Structure Excavation and Backfill.
 - a. Comply with instructions, requirements and considerations as indicated in project soils report.
 - b. Any imported fill shall have Expansion Index of 20 or less and be inspected prior to transport to site.
2. Pervious Fill: Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 300-3 for Structure Excavation and Backfill.
 - a. Comply with instructions, requirements and considerations as indicated in project soils report.
3. Topsoil: Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 212-1.1 for Topsoil.
 - a. Topsoil shall be imported for use at landscape areas only.

PART 3 EXECUTION

3.01 IMPORT/EXPORT OF MATERIALS

- A. Provide fill materials as specified in Part 2- Products. Test and analyze samples for compliance before delivery to site. If excavated materials from the Project site are not of required quality or sufficient quantity, import additional materials as necessary.
- B. Bills of lading or equivalent documentation will be submitted to the Project Inspector on a daily basis.
- C. Upon completion of import operations, provide the Engineer a certification statement attesting that all imported material has been obtained from the identified source site.

3.02 PREPARATION

- A. Do not begin backfilling operation until excavation has been inspected and approved by Geotechnical Engineer and Engineer as indicated in Section 31 2316 – Excavation.

3.03 FILLING

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 300-3.5 for Structure Backfill.
- B. Employ a placement method that does not disturb or damage other work.

3.04 COMPACTION

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 300-4.6 Application of Water and 300-4.7 for Compaction.

- B. Compact to minimum relative compaction as specified in 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 300-3.5 for Structure Backfill.

3.05 FIELD QUALITY CONTROL

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 211-1 for Compaction Tests.
- B. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- C. Frequency of Tests: Per Engineer's request.

3.06 CLEANING

- A. Remove unsuitable materials, rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 32 1123
AGGREGATE BASE COURSES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aggregate base course.
- B. Paving aggregates.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading: Preparation of site for base course.
- B. Section 31 2316.13 - Trenching: Compacted fill over utility trenches under base course.
- C. Section 31 2323 - Fill: Compacted fill under base course.
- D. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 301 for Treated Soil, Subgrade Preparation, and Placement of Base Materials.

1.03 REFERENCE STANDARDS

- A. ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)); 2007.
- B. ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.
- C. ASTM D 2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2006.

1.04 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Materials Sources: Submit name of imported materials source.
- C. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- D. Compaction Density Test Reports.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. When aggregate materials need to be stored on site, locate stockpiles where indicated.
 - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 - 2. Prevent contamination.
 - 3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 200-2 for Untreated Base Materials.

2.02 SOURCE QUALITY CONTROL

- A. Where aggregate materials are specified using ASTM D 2487 classification, test and analyze samples for compliance before delivery to site.
- B. If tests indicate materials do not meet specified requirements, change material and retest.
- C. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the work are as indicated.
- B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.02 PREPARATION

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 301-1 for Subgrade Preparation.

3.03 INSTALLATION

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 301-2 for Untreated Base.

3.04 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

3.05 FIELD QUALITY CONTROL

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 211-1 for Compaction Tests.
- B. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556.
- C. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor").
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Frequency of Tests: Per Engineer's request.
- F. Proof roll compacted aggregate at surfaces that will be under slabs-on-grade.

3.06 CLEANING

- A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 32 1216
ASPHALT PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Double course bituminous concrete paving.
- B. Surface sealer.
- C. Patching and Repair of Asphaltic Concrete Paving.

1.02 RELATED REQUIREMENTS

- A. Pavement sections indicated on Drawings.
- B. Section 31 2200 - Grading: Preparation of site for paving and base.
- C. Section 31 2323 - Fill: Compacted subgrade for paving.
- D. Section 32 1123 - Aggregate Base Courses: Aggregate base course.
- E. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK',
 - 1. Section 302-1 for Cold Milling of Existing Pavement.
 - 2. Section 302-3 for Preparatory Repair Work.
 - 3. Section 302-4 for Slurry Seal Surfacing.
 - 4. Section 302-5 for Asphalt Concrete Pavement.
 - 5. Section 302-8 for Sealcoat for Miscellaneous Areas.
 - 6. Section 302-14 for Crack Seal Work.

1.03 QUALITY ASSURANCE

- A. Perform Work in accordance with Standard Specifications for Public Works Construction.
- B. Mixing Plant: Conform to Standard Specifications for Public Works Construction.
- C. Obtain materials from same source throughout.

1.04 FIELD CONDITIONS

- A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 203 for Bituminous Materials.
- B. Redwood Headers: Redwood headers and stakes shall be 2x8 dimensional construction grade

redwood or approved equal.

1. Header boards shall be fastened to stakes with twelve penny (12d) galvanized nails.

2.02 ASPHALT PAVING MIXES AND MIX DESIGN

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK',
 1. Section 302-4 for Slurry Seal Surfacing.
 2. Section 302-5 for Asphalt Concrete Pavement.
 3. Section 302-8 for Sealcoat for Miscellaneous Areas.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

3.02 SUBGRADE PREPARATION

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 300 for Earthwork.

3.03 HEADER BOARD INSTALLATION

- A. Header Board Installation: Install header boards at perimeter of pavement with stakes spaced not over 24 inches on center unless otherwise indicated. Do not install header boards where asphaltic concrete paving abuts buildings, concrete walks or curbs, or other pavements.

3.04 APPLICATION OF BASE COURSE

- A. As specified in Section 32 1123 – Aggregate Base Courses.

3.05 STERILANT APPLICATION

- A. Place herbicide below asphalt paving. Meet the applicable environmental control requirements. Apply as directed by the manufacturer's printed instructions just before application of the paving. Take special care to insure that herbicide is not applied to any areas which are to be planted.

3.06 PREPARATION - PRIMER

- A. Apply primer in accordance with manufacturer's instructions.
- B. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 302-5 for Asphalt Concrete Pavement.
- C. Use clean sand to blot excess primer.

3.07 PREPARATION - TACK COAT

- A. Apply tack coat in accordance with manufacturer's instructions.

- B. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 302-5 for Asphalt Concrete Pavement.

3.08 PLACING ASPHALT PAVEMENT

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 302-5 for Asphalt Concrete Pavement

3.09 SEAL COAT

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK',
 - 1. Section 302-8 for Sealcoat for Miscellaneous Areas.
 - 2. Section 302-3 for Preparatory Repair Work.
 - 3. Section 302-14 for Crack Seal Work.
- B. Apply to all new asphaltic concrete paving. Apply to all existing asphaltic concrete paving where indicated.
- C. Apply, just prior to "line" work, at rate of 0.10 gallon per square yard, at temperature between 100 and 140 degrees. If tackiness prevails, lightly dust affected areas with rock dust or fine sand.

3.10 PATCHING AND REPAIR OF ASPHALTIC CONCRETE PAVING

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK',
 - 1. Section 302-1 for Cold Milling of Existing Pavement where indicated.
 - 2. Section 302-3 for Preparatory Repair Work.
 - 3. Section 302-14 for Crack Seal Work.
- B. Repairs: Remove paved areas that are defective or contaminated with foreign materials. Remove paving course over area affected and replace with primer, tack coat and fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness per part 3.08.
- C. Surface Treatments: Slurry Seal:
 - 1. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 302-3 for Slurry Seal Surfacing.
 - 2. Prior to slurry application, repair areas and major depressions, wide cracks filled, remove dust, dirt and other foreign material from the surface.
 - 3. Apply a tack coat of diluted emulsified asphalt of same type and grade specified for the slurry.

4. Apply slurry in accordance with [ASTM D-3910], the Asphalt Institute Standards and the International Slurry Seal Association, and part 3.09; and allow to cure. Minimum thickness of 1/4".
5. Roll slurry seal to smooth ridges and provide a uniform, smooth surface

3.11 PAVEMENT PAINTING

- A. Pavement Painting – as specified in Section 32 1723.13 Painted Pavement Markings.
 1. Allow seal coats to cure for ten days before applying paint.
 2. Cleaning: Sweep and clean surface to eliminate loose material and dust.
 3. Apply paint with mechanical equipment to produce uniform straight edges. Using painting equipment and templates specifically designed for this purpose. Protect adjoining work from damage.
 4. Make lines 4" wide unless otherwise indicated.
 5. Layout markings to exact requirements of Owner. Verify layout line widths and colors prior to painting.

3.12 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- B. Variation from True Elevation: Within 1/2 inch.

3.13 FIELD QUALITY CONTROL

- A. Provide Field Inspection and Verification Testing in compliance with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 302 for Roadway Surfacing, as indicated for each specific application.
- B. Before seal coating, flood the paved areas with water to check drainage and surface irregularities. Replace, or overlay high and low spots in an acceptable manner and water test the paving again after corrections have been made.
- C. Replace or repair deficient and damaged asphalt paving.
- D. All paving shall drain properly before being accepted. There shall be no variation greater than 1/4 inch plus or minus from a 10 foot straight-edge, except at grade changes.

3.14 PROTECTION

- A. Immediately after placement, protect pavement from mechanical injury until surface temperature is less than 140 degrees F.

END OF SECTION

SECTION 32 1313
CONCRETE PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete curbs and gutters.
- B. Concrete walks.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.
- B. Section 31 2323 - Fill: Compacted subbase for paving.
- C. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK',
 - 1. Section 301-1 for Subgrade Preparation.
 - 2. Section 302-6 for Portland Cement Concrete Pavement.
 - 3. Section 303-5 for Concrete Curbs, Walks, Gutters, Cross Gutters, Alley Intersections, Access Ramps, and Driveways.

1.03 REFERENCE STANDARDS

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).
- B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2005.
- C. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 2010.
- D. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 1988 (Reapproved 2002).
- E. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2009a.
- F. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2009a.
- G. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2008).
- H. ASTM D 1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2004a (Reapproved 2008).

1.04 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For concrete pavement installed as walkway surfaces, provide values equivalent to the following values as determine by testing per ASTM C 1028:

1. Level Surfaces: Minimum 0.6.
 2. Step Treads: Minimum 0.6.
 3. Ramp Surfaces: Minimum 0.6
- B. Area Paving: Floor and ground surfaces shall be stable, firm and slip resistant, complying with CBC 11B-302. Portland cement concrete paving shall have a medium broom finish on all surfaces sloped less than 6% and slip resistant heavy broom finish on all surfaces sloped greater than 6%.

1.05 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data: Provide data on joint filler, admixtures, and curing compound.
- C. Samples: Submit two sample panels, 12 x 12 inch in size illustrating exposed aggregate finish.
- D. Design Data: Indicate pavement thickness, design mixture, designed concrete strength, reinforcement, and typical details.
- E. Qualification Data: For qualified Installer of detectable warnings, ready-mix concrete Manufacturer, and Testing Agency.
- F. Material Certificates: For the following, from manufacturer:
 1. Cementitious materials.
 2. Steel reinforcement and reinforcement accessories.
 3. Fiber reinforcing.
 4. Admixtures.
 5. Curing compounds.
 6. Applied finish materials.
 7. Bonding agent or epoxy adhesive.
 8. Joint fillers.
- G. SPECIAL REQUIREMENT – HISTORIC: Submit surveyed horizontal control plan for all pavement to be removed and replaced, as described in Subsection 1.07, C, of this Section.

1.06 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

- B. **Testing Agency Qualifications:** Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated. Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.
- C. **ACI Publications:** Comply with ACI 301 unless otherwise indicated.
- D. **Preinstallation Conference:** Conduct conference at Project site.
 - 1. **Review methods and procedures related to concrete paving, including but not limited to, the following:**
 - a. Concrete mixture design.
 - b. Quality control of concrete materials and concrete paving construction practices.
 - 2. **Require representatives of each entity directly concerned with concrete paving to attend, including the following:**
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete paving subcontractor.
 - e. Manufacturer's representative of paving system used for detectable warnings.
- E. **Concrete paving shall comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK, including the following guidelines:**
 - 1. **All repairs shall be doweled into existing concrete with minimum #4 bar at 24 inch maximum spacing.**
 - 2. **Pedestrian paving, per plan.**
 - a. **Provide expansion joints and control joints to control cracking.**
 - b. **Control joints in walkways should be located a maximum of 5 feet on center with expansion joints at maximum 45 feet. No panel should be larger than 100 square feet.**
 - c. **Concrete paving expansion joints shall receive sealant. Use only elastomeric expansion joint sealants.**
 - d. **Slope flatwork away from utility vault lids**
 - e. **Finish for concrete walks is a medium broom finish, with brush strokes perpendicular to the primary direction of travel.**

1.07 PROJECT CONDITIONS

- A. **Traffic Control:** Maintain access for vehicular and pedestrian traffic as required for other construction activities.
- B. **Per soils report:** The upper 2 feet of soil below exterior concrete slabs on grade shall have an Expansion Index of 20 or less. Excavate and replace with imported fill as necessary to achieve

this requirement. Exterior concrete slabs on grade shall have a minimum thickness of 4 inches; reinforced with #3 bars at 18" on center each way. Slabs shall be provided with weakened plane joints. Joints shall be placed in accordance with the American Concrete Institute Guidelines.

- C. **SPECIAL REQUIREMENT – HISTORIC:** The pistol range site is a Designated Historic Resource. Due to this designation, the paving on-site – specifically the paved areas adjacent to the historic cobble buildings, West Range, and Public Range areas shall be removed and replaced to the satisfaction of the Historic Resources Board and their Representatives.
1. Contractor shall survey all paving removed in the historic areas, prior to removal, for horizontal control points, including but not limited to: paving perimeter and boundaries, control joints, and construction joints. **Submit horizontal control survey to Engineer for review and approval of Engineer and Historic Review Board Representative prior to removal of any site paving.**
 2. Any existing contractor pavement stamps shall be carefully removed and replaced in accordance with City Standard Drawings SDG-115.
 3. Contractor shall stake out new paving to be placed in exactly the same location as existing, and re-create existing control and construction joints.
 4. Finishing: No special finishing, texturing or scoring. Match finish color and texture with the following exception: Light to medium broom finish may be applied for slip-resistance.

PART 2 PRODUCTS

- A. Comply with 2012 Standard Specifications for Public Works Construction ‘The GREENBOOK’ and 2012 City Supplement ‘The WHITEBOOK’,
1. Section 201-1 for Portland Cement Concrete.
 2. Section 201-2 for Reinforcement for Concrete.
 3. Section 201-3 for Expansion Joint Filler and Joint Sealants.
 4. Section 201-4 for Concrete Curing Materials.
 5. Section 201-5.1 for Cement Mortar.

PART 3 EXECUTION

3.01 GENERAL EXECUTION

- A. Comply with 2012 Standard Specifications for Public Works Construction ‘The GREENBOOK’ and 2012 City Supplement ‘The WHITEBOOK’, Section 302-6 for Portland Cement Concrete Pavement and 303-5 for Concrete Curbs, Walks, Gutters, Cross Gutters, Alley Intersections, Access Ramps and Driveways.

3.02 SUBBASE

- A. Comply with 2012 Standard Specifications for Public Works Construction ‘The GREENBOOK’ and 2012 City Supplement ‘The WHITEBOOK’, Section 301-1 for Subgrade

Preparation.

3.03 FINISHING

- A. Area Paving - General: Floor and ground surfaces shall be stable, firm and slip resistant, complying with CBC 11B-302. Portland cement concrete paving shall have a medium broom finish on all surfaces sloped less than 6% and slip resistant heavy broom finish on all surfaces sloped greater than 6%.

3.04 REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Engineer.
- B. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- C. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION

SECTION 32 1540
AGGREGATE SURFACING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Base course.
- B. Crushed Aggregate surfacing on site access roads and range areas.
- C. Organic Binder for Crushed Aggregate.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading: Preparation of site for surfacing.
- B. Section 31 2323 - Fill: Compacted subgrade.
- C. Section 32 1123 – Aggregate Base Courses.

1.03 REFERENCE STANDARDS

- A. ASTM C 136 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ASTM D 2419 – Sand Equivalent Value of Soils and Fine Aggregates.
- C. ASTM D 2488 – Standard Practice for Description and Identification of Soils.

1.04 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Manufacturer’s product data sheet.
- C. Base course gradation and certification that product meets specifications.
- D. Stabilized crushed aggregate gradation and certification that product meets specifications.

1.05 QUALITY ASSURANCE

- A. Obtain materials from same source throughout.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Protect stabilized crushed aggregate mix from contamination. Store under cover.

1.07 SEQUENCING AND SCHEDULING

- A. Do not install work specified in this Section prior to acceptance of earth moving.
- B. Coordinate work specified in this Section with work specified in other Sections to minimize cutting of and operation of heavy equipment over installed stabilized crushed aggregate paving.
- C. Do not install stabilized crushed aggregate surfacing when subbase is wet at saturated field capacity.

PART 2 PRODUCTS

2.01 MATERIALS

A. Base Course Materials:

1. Comply with MTO OPSS 1010 – “Material Specification for Aggregates – Granular A, B, M and Select Subgrade Material” specification for Granular A material.

B. Crushed Aggregate Materials:

1. Imported, Crushed Aggregate Material shall consist of sound, angular, durable particles.
2. Gradation as determined in accordance with ASTM C 136:

<u>Sieve Size</u>	<u>Percent Passing</u>
3/4-inch	100
1/2-inch	90-100
No.4	50-100
No.30	25-55
No.100	10-20
No.200	5-18

3. SAND EQUIVALENT: As determined by ASTM D 2419 methodology (Caltrans217)
 - a. Shall have a minimum of 30 to maximum of 60
4. R-VALUE: As determined by ASTM D 2488 methodology (Caltrans 301)
 - a. Shall have a minimum of 73
5. Aggregate color shall be selected from a pre-approved material pallet from Gail Materials 951-667-6106, www.gailmaterials.net.
 - a. Approved Equal: Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 4-1.6 for Trade Names or Equals.

C. Organic Binder:

1. NexPave Organic-Lock™ self-healing organic binder by Gail Materials, Corona, CA; phone 951-667-6106; fax 951-667-6102; www.gailmaterials.net.
2. Approved Equal: Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 4-1.6 for Trade Names or Equals.

D. Final Mix Rate of organic binder depends on the selected material as well as the application and shall be determined by Manufacturer.

E. Water: Free from contaminants that would discolor or be deleterious to stabilized aggregate paving.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine grading and subsoil conditions. Do not proceed until conditions are acceptable.
- B. Verify that compacted subgrade is dry and ready to support aggregate and imposed loads.
- C. Verify gradients and elevations of subgrade are correct.

3.02 PREPARING SUBGRADE

- A. Excavate to depth required so that finish grade can be established as noted on plans.
- B. Remove excavated soil from site.
- C. Compact subgrade to 95% Modified Proctor Density. Excavate soft and unstable areas of subgrade that cannot be compacted to standard noted, fill and compact with approved granular material.
- D. Protect surface until placement of overlying aggregate surfacing.

3.03 BASE COURSE

- A. Place base course material over subgrade to depths and dimensions shown on drawings in maximum 6" lifts compacted to 95% Modified Proctor Density.

3.04 PLACING AGGREGATE SURFACING

- A. For areas of vehicular use or equal install Aggregate Paving to a compacted depth of 6 inches.
- B. Prewetted Aggregate Paving with organic binder: For areas of vehicular use of compacted depths of 6 inches or greater shall be installed at 3 inch compacted lifts. Estimated compacted max density is +/- 129 lbs/cu. ft. The moisture percentage in the prewetted Aggregate Paving with organic binder will be determined by manufacturer based on selected aggregate.
- C. For applications that are not prewetted by manufacturer, the Aggregate Paving with organic binder will be delivered dry. Manufacturer will calculate the required gallons of water to be added per ton of selected material in order to reach the ideal moisture percentage for installation. In order to ensure that water is being applied correctly, the Aggregate Paving with organic binder shall be bucket blended or equal prior to spreading. Manufacturer does not recommend installing Aggregate Paving with organic binder in place and then watering in either lifts or from the surface down.
- D. Depending on weather conditions, the time required to allow the material to set-up before it can be compacted varies. Generally, this time period is between 6 and 48 hours. The top layer should be firm and not sticky. Compaction can begin when you can walk on the material without significantly sinking in and material does not feel muddy. If material sticks to the roller during compaction, allow the material to further dry. Do not allow the material to completely dry out.
- E. Make 4-6 passes using a 1-10 ton double or single static drum roller, or equivalent. Do not use a vibratory compactor or vibratory setting on the compactor. The contractor shall select the proper size roller for the appropriate application.
- F. After final compaction, the surface shall be true to elevation and shall not vary by more than (1/4") tested with a straight edge at any location on the surfaces. Surfaces can either be crowned at a minimum of 2% and/or installed with a cross slope of minimum 1%.

- G. Compaction testing shall not be conducted until the Aggregate Paving with organic binder has been allowed to thoroughly dry and cure.

3.05 ADJUST AND CLEAN

- A. All paved areas or adjacent surface shall be brushed clean and excess materials shall be removed from the work site and disposed of in an approved dump location.

3.06 PROTECTION

- A. Do not allow traffic on stabilized crushed aggregate paving after placement or until compacted stabilized crushed aggregate paving has fully cured. This time may vary depending on weather conditions.
- B. Protect stabilized crushed aggregate paving surface from damage until Project completion. Repair damaged areas to match specified requirements.

3.07 MAINTENANCE AND REPAIRS

- A. Loose aggregate will appear on the surface over time and is a natural occurrence. If excess material becomes loose, redistribute the material over the surface, water thoroughly and re-compact with a minimum 1-ton drum roller.
- B. To repair, excavate damaged area and scarify exposed stabilized crushed aggregate paving. Pre-blend replacement crushed aggregate material with Aggregate Paving with organic binder (meeting original specification) at the specified rate. Apply material to the excavated area and compact. Thoroughly water the material and allow the material to cure, but not completely dry out. Re-compact the material, ensuring that the final grade and crown are maintained. Do not use a vibratory compactor.

END OF SECTION

SECTION 32 3119

DECORATIVE METAL FENCES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Decorative steel fence and gate – Pedestrian entry at Federal Boulevard.

1.02 RELATED REQUIREMENTS

- A. Section 03 3300 - Cast-in-Place Concrete: Concrete anchorage for posts.
- B. Section 05 5500 – Metal Fabrications: Gate hardware and fabrication.
- C. Section 08 7100 – Door Hardware: Gate Hardware specification.

1.03 REFERENCE STANDARDS

- A. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process; 2009a.
- B. ASTM B 117 - Practice for Operating Salt-Spray (Fog) Apparatus; 2009.
- C. ASTM D 523 - Test Method for Specular Gloss; 2008.
- D. ASTM D 714 - Test Method for Evaluating Degree of Blistering in Paint; 2002 (Reapproved 2009).
- E. ASTM D 822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus; 2001 (Reapproved 2006).
- F. ASTM D 1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments; 2008.
- G. ASTM D 2244 - Test Method for Calculations of Color Differences from Instrumentally Measured Color Coordinates; 2009b.
- H. ASTM D 2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact); 1993 (Reapproved 2004).
- I. ASTM D 3359 - Test Method for Measuring Adhesion by Tape Test; 2009.
- J. ASTM F 2408 - Ornamental Fences Employing Galvanized Steel Tubular Pickets; 2009.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to start of work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data: Submit manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation methods.
 4. Gate Hardware specified in section 087100 – Door Hardware.
 5. Balance of hardware necessary for gate in decorative fence.
- C. Shop Drawings:
1. Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.
 2. Foundation details, concrete design mix and reinforcing schedule for anti-ram barrier system.
 3. Dimensioned plans, including: dimensions based on field measurements, height, width, size of all components. Indicate full fabricated height and width of gate leaf (not opening) not including hardware such as latches and hinges.
- D. Installer's Qualification Statement.
- E. Manufacturer's Warranty.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Installer Qualifications: Experienced with type of construction involved and materials and techniques specified.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Store materials in a manner to ensure proper ventilation and drainage. Protect against damage, weather, vandalism and theft.

1.08 WARRANTY

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 6-8.3 for Warranty.
- B. Special Warranty for Finish: 10 years.

1.09 REGULATORY REQUIREMENTS

- A. Doors, doorways and gates that are part of an accessible route shall comply with CBC Section 11B-404.
- B. Hand-activated gate opening hardware, handles, pulls, latches, locks and other operating devices on accessible gates shall have a shape that is easy to grasp with one hand and does not require tight grasping, pinching or twisting of the wrist to operate. CBC Section 11B-404.2.7 and 11B309.4.
- C. The lever of lever actuated latches or locks shall be curved with a return to within ½ inch of the (face of) gate to prevent catching on the clothing or persons. California Referenced Standards

code. T-24 Part 12, Section 12-10-202, Item (F).

- D. The force for pushing or pulling open a door or gate other than fire doors shall be as follows: 5 pounds maximum. CBC Section 11B-404.2.9.
- E. Swinging door and gate surfaces within 10 inches of the finish floor or ground measured vertically shall have a smooth surface on the push side extending the full width of the door or gate. Parts creating horizontal or vertical joints in these surfaces shall be within 1/16 inch of the same plane as the other and be free of sharp or abrasive edges. Cavities created by added kick plates shall be capped. CBC Section 11B-404.2.10.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Decorative Metal Fences – Product or custom fabrication, to Match Existing.

2.02 FENCES AND GATES

- A. Fences: Complete factory- or shop-fabricated system of posts and panels, accessories, fittings, and fasteners; finished with coating, and having the following performance characteristics:
 - 1. Capable of resisting vertical load, horizontal load and infill performance requirements for fence categories defined in ASTM F 2408.
- B. Gate: Fabricate as indicated on Drawings.
- C. Finish: Multi-stage pretreatment/wash with zinc phosphate, galvanizing, followed by epoxy primer and acrylic topcoat.
 - 1. 1st Coat - Epoxy Primer: VOC compliant, two-component chemically-cured epoxy semi-gloss coating. Minimum film thickness 4-8 mil/dry, 5.4-10.8 mil/wet. Prepare surfaces thoroughly per manufacturer's instructions prior to application.
 - a. SW Macropoxy 646 Fast Cure Epoxy, or approved equal.
 - 2. 2nd and 3rd Coats – Top Coat: Aliphatic acrylic polyurethane, two-component gloss enamel. Minimum film thickness 3-6 mils/dry, 4.5-9 mils/wet. Prepare surfaces thoroughly per manufacturer's instructions prior to application.
 - a. SW Acrolon 218 HS Acrylic Polyurethane, or approved equal.
 - b. Top Coat Color: To match existing fence.
- D. Steel: ASTM A 653 A 653M; yield strength 45,000 psi, minimum.
 - 1. Hot-dip galvanized; A 653/A 653M, G60.
- E. Fasteners: Type 304 stainless steel; finished to match fence components.
 - 1. Tamper-proof security bolts.
 - 2. Self-drilling hex-head screws.
- F. Refer to Section 05 5500 – Metal Fabrications for additional information.

2.03 WELDED STEEL FENCE

- A. Provide fence meeting requirements for Industrial class as defined by ASTM F 2408.

- B. Fence Panels: Fusion welded.
 - 1. Panel Style: To Match Existing.
 - 2. Width: To match existing.
 - 3. Height: To match existing.
 - 4. Attach panels to posts with manufacturer's standard panel brackets.
- C. Posts:
 - 1. Size: To match existing. Provide post cap, typical.
 - 2. Post Cap: Flush plate, welded, ground smooth.
- D. Rails: To match existing. Minimum requirements: Manufacturer's standard, with pre-punched picket holes.
 - 1. Picket Retaining Rods: To match existing. Minimum size: 0.125 inch galvanized steel.
 - 2. Picket-to-Rail Intersection Seals: PVC grommets.
- E. Pickets: Steel tube to match existing. Minimum requirements below:
 - 1. Spacing: 4.715 inch on center.
 - 2. Size: 1 inch square by 14 gage.
 - 3. Style: Pickets with finial extend above top rail to match existing.
 - 4. Finial: match existing.
- F. Flexibility: Capable of following variable slope of up to 1:2.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Set fence posts in accordance with the manufacturer recommended spacing.
- C. When cutting rails immediately seal the exposed surfaces by:
 - 1. Removing all metal shavings from cut area.
 - 2. Apply primer to thoroughly cover cut edge and drilled hole; allow to dry.
 - 3. Apply 2 coats of top coat matching existing fence color.

4. Failure to seal exposed surfaces in accordance with manufacturer's instructions will negate manufacturer's warranty.
- D. Space gate posts according to the manufacturers' drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected.
1. Base type and quantity of gate hinges o the application; weight, height, and number of gate cycles.
 2. Identify the necessary hardware required for the application on the manufacturer's gate drawings.
 3. Provide gate hardware by the manufacturer of the gate and install per manufacturer's recommendations

3.04 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From Indicated Position: 1 inch.
- C. Minimum distance from property line: 6 inches..

3.05 CLEANING

- A. Leave immediate work area neat at end of each work day.
- B. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.
- C. Clean fence with mild household detergent and clean water rinse well. .
- D. Remove mortar from exposed posts and other fencing material using a 10 percent solution of muriatic acid followed immediately by several rinses with clean water.
- E. Touch up scratched surfaces using materials recommended by manufacturer. Match touchup paint color to fence finish.

3.06 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair, or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 32 84 00
PLANTING IRRIGATION

PART 1 - GENERAL

3.3 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including 2012 Standard Specifications for Public Works Construction 'The GREENBOOK', 2012 City Supplement 'The WHITEBOOK', and Supplementary Special Provisions.

3.4 SUMMARY

- A. This Section covers the furnishings of all materials and performing all operations to provide a complete operable Landscape Irrigation System as directed on the drawings including the following:
 - 1. Trenching, stockpiling excavated material and refilling trenches.
 - 2. Irrigation System components including but not limited to: irrigation sub-meter, backflow prevention device, pressure regulators, piping, valves, fittings, rotator spray heads, root zone tree bubblers, controller, wiring and final adjustments as determined by the Engineer to insure efficient and uniform distribution.
 - 3. Pipe connections to irrigation sub-meter and backflow prevention device.
 - 4. Testing and inspection of Irrigation System.
 - 5. Clean up and maintenance.
- B. Related Sections include the following:
 - 1. Division 22 Section "Water Distribution" for water supply piping, water meters, and backflow preventers.
 - 2. Division 31 Section "Earthwork" for excavating, trenching, and backfilling.
 - 3. Division 31 Section "Site Clearing."
 - 4. Division 32 Section "Planting."
 - 5. Division 32 Section "Hot-Mix Asphalt Paving" for cutting and patching asphalt paving.
 - 6. Division 32 Section "Cement Concrete Paving" for cutting and patching concrete paving.

3.5 DEFINITIONS

- A. Lateral Piping: Downstream from control valves to sprinklers. Piping is under pressure during flow.
- B. Pressure Piping: Downstream from point of connection to water distribution piping to and including control valves. Piping is under water distribution system pressure.
- C. The following are industry abbreviations for plastic materials.
 - 1. ABS: Acrylonitrile-butadiene-styrene plastic
 - 2. NP: Nylon plastic

3. PE: Polyethylene plastic
4. PP: Polypropylene plastic
5. PTEF: Polytetrafluoroethylene plastic
6. PVC: Polyvinyl chloride plastic

3.6 GENERAL REQUIREMENTS

- A. Code Requirements shall be those of State and Municipal Codes and Regulations locally governing this work, providing that any requirements of the Drawings and Specifications, not conflicting therewith but exceeding the Code Requirements shall govern, unless written permission to the contrary is granted by the Landscape Architect.
- B. Conform to the requirements of the reference information listed below except where more stringent requirements are shown or specified in the most current set of construction documents:
 1. American Society for Testing Material (ASTM), for test methods specifically referenced in this section.
 2. Underwriter's Laboratories (UL), for UL wires and cables.
 3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
 4. Comply with requirements the City of San Diego Water Utilities Department for preventing backflow and back siphonage.
 5. Comply with ASTM F 645, "Guide for Selection, Design, and Installation of Thermoplastic Water Pressure Piping Systems."
 6. Comply with NFPA 70, "National Electrical Code," for electrical connections between wiring and electrically operated devices.
 7. Furnish plastic pipe and fittings permanently marked with size, class, and type of pipe, working pressure at 73.4 degrees F, and National Sanitation Foundation (NSF) rating.
- C. A licensed and bonded plumbing contractor shall execute work involving substantial plumbing for installation of copper piping, backflow prevention devices and other related work. Obtain any necessary permits prior to beginning work.
- D. Specified depths of pressure supply lines, laterals and pitch of pipes as stated in this section are minimums. Settlement of trenches lower than grades specified on the final grading plans is cause for removal of finish grade treatment, refilling trenches, recompacting and repairing of finish grade treatment.
- E. Follow current printed manufacturer's specifications and drawings for items or information not specified or graphically indicated in the most current set of construction drawings.
- F. Dimensions indicated are approximate. It is not possible to indicate all required offsets, fittings and other related equipment graphically on the construction drawings. Contractor shall be responsible for minor changes caused by actual site conditions. Before proceeding with any work, Contractor shall carefully check and verify all dimensions of related architectural elements, utilities and landscaping; and furnish and install required fittings.

- G. Do not install the irrigation system as shown on the construction drawings when it is obvious that actual field conditions such as physical obstructions, grading discrepancies and field dimensions vary from those recorded on the construction drawings. Immediately bring any such discrepancies to the attention of the Engineer prior to proceeding with work. If immediate notification is not given and such discrepancies exist, Contractor shall assume full responsibility for necessary revisions, as determined by the Engineer.
- H. Central control system communication cable installation and splicing or radio communication shall be tested and certified in writing by the appropriate manufacturer's representative. The system shall also be tested on line with the central computer system prior to requesting a walk through for Substantial Completion.

3.7 DELIVERY, STORAGE, AND HANDLING

- A. Exercise caution in handling, loading and storing of plastic pipe and fittings to avoid damage.
- B. Transport pipe in a vehicle with a bed long enough to allow the length of pipe to lay flat so as not to be subjected to undue bending or concentrated external load at any point. Support pipe during storage from sagging and bending. Store plastic piping protected from direct sunlight.
- C. Discard pipe that has been dented or damaged unless such dent or damaged section is cut and rejoined with a coupling.
- D. Protect valves, fittings, and specialties from moisture, dirt, and other possible contaminants.

3.8 SEQUENCING AND SCHEDULING

- A. Install landscape headers, sidewalks, and mowing strips before installation of sprinkler system. Sleeves and mainlines under paving shall be in place before paving construction.
- B. Specimen trees (24 inches box and larger) shall be installed before the location of the irrigation system.
- C. Coordinate lawn sprinkler piping with utility work.
- D. Obtain permission, in writing, from the City at least 2 working days before shutting off existing in-use water lines. Contractor shall receive instructions from the City as to the exact length of time of each shut-off. Notify the City's Landscape Inspector of said intent.

3.9 EXISTING FIELD CONDITIONS

- A. Preserve and protect all existing trees, plants, monuments, structures, hardscape and architectural elements from damage due to work in this section. In the event that damage does occur to inanimate object and structures, Contractor shall repair or replace such damage to the satisfaction of the Engineer. Contractor at Contractor's expense shall replace damaged or injured living plant material.
- B. Trenching or other work required in this section under the limb spread of existing trees shall be done by hand or by other methods so as to prevent damage or harm to limbs, branches and roots.
- C. Trenching in areas where root diameter exceeds 2 inches shall be done by hand. Exposed roots of this size shall be heavily wrapped with moistened burlap to avoid scarring or excessive drying. Where a trenching machine is operated in proximity to roots that are less than 2 inches, the wall of the trench shall be hand trimmed, making clean cuts through roots.

- D. Trenches adjacent to or under existing trees shall be closed within 24 hours. When this is not possible, the side of trench closest to the tree or trees affected shall be covered with moistened burlap.
- E. Protect, maintain and coordinate work with other contracts, specifications, trades, and utilities. Exercise extreme care in excavating and working in areas where utilities exist. Contractor shall be responsible for damages caused by its operations. In the event that damage does occur, Contractor shall pay the costs of such repairs.
- F. Use caution where trenches and piping cross existing roadways, sidewalks, hardscape, paths or curbs. Contractor shall be responsible for damages caused by its operations.

3.10 REQUIRED DOCUMENTS

A. Service Manuals

- 1. Submit, prior to beginning construction, a list of irrigation equipment to be used, accompanied by manufacturer's catalog data, specifications, or other literature clearly indicating compliance with specification requirements for each item.
- 2. Furnish (4) four service manuals to the City prior to scheduling a walk through for Substantial Completion. Submit manuals in bound form complete with a table of contents, copy of contractor's warranty, and workmanship form on company letterhead. Manuals shall contain complete large-scale drawings of all installed equipment showing component warranties and catalog numbers together with the manufacturer's name and address. Manuals shall include operation instructions. Manuals shall be subject to approval by the Engineer as to completeness.

B. Record Drawings

- 1. Prior to beginning work in the field, secure a complete set of irrigation plans, details, and specifications on diazo mylars at the original scale. Contractor shall be responsible for making a set of blue line prints for every week on the project. At the end of each working day, Contractor shall record all work accomplished for that day on the set of blue line prints in red ink. These record drawings shall be brought up to date at the end of each workweek by a qualified draftsman. The drawings should indicate the following:
 - a. Any zoning changes.
 - b. Dimension from two permanent points of reference (building corners, fixed hardscape corners, road intersections, permanent existing utilities) the location of the following items:
 - 1) Water meters
 - 2) Connection to existing water lines
 - 3) Routing of pressure supply lines at every 100 feet along routing
 - 4) Backflow prevention devices
 - 5) Flow sensors
 - 6) Master valves
 - 7) Isolation ball valves

- 8) Quick coupling devices
 - 9) Electric control valves
 - 10) Check valves
 - 11) Field satellite units/controllers
 - 12) Grounding rods
 - 13) Control wire routing (if routed separately from pressure supply line)
 - 14) Communication cable routing (if routed separately from pressure supply line)
 - 15) Communication cable and control wire splices that are outside of control unit or field satellite unit
 - 16) Other equipment as directed by City
2. Prior to scheduling a walk through for Substantial Completion, provide a record set of field drawings as described above to the City for review. After review, the City will return the set to the field foreman requesting further information or will notify that the record set of field drawings are complete. After approval from the City, a walk through for Substantial Completion may be scheduled.
 3. Prior to scheduling the final walk through, the final set of irrigation record drawings shall be professionally drafted.
 4. Contractor is responsible for delivering the final set of record drawings to the Engineer prior to initiating the maintenance period.

C. Controller Charts

1. Provide drawings for each controller unit installed on the project. The controller drawings shall be an actual blue print reduction of the area covered by that controller unit and shall be at the maximum allowable scale that will fit inside the controller door without folding the drawing. The chart shall be a plot plan, entire or partial, showing building(s), walks, roads and walls. Drawings shall show valves and sprinkler heads serviced by that particular controller identifying each station by separate color. Number valves shall match the operation schedule and the drawings. All zones controlled by a controller shall be included on a single sheet. Only those areas controlled by that controller shall be shown. Resident Engineer's Landscape Inspector shall review this print prior to submittal. It shall be hermetically sealed by plastic, and then be secured to the inside door of the controller enclosure.
2. Prepare and submit additional copies of color coded controller drawings as follows: two - 11 inches x 17 inches laminated copies, one - 8 inches x 11 inches laminated copy, and one - 11 inches x 17 inches non-laminated copy.
3. Submit controller charts to the Engineer prior to requesting a walk-thru for substantial completion.

3.11 WARRANTY

- A. Contractor shall warrant materials against defects and guarantee workmanship for the period of one year. Contractor shall be responsible for coordinating warranty items with manufacturer/distributor and City.
- B. Settlement of trenches, which may occur during the one-year warranty period, will be repaired by Contractor at no expense to the City.

3.12 EXTRA STOCK AND EQUIPMENT CERTIFICATIONS

- A. Prior to a release of responsibility, schedule a walk through with the Engineer and disclose and provide the following:
 1. Five (5) bubblers and pop-up rotator spray heads with nozzles and screens of each type used, for every 100 pop-up spray heads installed on the project. Five (5) pop-up spray heads with nozzles and screens, minimum. One bubbler with screen, minimum.
 2. Two (2) Quick Coupler keys with 90 degree swivel and hose bib attachment, for type and size of quick coupling valve used on project.
 3. Two (2) sets of the required equipment specific specialty tools for removing, disassembling and adjusting each type of bubbler or sprinkler head, isolation valve, and electric control valve used on the project.
 4. Two (2) keys for opening and locking each automatic controller.
 5. All manufacturers' rebate certificates (bonus dollars).
 6. One (1) nickel-chrome plated 16-gauge steel 36 inches tube sampler soil probe, as manufactured by Oakfield or approved equal.
 7. All manufacturers' warranty information stating length of warranty and how to exercise warranty on all valves, irrigation controllers and sprinkler heads.
 8. Central Irrigation Control System equipment installation certification letter from the equipment supplier.
 9. Copy of backflow prevention device equipment operation certification as required by City Regulations.
 10. One (1) operation key for cross handle isolation valves.
 11. One (1) operation key for 2" square nut isolation gate valves.
 12. Five (5) spare keys matching equipment enclosure locks used.

PART 4 - PRODUCTS

2.1 MANUFACTURERS

- A. The design of the irrigation system is based on the manufacturers and products specified herein or indicated on the Drawings. Substitutions will be permitted only with the Engineer's approval. Where such substitution will change the coverage or flow rates of the sprinkler heads, the request for substitution shall include layout plans showing revised sprinkler head locations. Such revised layout plans shall provide coverages and watering rates equivalent to those indicated. The Engineer shall be notified of any design changes or substitutions.

2.2 PIPING

A. General Piping:

2. Pipe sizes shown are nominal inside diameter unless otherwise noted.
3. Pipe shall be identified with the following indelible markings:
 - a. Manufacturer's name
 - b. Nominal pipe size
 - c. Schedule or class
 - d. Pressure rating
 - e. NSF (National Sanitation Foundation) seal of approval
 - f. Date of extrusion

B. Solvent Weld Pressure Supply Line:

1. Solvent Weld Pressure Supply Line: (downstream of Backflow prevention device) shall be PVC **Schedule 80** conforming to ASTM D1785-83 for pipe sizes 3/4" through 1 1/2", and PVC Class 315 BE (SDR 13.5) conforming to ASTM D 2241 for pipe sizes 2" and larger.
 - g. Manufactured from virgin polyvinyl chloride (PVC) compound in accordance with ASTM D2241 and ASTM D1784; cell classification 12454-B.
 - h. Type 1, Grade 1.
4. Fittings: Standard weight, **Schedule 80**, injection molded PVC, complying with ASTM D1784 and D2466, cell classification 12454-B.
 - a. Threads - Injection molded type (where required)
 - b. Tees and Ells - side gated
5. Threaded Nipples: ASTM D2464, Schedule 80 with molded threads
6. Joint Cement and Primer: Type as recommended by manufacturer of pipe and fittings

C. Non-pressure Lateral Lines:

- Non-Pressure Lateral Lines: (downstream of electric remote control valve) PVC **Schedule 80**, conforming to ASTM D1785-83.
1. Fittings: Standard weight, **Schedule 80**, injection molded PVC, complying with ASTM D1784 and D2466, cell classification 12454-B.
 - a. Threads- Injection molded type (where required)
 - b. Tees and Ells-side gated
 - c. Threaded Nipples: ASTM D2464, Schedule 80 with molded threads.
 7. Joint Cement and Primer: Type as recommended by manufacturer of pipe and fittings

D. Sleeving and Conduit

1. All sleeving for pressure supply line and non-pressure supply lines shall be twice the nominal size of the pipe within, minimum.

8. Sleeving and Conduit Material:

a. **PVC SCH 80** for 1" to 2½" pressure supply line

b. **PVC SCH 80** for 3" and larger pressure supply line

c. **PVC SCH 80** for non-pressure lines

d. (1) one ¾" **PVC SCH 80** conduit for up to 5 wires

e. (1) one 1" **PVC SCH 80** conduit for up to 8 wires

f. (1) one 1-¼" **PVC SCH 80** conduit for up to 15 wires

g. (1) one 1-¼" **PVC SCH 80** wire conduit for Master Valve and Flow Sensing cable

9. Flow sensing cable and master valve wires shall be installed in the same conduit and apart from all other wires.

E. Brass Pipe and Fittings:

1. Pressure Supply line (from point of connection through Backflow Prevention Device) Brass pipe shall be regular weight, 85% red brass, ANSI Schedule 40 screwed pipe.

10. Fittings: Medium brass, screwed at 125 pound class.

2.3 PRESSURE REGULATORS

A. ASSE 1003, single-seated, direct-operated, water-pressure regulators, rated for 150-psi minimum, initial-inlet working pressure, with size, flow rate, and inlet and outlet pressures indicated (75-125psi adjustable). Include integral factory-installed or separate field-installed Y-pattern strainer that is compatible with unit for size and capacity:

1. 2-Inch NPS (DN50) and Smaller: Bronze body with threaded ends.

11. Interior Components: Corrosion-resistant materials

2.4 FLOW SENSORS

A. The flow sensor shall be a spinning impeller type, brass or PVC tee as required. Sized to accurately read irrigation system designed flow maximum and minimum (per technical specification of manufacturer). Manufactured by Data Industrial.

2.5 ISOLATION VALVES

A. Isolation Ball PVC Valves: Industrial grade sealed unit socket weld schedule 80 PVC ball valve (Use for mainline pipe 1-1/2" and smaller) as manufactured by Spears model CB-2-1000 or approved equal.

B. Isolation Gate Valve: Bronze, screw-in-bonnet, non-rising stem, cross handle, solid wedge, threaded valve (Use on mainline pipe 2" and 2-1/2" in size) as manufactured by Nibco model T-113-K, or approved equal.

- C. Manifold Ball PVC Valves: Industrial grade sealed unit socket weld schedule 80 PVC ball valve (Use for all electric control valve and quick coupler manifolds) as manufactured by Spears model 2122 or approved equal.

2.6 ELECTRIC CONTROL VALVES

- A. Remote Control Valves: Normally closed electrically actuated diaphragm type, corrosion and UV-resistant PVC material construction to operate at pressures up to 150 psi. Including a 24-volt solenoid, one-piece epoxy encapsulated and coated, with captured plunger and spring. Diaphragm one-piece molded construction with integral "O" ring seal reinforced with 600-pound test fabric. Capable of multi-angle installation (globe or angle) and manual slow closing operation with internal bleed. Valve shall be as manufactured by Rain Bird Manufacturing Corporation, model PGA (without pressure regulator option), or approved equal.
- B. Valve identification tags shall be pre-printed, double sided standard yellow tags as manufactured by Christy's or approved equal.

2.7 CHECK VALVES

- A. Swing Check Valves: Brass or bronze 100 pound class for non-pressurized lines.
- B. Spring Check Valves: King Brothers KC-2000-S, PVC, Thread x Thread, stainless steel internal parts and adjustable spring tension from 4 to 15 psi, to prevent low sprinkler head drainage.

2.8 VALVE BOXES

- A. Valve Boxes: Boxes adjacent to paved areas subject to vehicular traffic shall be precast concrete with cast iron lids designed to resist vehicular traffic. Concrete valve boxes shall have lockable covers. Boxes in all other areas shall be plastic valve boxes as follows:
 - 1. Quick Couplers, Isolation Ball Valves, Manifold Ball Valves, Spare Wire Boxes and Pull Boxes: Round 10" diameter valve box, green in color, with stainless steel hex bolt, including washer, size and type to secure lid. Manufactured by Carson-Brooks Series 910-4B with "T" cover or approved equal.
 - 12. Electric Control Valves, Flow sensors, and Master Valves: Rectangular 12" valve box, green in color, with stainless steel hex bolt, including washer, size and type to secure lid. As manufactured by Carson-Brooks Series 1419-12-2B hinged cover or approved equal.

2.9 ROTATOR SPRAY HEADS AND BUBBLERS

- A. Pop-up Rotator Spray Type: Full or part circle pop-up rotator spray type sprinkler body, stem, nozzle and screen constructed of heavy-duty plastic. The sprinkler shall have a soft wiper seal for cleaning debris from pop-up stem as it retracts into case to prevent sprinkler from sticking up. The sprinkler shall have a matched precipitation rate plastic nozzle with an adjusting screw capable of regulating the radius and flow. The sprinkler shall have a strong stainless steel retract spring for positive pop down. Pop-up height shall be as indicated on plans. The sprinkler head shall have a screen under the nozzle to protect it from clogging and for easy removal for cleaning and flushing system. The sprinkler head shall have a bottom inlet and may have a side inlet for ease of installation. Use only the bottom inlet for sprinkler heads equipped with anti-drain devices. Manufactured by Hunter PROS-12 series (without the PRS option), or approved equal.
 - 1. Swing Joints for 3/4" and larger sprinkler inlet size shall be pre-assembled, schedule 40 with ACME O-ring sealed threads, with 8" minimum lay length, as manufactured by Lasco

or approved equal. Swing joints assemblies for 1/2" sprinkler inlets shall use three marlex street ells with schedule 80 nipple, minimum length of 6".

- B. Fixed Root Zone Tree Bubbler Type: The bubbler, with flow rate of 0.25 GPM, shall be fixed in an 18" deep, 3" diameter perforated standpipe wrapped in a fabric sleeve to prevent soil intrusion. On the opposite side of the tree from the bubbler standpipe, equidistant from the tree trunk as the bubbler standpipe, shall be installed an 18" deep, 3" diameter perforated observation well standpipe, wrapped in a fabric sleeve to prevent soil intrusion. Both standpipes shall be enclosed with locking caps. Manufactured by Hunter RZWS-18-25-CV ROOTZONE, or approved equal.

2.10 ELECTRIC CONTROL VALVE WIRE

- A. All wire for control for valves shall be insulated solid copper conductor of a type approved for direct burial. Provide a different color for each controller, and install per valve manufacturer's specifications and wire chart. Common wire for each controller shall be white with stripe of same color as controller wires. Extra wires shall be black, one extra from controller to each valve manifold.
- B. Sizing of low voltage wire shall be in accordance to manufacturer's recommendations, in no case less than #14 in size. AWG UF UL approved direct burial copper wire for all control wires and all common wires.
- C. 120 volt wire to be type required by local codes and ordinances, of proper size to accommodate needs of equipment serviced.
- D. Connections on 24-volt wire shall be made by Pentite pre-filled waterproof connector, or approved equal.
- E. Trench Marker Tape: Tape shall be detectable, blue marking tape with the words "Caution – Irrigation Line Buried Below." Widths shall be at least 3/4 of the diameter of the pipe being protected. Tape shall be manufactured by "Christy's" or approved equal.

2.11 THRUST BLOCKS

- A. Thrust Blocks: Concrete thrust and anchor blocks shall be placed at each fitting 3" or greater, or where indicated on drawings, and shall consist of Class C @ 2000 psi with 4" slump Portland cement concrete.

2.12 SAND BEDDING

- A. Sand bedding on all pipe shall be clean construction grade type.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine field conditions prior to beginning the work of this section. Grading operations shall be completed and approved prior to beginning work.
- B. Verify all sleeve locations prior to beginning work in this section. Flag all existing sleeves and conduits installed by other trades. Report any conflicts and discrepancies to the Engineer immediately.

- C. Verify location of existing underground utilities, valves, manholes, catch basins, and other appurtenances that will affect the layout of the sprinkler system. Verify location of existing trees, new specimen trees, and other obstructions that will affect the layout of the sprinkler system. Verify location of stub outs and points of connection to the water supply system.

3.2 PREPARATION

- A. Locations of piping and equipment indicated on plans are diagrammatic and approximate and shall be adjusted as necessary and as directed to meet existing conditions and obtain complete water coverage. Contractor is responsible for irrigation system operation and complete coverage of the system. Report any conflicts and discrepancies to the Landscape Architect and Resident Engineer Landscape Inspector immediately.
- B. Sprinkler lines shall have a minimum clearance of 6 inches from each other and from other utility lines. Do not install parallel lines directly over one another.
- C. Construct irrigation system to the sizes and grades at the locations indicated. Mark with powdered lime or marking paint routing of pressure supply line and stake the location of each rotator spray head, tree bubbler, electric control valve and other related equipment for the first three zones. Engineer shall review staking and direct any necessary changes with Contractor prior to proceeding to other zones. This review does not in any way alleviate Contractor from the responsibilities associated with proper uniformity and distribution of head placement after staking.
- D. Install sleeves to accommodate pipes and wires under paving, hardscape areas, sidewalks, and paths prior to asphalt and concrete operations. Compact backfill around sleeves to 95% Modified Proctor Density within 2% of optimum moisture content in accordance with ASTM D1557. Where not yet utilized, close sleeve ends with cloth duct tape.

3.3 EXCAVATION AND BACKFILLING OF TRENCHES

- A. Follow layout indicated on drawings as closely as possible in excavating trenches. Trenches shall be straight in alignment and support pipe continuously on bottom of trench. Remove rocks and debris greater than 1" in diameter. Over excavate as required for bedding material.
- A. Depth of Trench (in landscape areas):
 - 1. Pressure Supply Line: 18" from top of pipe to finish grade.
 - 2. Non-Pressure Line: 12" from top of pipe to finish grade.
 - 3. Control Wiring: directly at side and bottom of pressure supply line.
 - 4. Communication Cable: opposite side of control wiring.
 - 5. Pressure Supply line Locator Tape: above pipe, 6" below finish grade, (at a maximum depth of 12").
- B. Depth of Trench (under asphalt paving or concrete, pipe and wires to be in sleeving):
 - 1. Pressure Supply Line: 36" from top of finish grade to top of sleeve.
 - 2. Non-Pressure Line: 24" from top of finish grade to top of sleeve.
 - 3. Control Wiring: Directly at side and bottom of pressure supply line.

4. Communication Cable: Opposite side of control wiring.
 5. Pressure Supply Line Locater Tape: Above pipe, 6" below finish grade, at a maximum depth of 12".
 6. Piping located under asphalt paving or concrete shall be installed with the appropriate sized sleeve. Backfilled with sand bedding (6" below pipe and 6" above pipe).
- C. Width of Trench:
1. Pipe less than 3": 7" minimum.
- D. Width Between Trenches:
1. Irrigation trench to irrigation trench: 6" minimum.
 2. Irrigation trench to other trade trenches: 12" minimum.
- E. Sleeves: Provide appropriate sized sleeves for piping located under asphalt paving or concrete.
- F. Boring: Boring is only permitted where pipe must pass under an obstruction that cannot be avoided or removed. Backfill shall match surrounding soil density and grain. Boring under existing paving, sidewalks, or hardscape shall be permitted at Contractor's risk. Contractor shall repair all damage to such items at Contractor's own expense.
- G. Backfilling: Backfilling of trenches shall not be done until all required testing for the irrigation system has been completed.
1. Material: Excavated material is generally considered to be adequate for backfilling operations. Before beginning the backfilling operation, insure that backfill material is free from debris and rocks greater than 1" in diameter, and is not mixed with topsoil. These materials after separated from backfill, shall be legally disposed of at Contractor's expense.
 2. Bed pressure supply line with construction grade sand 6" above and 6" below pipe. Remaining backfill shall be as described above.
 3. Bed all electrical control wire and communication cable wire, trenched separate from pressure supply line, with construction grade sand 6" above and 6" below wires.
 4. Bed all sleeves with sand bedding with construction grade sand 6" above and 6" below pipe sleeves.
 5. Set in place, cap and pressure test piping in the presence of the Engineer prior to backfilling.
 6. Compact backfill to a 90% maximum density in accordance with ASTM D1557 with a mechanical tamper. Do not leave trenches open for a period greater than 48 hours. Open trenches shall be protected in accordance with current OSHA regulations. Slightly mound filled trenches for settlement after backfilling is compacted.
 7. Smooth trenches to match surrounding finish grade prior to requesting walk through for Substantial Completion.

3.4 POINT(S) OF CONNECTION

- A. Point of connection shall be approximately as indicated on drawings. Connect new underground piping and valves, and provide all flanges, adapters, or other necessary fittings.

3.5 INSTALLATION OF SOLVENT WELD POLYVINYL CHLORIDE PIPE (PVC)

- A. Polyvinyl chloride pipe shall be cut with an approved PVC pipe cutter designed only for that purpose.
- B. All plastic-to-plastic solvent weld joints shall use solvent recommended by the pipe manufacturer. Do not install solvent weld pipe when temperature is below 40° F.
- C. Pipe ends and fittings shall be wiped with MEK, or approved equal, before welding solvent is applied. Welded joints shall be given a minimum of 15 minutes to set before moving or handling.
- D. Snake pipe from side-to-side on trench bottom to allow for expansion and contraction.
- E. All changes of direction over 15 degrees shall be made with appropriate fittings.
- F. When pipe laying is not completed by the end of the workday, close pipe ends with tight plug or cap.
- G. Install pressure supply line locating tape along the entire length of pressure supply line.
- H. Coordinate pressure supply line with sand bedding operations.
- I. No water shall be permitted in the pipe until inspections have been completed and a period of at least 24 hours has elapsed for solvent weld setting and curing.
- J. Center load pipe with small amount of backfill to prevent arching and slipping under pressure. Leave joints exposed for inspection during testing.
- K. Construct thrust blocks behind each fitting according to the following schedule (For 2” and larger pipe):

Thrust developed per 100 psi pressure (lbs. force) for various fitting configurations:

Pipe Size: 90° Elbow: 45° Elbow: Valves, Tees, Dead Ends:

1 1/2"	300	200	200
2"	500	300	400
3"	1,000	600	800
4"	1,800	1,100	1,300
6"	4,000	2,300	2,900
8"	7,200	4,100	5,100
10"	11,200	6,300	7,900
12"	16,000	9,100	11,300

Approximate bearing strength of typical soils:

Soil Type	Lbs/sqft
Mulch, Peat, Etc.	0
Soft Clay	500
Sand	1,000
Sand and Gravel	1,500
Sand and Gravel with Clay	2,000
Sand and Gravel Cemented with Clay	4,000
Hard Pan	5,000

Divide the soil bearing strength by the thrust developed for each specific fitting size to determine the minimum size (ft/2) of each thrust block face. Excavate a minimum of 6" into virgin soil when forming thrust block. Don't over excavate. No thrust block shall be smaller than 1 cubic foot.

3.6 INSTALLATION OF BRASS PIPE

- A. Brass piping shall be cut by a power hacksaw, a circular cutting machine using an abrasive wheel, or by means of a hand hacksaw. All pipes shall be reamed and rough edges or burrs removed so that a smooth and unobstructed flow is obtained.
- B. Eccentric reducing fittings shall be used where change in pipe size occurs. Bushings shall not be used unless specifically authorized by the Engineer.
- C. Carefully and smoothly place joint compound on the male thread only. All screwed joints shall be tightened with tongs or wrenches. Caulking of any kind is not permitted.
- D. All exposed piping under structural slabs shall be stenciled with "Irrigation Main" or "Irrigation Lateral" as required, at ten foot (10') intervals in black permanent ink lettering, 3/4" minimum high.

3.7 INSTALLATION OF ELECTRONIC CONTROL VALVES

- A. Install each electric control valve in a separate valve box so that cross handle is 3" minimum below valve box cover. Install with union type connection. All plastic valve boxes shall be secured with a stainless steel locking bolt mechanism, and set over 3/4" gravel with filter fabric.
- B. Group electric control valves together with no more than 3 per cluster. Allow a maximum of 12" between each valve boxes. Install valve boxes in the same direction and parallel with one another and perpendicular to paving, hardscape, sidewalks and paths. Install each manifold group with a ball valve sized equal to the largest non pressure lateral line in the manifold.

3.8 INSTALLATION OF CHECK VALVES

- A. Install check valves in a separate round valve boxes at a maximum of 10" below valve box cover. Plastic valve boxes shall be secured with a stainless steel locking bolt mechanism, and set over 3/4" gravel with filter fabric.

3.9 INSTALLATION OF VALVE BOXES

- A. Install valve boxes with each type of irrigation equipment so that top of valve box is above finish grade as specified on the Resident Engineer Standard Detail drawings. Valve box extensions are not acceptable except for mainline isolation gate valves.
- B. Place gravel sump below and around each valve box prior to installing valve box as specified on the detail drawings. Place remaining portion of gravel inside valve box, allowing full access in and around all fittings. Valve box shall be fully supported by gravel sump. No brick or wood supports are allowed.
- C. Brand the valve box lid of associated equipment as follows:
 - 1. Electric control valve box lid with "Controller Letter and Station Number"
 - 13. Quick coupling valve box lid with the letters "QC"
 - 14. Isolation gate valve box lid with the letters "GV"
 - 15. Isolation ball valve box lid with the letters "BV"
 - 16. Spare Wire box lids with the letters "SW"
 - 17. Wire Splice box lid with the letters "WS"
 - 18. Communication cable splice box lid with the letters "COMM"
 - 19. Grounding rod valve box lid with the letters "GR"
 - 20. Check valve box lid with the letters "CV"
- D. Letter and number size of brands shall be no less than 1" and no greater than 1 1/2" in height and shall be 1/8" maximum in depth. Provide sample branding to the Engineer prior to commencement of work. Coordinate with Engineer any non-listed equipment box identification required.
- E. Walk through for Substantial Completion shall not be allowed until all branding is complete and approved by Engineer.

3.10 INSTALLATION OF ROTATOR SPRAY HEADS AND BUBBLERS

- A. Flush circuit piping with full water pressure and install sprinklers after hydrostatic test is completed.
- B. Locate part circle sprinklers to maintain a minimum distance of 2" to a maximum of 4" between paving, hardscape, sidewalks, and paths and a minimum distance of 12" from walls.
- C. Rotator spray heads shall not exceed the maximum head and row spacing specified on the drawings or staked in the field unless approved by the Engineer. In no case may spray heads or rotors be installed at a distance between heads that exceeds the manufacturer's recommended distance.
- D. Angled nipples on swing joints below spray heads and rotors or any sprinkler type, where applies, shall not exceed 45° nor be less than 10°.

- E. After installation adjust nozzle sizes, arcs and radius of throw to allow head to head uniform distribution. Adjust all rotator spray heads to correct height above planting as detailed. No overspray will be allowed on paving, hardscape, sidewalks, and paths.
- F. Adjust adjacent new plant material placement or trim existing plants so that it does not interfere with uniform distribution of each rotator spray head.
- G. Landscape Architect or Resident Engineer's Landscape Inspector may request nozzle changes and/or adjustments without additional cost to the City.

3.11 INSTALLATION OF ELECTRICAL WIRE

A. Low Voltage Wiring:

1. Bury control wiring in same trench as pressure supply line as specified.
2. Bundle all 24 volt wires at 20' intervals with electrical tape.
3. Provide expansion loops at every pressure supply line angle fitting, inside each electric remote control valve box, and at 250' length intervals along routing. Form expansion loop by wrapping wire a minimum of 10 times around a 3/4" pipe and withdrawing pipe.
4. Limit splicing of electrical wiring. Provide each splice made at intervals or in electric control valve assembly valve boxes with approved connectors.
5. Wire splices occurring at intervals outside electric control valve box shall be installed in a separate valve box.
6. Provide (1) one electrical control wire for every electric remote control valve. Piggy backing like zones on the same electrical control wire or into the same station terminal is not allowed.
7. Install (2) two spare #14-1 electrical control wires (with common wire) from the automatic controller unit to the last electric control valve on each leg of pressure supply line. Locate the spare wires in their own valve box as specified. Provide (1) one additional spare electrical control wire at every electric remote control valve manifold (valve grouping). In addition to these spare wires, check the drawings for additional wires that are required and locate them in the same valve box as the spare wires. Length of spare wires at each end enclosure shall be sufficient for connection into possible fixture equipment or connection point.

3.12 QUALITY CONTROL

- A. Preconstruction Meeting: Contractor is responsible for contacting the Landscape Architect, Engineer, prior to beginning construction and/or ordering materials, to establish a meeting to review and discuss project objectives, concerns and to review the construction documents to ensure a complete understanding of required installation procedures.
- B. General Observation: The Resident Engineer's Inspector will visit the construction site at interim times during the construction process to access construction progress regarding installation of irrigation equipment to be in compliance with the drawings, details, specifications and site conditions. The Resident Engineer's Inspector will prepare a site report after each visit noting progress of installation, verbal communication with Contractor and identifying any field adjustments necessary which require modifications to the designed irrigation system. A copy of this site report will be delivered to both Contractor and the Resident Engineer's Construction

Manager. Contractor shall immediately address each item on the site report before proceeding with further construction.

- C. Hydrostatic Pressure Testing the Pressure Supply Line: After backfilling, flushing, and prior to the installation of each electric control valve, drip valve assembly, isolation ball valve, quick coupling valve, and manual drain valve the irrigation system shall be pressure tested.
1. Pressure testing shall be performed in the presence of the Landscape Architect and Engineer utilizing the following procedure:
 - a. Pressurize the irrigation system to 40 psi greater than the designated static pressure or 150 psi whichever is greater for a period of no less than 4 hours. The pressure gauge used for the pressure test shall not exceed readings greater than 300psi. Pressure pump and other equipment necessary for the test shall be furnished by Contractor.
 - b. Test is acceptable if no leakage occurs within the system for the duration of the testing period.
 - c. If leaks occur, repair said leaks and begin pressure test again. Repeat this operation until no leaks occur in the irrigation system.
 - d. Before requesting a walk through for Substantial Completion, the entire irrigation system shall remain under pressure for a period of no less than 48 hours.
 2. Inspection: In cases where inspection of the sprinkler system construction is required or where portions of the construction are specified to be performed under the direction or inspection of the Engineer, Inspector, Contractor is required to notify the Engineer Inspector at least 3 working days in advance of the time such inspection or direction is required.
 3. Inspection will be required for the following parts of the construction:
 - a. Upon installation and testing of main lines and lateral lines; when pipes are laid and are to be submitted to pressure tests. Do not cover lines until they have been inspected and approved.
 - b. Upon installation and testing of control valves and wires.
 - c. When the sprinkler system is completed, perform a coverage test, in the presence of the Engineer and Landscape Inspector, to determine if the coverage is complete and adequate for the lawn and planting areas. Furnish materials and perform construction required to correct inadequacies in the coverage.
 - d. Final inspection and performance test shall be at the same time as the final inspection of the landscape construction.
- D. Flushing: Center load all piping prior to flushing. After all new irrigation piping and risers are in place and connected and all necessary diversion work has been completed and prior to the installation of sprinkler heads and quick coupling valves, thoroughly flush piping system under full head of pressure. After the furthest riser from the point of connection begins to flush, continue flushing for duration of five minutes. After the system is thoroughly flushed, cap all risers.

- E. Repairs required due to vandalism before final acceptance will be performed at the Contractor's expense.
- F. Walk Through for Substantial Completion:
 - 1. Before requesting a walk through for Substantial Completion the following requirements must be entirely satisfied:
 - a. The entire irrigation system shall be completely installed, flushed and satisfactorily pressure tested. If Contractor fails to notify the Landscape Architect and Engineer for the pressure test and flushing procedures stated above then Contractor assumes full responsibility for any design modifications directed by the Engineer during the walk through for Substantial Completion regarding pressure and flushing issues.
 - b. All valve boxes shall be branded.
 - c. Record drawings shall have been submitted to the Landscape Architect and City for review as to completeness.
 - 2. Once the above requirements have been met a walk through for Substantial Completion shall be requested. The following procedures shall be used during the walk through:
 - a. Contractor shall have (2) two personnel available with radio communication for the entire length of the walk through.
 - b. All valve box lids shall be removed from valve boxes and placed faced up adjacent to the valve box prior to beginning the walk through.
 - c. The scheduling of each walk through type will be divided over several days as needed to provide adequate time to complete the review of all zones. The walk through will be divided into (2) two sections and proceed as follows:
 - 1) Visual Walk Through: This will consist of walking through the entire irrigation system and examining all components of the system without turning on zones. A punch list will be established of deficiencies in the construction and workmanship of the irrigation system as compared to the construction drawings, details, and specifications.
 - 2) Operational Walk Through: This will consist of walking through the entire irrigation system observing each zone in a fully operable condition. Valves must be activated from the automatic controller unit (Manual bleeding of individual electric control valves will not be acceptable). A punch list will be established of deficiencies in the operation of each zone in the irrigation system evaluating but not limited to head spacing, row spacing, nozzle sizing, correct radius of throw, correct stationing, and flushing operation of zones as compared to the construction drawings, details, and specifications.
 - 3) Once the Walk Through for Substantial Completion has been completed the Landscape Architect will provide a copy of all punch list items to the City for review and distribution to Contractor. It is Contractor's responsibility to repair, replace, and adjust all items on the punch prior to requesting a final walk through.
- G. Final Walk Through:

1. Before commencement of a final walk through is requested, the following requirements shall be entirely satisfied:
 - a. Each item on the walk through for Substantial Completion shall be thoroughly addressed and resolved by Contractor.
 - b. All final record drawings shall have been provided to the Landscape Architect and submitted to the City.
 - c. The maintenance manual for the project shall be completed and submitted to the City.
 - d. Controller charts for each automatic controller unit shall be completed, installed, and submitted to the City.
2. Once the above requirements are met a final walk through shall be requested. The following procedures will be used:
 - a. Contractor shall have (2) two personnel available with radio communication for the entire length of the walk through.
 - b. Only those valve box lids shall be removed from valve boxes as indicated on the walk through for Substantial Completion punch list. The valve box lids shall be placed faced up adjacent to the valve box prior to beginning the final walk through.
 - c. The final walk through shall be divided into (2) two sections and proceed as follows:
 - 1) Visual Walk Through: This will consist of walking through the punch list items created at the time of the walk through for Substantial Completion, examining all components of the system without turning on zones. Any remaining deficiencies in the construction and workmanship of the irrigation system as compared to the punch list generated at the time of the walk through for Substantial Completion, construction drawings, details and specifications will be noted.
 - 2) Operational Walk Through: This will consist of walking through the punch list items created at the time of the walk through for Substantial Completion and observing each zone in a fully operable condition. Valves shall be activated from the automatic controller unit (Manual bleeding of individual electric control valves will not be acceptable). Any remaining deficiencies in the operation of each zone in the irrigation system including but not limited to head spacing, row spacing, nozzle sizing, correct radius of throw, correct stationing, and flushing operation of zones as compared to the punch list generated at the time of the walk through for Substantial Completion construction drawings, details, and specifications.
 - 3) Once the Final Walk Through is completed and all items noted on the final punch list have been addressed the maintenance period shall begin. Any additional walk throughs required due to Contractors' inability to address all issues on the punch lists described above will be provided at Contractor's expense.

3.13 MAINTENANCE PERIOD

- A. The Maintenance Period shall be as indicated in the Agreement and shall begin once all items on the final walk through punch list have been satisfactorily addressed by a written statement indicating such from the Landscape Architect and the City.
1. Contractor is responsible for obtaining and following the maintenance manuals created specifically for the project from the City at the beginning of the maintenance period.
 2. Demonstrate to City's maintenance personnel operation of equipment, sprinklers, specialties, and accessories. Review maintenance information.
 - a. Provide seven days' advance written notice of demonstration.
 3. At the end of the maintenance period and prior to turning the project over to the City, Contractor shall deliver the following to the City:
 - a. All necessary maintenance materials.
 - b. Extra stock as specified elsewhere in this Section.
 4. Once Contractor has fulfilled all maintenance agreement obligations and has provided the above items to the City, the maintenance period will end.

END OF SECTION

SECTION 32 90 00

PLANTING

PART 1 - GENERAL

4.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including 2012 Standard Specifications for Public Works Construction 'The GREENBOOK', 2012 City Supplement 'The WHITEBOOK', and Supplementary Special Provisions.

4.3 SUMMARY

- A. This Section includes the following:
 - 1. Trees
 - 2. Shrubs
 - 3. Groundcovers
 - 4. Sod
 - 5. Soil Amendments
 - 6. Soil Preparation
 - 7. Fine Grading
 - 8. Imported Soil
 - 9. Hydroseed
- B. Related Sections include the following:
 - 1. Other Division 22 Sections for protection of existing trees and planting, topsoil stripping and stockpiling, and site clearing.
 - 2. Division 31 Section "Earthwork" for excavating, filling, and rough grading.

4.4 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product certificates signed by manufacturers certifying that their products comply with specified requirements.
 - 1. Manufacturer's certified analysis for standard products.
 - 2. Analysis for soil amendments made by a recognized laboratory according to methods established by the Association of Official Analytical Chemists.
 - 3. Label data substantiating trees, shrubs and planting materials comply with specified requirements.
- C. Warranty: Specified warranty.

D. Samples of each of the following at least 15 days before planting operations begin:

1. Upon completion of all grading operations, the Contractor shall request a Soil Sampling Kit from the landscape Architect and then shall take a composite soil sample from representative planting areas throughout the site which shall be analyzed for agronomic suitability by:

Gro-Power, Inc., 15065 Telephone Avenue, Chino, CA 91710-9614, Phone (800) 473-1307.

Analysis shall be for complete agricultural suitability of soil with individual recommendations for lawn, non-irrigated hydroseed, and all specified planting materials. The results of these tests are to be reviewed by the Landscape Architect for possible modifications to the specified soil preparation.

2. Photographs of trees selected for project of each species and size indicated, over 15 gallon size.
3. Shrub samples: Deliver to Project site, at least three samples of each plan material variety and size indicated, under 15 gallon size.
4. Acceptable samples shall be maintained as standards of comparison for plan materials furnished.
5. Acceptable samples may be incorporated into the work, if healthy.

4.5 QUALITY ASSURANCE

- A. Provide quality, size, genus, species, and variety of trees and shrubs indicated, implying with applicable requirements of ANSI Z60.1 "American Standard for Nursery Stock."
- B. Measurements: Measure trees and shrubs according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Measure main body of tree or shrub for height and spread, do not measure branches or roots tip-to-tip.

4.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.
- B. Trees and Shrubs: Deliver healthy trees and shrubs, container-grown by a certified nursery. Do not prune before delivery, except as approved by Landscape Architect. Protect bark, branches, buds, blooms, and root systems from sunscald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie shrubs in such a manner as to destroy natural shape. Provide protective covering during delivery. Do not drop trees and shrubs during delivery.
- C. Handle container stock by the container and by the root ball. Do not pick up plants by their leaves or branches.
- D. Deliver trees, shrubs, groundcovers and plants after preparations for planting have been completed and install immediately. If planting is delayed more than 6 hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist.
 1. Do not remove container-grown stock from containers before time of planting.

2. Water root systems of trees and shrubs stored on site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

4.7 PROJECT CONDITIONS

- A. Utilities: Determine location of above grade and underground utilities and perform work in a manner which will safely avoid damaging utilities. Hand excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.
- B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, putrefying soil, contaminants or obstructions, notify Landscape Architect before planting.

4.8 COORDINATION AND SCHEDULING

- A. Coordinate installation of planting materials during normal planting seasons for each type of plant material required.

4.9 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the City of other rights the City may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: Warrant the following living planting materials for the period specified after date of Substantial Completion, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by the City, abnormal weather conditions unusual for warranty period, or incidents that are beyond Contractor's control.
 1. Trees, shrubs and groundcovers: 180 days
- C. Remove and replace dead plant materials within 14 days unless required to plan in the succeeding planting season.
- D. Replace planting materials that are in an unhealthy condition at end of warranty period.
- E. A limit of one replacement of each plant material will be required, except for losses or replacements due to failure to comply with requirements.

4.10 MAINTENANCE

- A. Maintain planting areas by weeding, fertilizing, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Maintain landscaping for the following period:
 1. Maintenance Period: 180 days following completion and acceptance of all landscape work.
- B. The maintenance period shall be extended when, in the opinion of the City or Engineer, improper maintenance has been provided, or lawn areas are considered un-established. Continue maintenance until landscaping is acceptable to the Landscape Architect.
- C. All hydroseeded areas shall be weeded on a weekly basis during the Plant Establishment / Maintenance Period.

PART 2 – PRODUCTS

2.1 TREE AND SHRUB MATERIAL

- A. General: Furnish nursery-grown trees and shrubs conforming to ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully-branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
- D. Grade: Provide trees and shrubs of container sizes and grades confirming to ASNI Z60.1 for type of trees and shrubs required. Trees and shrubs of a larger size may be used if acceptable to the Landscape Architect, with a proportionate increase in size of root balls.
- E. Label at least 1 shrub of each variety and container size with a securely attached, waterproof tag bearing legible designation of botanical and common name.

2.2 GROUNDCOVERS AND PLANTS

- A. Provide groundcovers and plants established and well rooted in removable containers or integral peat pots and with not less than the minimum number and length of runners required by ANSI Z60.1 for the pot size indicated.

2.3 SOIL AMENDMENTS

- A. Soil Conditioner: Proprietary blend of organic fractions to supply several degrees of breakdown rate; a portion of inorganic amendment that resists further breakdown, a long-lasting form of iron with PH of 5.5 to 6.0, salinity of 1.75, organic matter (dry weight basis) more than 90%; nonionic wetting agent, and total nitrogen content of 0.5%. Provide one of the following:
 - 1. Loamex
 - 2. Organo Forest Humus
 - 3. Organo-Grow
- B. Agricultural Limestone: Finely pelletized agricultural grade, conforming to the following analyses:

CHEMICAL COMPOSITION

Calcium Oxide (CaO).....	28.0%
Magnesium Oxide (MgO).....	19.0%
Calcium Carbonate Equivalent.....	98.0%
ENV.....	96

PHYSICAL COMPOSITION (Guaranteed)

<u>U.S. Sieve</u>	<u>Passing</u>
20	98%
60	95%

100 90%

- C. Soil Activator: Shall be an all purpose soil conditioner/fertilizer delivered to the project site in unopened original container or package, each bearing the manufacturer's statement of guaranteed analysis, and shall contain the following minimum available percentage of weight of plant nutrients:

Nitrogen	5%
Phosphoric Acid	3%
Potash	1%
Humus	50%
Humic Acid	15%
Soil strain bacteria	---
Micronutrients	---
Wetting agent	---

Soil Activator shall be equal but not limited to "Gro-Power Plus."

- D. Hydroseed Materials: Seed shall be fresh, clean, new crop seed mechanically premixed to specified proportions. Seed shall be delivered to the site in original, unopened containers bearing the supplier's guaranteed analysis, purity and germination percentages and agricultural certification.

1. Hydroseed Slurry:
 - a) Seed as specified on schedules
 - b) 1,400 lbs. per acre – 'Ecofibre' Premium Wood Fibre Mulch
 - c) 80 lbs. per acre – 'Ecology' Controls Mbinder
 - d) 400 lbs. per acre – 'Gro-Power 531 Plus with Mycorrhizae' & Soil Penetrant
 - e) 60 lbs. per acre – Soil Seal Concentrate

2.4 FERTILIZER

- A. Post-Planting Fertilizer: Organic base, long-lasting, non-burning, slow release, uniform in composition, free-flowing, suitable for application with approved equipment, with trace minerals of 3% iron (expressed metallic) and 5% sulfur (elemental), in the following composition, by weight:

1. Nitrogen:	14% minimum
2. Phosphoric Acid:	7% minimum
3. Potash:	3% minimum

B. Fertilizer Tablets: Shall be 7 gram planting tablets consisting of the following percentages by weight:

- | | |
|---------------------|-----|
| 1. Nitrogen: | 12% |
| 2. Phosphoric Acid: | 8% |
| 3. Potash: | 8% |
| 4. Humus: | 20% |
| 5. Humic Acid: | 4% |

Fertilizer Tablets shall be equal but not limited to "Gro-Power Planting Tablets."

2.5 HERBICIDES

A. Pre-emergent herbicide: Provide one of the following:

1. Surflan
2. Treflan
3. Dymid

2.6 MULCHES

A. Organic Mulch: Proprietary organic mulch derived from 100% above-ground tree trimmings, free from grass or weed seeds, deleterious materials and manufactured as a top dressing of shrubs, consisting of the following:

1. Type: Screened tree trimmings, 3" to 3/8" size.

2.7 EROSION CONTROL MATERIALS

A. Fiber Mesh (Jute Netting): Biodegradable twisted or spun-coir mesh, 0.92 lb per sq. yd. minimum, with 50 to 65% open area. Include manufacturer's recommended steel wire staples, 6 inches long.

1. Fiber Mesh shall be equal but not limited to "Geojute."

2.8 STAKES AND GUYS

A. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, redwood, or pressure-preservative-treated softwood, free of knots, holes, cross grain, and other defects, 2 by 2 inches by length indicated, pointed at one end.

B. Tree Protection Boards: 1 x 3 rough Douglas Fir

C. Tree Ties: Black color; V.I.T., Cinch Tie or equal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Lay out individual tree and shrub locations and areas per plans for multiple plantings. Stake tree locations, outline shrub areas, and secure Landscape Architect's acceptance before the start of planting work. Make adjustments as required by the Landscape Architect.

3.3 CONTAINER PLANTING SOIL PREPARATION

- A. For planting backfill, mix planting soil at the following rate for all plants before backfilling:

1. Native Soil	19 cu. ft./cu. yd.
2. Soil Conditioner	8 cu. ft./cu. yd.
3. Soil Activator	16 lbs./cu. yd.
4. Agricultural Limestone	10 lbs./cu. yd.
5. Planting Tables	per schedule on plans

3.4 2:1 SLOPE AREA PREPARATION

- A. Rake planting areas with 2:1 in slope to a maximum depth of 1 inch, removing from the surface stones larger than 3" in any dimension and sticks, roots, rubbish, and other extraneous materials.

3.5 EXCAVATION FOR TREES AND SHRUBS

- A. Pits and Trenches: Excavate with vertical sides and with bottom of excavation slightly raised at the center to assist drainage. Loosen hard subsoil in bottom and sides of excavation.
- B. Fill excavations with water and allow water to percolate out before positioning trees and shrubs.

3.6 PLANTING TREES AND SHRUBS

- A. Set container-grown stock plumb and in center of pit or trench with top of root ball raised 1" above adjacent finish grades as indicated on the detailed drawings.
 - 1. Carefully removed containers so as not to damage root balls or trunks, holding one hand over top of root ball and removing container with other hand. **DO NOT PICK UP PLANTS BY THEIR FOLIAGE OR TRUNKS. PICK UP CONTAINER ONLY.**
 - 2. Place stock on setting layer of compacted planting soil as required to attain required planting height.
 - 3. Place backfill around root ball in layers, tamping to settle backfill and eliminate voids and air pockets. Insert the specified planting tablets into soil. Form watering basins (except in lawn areas) and water all plants thoroughly immediately after planting. Remove watering basins before the end of the maintenance period.
 - 4. Cut an "X" in jute netting to the size of the tree or shrub planting hold, fold back netting and excavate tree pit, plant tree and fold netting back around tree trunk. Do not bury netting.

3.7 PLANTING GROUNDCOVER

- A. Space groundcover plants uniformly, as indicated on the detailed drawings.

- B. Dig holes large enough to allow spreading of roots, and backfill with planting soil. Insert plant tablet. Firm soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- C. Planting Groundcover on Slopes: Spread weave of installed jute netting on slopes to allow for groundcover plants to be planted. Do not cut netting for groundcover.

3.8 HERBICIDE APPLICATION

- A. Contact: Ray Palmer, Pest Management Supervisor (858) 627-6223 prior to purchase or application of all herbicides to verify timing and method(s) of herbicide application.
- B. Apply pre-emergence herbicide to groundcover areas only, and in accordance with manufacturer's directions. Herbicides shall be applied by a certified applicator. Do not apply to lawn areas.

3.9 MULCHING

- A. Mulch backfilled surfaces of pits, trenches, and jute netting on slope, and other areas indicated on plans.
- B. Organic Mulch: Apply the following average thickness of organic mulch and finish level with adjacent finish grades. Do not place mulch against trunks or stems of plants.
 - 1. Thickness: 2 inches.

3.10 INSTALLING FIBER MESH (JUTE NETTING)

- A. Jute netting shall be installed on all 2:1 or greater slopes in the following manner:
 - 1. Rake off slope face to smooth irregularities.
 - 2. Backfold netting in 6" deep trench at top of slope and secure with staples driven at 12" on center. Fill trench with soil. Roll netting down.
 - 3. Overlap netting 6" on edges and 30" (of uphill netting) on ends.
 - 4. Install staples at 24" on center both ways across entire face of netting.
 - 5. Install plants, cutting netting only for plants 5 gallon size or larger.

3.11 HYDROSEEDING:

- A. Inspection of Conditions: Before proceeding with any work, the hydroseeding landscape contractor shall carefully check planting area conditions and shall immediately inform the Landscape Architect of any discrepancies between the drawings and actual conditions. No work shall be done on any area where there are such discrepancies or where conditions are unsuitable for successful plant material establishment until approval has been given by the Landscape Architect.
- B. Quality of Work: The hydroseeding work shall be performed by a competently trained individual or hydroseeding company in accordance with the best standards and practices related to the trade.
- C. Soil Preparation:

1. Water all hydroseeding areas thoroughly to saturate upper 3" of soil prior to hydroseeding operation.
 2. Allow planting area soil surface to dry out for one day only prior to the hydroseeding application. Care must be taken to not allow the soil surface to be super saturated with water prior to the hydroseeding installation. At the same time the soil surface should not be dry. There should be some residual moisture within the first ¼ inch of soil surface.
 3. Begin the hydroseeding operation on all areas as specified herein.
- D. Hydroseeding Equipment: The specified components shall be mixed together in a hydroseeding machine described as follows:
1. The hydromulching equipment shall meet the minimum requirements of a slurry distribution line large enough to prevent closing and shall be equipped with a set of hydraulic spray nozzles which will provide a continuous non fluctuating discharge of at least 25 PSI at the end of the spray nozzle. The slurry tank shall have a minimum capacity of 2000 gallons and shall be mounted on a traveling unit either self propelled or drawn by a separate unit.
 2. The equipment shall have a built-in agitation system under operating capacity sufficient to agitate, suspend and homogeneously mix a slurry containing not less than 20 kilo (44 lbs.) of organic mulching amendment plus fertilizer chemical additives and solids for each 100 gallons of water.
- E. Hydroseeding Application and Planting Schedule: The hydromulching shall be applied in the form of a slurry consisting of organic fibre, commercial fertilizer, plant seed and binder. When hydraulically sprayed onto the soil the mulch shall not form a blotter like material. The spray operation must be so directed that the slurry spray will also penetrate the soil surface as to drill and mix the slurry components into the soil, thus ensuring maximum impregnation and coverage.
- F. Preparation of Hydroseeding Mixture:
1. The slurry shall be prepared at the site and its components shall be mixed to supply the rates of application as specified herein.
 2. Slurry preparation shall begin by adding water to the tank when the engine is at one-half throttle. When the water level has reached the height of the agitator shaft and good recirculation has been established, the fertilizers shall be added to the mixture (the tank shall be at least 1/3 filled with water at this time).
 3. The engine throttle shall be open to full speed when the tank is 1/2 filled with water. All organic amendments, fibre, and chemicals shall then be added by the time the tank is 2/3 to 3/4 full. At this time the seedmix shall also be added.
 4. Spraying shall commence immediately when the tank is full and the slurry is mixed.
- G. Application: The operator shall spray the area with a uniform visible coat using the dark color of the cellulose fiber as a visual guide. The slurry shall be applied in a downward drilling motion via a fan stream nozzle.
- H. Time Limit: The hydroseeding slurry components are not to be left in the hydroseed machine for more than two hours. If slurry components are left for more than two hours in the machine, the Contractor shall add 50% more of the originally specified seedmix to any slurry mix which

has not been applied within the two hours after mixing. The Contractor shall add 75% more of the original seedmix to any slurry mixture which has not been applied eight hours after mixing. Any mixture not applied after eight hours shall be rejected and disposed of off-site at Contractor's expense.

- I. Protection: Special care is to be exercised by the Contractor to prevent any of the slurry from being sprayed onto any adjacent property, etc. Any slurry sprayed onto these areas shall be cleaned off at the Contractor's expense.

3.12 FIELD QUALITY CONTROL

- A. Observations: Notify Landscape Architect at least 3 days in advance of being ready for observation of the following:
 - 1. Layout of planting areas.
 - 2. Incorporation of soil amendments and fertilizer into the soil.
 - 3. Upon completion of grading, but before planting.
 - 4. Hydroseed application.
 - 5. Plant material review.
 - 6. At completion of all planting.
 - 7. At completion of maintenance period.

3.13 CLEANUP AND PROTECTION

- A. During landscaping, keep pavements clean and work area in an orderly condition.
- B. Protect landscaping from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

3.14 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus soil and waste materials, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the City's property.

END OF SECTION

SECTION 33 1116

SITE WATER UTILITY DISTRIBUTION PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pipe and fittings for site water lines including domestic water lines and fire water lines.
- B. Valves.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete for thrust restraints.
- B. Section 09 9000 - Painting and Coating.
- C. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.
- D. Section 31 2323 - Fill: Bedding and backfilling.
- E. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK',
 - 1. Section 207 for Pipe.
 - 2. Section 208 for Pipe Joint Types and Materials.
 - 3. Section 306 for Underground Conduit Construction.
- F. City Water Department Approved Materials List, latest published edition.
- G. Comply with 2012 San Diego Regional Standard Drawings, unless otherwise noted per Plans.

1.03 REFERENCES

- A. General:
 - 1. The following documents form part of the Specifications to the extent stated. Bring conflicts between Specifications, Drawings, and the referenced documents to the attention of the Engineer, in writing, for resolution before taking any related action. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
 - 2. If the year of the adoption or latest revision is omitted from the designation, it shall mean the specification, manual or test designation in effect the date the Notice to Proceed with the Work is given.
- B. ASSE - American Society of Sanitary Engineering:
 - 1. ASSE 1003-01 Water Pressure Reducing Valves
 - 2. ASSE 1013-99 Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers
 - 3. ASSE 1015-99 Double Check Backflow Prevention Assemblies and Double Check Fire Protection Backflow Prevention Assemblies

4. ASSE 1020-98 Pressure Vacuum Breaker Assembly (Recommended for Outdoor Usage)
5. ASSE 1047-99 Reduced Pressure Detector Fire Protection Backflow Prevention Assemblies
6. ASSE 1048-99 Double Check Detector Fire Protection Backflow Prevention Assemblies
7. ASSE 1060-96 Outdoor Enclosures for Backflow Prevention Assemblies

C. American Water Works Association:

1. AWWA C105-99 Polyethylene Encasement for Ductile-Iron Pipe Systems
2. AWWA C110-98 Ductile-Iron and Gray-Iron Fittings, 3 In. through 48 In. (76 mm through 1219 mm), for Water and Other Liquids
3. AWWA C111-00 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
4. AWWA C151-02 Ductile-Iron Pipe, Centrifugally Cast, for Water
5. AWWA C153-00 Ductile-Iron Compact Fittings for Water Service
6. AWWA C219-01 Bolted, Sleeve-Type Couplings for Plain-End Pipe
7. AWWA C500-02 Metal-Seated Gate Valves for Water Supply Service
8. AWWA C502-94 Dry-Barrel Fire Hydrants
9. AWWA C503-97 Wet-Barrel Fire Hydrants
10. AWWA C504-00 Rubber-Seated Butterfly Valves
11. AWWA C508-01 Swing-Check Valves for Waterworks Service, 2 In. (50 mm) through 24 In. (600 mm) NPS
12. AWWA C509-01 Resilient-Seated Gate Valves for Water Supply Service
13. AWWA C510-97 Double Check Valve Backflow-Prevention Assembly
14. AWWA C511-97 Reduced-Pressure Principle Backflow-Prevention Assembly
15. AWWA C512-99 Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service
16. AWWA C550-01 Protective Interior Coatings for Valves and Hydrants
17. AWWA C600-99 Installation of Ductile-Iron Water Mains and Their Appurtenances
18. AWWA C606-97 Grooved and Shouldered Joints
19. AWWA C651-99 Disinfecting Water Mains
20. AWWA C700-02 Cold-Water Meters - Displacement Type, Bronze Main Case
21. AWWA C701-02 Cold-Water Meters - Turbine Type, for Customer Service
22. AWWA C702-01 Cold-Water Meters - Compound Type
23. AWWA C703-96 Cold-Water Meters - Fire Service Type
24. AWWA C706-96 (Reaffirmed 2001): Direct-Reading, Remote-Registration Systems for Cold-Water Meters

25. AWWA C707-82 (Reaffirmed 1992): Encoder-Type Remote-Registration Systems for Cold-Water Meters
 26. AWWA C800-01 Underground Service Line Valves and Fittings
 27. AWWA C906-99 Polyethylene (PE) Pressure Pipe and Fittings, 4 In. through 63 In., for Water Distribution and Transmission
 28. AWWA C950-01 Fiberglass Pressure Pipe
 29. AWWA M6-99 Water Meters - Selection, Installation, Testing, and Maintenance
 30. AWWA M17-89 Installation, Field Testing, and Maintenance of Fire Hydrants
 31. AWWA M23-03 PVC Pipe - Design and Installation
 32. AWWA M41-03 Ductile-Iron Pipe and Fittings
 33. AWWA M44-98 Distribution Valves: Selection, Installation, Field Testing, and Maintenance
 34. AWWA M45-96 Fiberglass Pipe Design
- D. AWS - American Welding Society:
1. AWS A5.8-92 (Reaffirmed 2003): Specification for Filler Metals for Brazing and Braze Welding
- E. ASME International:
1. ASME A112.1.2-91 (Reaffirmed 2002): Air Gaps in Plumbing Systems
 2. ASME A112.6.3-01 Floor and Trench Drains
 3. ASME B1.20.1-83 (Reaffirmed 2001): Pipe Threads, General Purpose (Inch)
 4. ASME B16.1-98 Cast Iron Pipe Flanges and Flanged Fittings
 5. ASME B16.5-03 Pipe Flanges and Flanged Fittings NPS 1/2 through NPS 24
 6. ASME B16.18-02 Cast Copper Alloy Solder Joint Pressure Fittings
 7. ASME B16.22-02 Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
 8. ASME B16.24-02 Cast Copper Alloy Pipe Flanges and Flanged Fittings: Classes 150, 300, 400, 600, 900, 1500, and 2500
- F. ASTM International:
1. ASTM A 36/A 36M-03a Specification for Carbon Structural Steel
 2. ASTM A 47/A 47M-99 Specification for Ferritic Malleable Iron Castings
 3. ASTM A 48/A 48M-00 Specification for Gray Iron Castings
 4. ASTM A 536-84 (Reapproved 1999): Specification for Ductile Iron Castings
 5. ASTM A 674-00 Practice for Polyethylene Encasement for Ductile Iron Pipe for Water or Other Liquids

6. ASTM B 88-03 Specification for Seamless Copper Water Tube
 7. ASTM B 88M-03 Specification for Seamless Copper Water Tube [Metric]
 8. ASTM C 857-95 (Reapproved 2001): Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures
 9. ASTM C 858-83 (Reapproved 1997): Specification for Underground Precast Concrete Utility Structures
 10. ASTM C 891-90 (Reapproved 2003): Practice for Installation of Underground Precast Concrete Utility Structures
 11. ASTM D 1785-99 Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
 12. ASTM D 2239-01 Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter
 13. ASTM D 2464-99 Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
 14. ASTM D 2466-02 Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
 15. ASTM D 2467-02 Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
 16. ASTM D 2609-02 Specification for Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe
 17. ASTM D 2774-01 Practice for Underground Installation of Thermoplastic Pressure Piping
 18. ASTM D 3139-98 Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
 19. ASTM D 3350-02a Specification for Polyethylene Plastics Pipe and Fittings Materials
 20. ASTM F 645-02 Guide for Selection, Design, and Installation of Thermoplastic Water Pressure Piping Systems
 21. ASTM F 714-01 Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
 22. ASTM F 1267-01 Specification for Metal, Expanded, Steel
- G. Copper Development Association Inc.:
1. Copper Tube Handbook. 1996.
- H. FM Global:
1. Approval Guide. 2003.
- I. Manufacturers Standardization Society of The Valve and Fittings Industry, Inc.
1. MSS SP-60-99 Connecting Flange Joint between Tapping Sleeves and Tapping Valves
 2. MSS SP-80-97 Bronze Gate, Globe, Angle and Check Valves

3. MSS SP-108-96 Resilient-Seated Cast Iron-Eccentric Plug Valves
4. MSS SP-123-98 Non-Ferrous Threaded and Solder-Joint Unions for Use with Copper Water Tube

J. NFPA:

1. NFPA 24-02 Installation of Private Fire Service Mains and Their Appurtenances
2. NFPA 70-02 National Electrical Code
3. NFPA 1963-03 Fire Hose Connections

K. NSF International:

1. NSF 14-03 Plastics Piping System Components and Related Materials
2. NSF 61-02 Drinking Water System Components - Health Effects

L. Underwriters Laboratories Inc.:

1. UL 194-96 Gasketed Joints for Ductile-Iron Pipe and Fittings for Fire Protection Service
2. UL 246-93 Hydrants for Fire-Protection Service
3. UL 262-94 Gate Valves for Fire-Protection Service
4. UL 312-93 Check Valves for Fire-Protection Service
5. UL 405-93 Fire Department Connections
6. UL 753-95 Alarm Accessories for Automatic Water-Supply Control Valves for Fire Protection Service
7. UL 789-93 Indicator Posts for Fire-Protection Service
8. UL 1091-94 Butterfly Valves for Fire-Protection Service
9. UL 1285-01 Pipe and Couplings, Polyvinyl Chloride (PVC) for Underground Fire Service
10. UL 1713-01 Pressure Pipe and Couplings, Glass Fiber Reinforced, for Underground Fire Service
11. Fire Protection Equipment Directory. 2007.

1.04 DEFINITIONS

- A. PVC: Polyvinyl chloride plastic.

1.05 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data:
1. For each type of product indicated.
- C. Shop Drawings:

1. Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
 2. Wiring Diagrams: Power, signal, and control wiring for alarms.
- C. Coordination Drawings:
1. For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
- D. Quality Control Submittals:
1. Field quality-control test reports.
- E. Operation and Maintenance Data:
1. For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.06 QUALITY ASSURANCE

- A. Regulatory Requirements:
1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
 2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
 3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
- B. Product Requirements:
1. Piping materials shall bear label, stamp, or other markings of specified testing agency.
 2. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 3. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.
 4. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.
 5. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.
 6. NSF Compliance:
 - a. Comply with NSF 14 for plastic potable-water-service piping. Include marking "NSF-pw" on piping.
 - b. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport:

1. Prepare valves, including fire hydrants, according to the following:
 - a. Ensure that valves are dry and internally protected against rust and corrosion.
 - b. Protect valves against damage to threaded ends and flange faces.
 - c. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage:

1. Use precautions for valves, including fire hydrants, according to the following:
 - a. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
 - b. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling:

1. Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
2. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

D. Protection:

1. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
2. Protect flanges, fittings, and specialties from moisture and dirt.
3. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.08 COORDINATION

- A. Coordinate connection to water main with utility company.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:

1. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK'; Section 207 for Pipe and Section 208 for Pipe Joint Types and Materials; and City Water Department Approved Materials List, most recent published edition.

2. Products of manufacturers not listed may be proposed for substitution, provided they are comparable to the products specified.
 - a. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Substitutions.

PART 3 EXECUTION

3.01 GENERAL

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 306 for Underground Conduit Construction.

3.02 EXAMINATION

- A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.03 PREPARATION

- A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.

3.04 PIPING APPLICATIONS

- A. General:
 1. Use pipe, fittings, and joining methods for piping systems according to the following applications.
 2. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.
 3. Do not use flanges or unions for underground piping.
 4. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.
- B. Underground Water-Service Piping:
 1. NPS 3/4 to NPS 3.
 2. Provide any of the following:
 3. PVC, Schedule 40 pipe; PVC, Schedule 40 socket fittings; and solvent-cemented joints.
- C. Underground Water-Service Piping:
 1. NPS 4 to NPS 8.
 2. Provide the following:
 - a. PVC, Schedule 40 pipe; PVC, Schedule 40 socket fittings; and solvent-cemented joints.

- D. Water Meter Box Water-Service Piping:
 - 1. NPS 3/4 to NPS 2.
 - 2. Provide the same as underground water-service piping.
- E. Aboveground and Vault Water-Service Piping:
 - 1. NPS 3/4 to NPS 3.
 - 2. Provide the following:
 - a. PVC, Schedule 80 pipe; PVC, Schedule 80 [socket fittings; and solvent-cemented] [threaded fittings; and threaded] joints.
 - b. Ductile-iron, grooved-end pipe; ductile-iron, grooved-end appurtenances; and grooved joints.
- F. Underground Fire-Service-Main Piping:
 - 1. NPS 4 to NPS 12
 - 2. Provide the following:
 - a. PVC, AWWA Class 200 pipe listed for fire-protection service; PVC fabricated or molded fittings of same class as pipe; and gasketed joints.
- G. Aboveground and Vault Fire-Service-Main Piping:
 - 1. NPS 4 to NPS 12
 - 2. Provide ductile-iron, grooved-end pipe; ductile-iron-pipe appurtenances; and grooved joints.
- H. Underground Combined Water-Service and Fire-Service-Main Piping:
 - 1. NPS 6 to NPS 12.
 - 2. Provide the following:
 - a. PVC, AWWA Class 200 pipe listed for fire-protection service; PVC fabricated or molded fittings of same class as pipe; and gasketed joints.
- I. Aboveground and Vault Combined Water Service and Fire-Service-Main Piping:
 - 1. NPS 6 to NPS 12.
 - 2. Provide ductile-iron, grooved-end pipe; ductile-iron-pipe appurtenances; and grooved joints.

3.05 VALVE APPLICATIONS

- A. General Application:
 - 1. Use mechanical-joint-end valves for NPS 3 and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 and smaller installation.

2. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 - a. Underground Valves, NPS 3 and Larger: AWWA, cast-iron, nonrising-stem, resilient-seated gate valves with valve box.
 - b. Underground Valves, NPS 4 and Larger, for Indicator Posts: UL/FMG, cast-iron, nonrising-stem gate valves with indicator post.
3. Use the following for valves in vaults and aboveground:
 - a. Gate Valves, NPS 2 and Smaller: Bronze, nonrising stem.
 - b. Gate Valves, NPS 3 and Larger: AWWA, cast iron, OS&Y rising stem, metal seated.
 - c. Check Valves: AWWA C508, swing type.
4. Pressure-Reducing Valves: Use for water-service piping in vaults and aboveground to control water pressure.
5. Relief Valves: Use for water-service piping in vaults and aboveground.
 - a. Air-Release Valves: To release accumulated air.
 - b. Air/Vacuum Valves: To release or admit large volume of air during filling of piping.
 - c. Combination Air Valves: To release or admit air.
6. Detector Check Valves: Use for water-service piping in vaults and aboveground to detect unauthorized use of water.

3.06 PIPING INSTALLATION

A. Water-Main Connection:

1. Arrange with utility company for tap of size and in location indicated in water main.

B. Water-Main Connection:

1. Tap water main according to requirements of water utility company and of size and in location indicated.
2. Make connections larger than NPS 2 with tapping machine according to the following:
 - a. Install tapping sleeve and tapping valve according to MSS SP-60.
 - b. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
 - c. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
 - d. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.
3. Make connections NPS 2 and smaller with drilling machine according to the following:
 - a. Install service-saddle assemblies and corporation valves in size, quantity, and arrangement required by utility company standards.

- b. Install service-saddle assemblies on water-service pipe to be tapped. Position outlets for corporation valves.
 - c. Use drilling machine compatible with service-saddle assemblies and corporation valves. Drill hole in main. Remove drilling machine and connect water-service piping.
 - d. Install corporation valves into service-saddle assemblies.
 - e. Install manifold for multiple taps in water main.
 - f. Install curb valve in water-service piping with head pointing up and with service box.
- C. Fire-Service-Main Piping Materials and Installation.
- 1. Comply with NFPA 24.
 - 2. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.
 - 3. Install copper tube and fittings according to CDA's "Copper Tube Handbook."
- D. Ductile-Iron, Water-Service Piping:
- 1. Install according to AWWA C600 and AWWA M41.
- E. PVC, AWWA Pipe:
- 1. Install according to ASTM F 645 and AWWA M23.
- F. Minimum Depth:
- 1. Bury piping with depth of cover over top at least 36 inches, and according to the following:
 - a. Under Driveways: With at least 36 inches cover over top.
 - b. In Loose Gravelly Soil and Rock: With at least 12 inches additional cover.
- G. Obstructions:
- 1. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.
- H. Connection to Building:
- 1. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.
 - 2. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
- I. Sleeves:
- 1. Sleeves are specified in Section 22 0000 Plumbing, General Purpose.
- J. Mechanical sleeve seals:
- 1. Mechanical sleeve seals are specified in Section 22 0000 Plumbing, General Purpose.
- K. Piping with Gasketed Joints:

1. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

3.07 JOINT CONSTRUCTION

A. General:

1. Refer to Section 22 0000 Plumbing, General Purpose for basic piping joint construction.
2. Make pipe joints according to the following:
 - a. Copper-Tubing, Pressure-Sealed Joints: Use proprietary crimping tool and procedure recommended by copper, pressure-seal-fitting manufacturer.
 - b. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.
 - c. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.
 - d. Ductile-Iron Piping, Grooved Joints: Cut-groove pipe. Assemble joints with grooved-end, ductile-iron-piping couplings, gaskets, lubricant, and bolts according to coupling manufacturer's written instructions.
 - e. PE Piping Insert-Fitting Joints: Use plastic insert fittings and fasteners according to fitting manufacturer's written instructions.
 - f. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.
 - g. Fiberglass Piping Bonded Joints: Use adhesive and procedure recommended by piping manufacturer.
 - h. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure. Refer to Section 22 0000 Plumbing, General Purpose for joining piping of dissimilar metals.

3.08 ANCHORAGE INSTALLATION

A. Anchorage, General:

1. Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:
 - a. Concrete thrust blocks.
 - b. Locking mechanical joints.
 - c. Set-screw mechanical retainer glands.
 - d. Bolted flanged joints.
 - e. Heat-fused joints.
 - f. Pipe clamps and tie rods.

2. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
 - a. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
 - b. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.
 - c. Fire-Service-Main Piping: According to NFPA 24.
3. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.08 VALVE INSTALLATION

- A. AWWA Gate Valves:
 1. Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
- B. AWWA Valves Other Than Gate Valves:
 1. Comply with AWWA C600 and AWWA M44.
- C. UL/FMG, Gate Valves:
 1. Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.
- D. UL/FMG, Valves Other Than Gate Valves:
 1. Comply with NFPA 24.
- E. MSS Valves:
 1. Install as component of connected piping system.
- F. Corporation Valves and Curb Valves:
 1. Install each underground curb valve with head pointed up and with service box.
- G. Pressure-Reducing Valves:
 1. Install in vault or aboveground between shutoff valves.
- H. Relief Valves:
 1. Comply with AWWA C512. Install aboveground with shutoff valve on inlet.

3.09 DETECTOR CHECK VALVE INSTALLATION

- A. General:
 1. Install in vault or aboveground.
 2. Install for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.
 3. Support detector check valves, meters, shutoff valves, and piping on brick or concrete piers.

3.10 ROUGHING-IN FOR WATER METERS

A. General:

1. Rough-in piping and specialties for water meter installation according to utility company's written instructions.

3.11 BACKFLOW PREVENTER INSTALLATION

A. General:

1. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
 - a. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.
 - b. Do not install bypass piping around backflow preventers.
2. Support NPS 2-1/2 and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

3.12 WATER METER BOX INSTALLATION

A. General:

1. Install water meter boxes in paved areas flush with surface.
2. Install water meter boxes in grass or earth areas with top 2 inches above surface.

3.13 CONCRETE VAULT INSTALLATION

A. General:

1. Install precast concrete vaults according to ASTM C 891.

3.14 PROTECTIVE ENCLOSURE INSTALLATION

A. General:

1. Install concrete base level and with top approximately 2 inches above grade.
2. Install protective enclosure over valves and equipment.
3. Anchor protective enclosure to concrete base.

3.15 FIRE HYDRANT INSTALLATION

A. General:

1. Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.
2. Wet-Barrel Fire Hydrants: Install with valve below frost line. Provide for drainage.
3. AWWA Fire Hydrants: Comply with AWWA M17.
4. UL/FMG Fire Hydrants: Comply with NFPA 24.

3.16 FIRE DEPARTMENT CONNECTION INSTALLATION

A. General:

1. Install ball drip valves at each check valve for fire department connection to mains.
2. Install protective pipe bollards on three sides of each fire department connection.

3.17 CONNECTIONS

A. General:

1. Piping installation requirements are specified in Section 22 0000 Plumbing, General Purpose. Drawings indicate general arrangement of piping, fittings, and specialties.
2. Connect water-distribution piping to utility water main. Use tapping sleeve and tapping valve.
3. Connect water-distribution piping to interior domestic water and fire-suppression piping.
4. Connect waste piping from concrete vault drains to sanitary sewerage system. See 33 3111 Site Sanitary Utility Sewerage Piping for connection to sanitary-sewer piping.
5. Coordinate equipment grounding and wiring with electrical work.

3.18 FIELD QUALITY CONTROL

A. Piping Tests:

1. Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water. Prepare reports of testing activities.

B. Hydrostatic Tests:

1. Test at not less than one-and-one-half times working pressure for two hours.
2. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.

3.19 IDENTIFICATION

A. General:

1. Install continuous underground warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping.
2. Permanently attach equipment nameplate or marker indicating plastic water-service piping, on main electrical meter panel.

3.20 CLEANING

A. General:

1. Clean and disinfect water-distribution per Section 33 1300 Disinfecting Of Water Utility Distribution.

END OF SECTION

SECTION 33 1300

DISINFECTING OF WATER UTILITY DISTRIBUTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Disinfection of site domestic water lines and site fire water lines specified in Section 33 1116.
- B. Disinfection of building domestic water piping specified in Section 22 0000.
- C. Testing and reporting results.

1.02 RELATED REQUIREMENTS

- A. Section 22 0000 – Plumbing, General Purpose.
- B. Section 33 1116 - Site Water Utility Distribution Piping.
- C. Comply with 2012 City Supplement ‘The WHITEBOOK’, Section 306-1.4.7 for Disinfection and Testing.

1.03 REFERENCE STANDARDS

- A. AWWA B300 - Hypochlorites; American Water Works Association; 2010 (ANSI/AWWA B300).
- B. AWWA B301 - Liquid Chlorine; American Water Works Association; 2004 (ANSI/AWWA B301).
- C. AWWA B302 - Ammonium Sulfate; American Water Works Association; 2005 (ANSI/AWWA B302).
- D. AWWA B303 - Sodium Chlorite; American Water Works Association; 2005.
- E. AWWA C651 - Disinfecting Water Mains; American Water Works Association; 2005 (ANSI/AWWA C651).

1.04 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction ‘The GREENBOOK’ and City Supplement ‘The WHITEBOOK’, latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Test Reports: Indicate results comparative to specified requirements.
- C. Certificate: From authority having jurisdiction indicating approval of water system.
- D. Certificate: Certify that cleanliness of water distribution system meets or exceeds specified requirements.
- E. Disinfection report:
 - 1. Type and form of disinfectant used.
 - 2. Date and time of disinfectant injection start and time of completion.

3. Test locations.
 4. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
 5. Date and time of flushing start and completion.
 6. Disinfectant residual after flushing in ppm for each outlet tested.
- F. Bacteriological report:
1. Date issued, project name, and testing laboratory name, address, and telephone number.
 2. Time and date of water sample collection.
 3. Name of person collecting samples.
 4. Test locations.
 5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
 6. Coliform bacteria test results for each outlet tested.
 7. Certification that water conforms, or fails to conform, to bacterial standards of local and federal government standards.

1.05 QUALITY ASSURANCE

- A. Water Treatment Firm: Company specializing in disinfecting potable water systems specified in this Section with minimum three years documented experience.
- B. Testing Firm: Company specializing in testing potable water systems, certified by governing authorities of California.
- C. Submit bacteriologist's signature and authority associated with testing.

PART 2 PRODUCTS

2.01 DISINFECTION CHEMICALS

- A. Chemicals: AWWA B300, Hypochlorite, AWWA B301, Liquid Chlorine, AWWA B302, Ammonium Sulfate, and AWWA B303, Sodium Chlorite.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that piping system has been cleaned, inspected, and pressure tested.
- B. Schedule disinfecting activity to coordinate with start-up, testing, adjusting and balancing, demonstration procedures, including related systems.

3.02 DISINFECTION

- A. Comply with 2012 City Supplement 'The WHITEBOOK', Section 306-1.4.7 for Disinfection and Testing.
- B. Provide and attach equipment required to perform the work.

- C. Inject treatment disinfectant into piping system.
- D. Maintain disinfectant in system for 24 hours.
- E. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water.
- F. Replace permanent system devices removed for disinfection.
- G. Pressure test system. Repair leaks and re-test.

3.03 FIELD QUALITY CONTROL

- A. Comply with 2012 City Supplement 'The WHITEBOOK', Section 306-1.4.7 for Disinfection and Testing.

END OF SECTION

SECTION 33 3111

SITE SANITARY UTILITY SEWERAGE PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sanitary sewerage drainage piping, fittings, and accessories.
- B. Connection of building sanitary drainage system to municipal sewers.
- C. Cleanout Access.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete for cleanout base pad construction.
- B. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.
- C. Section 31 2323 - Fill: Bedding and backfilling.
- D. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK',
 - 1. Section 207 for Pipe.
 - 2. Section 208 for Pipe Joint Types and Materials.
 - 3. Section 306 for Underground Conduit Construction.
- E. City Public Utilities Department Approved Materials List for Wastewater, latest published edition.
- F. Comply with 2012 San Diego Regional Standard Drawings, unless otherwise noted per Plans.

1.03 DEFINITIONS

- A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.04 REFERENCE STANDARDS

- A. ASTM D 1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2006.
- B. ASTM D 2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2009.

1.05 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data: Provide data indicating pipe, pipe accessories.
- C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Project Record Documents:
 - 1. Record location of pipe runs, connections, catch basins, cleanouts, and invert elevations.
 - 2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
 - 3. Video inspection recordings in digital format.

PART 2 PRODUCTS

2.01 SEWER PIPE MATERIALS

- A. Acceptable Manufacturers:
 - 1. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK'; Section 207 for Pipe and Section 208 for Pipe Joint Types and Materials; and City Public Utilities Department Approved Materials List for Wastewater, latest published edition.
 - 2. Products of manufacturers not listed may be proposed for substitution, provided they are comparable to the products specified.
 - a. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 4-1.6 for Trade Names or Equals.

2.02 PIPE ACCESSORIES

- A. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Sewer Service " in large letters.

2.03 CLEANOUT MANHOLE

- A. Lid and Frame: Cast iron construction, hinged lid. :
 - 1. Lid Design: Open checkerboard grill.
 - 2. Nominal Lid and Frame Size: 26 inches.
- B. Shaft Construction and Concentric Cone Top Section: Reinforced precast Concrete pipe sections, lipped male/female dry joints, cast steel ladder rungs into shaft sections at 12 inches; nominal shaft diameter of 36 inches.
- C. Base Pad: Cast-in-place concrete of type specified in Section 03 3000, levelled top surface to receive concrete shaft sections, sleeved to receive sanitary sewer pipe sections.

2.04 BEDDING AND COVER MATERIALS

- A. Pipe Bedding Material: As specified in Section 31 2316.13.
- B. Pipe Cover Material: As specified in Section 31 2316.13.

PART 3 EXECUTION

3.01 GENERAL

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 306 for Underground Conduit Construction.

3.02 TRENCHING

- A. See Section 31 2316.13 for additional requirements.
- B. Hand trim excavation for accurate placement of pipe to elevations indicated.
- C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.03 INSTALLATION - PIPE

- A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.
- B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
 - 1. Plastic Pipe: Also comply with ASTM D 2321.
- C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.
- D. Connect to building sanitary sewer outlet and municipal sewer system, through installed sleeves.
- E. Install trace wire 6 inches above top of pipe; coordinate with Section 31 2316.13.

3.04 INSTALLATION - CLEANOUTS

- A. Form bottom of excavation clean and smooth to correct elevation.
- B. Form and place cast-in-place concrete base pad, with provision for sanitary sewer pipe end sections.
- C. Establish elevations and pipe inverts for inlets and outlets as indicated.
- D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.05 FIELD QUALITY CONTROL

- A. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to City.
- B. PVC Sewer Pipe and Fittings:
 - 1. Pipe and Fittings: Shall conform to ASTM D 3033 or ASTM D 3034, shall be SDR 35, with ends suitable for elastomeric gasket joints. Pipe shall meet requirements of UNI B 10 88.
 - 2. Joints and Jointing Material: Utilize an integral bell and spigot with a solid cross section rubber gasket. Joints shall conform to ASTM D 3212. Gaskets shall conform to ASTM F 477.
 - 3. Pipe Stiffness: Minimum pipe stiffness (@ 5% deflect) shall be 46 for all sizes when tested in accordance with ASTM D 2412.

4. Flattening: There shall be no evidence of splitting, cracking, or breaking when the pipe is tested as follows:
 - a. Flatten specimen of pipe, six inches long between parallel plates in a suitable press until the distance between the plates is forty percent of the outside diameter of the pipe. The rate of loading shall be uniform and such that the compression is completed within two to five minutes.
 - b. Products: Ringtite greenbell PVC sewer pipe, Johns Manville, Denver, Colorado; Fluidtite PVC sewer pipe, Certainteed Corporation, Anaheim, California; or equal.
- C. Video Inspection and Record: Scope of video is to include all portions of sanitary sewer installed by this project.
 1. Contractor to video-tape sanitary sewers prior to installation of hardscape or concrete slabs on grade to verify alignment, fall, drainage and absence of “bellies” in drain piping. Video tape must show a wet run water test with inspector present.
 2. Contractor to pressure jet sanitary sewers at end of construction, prior to occupancy to insure they are free of any construction debris. Then Contractor is to video-tape sewers to verify alignment, fall, drainage and absence of “bellies” in drain piping. Video tape must show a wet run water test with inspector present.
 3. The contractor shall provide both dated videotapes of the interior of the sanitary sewer systems to the Engineer within 10 days of video inspection.

END OF SECTION

SECTION 33 4111

SITE STORM UTILITY DRAINAGE PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Storm drainage piping, fittings, and accessories.
- B. Connection of drainage system to municipal sewers.
- C. Catch basins, Plant area drains, Paved area drainage, and Site surface drainage.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete for cleanout base pad construction.
- B. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.
- C. Section 31 2323 - Fill: Bedding and backfilling.
- D. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK',
 - 1. Section 207 for Pipe.
 - 2. Section 208 for Pipe Joint Types and Materials.
 - 3. Section 306 for Underground Conduit Construction.

1.03 DEFINITIONS

- A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.04 REFERENCE STANDARDS

- A. ASTM D 1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2006.
- B. ASTM D 2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2009.

1.05 SUBMITTALS

- A. Comply with Standard Specifications for Public Works Construction 'The GREENBOOK' and City Supplement 'The WHITEBOOK', latest editions, Section 2-5.3 for Shop Drawings and Submittals.
- B. Product Data: Provide data indicating pipe, pipe accessories.
- C. Shop Drawings:
 - 1. Manholes: Include plans, elevations, sections, details, frames, and covers.
 - 2. Catch basins. Include plans, elevations, sections, details, frames, covers, and grates.
- D. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same

trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

- E. **Profile Drawings:** Show system piping in elevation. Draw profiles at horizontal scale of not less than 1 inch equals 50 feet and vertical scale of not less than 1 inch equals 5 feet. Indicate manholes and piping. Show types, sizes, materials, and elevations of other utilities crossing system piping.
- F. **Manufacturer's Installation Instructions:** Indicate special procedures required to install Products specified.
- G. **Manufacturer's Certificate:** Certify that products meet or exceed specified requirements.
- H. **Field quality-control reports.**
- I. **Project Record Documents:**
 - 1. Record location of pipe runs, connections, catch basins, cleanouts, and invert elevations.
 - 2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
 - 3. Video inspection recordings of installation in digital format.

1.06 REGULATORY REQUIREMENTS

- A. Conform to applicable code for materials and installation of the Work of this section.

1.07 PROJECT CONDITIONS

- A. **Interruption of Existing Storm Drainage Service:** Do not interrupt service to facilities occupied by City or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
 - 1. Notify Engineer no fewer than seven days in advance of proposed interruption of service.
 - 2. Do not proceed with interruption of service without Engineer 's written permission.

PART 2 PRODUCTS

2.01 GENERAL

- A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK'; Section 207 for Pipe and Section 208 for Pipe Joint Types and Materials

2.02 HUB AND SPIGOT, CAST IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 74, Service class.
- B. Gaskets: ASTM C 564, rubber.
- C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

2.03 HUBLESS CAST IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.
- B. Heavy-Duty, Shielded Couplings:

1. Description: ASTM C 1277 and ASTM C 1540, with stainless-steel shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

2.04 DUCTILE IRON, CULVERT PIPE AND FITTINGS

- A. Pipe: ASTM A 716, for push-on joints.
- B. Standard Fittings: AWWA C110, ductile or gray iron, for push-on joints.
- C. Compact Fittings: AWWA C153, for push-on joints.
- D. Gaskets: AWWA C111, rubber.

2.05 PVC PIPE AND FITTINGS

- A. PVC Corrugated Sewer Piping:
 1. Pipe: ASTM F 949, PVC, corrugated pipe with bell-and-spigot ends for gasketed joints.
 2. Fittings: ASTM F 949, PVC molded or fabricated, socket type.
 3. Gaskets: ASTM F 477, elastomeric seals.
- B. PVC Stormdrain Pipe and Fittings, NPS 15 and Smaller: ASTM D 3034, SDR 35, for solvent-cemented or gasketed joints.

2.06 CONCRETE PIPE AND FITTINGS

- A. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76.
 1. Class III, Wall B.

2.07 NONPRESSURE TRANSITION COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.
- B. Sleeve Materials:
 1. For Concrete Pipes: ASTM C 443, rubber.
 2. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
 3. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 4. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
- C. Unshielded, Flexible Couplings:
 1. Description: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
- D. Shielded, Flexible Couplings:
 1. Description: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

E. Ring-Type, Flexible Couplings:

1. Description: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

2.08 CLEANOUTS

A. Cast-Iron Cleanouts:

1. Description: ASME A 112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
2. Top-Loading Classification(s): Medium Duty Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

B. Plastic Cleanouts:

1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.09 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350/350R, and the following:

1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.

1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - a. Invert Slope: 2 percent through manhole.
2. Benches: Concrete, sloped to drain into channel.
 - a. Slope: 4 percent.

D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

2.10 CATCH BASINS

A. Standard Precast Concrete Catch Basins:

1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
3. Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
4. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
5. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
6. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and grate.
7. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

B. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include flat grate with small square or short-slotted drainage openings.

1. Size: 12 by 12 inches minimum unless otherwise indicated.
2. Grate Free Area: Approximately 50 percent unless otherwise indicated.

C. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch-diameter flat grate with small square or short-slotted drainage openings.

1. Grate Free Area: Approximately 50 percent unless otherwise indicated.

PART 3 EXECUTION

3.01 GENERAL

- #### **A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 306 for Underground Conduit Construction.**

3.02 TRENCHING

- #### **A. Comply with 2012 Standard Specifications for Public Works Construction 'The GREENBOOK' and 2012 City Supplement 'The WHITEBOOK', Section 306 for Underground Conduit Construction and Section 31 2316.13.**
- #### **B. Hand trim excavation for accurate placement of pipe to elevations indicated.**
- #### **C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.**

3.03 INSTALLATION - PIPE

- #### **A. General Locations and Arrangements: Drawing plans and details indicate general location and**

arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.
- F. Install gravity-flow, nonpressure drainage piping according to the following:
 - 1. Install piping pitched down in direction of flow.
 - 2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.
 - 3. Install piping with 36-inch (minimum cover) or as shown on plans.
 - 4. Install hub-and-spigot, cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook."
 - 5. Install hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook."
 - 6. Install ductile-iron piping and special fittings according to AWWA C600 or AWWA M41.
 - 7. Install PE corrugated sewer piping according to ASTM D 2321.
 - 8. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.
 - 9. Install nonreinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."
 - 10. Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."
- G. Install corrosion-protection piping encasement over the following underground metal piping according to ASTM A 674 or AWWA C105:
 - 1. Hub-and-spigot, cast-iron soil pipe and fittings.
 - 2. Hubless cast-iron soil pipe and fittings.
 - 3. Ductile-iron pipe and fittings.
 - 4. Expansion joints.

3.04 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure drainage piping according to the following:
1. Join hub-and-spigot, cast-iron soil piping with gasketed joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
 2. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.
 3. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.
 4. Join ductile-iron culvert piping according to AWWA C600 for push-on joints.
 5. Join ductile-iron piping and special fittings according to AWWA C600 or AWWA M41.
 6. Join corrugated PE piping according to ASTM D 3212 for push-on joints.
 7. Join PVC corrugated sewer piping according to ASTM D 2321 for elastomeric-seal joints.
 8. Join nonreinforced-concrete sewer piping according to ASTM C 14 and ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
 9. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
 10. Join dissimilar pipe materials with nonpressure-type flexible couplings.

3.05 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
1. Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
 2. Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
 3. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.
 4. Use Extra-Heavy-Duty, top-loading classification cleanouts in roads Insert area.
- B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding earth grade.
- C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.06 CATCH BASIN INSTALLATION

- A. Set frames and grates to elevations indicated.

3.07 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318.

3.08 CONNECTIONS

- A. Connect nonpressure, gravity-flow drainage piping in building's storm drains.
- B. Make connections to existing piping and underground manholes.

1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.
 - a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
 - b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
4. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

C. Connect to sediment interceptors.

D. Pipe couplings and expansion joints with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping unless otherwise indicated.
 - a. Shielded flexible couplings for same or minor difference OD pipes.
 - b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
 - c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

3.09 IDENTIFICATION

A. Materials and their installation are specified in Section 31 2200 – Grading and Section 31 2323 – Fill. Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

1. Use detectable warning tape over ferrous piping.
2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.10 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate reports for each system inspection.
 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 4. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
1. Do not enclose, cover, or put into service before inspection and approval.
 2. Test completed piping systems according to requirements of authorities having jurisdiction.
 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 4. Submit separate report for each test.
 5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
 - a. Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
 - b. Option: Test plastic piping according to ASTM F 1417.
 - c. Option: Test concrete piping according to ASTM C 924.
- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.
- E. Video Inspection and Record: Scope of video is to include all portions of storm drain installed by this project.
1. Contractor to video-tape storm drains prior to installation of hardscape or concrete slabs on grade to verify alignment, fall, drainage and absence of "bellies" in drain piping. Video tape must show a wet run water test with inspector present.
 2. Contractor to pressure jet storm drains at end of construction, prior to occupancy to insure they are free of any construction debris. Then Contractor is to video-tape sewers to verify alignment, fall, drainage and absence of "bellies" in drain piping. Video tape must show a wet run water test with inspector present.
 3. The contractor shall provide both dated videotapes of the interior of the storm drain systems to the Engineer within 10 days of video inspection.

END OF SECTION

SUPPLEMENTARY SPECIAL PROVISIONS

APPENDICES

APPENDIX A

MITIGATED NEGATIVE DECLARATION AND NOTICE OF EXEMPTION



ENTITLEMENTS DIVISION
(619) 446-5460

MITIGATED NEGATIVE DECLARATION

Project No. 224708
SCH# N/A

SUBJECT: San Diego Police Pistol Range: AMENDMENT TO SITE DEVELOPMENT PERMIT (SDP) No. 8318 to allow for the extension of SDP Condition #11, which required the construction of an office for the Canine/SWAT facility. In addition to the amendment the project would include the following improvements: demolition of existing bullet backstops, construction of new bullet backstops (traps), repaving of an existing parking area, construction of a new parking area, construction of retaining walls, ADA improvements, landscaping improvements, replacement of dirt berms with tilt up walls, restoration of the historical shade structures and the installation of bio-retention filters and vegetated swales. The project site is located at 4002-4008 Federal Boulevard within the City Heights Neighborhood of the Mid City Community Planning Area. Legal Description: A portion of Blocks 32, 33, 35, 40, and 41 of Marilou Park Map No. 517. Applicant: City of San Diego Police Department/ Engineering & Capital Projects Department.

Update 11/28/2011

Revisions to this document have been made when compared to the Draft Mitigated Negative Declaration (DMND) dated October 21, 2011. Minor revisions have been made that clarifies the project description. The modifications to the FMND are denoted by ~~strikeout~~ and underline format. In accordance with the California Environmental Quality Act, Section 15073.5 (c)(4), the addition of new information that clarifies, amplifies, or makes insignificant modification does not require recirculation as there are no new impacts and no new mitigation identified. An environmental document need only be recirculated when there is identification of new significant environmental impact or the addition of a new mitigation measure required to avoid a significant environmental impact. The addition of corrected mitigation language within the environmental document does not affect the environmental analysis or conclusions of the MND.

Currently, the 7.73 acre project site consists of an operational San Diego Police Facility including a vehicle maintenance garage, ~~and four firing ranges~~ and temporary modular offices for the San Diego Police facility K-9/SWAT training/kennels to the east. The southern portion of the site is relatively flat, ranging in elevation from 90 to 95 feet above Mean Sea Level (MSL) while

the northern portion of the site is fairly steep ranging in elevation from 100 feet above MSL to 145 feet above MSL. The site is primarily developed and consists of asphalt paving, building structures, and sparse non-native and ornamental vegetation. A 0.317 acre portion of the project site is owned by The United States Navy. As a condition of the Site Development Permit the City of San Diego will acquire an easement for the purposes of operation, maintenance, and repair of the pistol range facilities together with rights of ingress and egress through this portion of land.

The existing bullet traps located at the north end of the ranges would be removed and replaced with concrete bullet trap lead containment systems. New integral colored concrete walls would be installed north of bullet traps to retain the disturbed slopes at the north end of the site. The retaining walls would vary in height from six to eighteen feet, with an average height of eleven and one half feet. The shade structures supporting the firing ranges would be reconstructed to match the existing structures minus the support member for the baffle. The support member would be replaced with steel members to match the size of the wood members and painted a matte finish. Roofing shall be corrugated metal to match the existing roof. Presently there are two earthen berms located on site, one between the west range and the civilian use range and one between the east range and rapid the fire range. These berms would be replaced with ten-foot-high concrete tilt-up dividing walls. Bioretention and vegetated swale areas would be constructed on site and would act to remove pollutants from storm water before it discharges into the existing storm drain system.

In addition to the project features described above, the project would repave existing parking areas as well as add an additional 13 parking spaces including three accessible spaces, bringing the total to 237 spaces. Landscape and hardscape improvements would include ADA accessible pedestrian walkways, masonry trash enclosures, ADA restroom improvements and plantings consisting of African sumac trees and red New Zealand flax.

- I. PROJECT DESCRIPTION: See attached Initial Study.
- II. ENVIRONMENTAL SETTING: See attached Initial Study.
- III. DETERMINATION:

The City of San Diego conducted an Initial Study which determined that the proposed project could have a significant environmental effect in the following areas(s): **Public Health and Safety, Historic Resources (Archaeology.)** Subsequent revisions in the project proposal create the specific mitigation identified in Section V of this Mitigated Negative Declaration. The project as revised now avoids or mitigates the potentially significant environmental effects previously identified, and the preparation of an Environmental Impact Report will not be required.

- IV. DOCUMENTATION:

The attached Initial Study documents the reasons to support the above Determination.

V. MITIGATION, MONITORING AND REPORTING PROGRAM:

A. GENERAL REQUIREMENTS – PART I

Plan Check Phase (prior to permit issuance)

1. Prior to the issuance Bid Opening/Bid Award or beginning any construction related activity on-site, the Development Services Department (DSD) Director's Environmental Designee (ED) shall review and approve all Construction Documents (CD), (plans, specification, details, etc.) to ensure the MMRP requirements have been incorporated.
2. In addition, the ED shall verify that the MMRP Conditions/Notes that apply ONLY to the construction phases of this project are included VERBATIM, under the heading, "ENVIRONMENTAL/MITIGATION REQUIREMENTS."
3. These notes must be shown within the first three (3) sheets of the construction documents in the format specified for engineering construction document templates as shown on the City website:

<http://www.sandiego.gov/development-services/industry/standtemp.shtml>

4. The **TITLE INDEX SHEET** must also show on which pages the "Environmental/Mitigation Requirements" notes are provided.

B. GENERAL REQUIREMENTS – PART II

Post Plan Check (After permit issuance/Prior to start of construction)

1. **PRE CONSTRUCTION MEETING IS REQUIRED TEN (10) WORKING DAYS PRIOR TO BEGINNING ANY WORK ON THIS PROJECT.** The PERMIT HOLDER/OWNER is responsible to arrange and perform this meeting by contacting the CITY RESIDENT ENGINEER (RE) of the Field Engineering Division and City staff from MITIGATION MONITORING COORDINATION (MMC). Attendees must also include the Permit holder's Representative(s), Job Site Superintendent and the following consultants:

Archaeologist, Native American Monitor, Environmental Services Department (ESD) Office, Asbestos and Lead Management Program (ALMP) representative

Note: Failure of all responsible Permit Holder's representatives and consultants to attend shall require an additional meeting with all parties present.

CONTACT INFORMATION:

- a) The **PRIMARY POINT OF CONTACT** is the **RE** at the **Field Engineering Division – 858-627-3200**

b) For Clarification of ENVIRONMENTAL REQUIREMENTS, it is also required to call **RE and MMC at 858-627-3360**

2. **MMRP COMPLIANCE:** This Project, Project Tracking System (PTS) 224708, shall conform to the mitigation requirements contained in the associated Environmental Document and implemented to the satisfaction of the DSD's ED, MMC and the City Engineer (RE). The requirements may not be reduced or changed but may be annotated (i.e. to explain when and how compliance is being met and location of verifying proof, etc.). Additional clarifying information may also be added to other relevant plan sheets and/or specifications as appropriate (i.e., specific locations, times of monitoring, methodology, etc

Note:

Permit Holder's Representatives must alert RE and MMC if there are any discrepancies in the plans or notes, or any changes due to field conditions. All conflicts must be approved by RE and MMC BEFORE the work is performed.

3. **OTHER AGENCY REQUIREMENTS:** Evidence that any other agency requirements or permits have been obtained or are in process shall be submitted to the RE and MMC for review and acceptance prior to the beginning of work or within one week of the Permit Holder obtaining documentation of those permits or requirements. Evidence shall include copies of permits, letters of resolution or other documentation issued by the responsible agency.

Not Applicable for this project.

4. **MONITORING EXHIBITS:** All consultants are required to submit, to RE and MMC, a monitoring exhibit on a 11x17 reduction of the appropriate construction plan, such as site plan, grading, landscape, etc., marked to clearly show the specific areas including the **LIMIT OF WORK**, scope of that discipline's work, and notes indicating when in the construction schedule that work will be performed. When necessary for clarification, a detailed methodology of how the work will be performed shall be included.

5. **OTHER SUBMITTALS AND INSPECTIONS:** The Permit Holder/Owner's representative shall submit all required documentation, verification letters, and requests for all associated inspections to the RE and MMC for approval per the following schedule:

Document Submittal/Inspection Checklist

<i>Issue Area</i>	<i>Document submittal</i>	<i>Associated Inspection/Approvals/Note</i>
General	Consultant Qualification Letters meeting	Prior to Pre-construction
General	Consultant Const. Monitoring	Prior to or at the Pre-Construction meeting
Archaeology	Archaeology Reports	Archaeological observation
Final MMRP		Final MMRP Inspection

PUBLIC HEALTH AND SAFETY

- I. Prior to Start of Construction/Preconstruction Meeting**
 - A. Verification of Contractor's Abatement Plan and Certification**
 - 1. Prior to start of construction The City of San Diego Environmental Services Department (ESD), Asbestos and Lead Management Program (ALMP) representative shall provide verification to MMC that the contractor's abatement plan and certification has been approved.
- II. During Construction**
 - A. Monitoring**
 - 1. ALMP shall monitor contractor work practices and take environmental sampling to verify contamination is not taking place outside the work area.
- III. End of Remediation**
 - A. Final Clearance**
 - 1. Prior to a work area being cleared, ALMP would perform visual and environmental sampling to verify lead levels are within regulatory thresholds. ALMP will provide MMC with final approval verification.

HISTORICAL RESOURCES (ARCHAEOLOGY)

- I. Prior to Permit Issuance or Bid Opening/Bid Award**
 - A. Entitlements Plan Check**
 - 1. Prior to permit issuance or Bid Opening/Bid Award, whichever is applicable, the Assistant Deputy Director (ADD) Environmental designee shall verify that the requirements for Archaeological Monitoring and Native American monitoring have been noted on the applicable construction documents through the plan check process.
 - B. Letters of Qualification have been submitted to ADD**
 - 1. Prior to Bid Award, the applicant shall submit a letter of verification to Mitigation Monitoring Coordination (MMC) identifying the Principal Investigator (PI) for the project and the names of all persons involved in the archaeological monitoring program, as defined in the City of San Diego Historical Resources Guidelines (HRG). If applicable, individuals involved in the archaeological monitoring program must have completed the 40-hour HAZWOPER training with certification documentation.
 - 2. MMC will provide a letter to the applicant confirming the qualifications of the PI and all persons involved in the archaeological monitoring of the project meet the qualifications established in the HRG.
 - 3. Prior to the start of work, the applicant must obtain written approval from MMC for any personnel changes associated with the monitoring program.
- II. Prior to Start of Construction**
 - A. Verification of Records Search**
 - 1. The PI shall provide verification to MMC that a site specific records search (1/4 mile radius) has been completed. Verification includes, but is not limited to a

copy of a confirmation letter from South Coastal Information Center, or, if the search was in-house, a letter of verification from the PI stating that the search was completed.

2. The letter shall introduce any pertinent information concerning expectations and probabilities of discovery during trenching and/or grading activities.
3. The PI may submit a detailed letter to MMC requesting a reduction to the ¼ mile radius.

B. PI Shall Attend Precon Meetings

1. Prior to beginning any work that requires monitoring; the Applicant shall arrange a Precon Meeting that shall include the PI, Native American consultant/monitor (where Native American resources may be impacted), Construction Manager (CM) and/or Grading Contractor, Resident Engineer (RE), Building Inspector (BI), if appropriate, and MMC. The qualified Archaeologist and Native American Monitor shall attend any grading/excavation related Precon Meetings to make comments and/or suggestions concerning the Archaeological Monitoring program with the Construction Manager and/or Grading Contractor.
 - a. If the PI is unable to attend the Precon Meeting, the Applicant shall schedule a focused Precon Meeting with MMC, the PI, RE, CM or BI, if appropriate, prior to the start of any work that requires monitoring.
2. Acknowledgement of Responsibility for Curation (CIP or Other Public Projects) The applicant shall submit a letter to MMC acknowledging their responsibility for the cost of curation associated with all phases of the archaeological monitoring program.
3. Identify Areas to be Monitored
 - a. Prior to the start of any work that requires monitoring, the PI shall submit an Archaeological Monitoring Exhibit (AME) (with verification that the AME has been reviewed and approved by the Native American consultant/monitor when Native American resources may be impacted) based on the appropriate construction documents (reduced to 11x17) to MMC identifying the areas to be monitored including the delineation of grading/excavation limits.
 - b. The AME shall be based on the results of a site specific records search as well as information regarding the age of existing pipelines, laterals and associated appurtenances and/or any known soil conditions (native or formation).
 - c. MMC shall notify the PI that the AME has been approved.
4. When Monitoring Will Occur
 - a. Prior to the start of any work, the PI shall also submit a construction schedule to MMC through the RE indicating when and where monitoring will occur.
 - b. The PI may submit a detailed letter to MMC prior to the start of work or during construction requesting a modification to the monitoring program. This request shall be based on relevant information such as review of final construction documents which indicate conditions such as age of existing pipe to be replaced, depth of excavation and/or site graded to bedrock, etc., which may reduce or increase the potential for resources to be present.
5. Approval of AME and Construction Schedule
After approval of the AME by MMC, the PI shall submit to MMC written authorization of the AME and Construction Schedule from the CM.

III. During Construction

A. Monitor Shall be Present During Grading/Excavation/Trenching

1. The Archaeological Monitor shall be present full-time during all soil disturbing and grading/excavation/trenching activities which could result in impacts to archaeological resources as identified on the AME. **The Construction Manager is responsible for notifying the RE, PI, and MMC of changes to any construction activities such as in the case of a potential safety concern within the area being monitored. In certain circumstances OSHA safety requirements may necessitate modification of the AME.**
2. The Native American consultant/monitor shall determine the extent of their presence during soil disturbing and grading/excavation/trenching activities based on the AME and provide that information to the PI and MMC. If prehistoric resources are encountered during the Native American consultant/monitor's absence, work shall stop and the Discovery Notification Process detailed in Section III.B-C and IV.A-D shall commence.
3. The PI may submit a detailed letter to MMC during construction requesting a modification to the monitoring program when a field condition such as modern disturbance post-dating the previous grading/trenching activities, presence of fossil formations, or when native soils are encountered that may reduce or increase the potential for resources to be present.
4. The archaeological and Native American consultant/monitor shall document field activity via the Consultant Site Visit Record (CSV). The CSV's shall be faxed by the CM to the RE the first day of monitoring, the last day of monitoring, monthly (**Notification of Monitoring Completion**), and in the case of ANY discoveries. The RE shall forward copies to MMC.

B. Discovery Notification Process

1. In the event of a discovery, the Archaeological Monitor shall direct the contractor to temporarily divert all soil disturbing activities, including but not limited to digging, trenching, excavating or grading activities in the area of discovery and in the area reasonably suspected to overlay adjacent resources and immediately notify the RE or BI, as appropriate.
2. The Monitor shall immediately notify the PI (unless Monitor is the PI) of the discovery.
3. The PI shall immediately notify MMC by phone of the discovery, and shall also submit written documentation to MMC within 24 hours by fax or email with photos of the resource in context, if possible.
4. No soil shall be exported off-site until a determination can be made regarding the significance of the resource specifically if Native American resources are encountered.

C. Determination of Significance

1. The PI and Native American consultant/monitor, where Native American resources are discovered shall evaluate the significance of the resource. If Human Remains are involved, follow protocol in Section IV below.
 - a. The PI shall immediately notify MMC by phone to discuss significance determination and shall also submit a letter to MMC indicating whether additional mitigation is required.

- b. If the resource is significant, the PI shall submit an Archaeological Data Recovery Program (ADRP) and obtain written approval of the program from MMC, CM and RE. ADRP and any mitigation must be approved by MMC, RE and/or CM before ground disturbing activities in the area of discovery will be allowed to resume. **Note: If a unique archaeological site is also an historical resource as defined in CEQA Section 15064.5, then the limits on the amount(s) that a project applicant may be required to pay to cover mitigation costs as indicated in CEQA Section 21083.2 shall not apply.**
 - (1). Note: For pipeline trenching and other linear projects in the public Right-of-Way, the PI shall implement the Discovery Process for Pipeline Trenching projects identified below under "D."
 - c. If the resource is not significant, the PI shall submit a letter to MMC indicating that artifacts will be collected, curated, and documented in the Final Monitoring Report. The letter shall also indicate that that no further work is required.
 - (1). Note: For Pipeline Trenching and other linear projects in the public Right-of-Way, if the deposit is limited in size, both in length and depth; the information value is limited and is not associated with any other resource; and there are no unique features/artifacts associated with the deposit, the discovery should be considered not significant.
 - (2). Note, for Pipeline Trenching and other linear projects in the public Right-of-Way, if significance can not be determined, the Final Monitoring Report and Site Record (DPR Form 523A/B) shall identify the discovery as Potentially Significant.
- D. Discovery Process for Significant Resources - Pipeline Trenching and other Linear Projects in the Public Right-of-Way**
- The following procedure constitutes adequate mitigation of a significant discovery encountered during pipeline trenching activities or for other linear project types within the Public Right-of-Way including but not limited to excavation for jacking pits, receiving pits, laterals, and manholes to reduce impacts to below a level of significance:
- 1. Procedures for documentation, curation and reporting
 - a. One hundred percent of the artifacts within the trench alignment and width shall be documented in-situ, to include photographic records, plan view of the trench and profiles of side walls, recovered, photographed after cleaning and analyzed and curated. The remainder of the deposit within the limits of excavation (trench walls) shall be left intact.
 - b. The PI shall prepare a Draft Monitoring Report and submit to MMC via the RE as indicated in Section VI-A.
 - c. The PI shall be responsible for recording (on the appropriate State of California Department of Park and Recreation forms-DPR 523 A/B) the resource(s) encountered during the Archaeological Monitoring Program in accordance with the City's Historical Resources Guidelines. The DPR forms shall be submitted to the South Coastal Information Center for either a Primary Record or SDI Number and included in the Final Monitoring Report.
 - d. The Final Monitoring Report shall include a recommendation for monitoring of any future work in the vicinity of the resource.

IV. Discovery of Human Remains

If human remains are discovered, work shall halt in that area and no soil shall be exported off-site until a determination can be made regarding the provenance of the human remains; and the following procedures as set forth in CEQA Section 15064.5(e), the California Public Resources Code (Sec. 5097.98) and State Health and Safety Code (Sec. 7050.5) shall be undertaken:

A. Notification

1. Archaeological Monitor shall notify the RE or BI as appropriate, MMC, and the PI, if the Monitor is not qualified as a PI. MMC will notify the appropriate Senior Planner in the Environmental Analysis Section (EAS) of the Development Services Department to assist with the discovery notification process.
2. The PI shall notify the Medical Examiner after consultation with the RE, either in person or via telephone.

B. Isolate discovery site

1. Work shall be directed away from the location of the discovery and any nearby area reasonably suspected to overlay adjacent human remains until a determination can be made by the Medical Examiner in consultation with the PI concerning the provenience of the remains.
2. The Medical Examiner, in consultation with the PI, will determine the need for a field examination to determine the provenience.
3. If a field examination is not warranted, the Medical Examiner will determine with input from the PI, if the remains are or are most likely to be of Native American origin.

C. If Human Remains **ARE** determined to be Native American

1. The Medical Examiner will notify the Native American Heritage Commission (NAHC) within 24 hours. By law, **ONLY** the Medical Examiner can make this call.
2. NAHC will immediately identify the person or persons determined to be the Most Likely Descendent (MLD) and provide contact information.
3. The MLD will contact the PI within 24 hours or sooner after the Medical Examiner has completed coordination, to begin the consultation process in accordance with CEQA Section 15064.5(e), the California Public Resources and Health & Safety Codes.
4. The MLD will have 48 hours to make recommendations to the property owner or representative, for the treatment or disposition with proper dignity, of the human remains and associated grave goods.
5. Disposition of Native American Human Remains will be determined between the MLD and the PI, and, if:
 - a. The NAHC is unable to identify the MLD, OR the MLD failed to make a recommendation within 48 hours after being notified by the Commission, OR;
 - b. The landowner or authorized representative rejects the recommendation of the MLD and mediation in accordance with PRC 5097.94 (k) by the NAHC fails to provide measures acceptable to the landowner, THEN
 - c. To protect these sites, the landowner shall do one or more of the following:
 - (1) Record the site with the NAHC;
 - (2) Record an open space or conservation easement; or

(3) Record a document with the County.

- d. Upon the discovery of multiple Native American human remains during a ground disturbing land development activity, the landowner may agree that additional conferral with descendants is necessary to consider culturally appropriate treatment of multiple Native American human remains. Culturally appropriate treatment of such a discovery may be ascertained from review of the site utilizing cultural and archaeological standards. Where the parties are unable to agree on the appropriate treatment measures the human remains and items associated and buried with Native American human remains shall be reinterred with appropriate dignity, pursuant to Section 5.c., above.

D. If Human Remains are NOT Native American

1. The PI shall contact the Medical Examiner and notify them of the historic era context of the burial.
2. The Medical Examiner will determine the appropriate course of action with the PI and City staff (PRC 5097.98).
3. If the remains are of historic origin, they shall be appropriately removed and conveyed to the San Diego Museum of Man for analysis. The decision for internment of the human remains shall be made in consultation with MMC, EAS, the applicant/landowner, any known descendant group, and the San Diego Museum of Man.

V. Night and/or Weekend Work

A. If night and/or weekend work is included in the contract

1. When night and/or weekend work is included in the contract package, the extent and timing shall be presented and discussed at the precon meeting.
2. The following procedures shall be followed.

a. No Discoveries

In the event that no discoveries were encountered during night and/or weekend work, the PI shall record the information on the CSVR and submit to MMC via fax by 8AM of the next business day.

b. Discoveries

All discoveries shall be processed and documented using the existing procedures detailed in Sections III - During Construction, and IV - Discovery of Human Remains. Discovery of human remains shall always be treated as a significant discovery.

c. Potentially Significant Discoveries

If the PI determines that a potentially significant discovery has been made, the procedures detailed under Section III - During Construction and IV-Discovery of Human Remains shall be followed.

- d. The PI shall immediately contact the RE and MMC, or by 8AM of the next business day to report and discuss the findings as indicated in Section III-B, unless other specific arrangements have been made.

B. If night and/or weekend work becomes necessary during the course of construction

1. The Construction Manager shall notify the RE, or BI, as appropriate, a minimum of 24 hours before the work is to begin.
2. The RE, or BI, as appropriate, shall notify MMC immediately.

C. All other procedures described above shall apply, as appropriate.

VI. Post Construction

A. Submittal of Draft Monitoring Report

1. The PI shall submit two copies of the Draft Monitoring Report (even if negative), prepared in accordance with the Historical Resources Guidelines (Appendix C/D) which describes the results, analysis, and conclusions of all phases of the Archaeological Monitoring Program (with appropriate graphics) to MMC via the RE for review and approval within 90 days following the completion of monitoring. **It should be noted that if the PI is unable to submit the Draft Monitoring Report within the allotted 90-day timeframe as a result of delays with analysis, special study results or other complex issues, a schedule shall be submitted to MMC establishing agreed due dates and the provision for submittal of monthly status reports until this measure can be met.**
 - a. For significant archaeological resources encountered during monitoring, the Archaeological Data Recovery Program or Pipeline Trenching Discovery Process shall be included in the Draft Monitoring Report.
 - b. Recording Sites with State of California Department of Parks and Recreation The PI shall be responsible for recording (on the appropriate State of California Department of Park and Recreation forms-DPR 523 A/B) any significant or potentially significant resources encountered during the Archaeological Monitoring Program in accordance with the City's Historical Resources Guidelines, and submittal of such forms to the South Coastal Information Center with the Final Monitoring Report.
2. MMC shall return the Draft Monitoring Report to the PI via the RE for revision or, for preparation of the Final Report.
3. The PI shall submit revised Draft Monitoring Report to MMC via the RE for approval.
4. MMC shall provide written verification to the PI of the approved report.
5. MMC shall notify the RE or BI, as appropriate, of receipt of all Draft Monitoring Report submittals and approvals.

B. Handling of Artifacts

1. The PI shall be responsible for ensuring that all cultural remains collected are cleaned and catalogued
2. The PI shall be responsible for ensuring that all artifacts are analyzed to identify function and chronology as they relate to the history of the area; that faunal material is identified as to species; and that specialty studies are completed, as appropriate.

C. Curation of artifacts: Accession Agreement and Acceptance Verification

1. The PI shall be responsible for ensuring that all artifacts associated with the survey, testing and/or data recovery for this project are permanently curated with an appropriate institution. This shall be completed in consultation with MMC and the Native American representative, as applicable.
2. When applicable to the situation, the PI shall include written verification from the Native American consultant/monitor indicating that Native American resources were treated in accordance with state law and/or applicable agreements. If the resources were reinterred, verification shall be provided to show what protective measures were taken to ensure no further disturbance occurs in accordance with Section IV – Discovery of Human Remains, Subsection C.

3. The PI shall submit the Accession Agreement and catalogue record(s) to the RE or BI, as appropriate for donor signature with a copy submitted to MMC.
 4. The RE or BI, as appropriate shall obtain signature on the Accession Agreement and shall return to PI with copy submitted to MMC.
 5. The PI shall include the Acceptance Verification from the curation institution in the Final Monitoring Report submitted to the RE or BI and MMC.
- D. Final Monitoring Report(s)
1. The PI shall submit one copy of the approved Final Monitoring Report to the RE or BI as appropriate, and one copy to MMC (even if negative), within 90 days after notification from MMC of the approved report.
 2. The RE shall, in no case, issue the Notice of Completion until receiving a copy of the approved Final Monitoring Report from MMC which includes the Acceptance Verification from the curation institution.

VI. PUBLIC REVIEW DISTRIBUTION:

Draft copies or notice of this Mitigated Negative Declaration were distributed to:

City of San Diego

Council Member Gloria, District 3
Historical Resource Board (87)
City Heights/Weingart Branch Library (81G)
Oak Park Branch Library (81U)
City Attorney (MS 56A)
 Shannon Thomas (MS 93C)
Engineering and Capital Projects
 Allison Sherwood (MS 908A)
 Darren Greenhaugh (MS 908A)
 George Freiha (MS 908A)
 Marc Cass (MS 908A)
Development Services Department
 Helene Deisher (MS 301)
 Julius Ocen-Odoge (MS 501)
 Myra Herrmann (MS 501)
 Kamran Khaligh (MS 501)
 Jodi Brown (MS 501)
 Bill Tripp (MS 501)
 Bill Prinz (MS 606L)
San Diego Police Department
 Scott Fuller (MS 770)
Library Dept.-Gov. Documents MS 17 (81)

Other

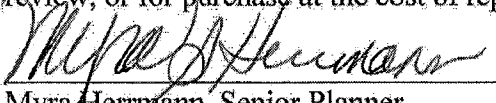
Jose Lopez (295)
William D. Jones (296)
Oak Park Community Council (299)
Theresa Quiroz (294)
Fairmount Park Neighborhood Association (303)

John Stump (304)
Chollas Restoration Enhancement and Conservancy (451)
City Heights Area Planning Committee (287)
Fairmount Park Neighborhood Association (303)
San Diego Gas and Electric (114)
Carmen Lucas (206)
Clint Linton (215B)
South Coastal Information Center @ San Diego State University (210)
San Diego Historical Society (211)
San Diego Archaeological Center (212)
Save Our Heritage Organization (214)
Ron Christman (215)
Louie Guassac (215A)
San Diego County Archaeological Society (218)
Kumeyaay Cultural Heritage Preservation (223)
Kumeyaay Cultural Repatriation Committee (225)
Native American Distribution (NOTICE ONLY 225A-R)

VII. RESULTS OF PUBLIC REVIEW:

- () No comments were received during the public input period.
- () Comments were received but did not address the draft Mitigated Negative Declaration finding or the accuracy/completeness of the Initial Study. No response is necessary. The letters are attached.
- (X) Comments addressing the findings of the draft Mitigated Negative Declaration and/or accuracy or completeness of the Initial Study were received during the public input period. The letters and responses follow.

Copies of the draft Mitigated Negative Declaration, the Mitigation, Monitoring and Reporting Program and any Initial Study material are available in the office of the Entitlements Division for review, or for purchase at the cost of reproduction.


Myra Herrmann, Senior Planner
Development Services Department

October 21, 2011
Date of Draft Report

November 28, 2011
Date of Final Report

Analyst: Jeffrey Szymanski

Figure 1- Location/Vicinity Map
Figure 2- Site Plan
Initial Study Checklist

THERESA QUIROZ (11/7/2011)

1. The first comment provides background information regarding the entitlement history of the project site and does not address the adequacy of the CEQA document No. 224708. To clarify, a Mitigated Negative Declaration (MND) No. 4955 was prepared for the previous entitlements and provided mitigation for biological resources, archaeological resources, paleontological resources, human health and safety (contaminated soils) and water quality. Condition # 11 of SDP No. 8313 required the replacement of temporary modular offices for the Canine/SWAT facility to be replaced with permanent office structures by September 23, 2009. The MND included analysis for the placement of the permanent office structure. Condition #11 was not completed due to a lack of available funds. Since the MND included analysis for the K-9/SWAT office structure, not constructing the office building in place of the modular buildings does not result in changes to any of the mitigation measures in the Mitigation, Monitoring and Reporting Program (MMRP) for MND No. 4955. As such, not constructing the K-9/SWAT office building does not affect the adequacy of MND No. 224708 for the current project.
2. With respect to the current funding for the site, the Police Department has included the need for funding to implement Conditions 11 and 22 of the SDP No. 8318 in their budget proposal to City Council every year since approval of the SDP No. 8313 in 2003. The City Council has never approved funding the cost of the improvements (most recently identified as \$3.5 million). The funding for the improvements proposed in this SDP amendment are derived from new sources of funding, which carry restrictions that would limit their ability to be used for the previously identified improvements. The current funding sources are the City's Deferred Maintenance Budget and the Pueblo Land/Police Department Facilities Management Budget. .

Site Development Permit No. 800689, which would amend SDP No. 8313, includes a date certain for the previous unfulfilled condition # 11. Specifically, the amended or new condition reads as follows, "The temporary modular offices for the Canine/SWAT facility shall be replaced with the permanent planned office structure by September 23, 2019." Additionally, the construction of the Canine/SWAT office building is not a mitigation measure and does not render the current MND No. 224708 inadequate under CEQA.
3. The K-9/SWAT facilities potential environmental impacts were analyzed under the previous MND No. 4955 and determined to be below a level of significance. The current proposal would not change anything on the K-9/SWAT portion of the site that has not already been analyzed under CEQA. See comment #1 for further discussion.

Szymanski, Jeffrey

From: Szymanski, Jeffrey
 Sent: Monday, November 07, 2011 9:42 AM
 To: Szymanski, Jeffrey
 Subject: FW: Project #: 224708

From: Theresa Quiroz [mailto:quiroz@cox.net]
 Sent: Monday, November 07, 2011 8:25 AM
 To: DSD EAS
 Subject: Project #: 224708

Mr. Jeffrey Szymanski:

This letter is my comment on the Mitigated Negative Declaration for the San Diego Pistol Range (MND WBS# B-10012.02.06, Project # 224708). Please reply to this message that it has been received.

History:

- 1 On August 5, 2003, the City Council approved MND 4955, amendments to the Mid-City Communities Plan, and granted SDP 8318 which reflected the mitigation requirements for the MND. All of these approvals were for the construction of the Vehicle Maintenance Facility (VMF) at Federal and Home Avenues, and the construction of a new K-9 facility. The VMF construction was necessitated by the City's intent to build a new downtown library at the site of the then-current VMF location.

The MND for that action (MND 4955) was based on the stated fact that the K-9 units would be constructed of concrete or stucco over masonry with decorative rock pilasters and sloped roves with red tile.

The aesthetic of the construction were of major importance to the neighboring communities because of the dilapidated state of the previous SWAT/K-9 modular facilities.

At the last minute, the city made an agreement with the community that, due to a lack of funds, the K-9 facility would be built at a later date, but no later than September 23, 2009, as specified in the Site Development Permit (SDP). It was determined that since the project would be completed by that date, the MND was still valid. It was also determined that the art component of the project - which was required by Municipal Code at the time - would also be included in the later phase. It was agreed that the determination of the date of completion in the SDP (Condition 11) made that portion also valid under MND 4955.
- 2 Response to MND # 224708.

Funds Available -

Since the City of San Diego now has the funds available to complete the SDP # 8318, that project should be completed as required rather than using the funds to start a new project.

Length of extension -

This MND, 224708, describes the project as "allows for the extension of SDP Condition number 11". However, there is no date to which the requirement is extended. The extension is, therefore, in perpetuity. The course of conduct by the city in the past thirty years on this site indicates that the length of the extension can reasonably be expected to be in perpetuity.

That unlimited extension and its significant impacts on the area are not considered by the MND. Furthermore, the failure to establish a firm deadline for this mitigation condition renders the mitigation ineffective. This is a violation of CEQA because mitigation measures must be enforceable with a firm deadline so that the significant impact is not endured after the project is otherwise completed.
- 3 Effect on prior decisions -

SDP 8318 states, "All of the conditions contained in this permit have been considered and have been determined necessary in order to make the findings required for this permit." Therefore, a full review of the original approval needs to be made before one of the conditions is invalidated. That would include a review of MND 4955 which was a requirement of the project, and which did not consider, or mitigate for, the significant impacts of the unlimited extension.

Project area -

4) SDP 8318 Condition number 11 refers to the construction of the K-9 building. The project description under review, 224708, does not include the K-9 facility. It states that the project is "surrounded by the San Diego K-9 training/kennels".

5) It is unclear how an amendment to a project not covered under the study area of the MND can be included as part of the project description. Since the K-9 modulars are not part of the study, the effects of them remaining on site have not been reviewed, despite the fact that the extension of the requirement for replacement is part of the project. In essence, you have failed to consider the K-9 facility's environmental impacts as part of the project otherwise covered by the MND.

6) Aesthetics -

The initial study in MND 224708 claims that the project will not substantially degrade the existing visual character or quality of the site. However, the course of conduct of the city over the past thirty years proves that the project will, indeed, substantially degrade the visual character or quality of the site.

Before this project was constructed, the SWAT/K-9 facilities were modulars. The city had been required to replace the modulars for approximately 30 years prior to the VMF project being approved. No action was ever taken to replace them. The modulars were an eyesore on the community and substantially degraded the visual quality of the site.

7) When the VMF project was approved, the city once again did not replace the modulars with permanent buildings. Once again, requirements to replace the modulars were ignored. The SDP 8318 required the replacement to have been completed by September 23, 2009 - and yet no effort has been made to abide by the terms of the permit.

The historical facts lead one to believe that there is no enforceable means by which to make the city abide by its requirements. It is clear that the outcome of the project being reviewed is that the modulars will be left on site in perpetuity to become the eyesore they once were to the area.

That significant impact must be mitigated. In this regard, it is not enough to require completion of permanent facilities by a specified date because that mitigation has already been ignored and proven ineffective. You must include additional mitigation to ensure that the significant impact is avoided.

8) Artwork -

As a requirement of the original project and MND 4955, the city was required to put in place artwork around the project. The community agreed to allow that artwork to be constructed with the K-9 facility by September 23, 2009. Without that artwork, there are other impacts to the visual quality that were considered during the original MND, but have not been considered now that placement of the artwork will be extended to perpetuity. This is another instance of mitigation being ineffective. You must include additional mitigation to ensure that the significant impact is avoided.

I would request the following:

9) 1) The City remove the extension of the SDP Condition # 11 from the MND since the effects of that action have not been studied within the MND.

10) 2) The City use the available funds to fulfill its requirements under condition # 11.

11) 3) The City then approve MND 224708 - without the extension - and move forward with preparing to construct the new project, while collecting the funds needed to replace that spent on complying with its legal requirement.

THERESA QUIROZ (11/7/2011) continued

4. Existing site conditions within MND No. 224708 will be modified to include the description of the modular K-9 units. The current proposal would not change anything on the K-9/SWAT portion of the site that has not already been analyzed under the previously certified CEQA document (MND No. 4955). Furthermore, MND No. 4955 analyzed the K-9 facilities and determined that with mitigation, all environmental impacts could be reduced to below a level of significance.

5. The amendment to Site Development Permit 8318 and extension of permit condition 11 is a component of the San Diego Police Pistol Range project; therefore, the inclusion of these actions in the MND is appropriate. Please see response no. 4. The current proposal would not change anything on the K-9/SWAT portion of the site that has not already been analyzed under the previously certified CEQA document (MND No. 4955). Furthermore, MND No. 4955 analyzed the K-9 facilities and determined that with mitigation, all environmental impacts could be reduced to below a level of significance.

6. With respect to the aesthetics of the site, the pistol range project would dramatically improve the visual quality of the site as many of the current structures are dilapidated and in need of repair or replacement. The existing modular facilities do not trigger a new significant visual quality impact under CEQA because they are an existing condition. As such, project implementation would not result in a significant visual quality impact under CEQA and mitigation would not be required.

7. Please see response 6. Furthermore, the construction of the permanent K-9 buildings was not a CEQA mitigation measure and significant visual quality impacts were not identified in the previously certified CEQA document.

8. With respect to the public artwork element of the original project, this was included in the original SDP No. 8313 as one of the improvements that were not completed. The public artwork element was not included as mitigation for visual quality in MND No. 4955 because the Initial Study that was completed did not identify a significant impact to visual quality under CEQA. Instead, the artwork, along with other improvements, was included as a condition of approval under SDP No. 8313. Installation of public artwork would be accomplished after construction of the permanent K-9/SWAT facilities.

9. Please see response no.5. The amendment to Site Development Permit 8318 and extension of permit condition 11 is a component of the San Diego Police Pistol Range project; therefore, the inclusion of these actions in the MND is appropriate. The current proposal would not change anything on the K-9/SWAT portion of the site that has not already been analyzed under the previously certified CEQA document.

10. The City use of funds is not a CEQA related issue and no response is required.

11. Please see response no. 5.



San Diego County Archaeological Society, Inc.

Environmental Review Committee

9 November 2011

To: Mr. Jeffrey Szymanski
Development Services Department
City of San Diego
1222 First Avenue, Mail Station 501
San Diego, California 92101

Subject: Draft Mitigated Negative Declaration
San Diego Police Pistol Range

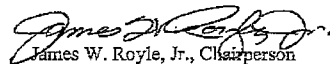
Dear Mr. Szymanski:

I have reviewed the subject DMND on behalf of this committee of the San Diego County Archaeological Society.

⑫ Based on the information in the initial study, DMND and historical report for the project, we agree with the impact analysis and mitigation measures as presented.

Thank you for affording us this opportunity to participate in the City's environmental review process for this project.

Sincerely,


James W. Royle, Jr., Chairperson
Environmental Review Committee

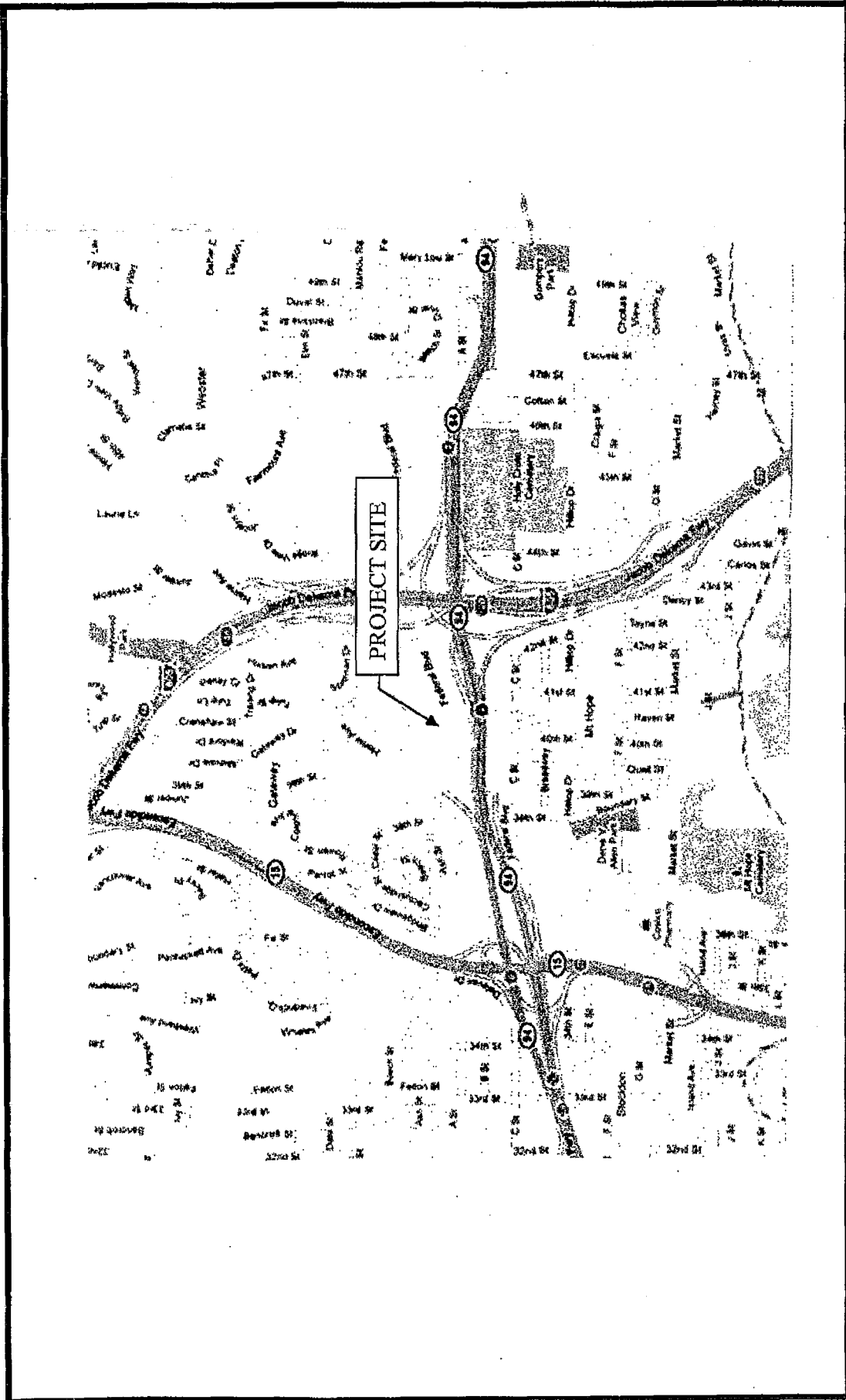
cc: Cultural Land Planning & Research
SDCAS President
File

P.O. Box 81106 • San Diego, CA 92138-1106 • (658) 538-0935

SAN DIEGO COUNTY ARCHAEOLOGICAL SOCIETY INC. (11/9/2011)

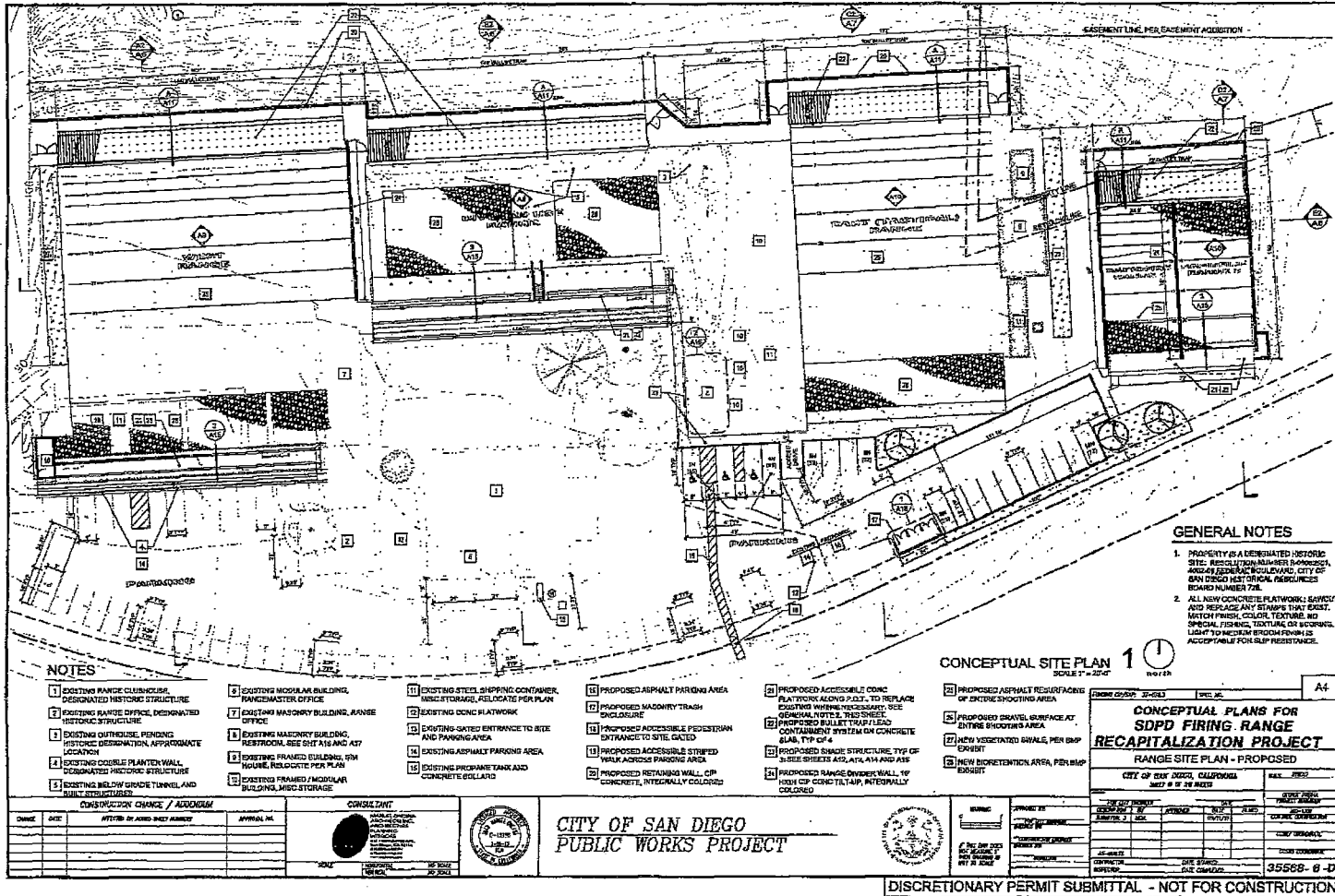
12. Comment noted.

**FIGURE
No. 1**



Location Map
 San Diego Police Pistol Range / Project No. 224708
 City of San Diego – Development Services Department





SDPD FIRING RANGE RECAPITALIZATION PROJECT



Site Plan
 San Diego Police Pistol Range / Project No. 224708
 City of San Diego – Development Services Department

FIGURE
No. 2

INITIAL STUDY CHECKLIST

1. Project Title/Project number: San Diego Police Pistol Range/Project No. 224708
2. Lead agency name and address: City of San Diego, Development Services Department, 1222 First Avenue, MS 501, San Diego, CA 92101
3. Contact person and phone number: Jeff Szymanski, Associate Planner, 619-446-5324
4. Project location: The project site is located at 4002-4008 Federal Boulevard within the City Heights Neighborhood of the Mid City Community Planning Area. Legal Description: A portion of Blocks 32, 33, 35, 40, and 41 of Marilou Park Map No. 517.
5. Project Applicant/Sponsor's name and address: City of San Diego Police Department/ Engineering & Capital Projects Department, 600 B Street, MS 908A, San Diego, CA 92101. Contact George Freiha (619) 533-7449.
6. General Plan designation: The Mid-City Community Plan designates the site as Open Space and Institutional.
7. Zoning: The site is zoned MCCPD-MR-3000 and RS-1-7
8. Description of project (Describe the whole action involved, including but not limited to, later phases of the project, and any secondary, support, or off-site features necessary for its implementation.): San Diego Police Pistol Range: AMENDMENT TO SITE DEVELOPMENT PERMIT (SDP) No. 8318 to allow for the extension of SDP Condition #11, which required the construction of an office for the Canine/SWAT facility. In addition to the amendment the project would include the following improvements: demolition of existing bullet backstops, construction of new bullet backstops (traps), repaving of an existing parking area, construction of a new parking area, construction of retaining walls, ADA improvements, landscaping improvements, replacement of dirt berms with tilt up walls, restoration of the historical shade structures and the installation of bio-retention filters and vegetated swales.

Currently, the 7.73 acre project site consists of an operational San Diego Police Facility including a vehicle maintenance garage and four firing ranges. The southern portion of the site is relatively flat, ranging in elevation from 90 to 95 feet above Mean Sea Level (MSL) while the northern portion of the site is fairly steep ranging in elevation from 100 feet above MSL to 145 feet above MSL. The site is primarily developed and consists of asphalt paving, building structures, and sparse non-native and ornamental vegetation. A 0.317 acre portion of the project site is owned by The United States Navy. As a condition of the Site Development Permit the City of San Diego will acquire an easement for the purposes of operation, maintenance, and repair of the pistol range facilities together with rights of ingress and egress through this portion of land.

The existing bullet traps located at the north end of the ranges would be removed and replaced with concrete bullet trap lead containment systems. New integral colored concrete walls would be installed north of bullet traps to retain the disturbed slopes at the north end of the site. A cast in place retaining wall would be constructed that would support the slopes on the north side of the project. The retaining walls would vary in height from six to eighteen feet, with an average height of eleven and one half feet. The shade structures supporting the firing ranges would be reconstructed to match the existing structures minus the support member for the baffle. The support member would be replaced with steel members to match the size of the wood members and painted a matte finish. Roofing shall be corrugated metal to match the existing roof. Presently there are two earthen berms located on site, one between the west range and the civilian use range and one between the east range and rapid the fire range. These berms would be replaced with ten-foot-high concrete tilt-up dividing walls. Bioretention and vegetated swale areas would be constructed on site and would act to remove pollutants from storm water before it discharges into the existing storm drain system.

In addition to the project features described above, the project would repave existing parking areas as well as add an additional 13 parking spaces including three accessible spaces, bringing the total to 237 spaces. Landscape and hardscape improvements would include ADA accessible pedestrian walkways, masonry trash enclosures, ADA restroom improvements and plantings consisting of African sumac trees and red New Zealand flax.

9. Surrounding land uses and setting. Briefly describe the project's surroundings: The project site is located at 4008 Federal Boulevard in the Mid-City Community Planning area and is surrounded by the temporary modular offices for the San Diego Police facility K-9/SWAT training/kennels to the east and City Open Space east of that, Federal Boulevard and the I-94 to the south and Multi-Unit Residential to the north of the property. The southern portion of the site is relatively flat ranging in elevation from 90 to 95 feet above Mean Sea Level (MSL) while the northern portion of the site is fairly steep ranging in elevation from 100 feet above MSL to 145 feet above MSL.
10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.): None.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

- | | | |
|---|---|---|
| <input type="checkbox"/> Aesthetics | <input type="checkbox"/> Greenhouse Gas Emissions | <input type="checkbox"/> Population/Housing |
| <input type="checkbox"/> Agriculture and Forestry Resources | <input checked="" type="checkbox"/> Hazards & Hazardous Materials | <input type="checkbox"/> Public Services |
| <input type="checkbox"/> Air Quality | <input type="checkbox"/> Hydrology/Water Quality | <input type="checkbox"/> Recreation |
| <input type="checkbox"/> Biological Resources | <input type="checkbox"/> Land Use/Planning | <input type="checkbox"/> Transportation/Traffic |
| <input checked="" type="checkbox"/> Cultural Resources | <input type="checkbox"/> Mineral Resources | <input type="checkbox"/> Utilities/Service System |
| <input type="checkbox"/> Geology/Soils | <input type="checkbox"/> Noise | <input checked="" type="checkbox"/> Mandatory Findings Significance |

DETERMINATION: (To be completed by Lead Agency)

On the basis of this initial evaluation:

- The proposed project **COULD NOT** have a significant effect on the environment, and a **NEGATIVE DECLARATION** will be prepared.
- Although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A **MITIGATED NEGATIVE DECLARATION** will be prepared.
- The proposed project **MAY** have a significant effect on the environment, and an **ENVIRONMENTAL IMPACT REPORT** is required.
- The proposed project **MAY** have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (a) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (b) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An **ENVIRONMENTAL IMPACT REPORT** is required.
- Although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or (MITIGATED) **NEGATIVE DECLARATION** pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or (MITIGATED) **NEGATIVE DECLARATION**, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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D) AESTHETICS – Would the project:

- a) Have a substantial adverse effect on a scenic vista?

The project would not impact any designated scenic vista as outlined in the Mid-City Community Plan (MCCP). Additionally, a recommendation in the MCCP is to comply with setbacks adjacent to Open Space in order to preserve public views from uplands to lowland areas. The project does not propose development in the Open Space area on-site and complies with appropriate setbacks. As such, project implementation would not substantially affect public views including scenic vistas.

- b) Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

The project is not located within or adjacent to a state scenic highway. As such, project implementation would not result in such an impact.

- c) Substantially degrade the existing visual character or quality of the site and its surroundings?

The project would improve the visual quality and character of the site and at the same time preserve the designated historic structures. The shade structures have been determined to be contributing features to the historicity of the site. As such, the proposed improvements to the structures have been designed in such a way as to closely match the elements of the existing shade structures. The proposed design achieves the preservation of the aesthetic value of the site and improves the safety operations of the site.

New integral colored concrete walls would be installed north of bullet traps to retain the disturbed slopes at the north end of the site. The retaining walls would vary in height from six to eighteen feet, with an average height of eleven and one half feet. The bullet trap system and existing structures would be located in front of the retaining walls and the majority of the walls would not be visible from any public vantage point.

Furthermore, from the public right-of-way (looking north from Federal Boulevard and the 94 Freeway), the site improvements would ultimately improve the visual quality of the site because the existing condition of the structures and associated elements are in poor condition and are in need of improvement. As such, project implementation would not result in a substantial degradation of the site and/or its surroundings.

- d) Create a new source of substantial light or glare that would adversely

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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affect day or nighttime views in the area?

The project would utilize construction materials that are not highly reflective. Additionally, the line-of-sight from the public right-of-way to the various structures on-site is not distracting. As such, project implementation would not result in an adverse affect to daytime or nighttime views.

II) **AGRICULTURAL AND FOREST RESOURCES:** In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. – Would the project:

a) Converts Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

The project site is not classified as farmland by the Farmland Mapping and Monitoring Program (FMMP). Similarly, land surrounding the project is not in agricultural production and is not classified as farmland by the FMMP. Therefore, the project would not result in the conversion of farmland to non-agricultural uses.

b) Conflict with existing zoning for agricultural use, or a Williamson Act Contract?

Please see II.a

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 1220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
The zoning of the project site does not impact forest land. Therefore, the project would not conflict with existing zoning for forest land.				

d) Result in the loss of forest land or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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See II d).

e) Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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The project would not involve a change in land use and would not impact farmland or forestland.

III. AIR QUALITY – Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make the following determinations - Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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The project would not involve any future actions that would generate emissions as a result of the proposed use (e.g. vehicle miles traveled, etc). The project proposes to revitalize an existing shooting range, which would not generate additional traffic. However, emissions would occur during the construction phase of the project. The emissions would be minimal and would only occur temporarily during construction. Additionally, the construction equipment typically involved in small-scale projects generates relatively few emissions. During grading activities, dust suppression methods would be included.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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Please see III.a

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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(including releasing emissions which exceed quantitative thresholds for ozone precursors)?

As described above, construction operations could temporarily increase the emissions of dust and other pollutants. However, construction emissions would be temporary and implementation of Best Management Practices (BMPs) would reduce temporary dust impacts. Additionally, the scope and nature of the project would not result in an increase in Vehicle Miles Traveled (VMTs) and associated emissions. Therefore, the project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project is non-attainment in the region under applicable federal or state ambient air quality standards.

- d) Expose sensitive receptors to substantial pollutant concentrations?

The project site is surrounded by freeways and is not in close proximity to any sensitive receptors. Additionally, project implementation would result in minimal and temporary air quality emissions during construction activities. As such, project implementation would not expose sensitive receptors to substantial concentrations of pollution.

- e) Create objectionable odors affecting a substantial number of people?

Operation of construction equipment and vehicles could generate odors associated with fuel combustion. However, these odors would dissipate into the atmosphere upon release. Therefore, the project would not create substantial amounts of objectionable odors affecting a substantial number of people.

IV. BIOLOGICAL RESOURCES – Would the project:

- a) Have substantial adverse effects, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

The project would not impact local, state or federally protected species. The project site is developed and lacks sensitive biological resources. Project implementation would not result in an adverse effect to sensitive biological resources.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Have a substantial adverse effect on any riparian habitat or other community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The project site is just north of Federal Boulevard with Chollas Creek located on the south side of Federal Boulevard. Project implementation would not impact any jurisdictional wetlands or riparian habitat.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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See IV b).

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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The developed police facility does not support any migratory wildlife corridors. Project implementation would not impact any native resident or migratory fish.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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The project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. Project implementation would not impact *Sensitive Biological Resources* as defined in the Land Development Code. With respect to policies found in the Chollas Creek Enhancement Plan (CCEP), the project would be consistent with the goals and objectives of the CCEP.

f) Conflict with the provisions of an	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

The project would be consistent with the goals, policies and objective of the City's Multiple Species Conservation Program (MSCP) as project implementation would not occur within or adjacent to the City's Multi-Habitat Planning Area (MHPA) and would not impact *Sensitive Biological Resource* as defined in the Land Development Code (LDC). Additionally, the project would be consistent with the policies found in the Chollas Creek Enhancement Plan (CCEP).

V. CULTURAL RESOURCES – Would the project:

- a) Cause a substantial adverse change in the significance of an historical resource as defined in §15064.5?

The purpose and intent of the *Historical Resources Regulations of the Land Development Code (Chapter 14, Division 3, and Article 2)* is to protect, preserve and, where damaged, restore the historical resources of San Diego. The regulations apply to all proposed development within the City of San Diego when historical resources are present on the premises.

CEQA requires that before approving discretionary projects, the Lead Agency must identify and examine the significant adverse environmental effects, which may result from that project. A project that may cause a substantial adverse change in the significance of a historical resource may have a significant effect on the environment (Sections 15064.5(b) and 21084.1). A substantial adverse change is defined as demolition, destruction, relocation, or alteration activities, which would impair historical significance (Sections 15064.5(b)(1)). Any historical resource listed in, or eligible to be listed in the California Register of Historical Resources, including archaeological resources, is considered to be historically or culturally significant.

The project site located at 4002-4008 Federal Blvd., APN 541-251-04 and is a designated historic resource listed as Historic Resources Board Site #726-San Diego Police Pistol Range. In order to assess the historical significance of the structures on-site, a Historical Resource Evaluation Report, *The San Diego Police Pistol Range* (May, July 2005 and amended October 2010), was prepared and is summarized herein. Two cobble-stone buildings, the clubhouse and office/residence, were built during the years 1934-1936. These buildings are significant historical resources as they are examples of a late period of Arts & Crafts architecture at its most organic and functional stage. In addition to the cobble-stone buildings, the shade structure model was analyzed for historical significance and found to be a “contributing” structure to the overall site.

The scope of the proposed project does not include any modifications to the two historic, cobble-

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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stone buildings. However, the shade structures would be reconstructed to match the existing one, minus the support member for the baffle. The support member would be replaced with steel members to match the size of the wood members and painted a matte finish. Roofing for the structures shall be corrugated metal to match the existing roof. The shade structures have been designed to incorporate many of the same elements of the existing shade structures while improving the operational safety of the firing ranges. City of San Diego Historic Resources Board Staff has reviewed the proposal and determined that the project would be consistent with the U.S. Secretary of the Interior's Standards for the Treatment of Historic Properties. Therefore, the project would not result in a substantial adverse change in the significance of an historical resource and mitigation is not required.

- b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

During the mass grading of the project area for the Central Police Facility, several historic trash deposits were identified by the archaeological monitor (artifacts range from the 1880's to modern trash intrusions). It was determined that these deposits were an extension of CA-SDI-10528H, which lies to the north of the project. CA-SDI-10528H is recorded as a City dump that was in use from circa 1908-1915. Based upon the very disturbed nature of both the recorded site to the north and its extension within the project's boundary it was determined that neither deposit is historically significant.

Qualified City Staff (Jeff Szymanski RPA) conducted a field visit and surface components of the previously identified historic deposits were not identified. Furthermore, it was determined that the new improvements are not located where the historic deposits were recorded. Based upon the negative site visit and the scope of work, archaeological testing of extension of CA-SDI-10528H is not required. However, due to the project's proposed ground disturbing activities, archaeological monitoring would be required in case additional components of CA-SDI-10528H are present. As such, mitigation has been incorporated into Section V of the Mitigated Negative Declaration and would reduce impacts to historical resources to below a level of significance.

- c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

The site is previously developed and the project would not result in grading quantities that would exceed 10 feet in depth into undisturbed formation. Much of the project grading would be a result of the new bullet traps and retaining walls that would occur at the northern portion of the site. Excavation for the retaining walls would require excavation of 18 feet of cut into a slope. This area of the site has been previously disturbed and does not support exposed and undisturbed geologic formations with high sensitivity. Therefore, based on the disturbed nature of the hillside, paleontological monitoring would not be required.

- d) Disturb any human remains,

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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including those interred outside of formal cemeteries?

Based upon previous archaeological research in the area the likelihood of encountering human remains is low. However, the project proposes ground disturbing activities and therefore there is a potential to discover human remains. Therefore, monitoring is required with Native American participation. In addition, mitigation measures that address the discovery of human remains are included in Section V of the MMRP. Implementation of these measures would reduce potential impacts to below a level of significance. As such, project implementation would not result in a significant impact to human remains.

Furthermore, standard language outlined in the *City of San Diego Standard Specifications for Public Works Construction ("WHITEBOOK")* would be included in the construction documents. This language requires that upon notification by the Contractor of the discovery of human remains of unknown origin, the Engineer shall immediately notify the San Diego County Coroner to start the investigation process, in accordance with the California Health and Safety Code §§7050.5 and 7051.

VI. GEOLOGY AND SOILS – Would the project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| <p>i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.</p> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|

The City of San Diego’s Seismic Safety Map does not indicate the presence of a known earthquake fault mapped within the project area. Therefore, no impact would occur from a known earthquake fault.

- | | | | | |
|---|--------------------------|--------------------------|-------------------------------------|--------------------------|
| <p>ii) Strong seismic ground shaking?</p> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|-------------------------------------|--------------------------|

Based on a Probabilistic Seismic Hazard Assessment for the Western United States, issued

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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by the United States Geological Survey (1997), the project site is located in a zone where the horizontal peak ground acceleration having a 10 percent probability of exceedance in 50 years is 0.26g (26 percent of the acceleration of gravity). Engineering design considerations and utilization of standard construction practices would ensure that potential impacts would remain less than significant.

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| iii) Seismic-related ground failure, including liquefaction? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|

A Geotechnical Evaluation, prepared by Ninyo and Moore, dated May 29, 2001, evaluated the Central Police Facility and the dog kennel (both sides of the firing ranges) for geologic issues including liquefaction. The analysis concluded that based on the cemented character of the formational material as well as the absence of groundwater encountered in the exploratory borings, the potential for seismic-related ground failure, liquefaction is low. Additionally, the analysis indicated a low potential and no indication of landslides.

- | | | | | |
|-----------------|--------------------------|--------------------------|-------------------------------------|--------------------------|
| iv) Landslides? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|-----------------|--------------------------|--------------------------|-------------------------------------|--------------------------|

See VI (iii). In addition, the site is underlain by the geologic San Diego Formation, fill, topsoil and alluvium. The engineering design and utilization of standard construction practices would ensure that potential impacts based on regional geologic hazards would remain less than significant.

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| b) Result in substantial soil erosion or the loss of topsoil? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|

The project would result in 3,700 cubic-yards of cut at a maximum depth of approximately 18 feet (this depth would occur into the previously disturbed manufactured slope immediately behind the bullet traps). Grading would occur over 0.48-acres of the site. The majority of the grading would occur at the northern portion of the site for construction of the bullet traps and retaining walls. The project would not result in a substantial loss of topsoil as the grading quantities are relatively small. With respect to erosion control, the current storm water is discharged to a concrete lined, impermeable channel. As such, no undercutting erosion, slope stability or vegetative stress is anticipated. With incorporation of vegetated swales and bioretention areas into the drainage design, project implementation would not increase runoff volume, velocity or frequency at any of the basin outfalls, nor will it significantly reduce existing infiltration rates. As a result, project implementation would not significantly impact the existing flow regime and downstream conditions such as erosion and habitat impacts are anticipated

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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Project implementation would not result in such an impact. See VI (iii)

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|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|

Project implementation would not result in such an impact. See VI (iii)

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|

The project does not propose any septic tanks or alternative waste disposal methods.

VII. GREENHOUSE GAS EMISSIONS - Would the project:

- | | | | | |
|---|--------------------------|--------------------------|-------------------------------------|--------------------------|
| a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|-------------------------------------|--------------------------|

The City of San Diego is utilizing the California Air Pollution Control Officers Association (CAPCOA) report "CEQA and Climate Change" (CAPCOA 2009) to determine whether a GHG analysis would be required for submitted projects. The CAPCOA report references a 900 metric ton guideline as a conservative threshold for requiring further analysis and possible mitigation. This emission level is based on the amount of vehicle trips, the typical energy and water use associated with projects, and other factors.

CAPCOA identifies project types that are estimated to emit approximately 900 metric tons of GHG's annually. This 900 metric ton threshold is roughly equivalent to 35,000 square feet of office space, 11,000 square feet of retail, 50 single-family residential units, 70 multi-family residential units and 6,300 square feet of supermarkets.

Since the proposed recapitalization of the Central Police Firing Range and associated improvements does not fit in the categories listed above, a GHG modeling analysis was conducted to determine the level of GHG emissions. The Urbemis Model (2007 9.2.4) was utilized to generate GHGs emissions estimates for the project. The model utilizes project information (e.g. total construction months, project type, construction equipment, grading quantities and the total disturbance area, etc.) to quantify GHG emissions from heavy-duty construction equipment, haul trucks, and worker commute

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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trips associated with linear construction projects.

The result of the model indicates approximately 250 annualized metric tons of emissions. The output for the project falls well below the 900 metric ton per year figure. Therefore, based upon the analysis showed above the project would result in a less than significant CEQA Greenhouse gas impact and mitigation would not be required.

- b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Please see VII.a. The project would not conflict with any applicable plans, policies, or regulations related to greenhouse gases.

VIII. HAZARDS AND HAZARDOUS MATERIALS – Would the project:

- a) Create a significant hazard to the public or the environment through routine transport, use, or disposal of hazardous materials?

A Phase I Environmental Site Assessment was prepared by Ninyo and Moore, dated February 7, 2002 for the undeveloped land at the southeast corner of Federal Boulevard and Home Avenue (across the street from the Pistol Range). According to County DEH records reviewed for the 2002 report lead removal had occurred at the facility in 1994 and 1998 under the supervision of the City of San Diego and completed to the satisfaction of the City.

Given the continued use of the shooting range for training purposes, additional lead contamination has occurred since the last removal effort in 1998. The project would be required to safely remove the lead and any asbestos containing materials that would be affected during the construction process. As a result, a hazardous material abatement plan for the removal of the contamination would be required. Prior to the construction of the project the abatement plan would be reviewed and approved by the City of San Diego Environmental Services Department (ESD) Office, Asbestos and Lead Management Program (ALMP) as outlined in the mitigation measures found in Section V of the MND.

Furthermore, section 803 "Encountering or Releasing Hazardous Substances or Petroleum Products" of the City of San Diego Standard Specifications for Public Works Construction ("WHITEBOOK"), would be made part of the construction documents and would ensure the proper handling and disposal of any contaminated soils. Additionally, state and federal law require the proper treatment and disposal of any such discovery that would fall under their jurisdiction. As such, the project would incorporate measures to meet the local, state and federal requirements to address such hazardous materials should they be discovered during construction. Therefore, incorporation of the mitigation in Section V of the MND would mitigate impacts to below a level of significance.

- b) Create a significant hazard to the

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

See VIII a)

- c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Project implementation would involve the disposal of hazardous substances; however, the site is not located within one-quarter mile of an existing or proposed school. Additionally, the project is required to comply with mitigation in Section V of the MND. Furthermore, section 803 of the City of San Diego's "WHITEBOOK" would ensure that appropriate specifications are included in the contract documents. As such, impacts regarding the handling or discovery of hazardous waste within close proximity to a school would be mitigated to below a level of significance.

- d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Please see VIII, mitigation would be required to safely remove hazardous materials from the site.

- e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two mile of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

The proposed project is not located within the Airport Influence Area (AIA) of the San Diego International Airport's Airport Land Use Compatibility Plan (ALUCP).

- f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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The project is not located within the vicinity of a private airstrip. As such, the project would not result in a safety hazard for people residing or working in the project area.

- g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

The project does not include work within the public Right-of-Way and therefore it is not anticipated to interfere within an adopted emergency response or evacuation plan.

- h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

The project site is mostly developed and is not adjacent to wildlands or areas that are susceptible for wild fires. As such, project implementation would not expose people or structures to fires.

IX. HYDROLOGY AND WATER QUALITY - Would the project:

- a) Violate any water quality standards or waste discharge requirements?

A Water Quality Technical Report (WQTR) was prepared to address potential water quality issues that could occur on-site resulting from project implementation (WQTR For San Diego Police Department Pistol Range Improvements, Nasland Engineering, October 2010). The report was prepared to identify information related to pollutants of concern generated by the project then describes how Permanent Storm Water Best Management Practices (BMPs), Treatment Control BMPs, Low Impact Development (LID) BMPs, and Source Control BMPs would be implemented to meet storm water requirements.

The potentially affected water bodies include Chollas Creek (adjacent to Federal Boulevard immediately south of the site) and the San Diego Bay Shoreline, located approximately 2.6 miles southwest of the site. Both water bodies are listed in Section 303 (d) of the Clean Water Act as being impaired. Chollas Creek is listed for being polluted or stressed by copper, lead and zinc. The San Diego Bay Shoreline is listed for being polluted or stressed by Benthic Community Effects and Sediment Toxicity.

The project would comply with the City of San Diego's Storm Water Standards. As identified in the report, the project is considered a priority development project and has incorporated permanent BMPs (including LID, source control and treatment control BMPs) into the design. As part of the project design, the project includes 11,600 square-feet of bio-retention areas in front of each of the firing ranges and two 900 square-foot vegetated swales running north/south between the eastern

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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ranges and on the western side of the western-most range. Prior to construction, a Storm Water Pollution Prevention Plan (SWPPP) would ensure implementation of the priority BMPs.

The WQTR has concluded that through the incorporation of vegetated swales and bioretention areas into the drainage design, the project would not increase the runoff volume, velocity or frequency at any of the basin outfalls, nor will it significantly reduce existing infiltration rates. Because the project will not significantly impact the existing flow regime, no alterations to existing downstream conditions such as erosion and habitat characteristics are anticipated.

- b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

The project does not propose the use of groundwater nor would it impact groundwater during grading activities. Furthermore, the project would not introduce a substantially large amount of new impervious surfaces over ground that could interfere with groundwater recharge. Therefore, the project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge.

- c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner, which would result in substantial erosion or siltation on- or off-site?

A preliminary Hydrology Study (Nasland Engineering, October 2010) was prepared for the project which concluded that the project would not negatively impact existing hydrologic conditions and would not result in a substantial impact to the drainage pattern. Upon project completion, the runoff volume would not increase. With respect to erosion control, a concrete drainage ditch would be constructed at the top of all proposed retaining walls so as to prevent storm water from flowing over the wall. The concrete drainage ditch would collect potential off-site runoff, convey it into new storm drain laterals and ultimately connect to the existing storm drain system. Additionally, any vegetation removed during construction of the proposed retaining wall shall be replaced with native or drought tolerant landscaping in order to minimize erosion.

- d) Substantially alter the existing drainage pattern of the site or area,

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site?

Please see IX.c.

- e) Create or contribute runoff water, which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

The project would not result in an increase in storm water volume, frequency or velocity at any of the basin outfalls, nor will it significantly reduce existing infiltration rates.

- f) Otherwise substantially degrade water quality?

See IX-a.

- g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

The project would result in improvement to the existing firing ranges and does not propose any habitable structures.

- h) Place within a 100-year flood hazard area, structures that would impede or redirect flood flows?

The project is partially within the FEMA 100-year Flood Hazard Zone AE. However, project implementation would not result in an increase to the base-flood elevation and would not impact the floodway or increase the floodplain. The engineering analysis verifying a no-rise in base-flood elevation would be verified by the City Engineer. Therefore, the project is consistent with Council Policy 600-14 and would not impede or redirect flood flows or result in on or off site impacts on upstream or downstream properties.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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- i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

The project would not result in the exposure of people or structures to floods as a result of a levee or dam. The project site is not downstream from either a levee or dam. As such, no impact would occur.

- j) Inundation by seiche, tsunami, or mudflow?

The project would not include any new features that would increase the risk associated with seiche, tsunami, or mudflow beyond those of the existing conditions.

X. LAND USE AND PLANNING – Would the project:

- a) Physically divide an established community?

The existing San Diego Police Pistol Range was constructed over a period of three years: 1934-1936. The proposed amendment to Site Development Permit No. 8313 would result in improvements to the existing firing ranges. The project site is located just north of the I-94 freeway, just east of I-15 and just west of I-805. Existing multi-dwelling residential development sits just to the north of the subject site, beyond the top of the slope. Therefore, project implementation would not result in the division of an established community.

- b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

The project is consistent with the policies, goals and recommendations of the General Plan, Mid-City Community Plan and the Chollas Creek Enhancement Plan (CCEP). The CCEP was adopted with the overarching policy of preserving, restoring and enhancing riparian habitat along Chollas Creek. The project site is just north of Federal Boulevard with Chollas Creek located adjacent to Federal Boulevard immediately to the south. Project implementation would be consistent with the applicable Design/Development Guidelines which call for erosion control, water quality maintenance and enhancement of the CCEP. Additionally, project implementation would not impact any jurisdictional wetlands.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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The site drains to two basin outfalls located at the southern portion of the site and ultimately discharges into a concrete lined channel portion of the Chollas Creek located near the site just south of Federal Boulevard. Per the Countywide Standard Urban Stormwater Mitigation Plan (SUSMP), Chollas Creek is listed as having set Total Maximum Daily Loads (TMDL) for Daizinon, Copper, Lead and Zinc. Heavy metals (lead) are identified as a pollutant of concern for the project. In order to address the TMDL requirements, treatment BMPs, which have high removal efficiency for heavy metals, have been selected and incorporated into the project. As such, the project is consistent with the water quality objectives of the CCEP and the overall policies and objectives of the enhancement plan.

- c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

The project site is not located within or adjacent to the City's Multi-Habitat Planning Area (MHPA) and would be consistent with the CCEP, see X-b) for further discussion. As such, project implementation would not conflict with any habitat conservation plan.

XI. MINERAL RESOURCES – Would the project?

- a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

The areas surrounding the project are not being used for the recovery of mineral resources. Similarly, these areas surrounding the project site are not designated for the recovery of mineral resources on the City of San Diego General Plan Land Use Map. Therefore, the project would not result in the loss of availability of a known mineral resource.

- b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

The project would not result in the loss of the availability of a locally important mineral resource. There are no existing quarries within close proximity to the site. As such, project implementation would not impact the operations of any existing quarries.

XII. NOISE – Would the project result in:

- a) Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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standards of other agencies?

The project would not result in a permanent substantial increase in the existing noise environment. The existing use is a police firing range and no change of use would occur. The project would result in improved firing range facilities and would not result in an increase in usage of the site. Furthermore, existing noise levels are elevated because of the projects adjacency to I-94. Therefore, the firing range noise would not exceed noise levels beyond those of existing and mitigation would not be required.

- b) Exposure of persons to, or generation of, excessive ground borne vibration or ground borne noise levels?

The project would not result in people being exposed to excessive ground borne noise levels.

- c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

The project would not result in permanent substantial increase in the existing noise environment. The existing use is a police firing range. Furthermore, existing noise levels are elevated because of the projects adjacency to I-94. Therefore, the firing range noise would not exceed noise levels beyond those of existing and mitigation would not be required.

- d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing without the project?

The project would not result in a substantial increase in the ambient noise environment. However, during construction and grading activities, there is the potential for construction noise to occur. Noise occurring during construction activities would be temporary and would be regulated under San Diego Municipal Code Section (SDMC) 59.5.0404, "Noise Abatement and Control." Given that the construction of the project would result in temporary noise and would be regulated by the SDMC, the project would not result in a significant noise environment.

- e) For a project located within an airport land use plan, or, where such a plan has not been adopted, within two miles of a public airport or public use airport would the project expose people residing or working in the area to excessive noise levels?

The project is not located within the Airport Influence Area (AIA) of the San Diego International Airport's Airport Land Use Compatibility Plan (ALUCP) or a within a private airstrip. Therefore,

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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people residing or working in the area of the project would not be exposed to excessive airport noise.

- f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

The project is not located within the vicinity of a private airport; therefore, people residing or working in the area of the project would not be exposed to excessive airport noise.

XIII. POPULATION AND HOUSING – Would the project:

- a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

The project does not propose any residential structures or any other infrastructure improvements. Therefore, project implementation would not induce substantial population growth.

- b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

Project implementation would not displace any housing. Therefore, the construction of housing elsewhere would not be necessitated.

- c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

See XIII b).

XIV. PUBLIC SERVICES

- a) Would the project result in substantial adverse physical impacts associated with the provisions of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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order to maintain acceptable service rations, response times or other performance objectives for any of the public services:

- | | | | | |
|--------------------|--------------------------|--------------------------|--------------------------|-------------------------------------|
| i) Fire Protection | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|--------------------|--------------------------|--------------------------|--------------------------|-------------------------------------|

The project would not alter any fire protection response times, facilities or impact the operation of fire personnel.

- | | | | | |
|-----------------------|--------------------------|--------------------------|--------------------------|-------------------------------------|
| ii) Police Protection | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|-----------------------|--------------------------|--------------------------|--------------------------|-------------------------------------|

The project would result in the improved operation of the Central Police Station Firing Ranges. The revitalization of the firing ranges would include a new bullet trap system with a concrete pad and a lead containment system, better designed and more functional shade structures, retaining walls, range divider walls, lead remediation, landscaping and resurfaced parking areas. The project would substantially improve the site from a public health, and safety standpoint as well as from an aesthetic standpoint.

- | | | | | |
|--------------|--------------------------|--------------------------|--------------------------|-------------------------------------|
| iii) Schools | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|--------------|--------------------------|--------------------------|--------------------------|-------------------------------------|

The project would not physically alter any schools.

- | | | | | |
|----------|--------------------------|--------------------------|--------------------------|-------------------------------------|
| v) Parks | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|----------|--------------------------|--------------------------|--------------------------|-------------------------------------|

The project would not physically alter any parks.

- | | | | | |
|-----------------------------|--------------------------|--------------------------|--------------------------|-------------------------------------|
| vi) Other public facilities | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|-----------------------------|--------------------------|--------------------------|--------------------------|-------------------------------------|

The project would not result in the increased demand for electricity, gas, or other public facilities. The project would improve the police firing ranges and would not impact any other public facilities.

XV. RECREATION –

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|

The project would not result in the building of residential units and would therefore not result in an increase in demand for recreational facilities.

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| b) Does the project include recreational facilities or require the construction | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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or expansion of recreational facilities, which might have an adverse physical effect on the environment?

See XV a).

XVI. TRANSPORTATION/TRAFFIC – Would the project?

- a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

The project would improve site circulation, but would not adversely affect neighboring circulation systems. Additionally, project implementation would not result in an increase in Vehicle-Miles Traveled (VMT) as the project would not increase the intensity of the use.

- b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

See XVI a)

- c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

See XVI a., the project would not have any such impacts.

- d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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incompatible uses (e.g., farm equipment)?

The project has been designed in such a way as to improve the operation of the site and the public health and safety. No such hazards resulting from a design feature would occur.

- e) Result in inadequate emergency access?

Due to the improvements to the parking areas the project would result in improved circulation and would allow for easier movement throughout the site in the event of an emergency.

- f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

The project would not conflict with any such plans.

XVII. UTILITIES AND SERVICE SYSTEMS – Would the project:

- a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

The project would not result in an increase in the intensity of the use and would not exceed wastewater treatment requirements.

- b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

The project would not result in an increase in the intensity of the use and would not be required to construct a new water or wastewater treatment facility.

- c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

The project would not result in a substantial impact to the drainage pattern. Upon project

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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completion, the runoff volume would not increase.

- d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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The project would not increase the intensity of use of the site and would therefore be served by the existing water supplies available to the site.

- e) Result in a determination by the wastewater treatment provided which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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See XVII c)

- f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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Construction of the project would likely generate minimal waste. This waste would be disposed of in conformance with all applicable local and state regulations pertaining to solid waste including permitting capacity of the landfill serving the project area. Operation of the project would not generate waste and, therefore, would not affect the permitted capacity of the landfill serving the project area. Future removal of lead would be done in compliance with all federal, state, and local regulations related to hazardous materials.

- g) Comply with federal, state, and local statutes and regulation related to solid waste?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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See XVII f). Any solid waste generated during construction related activities would be recycled or disposed of in accordance with all applicable local, state and federal regulations.

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE –

- a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species,

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

The project is located in a developed urbanized neighborhood and would not degrade the quality of the surrounding environment. Implementation of the MMRP would reduce potential impacts to historical resources to below a level of significance. No biological resources are present on site and therefore, impacts to such resources would not result from the project. The on-site improvements were determined to be consistent with the U.S. Secretary of the Interior's Standards for the Treatment of Historic Properties and no impacts would occur to the Historic Designated structures and the contributing shade structure. As a result, project implementation would not result in a significant impact to these resources.

- b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable futures projects)?

The project may result in minimal dust and GHGs during the construction process. However, these emissions would be relatively minor and would not be considerable. When viewed in connection with the effects of other projects in the Mid-City area, construction activities have the potential to impact cultural resources which could incrementally contribute to a cumulative loss of non-renewable resources. However, with implementation of the mitigation measures in Section V of the MND, incremental impacts would be reduced to below a level of significance.

- c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?

As stated previously, potentially significant impacts have been identified for Archaeological Resources and Public Health and Safety. Impacts associated with Historical Resources are individually significant and when taken into consideration with other past projects in the vicinity, may contribute to a cumulative impact; specifically with respect to non-renewable resources.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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However, with implementation of the MMRP, the information associated with these resources will be collected catalogued and included in technical reports available to researchers for use on future projects, thereby reducing the cumulative impact to below a level of significance. Mitigation has been included in Section V of this MND to reduce impacts to below a level of significance. As such, project implementation would not result in substantial adverse impact to human beings.

INITIAL STUDY CHECKLIST

REFERENCES

I. AESTHETICS / NEIGHBORHOOD CHARACTER

- City of San Diego General Plan.
- Community Plan.
- Local Coastal Plan.

II. AGRICULTURAL RESOURCES & FOREST RESOURCES

- City of San Diego General Plan.
- U.S. Department of Agriculture, Soil Survey - San Diego Area, California, Part I and II, 1973.
- California Agricultural Land Evaluation and Site Assessment Model (1997)
- Site Specific Report:

III. AIR QUALITY

- California Clean Air Act Guidelines (Indirect Source Control Programs) 1990.
- Regional Air Quality Strategies (RAQS) - APCD.
- Site Specific Report:

IV. BIOLOGY

- City of San Diego, Multiple Species Conservation Program (MSCP), Subarea Plan, 1997
- City of San Diego, MSCP, "Vegetation Communities with Sensitive Species and Vernal Pools" Maps, 1996.
- City of San Diego, MSCP, "Multiple Habitat Planning Area" maps, 1997.
- Community Plan - Resource Element.
- California Department of Fish and Game, California Natural Diversity Database, "State and Federally-listed Endangered, Threatened, and Rare Plants of California," January 2001.
- California Department of Fish & Game, California Natural Diversity Database, "State and Federally-listed Endangered and Threatened Animals of California," January 2001.
- City of San Diego Land Development Code Biology Guidelines.
- Site Specific Report:

V. CULTURAL RESOURCES (INCLUDES HISTORICAL RESOURCES)

- City of San Diego Historical Resources Guidelines.
- City of San Diego Archaeology Library.
- Historical Resources Board List.
- Community Historical Survey:
- Site Specific Report: "The San Diego Police Pistol Range," prepared by Vonn Marie May, July 2005 and subsequently amended October 2010.

VI. GEOLOGY/SOILS

- City of San Diego Seismic Safety Study.
- U.S. Department of Agriculture Soil Survey - San Diego Area, California, Part I and II, December 1973 and Part III, 1975.
- Site Specific Report: A Geotechnical Evaluation, prepared by Ninyo and Moore, dated May 29, 2001

VII. GREENHOUSE GAS EMISSIONS

- Site Specific Report: City of San Diego Engineering and Capital Projects GHG Urbemis Model (2007 9.2.4) for the San Diego Police Pistol Range Project.

VIII. HAZARDS AND HAZARDOUS MATERIALS

- San Diego County Hazardous Materials Environmental Assessment Listing
- San Diego County Hazardous Materials Management Division
- FAA Determination
- State Assessment and Mitigation, Unauthorized Release Listing, Public Use Authorized.
- Airport Land Use Compatibility Plan.
- Site Specific Report: Phase I Environmental site Assessment, prepared by Ninyo & Moore, dated February 7, 2002.

IX. HYDROLOGY/WATER QUALITY

- Flood Insurance Rate Map (FIRM).
- Federal Emergency Management Agency (FEMA), National Flood Insurance Program - Flood Boundary and Floodway Map.
- Clean Water Act Section 303(b) list, http://www.swrcb.ca.gov/tmdl/303d_lists.html.

Site Specific Report: Water Quality Technical Report, prepared by Nasland Engineering, dated October 14, 2010. Preliminary Hydrology Study, prepared by Nasland Engineering dated October 14, 2010

X. LAND USE AND PLANNING

City of San Diego General Plan.

Community Plan. Mid-City Community Plan and the Chollas Creek Enhancement Plan (CCEP).

Airport Land Use Compatibility Plan: Lindberg Field

City of San Diego Zoning Maps

FAA Determination

XI. MINERAL RESOURCES

California Department of Conservation - Division of Mines and Geology, Mineral Land Classification.

Division of Mines and Geology, Special Report 153 - Significant Resources Maps.

California Geological Survey - SMARA Mineral Land Classification Maps.

Site Specific Report:

XII. NOISE

Community Plan

San Diego International Airport Master Plan CNEL Maps.

MCAS Miramar ACLUP

Brown Field Airport Master Plan CNEL Maps.

Montgomery Field CNEL Maps.

San Diego Association of Governments - San Diego Regional Average Weekday Traffic Volumes.

San Diego Metropolitan Area Average Weekday Traffic Volume Maps, SANDAG.

City of San Diego General Plan.

Site Specific Report:

XIII. PALEONTOLOGICAL RESOURCES

City of San Diego Paleontological Guidelines.

Deméré, Thomas A., and Stephen L. Walsh, "Paleontological Resources City of San Diego," Department of Paleontology San Diego Natural History Museum, 1996.

Kennedy, Michael P., and Gary L. Peterson, "Geology of the San Diego Metropolitan Area, California. Del Mar, La Jolla, Point Loma, La Mesa, Poway, and SW 1/4 Escondido 7 1/2 Minute Quadrangles," California Division of Mines and Geology Bulletin 200, Sacramento, 1975.

Kennedy, Michael P., and Siang S. Tan, "Geology of National City, Imperial Beach and Otay Mesa Quadrangles, Southern San Diego Metropolitan Area, California," Map Sheet 29, 1977.
 Site Specific Report:

XIV. POPULATION / HOUSING

City of San Diego General Plan.
 Community Plan.
 Series 11 Population Forecasts, SANDAG.
 Other:

XV. PUBLIC SERVICES

City of San Diego General Plan.
 Community Plan.

XVI. RECREATIONAL RESOURCES

City of San Diego General Plan.
 Community Plan.
 Department of Park and Recreation
 City of San Diego - San Diego Regional Bicycling Map
 Additional Resources:

XVII. TRANSPORTATION / CIRCULATION

City of San Diego General Plan.
 Community Plan.
 San Diego Metropolitan Area Average Weekday Traffic Volume Maps, SANDAG.
 San Diego Region Weekday Traffic Volumes, SANDAG.
 Site Specific Report:

XVIII. UTILITIES

X City of San Diego General Plan.

X Community Plan.

___ Site Specific Report:

XIX. WATER CONSERVATION

___ City of San Diego General Plan.

___ Community Plan.

___ Sunset Magazine, New Western Garden Book. Rev. ed. Menlo Park, CA: Sunset Magazine.

___ Site Specific Report:

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 92101-2422

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/WBS No.: B-10012.02.06/S-10018.02.06 PROJECT TITLE: San Diego Police Department (SDPD) Firing Range Tenant Improvements

PROJECT LOCATION-SPECIFIC: Project is located at 4002 Federal Boulevard, San Diego, CA 92105 in the Mid-City/City Heights Community Planning Area (Council District 9).

PROJECT LOCATION-CITY/COUNTY: San Diego/San Diego

DESCRIPTION OF NATURE, PURPOSE, AND BENEFICIARIES OF PROJECT: This project proposes tenant improvements for the clubhouse and the staff office. Improvements for the clubhouse include removal and replacement of: two (2) entrance doors (frames and sidelights); one (1) interior door; cabinetry, counter and sink in kitchen; two (2) ceiling-hung space heaters; all interior light fixtures; all restroom fixtures and accessories; as well as a new sloped walkway to existing platform, installation of new audio/visual equipment for training, and new floor and wall finishes. Improvements to the staff office building include: removal and replacement of all interior light fixtures and electrical panels; as well as new floor, wall and ceiling finishes and modifications to cabinetry. The facility is designated by the Historic Resources Board (HRB) as "Site #726-San Diego Police Pistol Range." Historic staff reviewed and found the project to be in conformance with the City's Historic Resources Regulations and the United States Secretary of Interior's Standards and Guidelines for Rehabilitation of Historic Buildings.

NAME OF PUBLIC AGENCY APPROVING PROJECT: San Diego/San Diego

NAME OF PERSON OR AGENCY CARRYING OUT PROJECT: City of San Diego, Public Works Contact: George Freiha; 525 B Street, Suite 750, San Diego, CA 92101; Ph: (619) 533-7449

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), 15303 (New Construction or Conversion of Small Structures), and 15304 (Minor Alterations to Land)
- STATUTORY EXEMPTIONS:

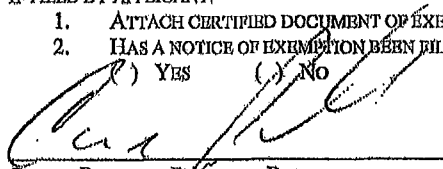
REASONS WHY PROJECT IS EXEMPT: The City of San Diego conducted an environmental review which determined that the project meets the categorical exemption criteria set forth in CEQA State Guidelines, Sections 15301(a and d) which allows for minor alterations to existing public structures, facilities, mechanical equipment or topographical features, involving negligible or no expansion of use including interior and exterior, repairs or rehabilitation of buildings or structures, 15303(c) which allows for new construction or conversion of small structures within the existing buildings and minor exterior improvements where the facility will continue to be used for the same purpose and capacity; 15304(a) which allows minor alteration to the condition of land which do not involve removal of healthy, mature, scenic trees where the improvements for the new sloped walkway will be completed on land with a slope of less than 10 percent; and where the exceptions listed in Section 15300.2 would not apply.

LEAD AGENCY CONTACT PERSON: JAMES ARNHART, SENIOR PLANNER

TELEPHONE: (619) 533-5275

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


CARRIE PURCELL, PRINCIPAL PLANNER

12/23/15
DATE

CHECK ONE:
 SIGNED BY LEAD AGENCY
 SIGNED BY APPLICANT

DATE RECEIVED FOR FILING AT OPR:

Revised December 24, 2015 JA

APPENDIX B
FIRE HYDRANT METER PROGRAM

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 1 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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.)

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 2 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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.

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 3 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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.

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 4 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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.

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 5 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 6 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 7 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 8 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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.

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 9 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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.

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 10 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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).

**Larry Gardner
Water Department Director**

- Tabs: 1. Fire Hydrant Meter Application
2. Construction & Maintenance Related Activities With No Return To Sewer
3. Notice of Discontinuation of Service

APPENDIX

Administering Division: Customer Support Division

Subject Index: Construction Meters
Fire Hydrant
Fire Hydrant Meter Program
Meters, Floating or Vehicle Mounted
Mobile Meter
Program, Fire Hydrant Meter

Distribution: DI Manual Holders



Application for Fire Hydrant Meter (EXHIBIT A)

(For Office Use Only)

NS REQ	FAC#
DATE	BY

METER SHOP (619) 527-7449

Meter Information

Application Date	Requested Install Date:
------------------	-------------------------

Fire Hydrant Location: (Attach Detailed Map//Thomas Bros. Map Location or Construction drawing.) <u>Zip:</u>	<u>T.B.</u>	<u>G.B. (CITY USE)</u>
Specific Use of Water:		
Any Return to Sewer or Storm Drain, if so, explain:		
Estimated Duration of Meter Use: <input type="text"/>	<input type="checkbox"/>	Check Box if Reclaimed Water

Company Information

Company Name:			
Mailing Address:			
City:	State:	Zip:	Phone: ()
*Business license#		*Contractor license#	
A Copy of the Contractor's license OR Business License is required at the time of meter issuance.			
Name and Title of Billing Agent: <small>(PERSON IN ACCOUNTS PAYABLE)</small>		Phone: ()	
Site Contact Name and Title:		Phone: ()	
Responsible Party Name:		Title:	
Cal ID#		Phone: ()	
Signature:		Date:	
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			

Fire Hydrant Meter Removal Request	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: \$ 936.00	Fees Amount: \$ 62.00
Meter Serial #		Meter Size: 05	Meter Make and Style: 6-7
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

City of San Diego, Field Engineering Div., 9485 Aero Drive, SD CA 92123		Contractor's Name:	
Project Name:		Contractor's Address:	
Work Order No or Job Order No.			
City Purchase Order No.		Contractor's Phone #:	Invoice No.
Resident Engineer (RE):		Contractor's fax #:	Invoice Date:
RE Phone#:	Fax#:	Contact Name:	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%	\$ -
9					\$ -		\$ -		\$ -	0.00%	\$ -
10					\$ -		\$ -		\$ -	0.00%	\$ -
11					\$ -		\$ -		\$ -	0.00%	\$ -
12					\$ -		\$ -		\$ -	0.00%	\$ -
13					\$ -		\$ -		\$ -	0.00%	\$ -
14					\$ -		\$ -		\$ -	0.00%	\$ -
15					\$ -		\$ -		\$ -	0.00%	\$ -
16					\$ -		\$ -		\$ -	0.00%	\$ -
17	Field Orders				\$ -		\$ -		\$ -	0.00%	\$ -
18					\$ -		\$ -		\$ -	0.00%	\$ -
CHANGE ORDER No.					\$ -		\$ -		\$ -	0.00%	\$ -
Total Authorized Amount (including approved Change Order)					\$ -		\$ -		\$ -		\$ -
										Total Billed	\$ -

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	\$ -
G. Payment Due Less Retention	\$0.00
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
Add'l Amt to Withhold in PO/Transfer in Escrow:	\$0.00
Amt to Release to Contractor from PO/Escrow:	

Contractor Signature and Date: _____

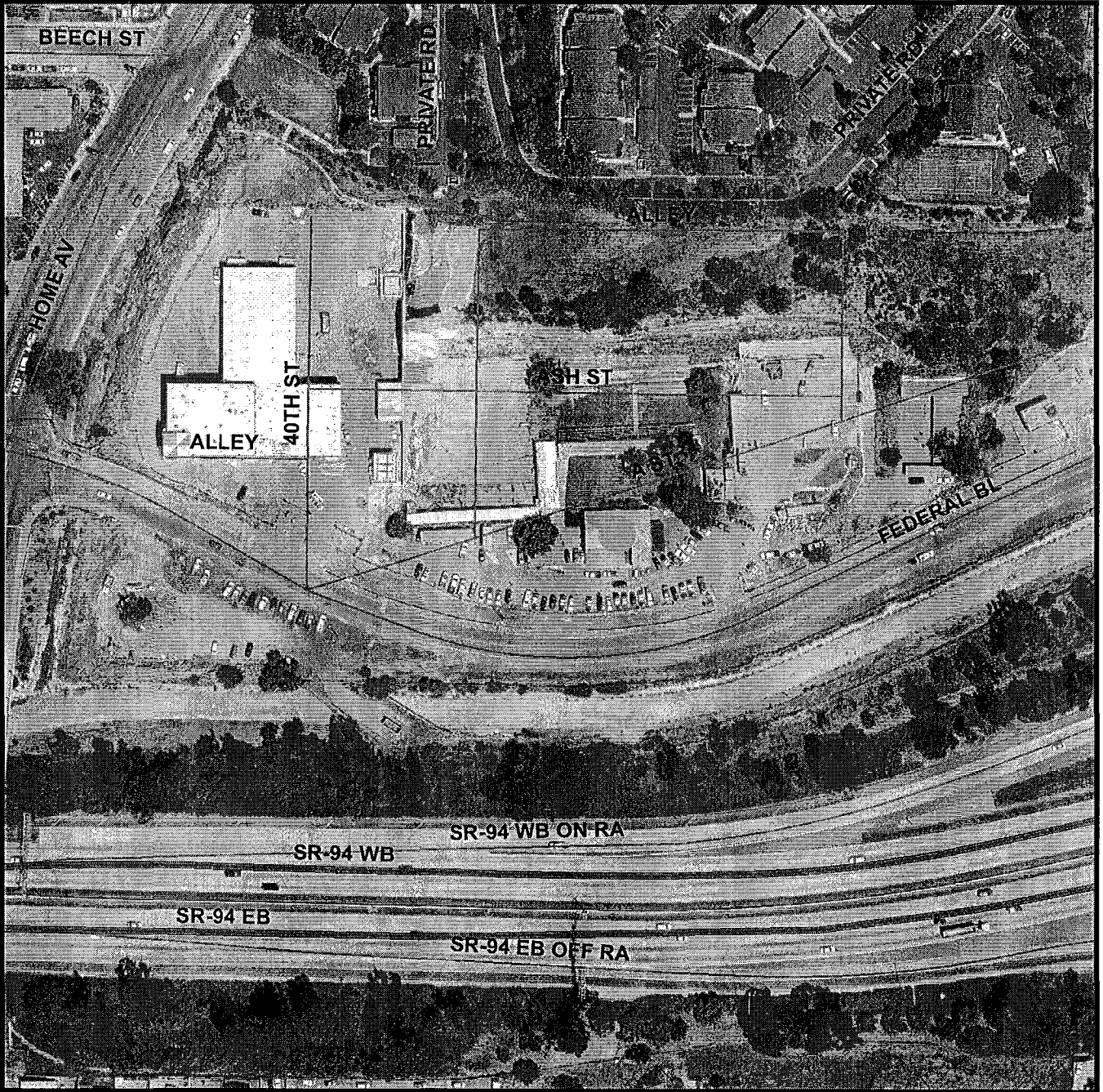
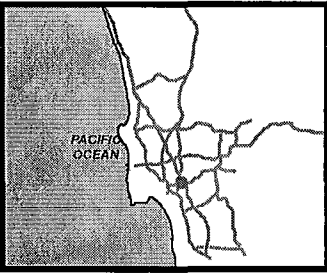
APPENDIX E
LOCATION MAP

SDPD FIRING RANGE RECAPITALIZATION & TENANT IMPROVEMENT PROJECT

SENIOR ENGINEER
 GEORGE FREIHA
 619-533-7449

CONSTRUCTION PROJECT
 INFORMATION LINE
 619-533-4207

PROJECT MANAGER
 MICHELLE GARCIA-QUILICO
 619-533-6635



Legend

- 4004-4008 Federal Boulevard
 SDPD Firing Range Recapitalization &
 Tenant Improvement Project

No Scale



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APPENDIX F
LEAD AND ASBESTOS ABATEMENT SPECIFICATIONS



THE CITY OF SAN DIEGO



**LEAD CONTAINING MATERIALS AND UNIVERSAL WASTE
ABATEMENT SPECIFICATION
for
SDPD FIRING RANGE BUILDINGS
CLEARANCE ACTIVITY
MAY 4, 2016**

Prepared by:

William B. Blondet

Asbestos & Lead Program Inspector

CDPH IA/PM License# 5464

Reviewed by:

Michael Anderson

Asbestos & Lead Program Inspector

CDPH IA/PM License# 17780

City of San Diego
Environmental Services Department
Disposal & Environmental Protection
Asbestos & Lead Management Program
9601 Ridgehaven Court, Ste 320
San Diego, CA 92123
Tel: (858) 492-5086
Fax: (858) 492-5089

I.	GENERAL REQUIREMENTS	3
A.	DESCRIPTION OF WORK.....	3
B.	CONTRACTOR USE OF THE PREMISES.....	3
C.	PROJECT COORDINATION	3
D.	PROJECT SUBMITTALS	4
E.	SCHEDULES AND REPORTS	7
F.	PRODUCT DATA	7
G.	PROJECT CLOSE-OUT.....	8
II.	DEFINITIONS	8
III.	SITE WORK	11
A.	INTRODUCTION	11
B.	BACKGROUND INFORMATION.....	11
C.	GENERAL INFORMATION	11
D.	PROJECT ADMINISTRATION.....	12
E.	SPECIAL REPORTS.....	12
F.	COMPLIANCE WITH CODES AND REGULATIONS	12
G.	PERMITS AND LICENSES.....	14
H.	HEALTH AND SAFETY	15
I.	WORK AREA PROCEDURES	18
J.	REMOVAL OF LEAD CONTAINING MATERIALS AND UNIVERSAL WASTE.....	19
K.	CLEANING	19
L.	DECONTAMINATION PROCEDURE.....	20
M.	CLEARANCE	20
N.	TRANSPORTATION AND DISPOSAL	21
	APPENDIX A	23
	CERTIFICATE OF WORKER'S ACKNOWLEDGMENT	23
	APPENDIX B.....	24
	CERTIFICATION OF VISUAL INSPECTION	24
	APPENDIX C.....	25
	SUMMARY OF LEAD CONTAINING MATERIALS	25
	SUMMARY OF UNIVERSAL WASTE.....	27

I. GENERAL REQUIREMENTS

A. DESCRIPTION OF WORK

ABATEMENT CONTRACTOR shall supply all labor, transportation, material, apparatus, and equipment for the removal, and disposal of lead containing materials and universal waste to be impacted as a result of this project, as identified in Appendix C of this section.

ABATEMENT CONTRACTOR shall be responsible for ensuring the building will not be contaminated with lead containing materials or universal waste during work and shall be responsible for any clean-up determined necessary by City of San Diego's PROJECT MONITOR.

Before submitting his/her bid, the ABATEMENT CONTRACTOR shall visit the project site and verify the location of the lead containing materials and universal waste that will be removed under the terms and conditions of the contract and this specification.

All waste collected must be stored in sealable drum containers (not in bags).

Abatement work shall be performed within agreed upon hours submitted prior to project start which will not include designated City holidays.

Before the beginning of abatement work the ABATEMENT CONTRACTOR shall hold a safety construction meeting with all abatement supervisors, workers, and other contractors on-site that provides an overview of the accepted work plan, decontamination procedures specific to this project (decontamination procedures shall be on paper with copies for all present), and disposal plan for this project. Meeting shall include the PROJECT MONITOR and any other designated City representative.

B. CONTRACTOR USE OF THE PREMISES

All site rules and regulations affecting the work should be complied with while engaged in project activities. The existing building should be maintained in a safe condition throughout the abatement activities. The ABATEMENT CONTRACTOR will be responsible for adhering to all applicable building codes and fire safety requirements.

All public areas will be kept free of accumulated waste, materials, rubbish, and debris.

C. PROJECT COORDINATION

It will be the responsibility of the ABATEMENT CONTRACTOR to coordinate all site activities with the City's Asbestos & Lead Management Program's (ALMP) PROJECT MONITOR including any meetings, surveys, special reports, and site usage limitations.

D. PROJECT SUBMITTALS

The ABATEMENT CONTRACTOR shall not commence any work until approval has been given from the City. The ABATEMENT CONTRACTOR shall submit the following at least 60 days prior to commencement of any lead and universal waste abatement activities:

Lead and Universal Waste Abatement Work Plan:

- a) Submit a detailed job-specific plan that includes:
 - (1) The procedures proposed to comply with the requirements of this specification and all applicable regulations.
 - (2) Detailed drawings that identify the location, size, layout and details of the Work Areas, any equipment, disposal storage, restrooms, and worker decontamination facilities.
 - (3) The sequencing of abatement work and the interface of trades involved in the performance of work. Provide a time line that details each major phase of work activity and anticipated time it will occur.
 - (4) The methods to be used to assure the safety of occupants and visitors to the site.
 - (5) A description of methods to be used to control dispersion of hazardous materials to the interior and exterior of the building.
 - (6) The method of removal to minimize dust generation in the Work Area.
- b) Work site coordination submittals including:
 - (1) Contingency and Spill Plan: Prepare a contingency plan for emergencies including fire, accident, power failure, or any other event that may require modification or abridgement of decontamination or Work Area isolation procedures. Include in plan specific procedures for decontamination or Work Area isolation. Plan should be specific for all types of hazardous materials or situations specific to this work site. Note that nothing in this specification should impede safe exiting or providing of adequate medical attention in the event of an emergency.
 - (2) Telephone numbers and locations of emergency services including but not limited to fire, ambulance, doctor, hospital, police, power company, telephone company.

Notifications:

- c) Prior to any abatement activities the ABATEMENT CONTRACTOR must submit a CDPH Form 8551 (Abatement of Lead Hazards Notification) to the Compliance and Enforcement Unit of the CLPPB. The Form

8551 must be posted at the entrances to the property at least 5 days prior and during abatement activities.

- d) Submit Cal/OSHA pre-job notification for lead-related construction work per Title 8 CCR 1532.1 subsection (p), "Lead-Work Pre-Job Notification".
- e) Permits, notifications, and licenses needed to perform work (including hazardous waste hauler's registration)
- f) Notify emergency service agencies including fire, ambulance, police or other agency that may service the abatement work site in case of an emergency. Notification is to include methods of entering Work Area, emergency entry and exit locations, modifications to fire notification or fire-fighting equipment, and other information needed by agencies providing emergency services.
- g) Notifications of Emergency: Any individual at the job site may notify emergency service agencies if necessary without effect on this contract or the Contract Sum.
- h) Provide submittal identifying person responsible for responding to project site emergencies twenty-four hours a day, seven days a week.

ABATEMENT CONTRACTOR qualifications and personnel information submittals that include but are not limited to:

- i) Provide all staff names, certifications, and experience. Identify their duties and responsibilities on this project. ABATEMENT CONTRACTOR shall have the following minimum levels of qualified supervision on the project site:
 - (1) General Superintendent: Provide a full-time General Superintendent who is experienced in administration and supervision of lead abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc. This person is the ABATEMENT CONTRACTOR's representative responsible for compliance with all applicable federal, state and local regulations and guidelines, particularly those relating to lead abatement and hazardous waste. Should, in the opinion of the OWNER, any language barrier exist between the on-site superintendent and the OWNER or PROJECT MONITOR, the ABATEMENT CONTRACTOR shall employ a qualified full-time interpreter or provide a new on-site superintendent at no additional cost to the OWNER. Shall be CDPH certified as a Lead Supervisor.
 - (2) Foreman: Provide a full time Foreman to directly supervise and direct no more than 10 lead workers. Each Foreman will act as the Competent Person for the workers the foreman is directing. The Foreman has oversight authority over the workers and reports to the General Superintendent. If there are 10 or fewer abatement workers

on the project the General Superintendent may fill the Foreman's position. Shall be CDPH certified as a Lead Supervisor.

(3) Experience and Training: The General Superintendent and foreman shall meet all the training requirements as a Supervisor in accordance with Title 17, California Code of Regulations, Division 1, Chapter 8. They shall also have experience with projects of similar types and sizes.

(4) Workers: All abatement workers shall have current certifications as a Lead Worker in accordance with Title 17, California Code of Regulations, Division 1, Chapter 8.

(5) Certificate of Worker's Acknowledgment: Submit an original signed copy of the Certificate of Worker's Acknowledgment found in Appendix A of this section, for each worker and supervisor who is to be at the job site or enter the Work Area.

- j) Identify state licensed transporter, disposal location, and associated permits for all hazardous waste.
- k) Submit respiratory protection information and air monitoring data as per the following:
 - (1) Operating Instruction: Submit complete operating and maintenance instructions for all components and systems as a whole. Submittal is to be in bound manual form suitable for field use.
 - (2) Respiratory Protection Program: Submit ABATEMENT CONTRACTOR's written respiratory protection program manual as required by 8 CCR 1531 and 5144.
 - (3) Respiratory Protection Schedule: Submit level of respiratory protection intended for each operation required by the project.
 - (4) Copies of current respirator fit test: Fit tests must be performed every 6 months.
- l) Submit doctor's report from medical examination conducted within the last 12 months as part of compliance with OSHA medical surveillance requirements for each worker who is to enter the Work Area. Submit, at a minimum, the following for each worker:
 - (1) Name and Social Security Number
 - (2) Copies of Blood Lead Levels and Zinc Protoporphyrin tests
 - (3) Physicians Written Opinion from examining physician including at a minimum the following:

(a) Whether worker has any detected medical conditions that would place the worker at an increased risk of material health impairment from exposure to lead. Any recommended limitations on the worker or on the use of personal protective equipment such as respirators.

(b) Statement that the worker has been informed by the physician of the results of the medical examination and of any medical conditions that may result from lead exposure.

- m) Submit a notarized certification, signed by an officer of the ABATEMENT CONTRACTOR firm that exposure measurements, medical surveillance, and worker training records are being kept in conformance with 8 CCR 1529.
- n) Identify the laboratory that will be performing the analysis of the personal samples and provide their accreditation. Also discuss the method by which the ABATEMENT CONTRACTOR will provide the analytical results to the PROJECT MONITOR within 24 hours of sampling completion.

Submit the following during and at the completion of the work

- o) Copies of all Waste Shipment Records
- p) Copies of all air monitoring results within 24 hours

At the end of a project, the ABATEMENT CONTRACTOR shall submit the following to the PROJECT MONITOR:

- q) Personal Air Sample Results
- r) Copies of Project Daily Logs
- s) Containment Entry/Exit Logs
- t) Waste Disposal Documentation
- u) Certificate of Visual Inspection

E. SCHEDULES AND REPORTS

Prior to each phase of project, the ABATEMENT CONTRACTOR shall provide the City with a tentative time line which outlines the project schedule. These documents will be reviewed and approved by the City prior to the commencement of work.

F. PRODUCT DATA

The ABATEMENT CONTRACTOR shall submit product information that is to be used during the abatement activities prior to commencement of work (i.e., encapsulants). General information required includes manufacturer's standard printed

recommendations for application and use, compliance with recognized standards of trade association and testing agencies, and safety data sheets (SDSs).

Polyethylene sheet

- a) A single polyethylene film in the largest sheet size possible to minimize seams, 4.0 or 6.0 mil thick as indicated, and clear, frosted, or black as indicated.
- b) Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 4.0 or 6.0 mil thick as indicated, and frosted or black as indicated.
- c) Reinforced Polyethylene Sheet: Where plastic sheet is the only separation between the Work Area and building exterior, provide translucent, nylon reinforced, laminated, flame resistant, polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 4.0 or 6.0 mil thick as indicated, frosted or black as indicated.

Tape

- d) Provide duct tape in 2" or 3" widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.

Spray adhesive

- e) Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

G. PROJECT CLOSE-OUT

Upon completion of work and prior to payment, the PROJECT MONITOR will proceed with an initial inspection of the abatement work area. A Certificate of Visual Inspection (Appendix B) will be signed by both the ABATEMENT CONTRACTOR and PROJECT MONITOR. The ABATEMENT CONTRACTOR will not be paid until the area meets the established project-specific clearance criteria and has submitted the required information.

II. DEFINITIONS

- A. **ABATEMENT:** Any set of measures designed to permanently eliminate lead based paint hazards including paint removal, building component removal, or near-permanent enclosure of lead based paint hazards.
- B. **ABATEMENT CONTRACTOR:** The designated sub-contractor performing the required abatement work outlined in this specification.

- C. ACCREDITED or ACCREDITATION (when referring to a person or laboratory): A person or laboratory accredited in accordance with section 206 of Title II of the Toxic Substances Control Act (TSCA).
- D. ACTION LEVEL: An 8-hour time weighted average (TWA) lead airborne concentration of 30 µg/m³.
- E. AIR MONITORING: The process of measuring the lead content of a specific volume of air.
- F. AUTHORIZED VISITOR: The Owner, the Owner's Representative, testing lab personnel, the Architect/Engineer, emergency personnel or a representative of any federal, state and local regulatory or other agency having authority over the project.
- G. BARRIER: Any surface that seals off the work area to inhibit the movement of dust.
- H. BREATHING ZONE: A hemisphere forward of the shoulders with a radius of approximately 6 to 9 inches.
- I. CONTAINMENT: A process for protecting both workers and environment by controlling exposures to lead dust and debris created during abatement.
- J. CONTAMINATE: Refers to lead-containing dust/debris.
- K. DEMOLITION: The wrecking or taking out of any building component, system, finish or assembly of a facility together with any related handling operations.
- L. DISPOSAL BAG: A properly labeled 6 mil thick leak tight plastic bags used for transporting lead waste from work site to disposal site.
- M. ENCAPSULATION: Any covering or coating that acts as a barrier between lead based paint and the environment and that relies on adhesion and the integrity of the existing paint bonds between layers and with the substrate for its durability.
- N. ENCLOSURE: The use of rigid durable construction materials that are mechanically fastened to the substrate in order to act as a barrier between lead based paint and the living or work space.
- O. HEPA FILTER: A high Efficiency Particulate Air (HEPA) filter capable of trapping and retaining 99.97% of all mono-dispersed particles greater than 0.3 microns in diameter or larger.
- P. HEPA FILTER VACUUM COLLECTION EQUIPMENT (or vacuum cleaner): High efficiency particulate air filtered vacuum collection equipment with a filter system capable of collecting and retaining lead.
- Q. HIGH PHOSPHATE DETERGENT: Detergent which contains at least 5% tri sodium phosphate.
- R. LEAD: Means metallic lead, all inorganic lead compounds, and organic lead soaps.

- S. LEAD-BASED PAINT (LBP): For purposes of this project, LBP refers to the materials identified in these specifications as having paint or coatings that contains lead.
- T. LEAD-RELATED CONSTRUCTION SUPERVISOR: Means an individual who is responsible for implementing lead-related construction work and enforcing work practices. This person must have received certification as a lead-related construction Supervisor.
- U. LEAD-RELATED CONSTRUCTION WORK: Means any construction, alteration, painting, demolition, salvage, renovation, repair, or maintenance of a building, including preparation and cleanup, by disturbing lead-containing material that may result in exposure of individuals to lead.
- V. LEAD-RELATED CONSTRUCTION WORKER: Means any individual who performs lead-related construction work in a building under the direction of lead-related construction Supervisor, and has received certification as a lead-related construction Worker.
- W. OWNER: Refers to the City of San Diego
- X. PAINT FILM STABILIZATION: The process of using wet scraping, priming, and repainting a deteriorated lead based paint film in a dwelling including clean-up and clearance.
- Y. PAINT REMOVAL: A strategy of abatement which entails removing lead based paint from surfaces of components using chemicals, heat guns below 11000F, and certain contained abrasive methods but not open flame burning, open abrasive blasting, sandblasting, water blasting, extensive dry scraping, or methylene chloride removers.
- Z. PERMISSIBLE EXPOSURE LIMIT (PEL): An 8-hour TWA lead airborne concentration of 50 µg/m³.
- AA. PERSONAL MONITORING: Sampling of contaminant concentrations within the breathing zone of an employee.
- BB. PROJECT MONITOR: City of San Diego Asbestos & Lead Management Program staff or their designated consultant.
- CC. PROTECTION FACTOR: The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.
- DD. RRP: EPA's Renovation, Repair and Painting certification that requires contractor training and lead-safe work practices when performing renovation type activities in housing built prior to 1978.

- EE. REPLACEMENT: A strategy of abatement which entails the removal of components such as windows, doors, and trim that have lead painted surfaces and installing new components free of lead paint.
- FF. RESPIRATOR: A device designed to protect the wearer from the inhalation of harmful contaminants.
- GG. TESTING LABORATORIES: A "testing laboratory" is an entity engaged to perform specific inspections or tests, either at the project site or elsewhere, and to report on, and, if required, to interpret results of, those inspections or tests.
- HH. TIME-WEIGHTED AVERAGE (TWA): The average concentration of a contaminant in air during a specific time period.
- II. TRIGGER TASKS: Work tasks that require an employer to assume specified employee exposures until the employer has performed an exposure assessment [see T8CCr, 1532.1 (d) (2)].
- JJ. UNIVERSAL WASTE: Hazardous wastes including but not limited to: fluorescent lamps, mercury thermostats, and other mercury containing equipment.
- KK. WET CLEANING: The process of eliminating lead contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils which have been dampened with amended water or diluted removal encapsulant and afterwards thoroughly decontaminated or disposed of appropriately.
- LL. WORK AREA: The area where abatement work operations are performed which is defined and/or isolated to prevent the spread of contamination, and entry by unauthorized personnel.

III. SITE WORK

A. INTRODUCTION

This portion of the specification describes procedures and protocols for abatement activities. The protocols/procedures described hereafter are in accordance with federal/state/local requirements. In the absence of these requirements, the procedure/protocols are based on current industry standards.

B. BACKGROUND INFORMATION

Sampling of building materials has been performed by inspectors from the City's Asbestos and Lead Management Program (ALMP) and has been provided in Appendix C of this specification.

C. GENERAL INFORMATION

Potential Hazards

The disturbance of lead containing materials and universal waste may cause exposure to workers and building occupants. All workers, supervisory personnel,

subcontractors, and consultants who will be at the job site, need to be apprised of the seriousness of the hazard and of proper work practices which must be followed to minimize exposure. The procedures and methods described herein must be followed and the ABATEMENT CONTRACTOR must comply with all applicable federal/state/local requirements.

Stop Work

If the PROJECT MONITOR presents a verbal or written stop work order, the ABATEMENT CONTRACTOR shall immediately and automatically stop all work. Recommencement of the work may not begin until authorized by the PROJECT MONITOR.

D. PROJECT ADMINISTRATION

Certified Supervisor

The ABATEMENT CONTRACTOR needs to provide a full-time lead abatement supervisor who is experienced in administration and supervision of lead abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc. This supervisor must have a current CDPH Lead Supervisor certificate. This person will act as the competent person on the job.

In addition, all employees working on the project must have current CDPH Lead Worker certification.

E. SPECIAL REPORTS

Reporting Unusual Events

When an event of unusual and significant nature occurs at the site (e.g., a spill of lead debris, failure of special equipment used to contain lead), the ABATEMENT CONTRACTOR shall prepare and submit a special report listing the chain of events, persons participating, response by Contractor's personnel, evaluation of results, and other pertinent information.

Reporting Accidents

The ABATEMENT CONTRACTOR shall prepare and submit reports of significant accidents at the subject site. Pertinent data and actions need to be recorded. In addition, response actions should comply with industry standards. For this purpose, a significant accident is defined to include events where personal injury or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury or potential environmental contamination.

F. COMPLIANCE WITH CODES AND REGULATIONS

Except to the extent that more explicit, or more stringent requirements are written directly into this Abatement Contract/Specification, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the contract

documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.

The ABATEMENT CONTRACTOR will assume full responsibility and liability for the compliance with all applicable federal/state/local regulations pertaining to work practices, protection of workers, and visitors to the site, persons occupying areas adjacent to the site, hauling, and disposal of waste. The ABATEMENT CONTRACTOR shall hold the City and its representative harmless for the ABATEMENT CONTRACTOR's failure to comply with any applicable work, hauling, disposal, safety, health, or other regulation on the part of itself, its employees, or its subcontractors, State requirements which govern lead hazard control activities or hauling and disposal of hazardous waste include, but are not limited to, the following:

- a) California Occupational Safety and Health Administration (Cal/OSHA):
 - (1) Division of Industrial Safety; Chapter 4
 - (2) 8CCR, Section 1532.1, Lead in Construction
 - (3) 8CCR, Section 5194, Hazard Communication Standard
 - (4) 8CCR, Section 1531, Construction Respiratory Protection Standard
 - (5) 8CCR, Section 1514, Construction Personal Protective Equipment
 - (6) 8CCR, Section 1509, Construction Injury Illness Prevention Program
 - (7) 8CCR, Section 6003-4, Accident Prevention Signs and Tags
 - (8) 8CCR, Section 3204, Access to Employee Exposure Medical Records
- b) California Environmental Protection Agency (Cal/EPA):
 - (1) 22CCR, Division 4.5, Environmental Health Standards for the Management of Hazardous Waste.
- c) California Department of Public Health (CDPH):
 - (1) 17CCR, Division 1, Chapter 8, Accreditation of training providers and interim certification of individuals engaged in lead-related construction work.

Federal requirements which govern lead hazard control activities or hauling and disposal of hazardous waste include, but are not limited to, the following:

- d) Federal Environmental Protection Agency (FED/EPA):
 - (1) Hazardous Waste Standards, 40 Code of Federal Regulations (CFR), Part 261
 - (2) EPA Renovate, Repair, Painting (RRP), 40 CFR 745, Subpart E.

- e) U.S. Department of Transportation (DOT):
 - (1) Hazardous Substances, 49CFR, Parts 171 through 180
- f) American National Standards Institute, Inc. (ANSI):
 - (1) Z9.2-79 Fundamentals Governing the Design and Operation of Local Exhaust
 - (2) Z88.2-80 Practices of Respiratory Protection
- g) Department of Housing and Urban Development (HUD):
 - (1) Guidelines for the Evaluation and Control of Lead Based Paint Hazards in Housing (most current draft or final copy)

In addition, the ABATEMENT CONTRACTOR must comply with any applicable regulations promulgated as a result of Title X, the Residential Lead Based Paint Hazard Reduction Act and Title IV, Lead Exposure Reduction Act.

Local requirements which govern lead hazard control activities include, but are not limited to, the following:

- h) Air Pollution Control District (APCD) - San Diego County
 - (1) APCD Rules and Regulations, Rule 51 (Public Nuisance), Rule 10-11 (permitting of equipment)
- i) San Diego Municipal Code §54.1001 etc. seq.
 - (1) Prevents, identifies and remedies lead hazards within the City of San Diego

G. PERMITS AND LICENSES

The ABATEMENT CONTRACTOR shall submit to the City in the bid submittal any permits or licenses necessary to carry out this work.

Permits

A valid Hazardous Waste Hauler registration is required for transporting any hazardous waste. Certain types of equipment require APCD permits (e.g., abrasive blasters).

Licenses

The ABATEMENT CONTRACTOR must be certified by the California Contractors State License Board. The Contractor, or its subcontractor, shall have current licenses, as

required by all applicable state or local jurisdictions for the removal, transportation, disposal, or other regulated activity relative to the work described in this plan.

H. HEALTH AND SAFETY

This section describes the equipment and procedures required for protecting workers from Lead or Universal Waste contamination and other workplace hazards. Provide worker protection as required by the most stringent OSHA and/or EPA standards applicable to the work.

Training

- a) ABATEMENT CONTRACTOR workers shall be trained in accordance with 8CCR, Section 1532.1 (lead). In addition, workers and supervisors must be lead-trained and have certification for lead-related work from the California Department of Public Health (CDPH).
- b) Workers must be provided with initial biological monitoring (blood sampling) if they are occupationally exposed on any day to lead at or above the Action Level (AL). Employees must be provided with biological monitoring and a medical examination if they are occupationally exposed to lead above the action level for more than 30 days in any consecutive 12 month period. Periodic biological monitoring and medical examinations must be performed according to the schedule and criteria specified in T8CCR, Section 1532.1(j). In addition, employees performing "trigger" tasks must be included in biological monitoring and/or medical examinations based on their assumed exposure. In the absence of specific airborne exposure data, medical surveillance will need to be provided for all workers.
- c) At a minimum, examinations shall meet all requirements as set forth in T8CCR, Section 1532.1. Furthermore, if an employee's blood levels are at or above 20µg/dl they will not be allowed to work on the project and shall be medically removed until two consecutive blood lead tests show the employee's blood lead level under 15µg/dl.
- d) In addition, evaluations of each individual's ability to work in environments capable of producing heat stress in the worker should be completed. Employees who wear respirators must be medically evaluated.

Protective clothing

- e) Coveralls: Provide disposable "full body" coveralls and disposable head covers, and require that they be worn at all times by all workers in the Work Area. Provide a sufficient number for all required changes, for all workers in the Work Area.
- f) Boots: Provide work boots with non-skid soles, and where required by OSHA, foot protection for all workers. Provide boots at no cost to workers. Do not allow boots to be removed from the Work Area for

any reason, after being contaminated with lead containing material. Thoroughly clean, decontaminate and bag boots before removing them from Work Area at the end of the work.

- g) **Hard Hats:** Provide head protection (hard hats) as required by OSHA for all workers, and provide 1 spare for use by Owner's Representative, Project Administrator, and Owner. Require hard hats to be worn at all times that work is in progress that may potentially cause head injury. Provide hard hats of the type with plastic strap suspension. Require hats to remain in the Work Area throughout the work. Thoroughly clean, decontaminate and bag hats before removing them from Work Area at the end of the work.
- h) **Goggles:** Provide eye protection (goggles) as required by OSHA for all workers involved in scraping, spraying, or any other activity which may potentially cause eye injury. Thoroughly clean, decontaminate and bag goggles before removing them from Work Area at the end of the work.
- i) **Gloves:** Provide work gloves to all workers and require that they be worn at all times in the Work Area. Do not remove gloves from Work Area and dispose of as lead contaminated waste at the end of the work.

Respirators

- j) **Air Purifying Respirators**
 - (1) **Respirator Bodies:** Provide half face or full face type respirators based upon appropriate protection factor as determined by the ABATEMENT CONTRACTORS competent person. .
 - (2) **Filter Cartridges:** Provide, at a minimum, HEPA type filters labeled with NIOSH and MSHA Certification for "Radionuclides, Radon Daughters, Dust, Fumes, Mists including Lead Containing Dusts and Mists" and color coded in accordance with ANSI Z228.2 (1980). In addition, a chemical cartridge section may be added, if required, for solvents, etc., in use. In this case, provide cartridges that have each section of the combination canister labeled with the appropriate color code and NIOSH/MSHA Certification.
 - (3) **Non permitted respirators:** Do not use single use, disposable or quarter face respirators.
 - (4) **Require that respiratory protection be used at all times when there is any possibility of disturbance of lead containing or other hazardous materials whether intentional or accidental.**
 - (5) **Require that a respirator be worn by anyone in a Work Area at all times, regardless of activity, during a period that starts with any**

operation which could cause airborne dust until the area has been cleared for re occupancy.

(6) Regardless of Airborne Levels: Require that the minimum level of respiratory protection used be a half face air purifying respirators with high efficiency filters.

k) Fit testing

(1) Initial Fitting: Provide initial fitting of respiratory protection during a respiratory protection course of training. Only allow an individual to use respirators for which training and fit testing has been provided.

(2) Upon Each Wearing: Require that each time an air purifying respirator is put on it be checked for fit with a positive and negative pressure fit check in accordance with the manufacturer's instructions or ANSI Z88.2 (1980).

l) Respirators, disposable coveralls, head covers, and foot covers shall be provided by the ABATEMENT CONTRACTOR for the City of San Diego's Asbestos and Lead Management Program's PROJECT MONITOR, and other authorized representatives who may inspect the job site. Provide two (2) respirators and six (6) complete coveralls and, where applicable, six (6) respirator filter changes per day.

Materials and Equipment

m) Only material and equipment that are recognized as being suitable for the intended use, by compliance with appropriate standards, may be used.

Water Service

n) The ABATEMENT CONTRACTOR will be able to obtain water services from on-site facilities. The City will designate the facilities from which water service may be obtained.

Electrical Services

o) The ABATEMENT CONTRACTOR will be able to obtain electrical services from on-site facilities. The City will designate the facilities from which electrical services may be obtained. The ABATEMENT CONTRACTOR shall provide their own electrical hook-ups, i.e. spider boxes, ground fault circuit interrupter (GFCI) etc. and installed by a licensed electrician.

p) The electrical services need to comply with the applicable NEMA, NECA, and UL standards, and governing regulations for materials and lay-out of temporary electrical services.

Sanitary Facilities

- q) The ABATEMENT CONTRACTOR shall provide sanitary facilities on-site if none have been made available by the City.

Fire Extinguisher

- r) Applicable recommendations of the National Fire Protection Association (NFPA) Standard 10, "Standard for Portable Fire Extinguishers," must be complied with by the Contractor. Fire extinguishers need to be located where they are most convenient and effective for their intended purpose, but not less than one (1) extinguisher in each work area, the equipment room, outside/work areas, and in the clean room.

First Aid

- s) The ABATEMENT CONTRACTOR will need to provide first aid supplies which should comply with the governing regulations and recognized recommendations within the construction industry.

I. WORK AREA PROCEDURES

General guidelines for performing lead hazard control activities are presented in this section and are based on procedures established by HUD for residential settings. Due to the difference between residential settings and commercial buildings, these procedures will be modified on a case-by-case basis.

Require that workers NOT eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the Work Area.

ABATEMENT CONTRACTOR shall secure work area from access by public, staff or users of the area. Accomplish this where possible, by locking doors, gates, or other means of access to the area.

Barricade fencing is required for securing an outside area from unauthorized access. Work area delineation shall occur at no less than twelve feet (12') from the radius of the work and/or building. Yellow caution tape shall not be used.

All windows, vents, mechanical systems, etc., in close proximity to the abatement area shall be sealed with plastic and tape by the ABATEMENT CONTRACTOR prior to the work beginning.

Warning signs for lead shall be posted as per 8CCR, Section 1532.1(m).

A visitor entry and exit-log, and an employee daily sign-in log will be maintained throughout the lead hazard control activities. The ABATEMENT CONTRACTOR shall

be responsible for the project site security during the operations in order to protect work efforts and equipment.

J. REMOVAL OF LEAD CONTAINING MATERIALS AND UNIVERSAL WASTE

Lead containing materials shall be adequately wetted with water or a removal encapsulant before and during removal process, to reduce dust emission.

The ABATEMENT CONTRACTOR should exercise caution in using water, as he will be solely responsible for any water damage to the facility resulting from the work.

ABATEMENT CONTRACTOR is responsible for keeping all hazardous debris within the containment area at all times throughout removal. Any interior contamination, if created, is the responsibility of the ABATEMENT CONTRACTOR to clean with no additional cost to this contract.

ABATEMENT CONTRACTOR shall ensure there is no loose debris around the Work Area during the removal and if found, ABATEMENT CONTRACTOR shall clean the area immediately.

K. CLEANING

Daily cleaning includes removing large and small debris, HEPA vacuuming horizontal surfaces, wet mopping, and then HEPA vacuuming horizontal surfaces, and possible exterior cleaning.

Final cleaning must occur no sooner than one (1) hour after lead hazard control activities are finished. All plastic should be misted, cleaned, and folded toward the center to trap any remaining dust. The order of removal should be upper plastic, the first layer of floor plastic, vent and door plastic, the second layer of floor plastic, and finally plastic separating contaminated from non-contaminated areas. Then the entire area should be cleaned using a HEPA vacuum/wet wash/HEPA vacuum cycle. This should be from ceiling to floor. Paint or otherwise seal treated surfaces with the

exception of interior floors (floors will be sealed after clearance). The Supervisor should perform an inspection for visible dust and debris.

Additional cleaning cycles may be necessary for porous surfaces, and difficult to clean surfaces (crevices). Failure to meet clearance criteria will require additional cleaning.

L. DECONTAMINATION PROCEDURE

Prior to leaving the Work Area, HEPA vacuum outer suit completely and remove, turning it inside out while doing so.

Proceed to decontamination area where the second suit is to be removed while turning it inside out.

After wiping all areas and respirator, remove respirator and wipe facial area clean. Place contaminated suits, towels, and respirator cartridges in a properly labeled waste containers.

At the completion of the project, boots, hard hats, and goggles should be decontaminated and bagged prior to removal from the Work Area.

Equipment leaving the Work Area should be HEPA vacuumed and wet wiped.

M. CLEARANCE

Clearance must be performed by a California Department of Public Health Certified Lead PROJECT MONITOR. It will not be performed by the ABATEMENT CONTRACTOR (although the ABATEMENT CONTRACTOR may perform their own clearance testing). Clearance testing must occur no sooner than one (1) hour after final cleaning. It consists of two steps; visual examination and possibly environmental sampling (dust and/or soil sampling).

a) Visual Examination for Determination of Completed Work:

(1) This is a determination that the work specified in the scope of work has been completed satisfactorily. For surfaces that are to be re-painted, it is important this examination occurs prior to the re-painting (to determine that either all the paint has been removed [abatement] or that the deteriorated paint has been stabilized [interim controls]). Next the surfaces should be examined for settled dust and debris. If dust or debris is visually noted, the ABATEMENT CONTRACTOR will be asked to re-clean prior to samples being collected.

(2) If no such dust/debris is found, the independent consultant or PROJECT MONITOR will complete a Certificate of Visual Inspection (Appendix B) for the area or for multiple areas. The Certified Supervisor will also sign this Certificate. The completed form should be submitted to the City at the end of the project.

Environmental Sampling:

- b) The number and location of dust and/or soil samples will be determined on a case-by-case basis. The clearance criterion to be used is shown in the table below:

Surface Level

(1)	Interior Floors	40 µg/ft ²
(2)	Interior Window Sills	250 µg/ft ²
(3)	Exterior Horizontal Surfaces	400 µg/ft ²
(4)	Exterior Soil*	1000 µg/ft ²
(5)	Soil in Play Areas*	400 µg/ft ²

- c) Re-cleaning, at the Contractor's expense, will be required for surfaces that do not pass clearance criteria.
- d) The cost for additional tests, which may be required as a result of samples failing to meet the release criteria, shall be paid for the Contractor. This cost shall include all costs associated with sample analysis and collection of additional samples, including Consultant fees.

* Soil may not be impacted as a part of the proposed work but if contamination occurs then levels shall be used for clearances. ABATEMENT CONTRACTOR may take background soil samples to determine the pre-existing soil conditions.

N. TRANSPORTATION AND DISPOSAL

Waste minimization

- a) The ABATEMENT CONTRACTOR is required to make all reasonable efforts to minimize the amount of hazardous waste generated from this project.

Waste characterization

- b) The ABATEMENT CONTRACTOR shall test any potential hazardous waste generated in accordance with 22 CCR Division 4.5 within ten (10) days and/or prior to the end of the project to determine if it is hazardous waste and requires disposal. All paint chips will be considered hazardous waste and do not require testing. Components with lead paint that has been stabilized shall have a hazardous waste determination made prior to sending to a landfill.

Pre-transportation requirements

- c) Any packaging used to ship hazardous waste off site such as a container, roll-off bin, tank or other device, must comply with 49 CFR Parts 173, 178, 179 and be labeled and prepared for transportation in accordance with 22 CCR Article 3.

- d) The hazardous waste label must be affixed and filled out when the first amount of hazardous waste is placed in the container. The label must include the initial accumulation date.
- e) All additional pre-transportation labeling, marking or placarding must be conducted prior to transporting off site and in accordance with 22 CCR Chapter 12, Article 3.

All containers and tanks of hazardous waste must be managed in a way which minimizes the threat of fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste to the air, soil or surface water which could threaten human health or the environment. Management techniques include containment areas capable of holding the contents of largest container within the containment area. Properly store and secure waste at all times. Do not leave hazardous waste in uncovered or unlocked trucks or dumpsters.

A hazardous waste manifest will be completed in accordance with 22 CCR Chapter 12, Article 2 for each shipment of hazardous waste leaving the work site. All waste shall leave the project site by the end of the project. Only The PROJECT MONITOR employees shall sign as the generator on manifests.

Disposal of the lead related hazardous wastes shall be by incineration unless otherwise specified by the ALMP.

APPENDIX A

CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

PROJECT NAME: _____ DATE: _____

PROJECT ADDRESS: _____

CONTRACTOR'S NAME: _____

Working with lead can be dangerous. Inhaling and ingesting lead dust can cause an increase in blood lead levels which can lead to adverse health effects such as kidney damage, elevated blood pressure or infertility.

Your employer's contract with the City for the above project requires that: You be supplied with the proper respirator and be trained in its use. You be trained in safe work practices and in the use of the equipment found on the job. You receive a medical examination. These items are to have been done at no cost to you.

RESPIRATORY PROTECTION: You must have been trained in the proper use of respirators, and informed of the type respirator to be used on the above referenced project. You must be given a copy of the written respiratory protection manual issued by your employer. You must be equipped at no cost with the respirator to be used on the above project.

TRAINING COURSE: You must be licensed by the California Department of Public Health for Lead Hazard Control and be able to provide onsite documentation of training. You should have been trained in the dangers inherent in handling lead and breathing and ingesting lead dust and in proper work procedures and personal and area protective measures. The topics covered in the course must have included the following:

- Possible routes of exposure to lead
- Health hazards associated with lead
- Respiratory protection
- Use of protective equipment
- Work practices including hands on or on the-job training
- Personal decontamination procedures
- Health and safety considerations

MEDICAL EXAMINATION: You must have had a medical examination within the past 12 months at no cost to you. This examination must have included: health history, physical examination, a blood pressure measurement, pulmonary function test and blood sample and analysis for lead.

By signing this document you are acknowledging only that the City has advised you of your rights to training and protection relative to your employer, the Contractor.

Signature: _____ Social Security No.: _____

Printed Name: _____

Witness (print): _____ Witness Signature: _____

APPENDIX B

CERTIFICATION OF VISUAL INSPECTION

Project # _____ Date: _____ Location: _____

Contractor: _____

The contractor hereby certifies that he/she has visually inspected the Work Area (all surfaces including pipes, counters, ledges, walls, ceiling and floor, behind critical barriers, sheet plastic, etc.) and has found no dust, debris or residue.

by: (Signature): _____ Date: _____

(Print Name): _____

(Company Name): _____

(Print Title): _____

CITY ALMP REPRESENTATIVE

The City ALMP Representative hereby certifies that he has accompanied the contractor on his/her visual inspection and verifies that this inspection has been thorough and to the best of his/her knowledge and belief, the contractor's certification above is a true and honest one.

by: (Signature): _____ Date: _____

(Print Name): _____

WORK AREA

Location: _____

Room: _____

Hazard Reduction Performed:

APPENDIX C

SUMMARY OF LEAD CONTAINING MATERIALS

READING	STRUCTURE	ROOM	COMPONENT	SUBSTRATE	COLOR	RESULTS	PBC	UNITS
9	Staff Bldg.	OUTSIDE	Window sill	Wood	PINK	POSITIVE	1.1	mg / cm ²
10	Staff Bldg.	OUTSIDE	Window	Wood	PINK	POSITIVE	0.5	mg / cm ²
11	Staff Bldg.	OUTSIDE	Door	Wood	PINK	POSITIVE	0.4	mg / cm ²
12	Staff Bldg.	OUTSIDE	Door frame	Wood	PINK	POSITIVE	0.4	mg / cm ²
13	Staff Bldg.	OUTSIDE	Upper trim	Wood	PINK	POSITIVE	0.5	mg / cm ²
15	Staff Bldg.	OFFICE	Wall	Concrete	BEIGE	POSITIVE	0.14	mg / cm ²
19	Staff Bldg.	OFFICE	Vault door	Metal	BROWN	POSITIVE	0.5	mg / cm ²
20	Staff Bldg.	OFFICE	Vault door frame	Metal	BROWN	POSITIVE	0.7	mg / cm ²
21	Staff Bldg.	OFFICE	Wall	Concrete	BEIGE	POSITIVE	0.14	mg / cm ²
22	Staff Bldg.	OFFICE	Door	Wood	BEIGE	POSITIVE	0.22	mg / cm ²
23	Staff Bldg.	OFFICE	Door frame	Wood	BEIGE	POSITIVE	0.29	mg / cm ²
28	Staff Bldg.	FRONT OFFICE	Window frame	Metal	BEIGE	POSITIVE	0.22	mg / cm ²
30	Range Office	OUTSIDE	Window frame	Wood	BEIGE	POSITIVE	9.7	mg / cm ²
31	Range Office	OUTSIDE	Door frame	Wood	BEIGE	POSITIVE	2.2	mg / cm ²
33	Range Office	OUTSIDE	Window	Wood	BEIGE	POSITIVE	6.4	mg / cm ²
34	Range Office	OUTSIDE	Upper trim	Wood	BEIGE	POSITIVE	3.3	mg / cm ²
36	Range Office	OUTSIDE	Door frame	Wood	BEIGE	POSITIVE	0.8	mg / cm ²
37	Range Office	OUTSIDE	Elec. closet	Wood	PINK	POSITIVE	1.8	mg / cm ²
38	Range Office	OUTSIDE	Eaves	Wood	PINK	POSITIVE	1.9	mg / cm ²
39	Range Office	OUTSIDE	Beam	Wood	PINK	POSITIVE	24	mg / cm ²
42	Range Office	INSIDE - REAR	Door frame	Metal	BEIGE	POSITIVE	2	mg / cm ²
45	Range Office	INSIDE - REAR	Wall	DRYWALL	BEIGE	POSITIVE	1.8	mg / cm ²
46	Range Office	INSIDE - REAR	Cabinet	DRYWALL	BEIGE	POSITIVE	3.5	mg / cm ²
47	Range Office	INSIDE - REAR	Cabinet	DRYWALL	BEIGE	POSITIVE	3.8	mg / cm ²

48	Range Office	INSIDE - REAR	Window sill	Wood	BEIGE	POSITIVE	0.25	mg / cm ²
50	Range Office	INSIDE - REAR	Door frame	Wood	BEIGE	POSITIVE	1.6	mg / cm ²
52	Range Office	INSIDE - REAR	Wall	Wood	BEIGE	POSITIVE	4.8	mg / cm ²
53	Range Office	INSIDE - REAR	Wall	Concrete	BEIGE	POSITIVE	0.15	mg / cm ²
56	Range Office	INSIDE - FRONT	Window frame	Metal	BEIGE	POSITIVE	5.3	mg / cm ²
57	Range Office	INSIDE - FRONT	Window frame	Wood	BEIGE	POSITIVE	6.1	mg / cm ²
58	Range Office	INSIDE - FRONT	Window	Metal	BEIGE	POSITIVE	8.4	mg / cm ²
59	Clubhouse	OUTSIDE	Window	Wood	BEIGE	POSITIVE	1.5	mg / cm ²
60	Clubhouse	OUTSIDE	Window sill	Concrete	BEIGE	POSITIVE	0.16	mg / cm ²
63	Clubhouse	OUTSIDE	Window	Wood	BEIGE	POSITIVE	9.8	mg / cm ²
68	Clubhouse	OUTSIDE	Eaves	Wood	BEIGE	POSITIVE	2.7	mg / cm ²
69	Clubhouse	OUTSIDE	Upper trim	Wood	BEIGE	POSITIVE	10.6	mg / cm ²
71	Restroom	OUTSIDE	Door	Metal	BEIGE	POSITIVE	0.6	mg / cm ²
72	Restroom	OUTSIDE	Door frame	Metal	BEIGE	POSITIVE	0.7	mg / cm ²
74	Restroom	MEN'S	Wall	Concrete	BEIGE	POSITIVE	0.14	mg / cm ²
76	Restroom	MEN'S	Window	Metal	BEIGE	POSITIVE	0.27	mg / cm ²
80	Restroom	WOMEN'S	Door	Wood	BEIGE	POSITIVE	0.5	mg / cm ²
82	Restroom	WOMEN'S	WINDOW	Metal	BEIGE	POSITIVE	0.2	mg / cm ²
84	Restroom	OUTSIDE	Eaves	Metal	BEIGE	POSITIVE	0.4	mg / cm ²
85	Restroom	OUTSIDE	Upper trim	Metal	BEIGE	POSITIVE	0.4	mg / cm ²
92	Clubhouse	HALL	Window sill	Wood	BROWN	POSITIVE	11	mg / cm ²
96	Clubhouse	KITCHEN	Cabinet	Wood	BEIGE	POSITIVE	0.15	mg / cm ²
98	Clubhouse	KITCHEN	Wall	Wood	BEIGE	POSITIVE	7.2	mg / cm ²
101	Clubhouse	KITCHEN	Window	Wood	BEIGE	POSITIVE	6.7	mg / cm ²
102	Clubhouse	KITCHEN	Door	Wood	BEIGE	POSITIVE	0.8	mg / cm ²

SUMMARY OF UNIVERSAL WASTE

MATERIAL	APPROXIMATE QUANTITY
FLOURESCENT LIGHT TUBES	None affected
PCB CONATINING LIGHT BALLASTS	None affected
MERCURY CONTAINING THERMOSTATS	None affected



THE CITY OF SAN DIEGO



ASBESTOS ABATEMENT SPECIFICATION

for

SDPD FIRING RANGE BUILDINGS

CLEARANCE ACTIVITY

May 4, 2016

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I.	GENERAL REQUIREMENTS	3
A.	DESCRIPTION OF WORK	3
B.	CONTRACTOR USE OF THE PREMISES	3
C.	PROJECT COORDINATION	3
D.	PROJECT SUBMITTALS	4
E.	SCHEDULES AND REPORTS	7
F.	PRODUCT DATA	7
G.	PROJECT CLOSE-OUT	8
II.	DEFINITIONS	8
III.	SITE WORK	10
A.	INTRODUCTION	10
B.	BACKGROUND INFORMATION	11
C.	GENERAL INFORMATION	11
D.	PROJECT ADMINISTRATION	11
E.	SPECIAL REPORTS	11
F.	COMPLIANCE WITH CODES AND REGULATIONS	12
G.	PERMITS AND LICENSES	13
H.	HEALTH AND SAFETY	13
I.	WORK AREA PROCEDURES	16
J.	REMOVAL OF ASBESTOS-CONTAINING MATERIALS	16
K.	DISPOSAL	17
L.	DECONTAMINATION PROCEDURE	17
M.	AIR MONITORING/WORK AREA CLEARANCE	17
N.	TRANSPORTATION AND DISPOSAL	18
	APPENDIX A - CERTIFICATE OF WORKER'S ACKNOWLEDGMENT	19
	APPENDIX B - CERTIFICATION OF VISUAL INSPECTION	20
	APPENDIX C - SUMMARY OF ASBESTOS RESULTS	21

I. GENERAL REQUIREMENTS

A. DESCRIPTION OF WORK

1. ABATEMENT CONTRACTOR shall supply all labor, transportation, material, apparatus, and equipment for the removal, and disposal of asbestos-containing materials (ACM) to be impacted as a result of this project, as identified in Appendix C of this section.
2. ABATEMENT CONTRACTOR shall be responsible for ensuring the building will not be contaminated with asbestos containing material during work and shall be responsible for any clean-up determined necessary by City of San Diego's PROJECT MONITOR.
3. Before submitting his/her bid, the ABATEMENT CONTRACTOR shall visit the project site and verify the location of the asbestos-containing materials that will be removed under the terms and conditions of the contract and this specification.
4. Abatement work shall be performed within agreed upon hours submitted prior to project start which will not include designated City holidays.
5. Before the beginning of the work related to asbestos abatement, ABATEMENT CONTRACTOR shall hold a safety construction meeting with all asbestos related supervisors, workers, and other contractors on-site that provides an overview of the accepted asbestos work plan, decontamination procedures specific to this project (decontamination procedures shall be on paper with copies for all present), and disposal plan for this project. Meeting shall include the PROJECT MONITOR and any other designated City representative.

B. CONTRACTOR USE OF THE PREMISES

1. All site rules and regulations affecting the work should be complied with while engaged in project activities. The existing building should be maintained in a safe condition throughout the asbestos abatement activities. The ABATEMENT CONTRACTOR will be responsible for adhering to all applicable building codes and fire safety requirements.
2. All public areas will be kept free of accumulated waste, materials, rubbish, and debris.

C. PROJECT COORDINATION

1. It will be the responsibility of the ABATEMENT CONTRACTOR to coordinate all site activities with the City's Asbestos & Lead Management Program's (ALMP) PROJECT MONITOR including any meetings, surveys, special reports, and site usage limitations.

D. PROJECT SUBMITTALS

The ABATEMENT CONTRACTOR shall not commence any work until approval has been given from the City. The ABATEMENT CONTRACTOR shall submit the following at least 60 days prior to commencement of any asbestos abatement activities:

1. Asbestos Abatement Work Plan:

a) In addition to information required in this section, Work Plan shall contain all information required under Title 8 CCR 1529. Submit a detailed job-specific plan that includes:

(1) The procedures proposed to comply with the requirements of this specification and all applicable regulations.

(2) Detailed drawings that identify the location, size, layout and details of the Work Areas, any equipment, disposal storage, restrooms, and worker decontamination facilities.

(3) The sequencing of abatement work and the interface of trades involved in the performance of work. Provide a time line that details each major phase of work activity and anticipated time it will occur.

(4) The methods to be used to assure the safety of occupants and visitors to the site.

(5) Detailed description of the methods to be employed to ensure asbestos is not released above background air levels.

(6) The method of removal to minimize asbestos dust generation in the Work Area,

b) Work site coordination submittals including:

(1) Contingency and Spill Plan: Prepare a contingency plan for emergencies including fire, accident, power failure, or any other event that may require modification or abridgement of decontamination or Work Area isolation procedures. Include in plan specific procedures for decontamination or Work Area isolation. Plan should be specific for all types of hazardous materials or situations specific to this work site. Note that nothing in this specification should impede safe exiting or providing of adequate medical attention in the event of an emergency.

(2) Telephone numbers and locations of emergency services including but not limited to fire, ambulance, doctor, hospital, police, power company, telephone company.

2. Notifications:

a) If required by regulations, submit copies of notifications made to regulatory agencies along with a copy of certified mail receipt.

b) Notify emergency service agencies including fire, ambulance, police or other agency that may service the abatement work site in case of an

emergency. Notification is to include methods of entering Work Area, emergency entry and exit locations, modifications to fire notification or fire-fighting equipment, and other information needed by agencies providing emergency services.

c) Notifications of Emergency: Any individual at the job site may notify emergency service agencies if necessary without effect on this contract or the Contract Sum.

d) Provide submittal identifying person responsible for responding to project site emergencies twenty-four hours a day, seven days a week.

3. ABATEMENT CONTRACTOR qualifications and personnel information submittals that include but are not limited to:

a) Submit a copy of the ABATEMENT CONTRACTOR's Asbestos DOSH Handling License.

b) Identify state licensed transporter, disposal location, and associated permits for all asbestos waste.

c) Provide all staff names, certifications, and experience. Identify their duties and responsibilities on this project. ABATEMENT CONTRACTOR shall have the following minimum levels of qualified supervision on the project site:

(1) General Superintendent: Provide a full-time General Superintendent who is experienced in administration and supervision of asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc. This person is the ABATEMENT CONTRACTOR's representative responsible for compliance with all applicable federal, state and local regulations and guidelines, particularly those relating to asbestos abatement and hazardous waste. Should, in the opinion of the OWNER, any language barrier exist between the on-site superintendent and the OWNER or PROJECT MONITOR, the ABATEMENT CONTRACTOR shall employ a qualified full-time interpreter or provide a new on-site superintendent at no additional cost to the OWNER. Shall be AHERA certified as asbestos supervisor.

(2) Foreman: Provide a full time Foreman to directly supervise and direct no more than 10 abatement workers. Each Foreman will act as the Competent Person as required by Title 8 CCR 1529 for the workers the foreman is directing. The Foreman has oversight authority over the workers and reports to the General Superintendent. If there are 10 or fewer abatement workers on the project the General Superintendent may fill the Foreman's position. Shall be AHERA certified as asbestos supervisor.

(3) Experience and Training: The General Superintendent and foreman shall meet all the requirements as a Competent Person as required by Title 8 CCR 1529. They shall have completed training in

EPA Asbestos Supervisor Training. They shall have experience with projects of similar types and sizes.

(4) Workers: All asbestos abatement workers shall have current EPA and OSHA asbestos abatement training.

(5) Certificate of Worker's Acknowledgment: Submit an original signed copy of the Certificate of Worker's Acknowledgment found in Appendix A of this section, for each worker and supervisor who is to be at the job site or enter the Work Area.

d) Submit respiratory protection information and air monitoring data as per the following:

(1) Operating Instruction: Submit complete operating and maintenance instructions for all components and systems as a whole. Submittal is to be in bound manual form suitable for field use.

(2) Respiratory Protection Program: Submit ABATEMENT CONTRACTOR's written respiratory protection program manual as required by Title 8 CCR 1529 and 5144.

(3) Respiratory Protection Schedule: Submit level of respiratory protection intended for each operation required by the project.

(4) Copies of current respirator fit test: Fit tests must be performed every 6 months.

e) Submit doctor's report from medical examination conducted within the last 12 months as part of compliance with OSHA medical surveillance requirements for each worker who is to enter the Work Area. Submit, at a minimum, the following for each worker:

(1) Name and Social Security Number

(2) Physicians Written Opinion from examining physician including at a minimum the following:

(a) Whether worker has any detected medical conditions that would place the worker at an increased risk of material health impairment from exposure to asbestos. Any recommended limitations on the worker or on the use of personal protective equipment such as respirators.

(b) Statement that the worker has been informed by the physician of the results of the medical examination and of any medical conditions that may result from asbestos exposure.

f) Submit a notarized certification, signed by an officer of the ABATEMENT CONTRACTOR firm that exposure measurements, medical surveillance, and worker training records are being kept in conformance with Title 8 CCR 1529.

- g) Identify the laboratory that will be performing the analysis of the personal samples and provide their accreditation. Also discuss the method by which the ABATEMENT CONTRACTOR will provide the analytical results to the PROJECT MONITOR within 24 hours of sampling completion.
- 4. Submit the following during and at the completion of the work
 - a) Copies of all Waste Shipment Records
 - b) Copies of all air monitoring results within 24 hours
- 5. At the end of a project, the ABATEMENT CONTRACTOR shall submit the following to the PROJECT MONITOR:
 - a) Personal Air Sample Results
 - b) Copies of Project Daily Logs
 - c) Containment Entry/Exit Logs
 - d) Waste Disposal Documentation
 - e) Certificate of Visual Inspection

E. SCHEDULES AND REPORTS

- 1. Prior to each phase of project, the ABATEMENT CONTRACTOR shall provide the City with a tentative time line which outlines the project schedule. These documents will be reviewed and approved by the City prior to the commencement of work.

F. PRODUCT DATA

- 1. The ABATEMENT CONTRACTOR shall submit product information that is to be used during the abatement activities prior to commencement of work (i.e., encapsulants). General information required includes manufacturer's standard printed recommendations for application and use, compliance with recognized standards of trade association and testing agencies, and safety data sheets (SDSs).
- 2. Polyethylene sheet.
 - a) A single polyethylene film in the largest sheet size possible to minimize seams, 4.0 or 6.0 mil thick as indicated, and clear, frosted, or black as indicated.
 - b) Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 4.0 or 6.0 mil thick as indicated, and frosted or black as indicated.
 - c) Reinforced Polyethylene Sheet: Where plastic sheet is the only separation between the Work Area and building exterior, provide translucent, nylon reinforced, laminated, flame resistant, polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles

and Films. Provide largest size possible to minimize seams, 4.0 or 6.0 mil thick as indicated, frosted or black as indicated.

3. Tape
 - a) Provide duct tape in 2" or 3" widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.
4. Spray adhesive
 - a) Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

G. PROJECT CLOSE-OUT

1. Upon completion of work and prior to payment, the PROJECT MONITOR will proceed with an initial inspection of the abatement work area. A Certificate of Visual Inspection (Appendix B) will be signed by both the ABATEMENT CONTRACTOR and PROJECT MONITOR. The ABATEMENT CONTRACTOR will not be paid until the area meets the established project-specific clearance criteria and has submitted the required information.

II. DEFINITIONS

- A. ABATEMENT: Any set of measures designed to permanently eliminate lead based paint hazards including paint removal, building component removal, or near-permanent enclosure of lead based paint hazards.
- B. ABATEMENT CONTRACTOR: The designated sub-contractor performing the required abatement work outlined in this specification.
- C. ACCREDITED or ACCREDITATION (when referring to a person or laboratory): A person or laboratory accredited in accordance with section 206 of Title II of the Toxic Substances Control Act (TSCA).
- D. AIR MONITORING: The process of measuring the fiber content of a specific volume of air.
- E. AMENDED WATER: Water to which a surfactant has been added to decrease the surface tension to 35 or less dynes.
- F. ASBESTOS: The asbestiform varieties of serpentinite (chrysotile), riebeckite (crocidolite), cummingtonite grunerite, anthophyllite, and actinolite tremolite. For purposes of determining respiratory and worker protection both the asbestiform and non-asbestiform varieties of the above minerals and any of these materials that have been chemically treated and/or altered shall be considered as asbestos.
- G. ASBESTOS CONTAINING MATERIAL (ACM): Any material containing more than 1% by weight of asbestos of any type or mixture of types.

- H. ASBESTOS-CONTAINING BUILDING MATERIAL (ACBM): Surfacing ACM, thermal system insulation ACM, or miscellaneous ACM that is found in or on interior structural members or other parts of a building.
- I. ASBESTOS CONTAINING WASTE MATERIAL: Any material which is or is suspected of being or any material contaminated with an asbestos containing material which is to be removed from a work area for disposal.
- J. ASBESTOS DEBRIS: Pieces of ACBM that can be identified by color, texture, or composition, or means dust, if the dust is determined by an accredited inspector to be ACM.
- K. AUTHORIZED VISITOR: The Owner, the Owner's Representative, testing lab personnel, the Architect/Engineer, emergency personnel or a representative of any federal, state and local regulatory or other agency having authority over the project.
- L. BARRIER: Any surface that seals off the work area to inhibit the movement of fibers.
- M. BREATHING ZONE: A hemisphere forward of the shoulders with a radius of approximately 6 to 9 inches.
- N. DEMOLITION: The wrecking or taking out of any building component, system, finish or assembly of a facility together with any related handling operations.
- O. DISPOSAL BAG: A properly labeled 6 mil thick leak tight plastic bags used for transporting asbestos waste from work and to disposal site.
- P. ENCAPSULANT: A penetrating encapsulant specifically designed to minimize fiber release during removal of asbestos containing materials rather than for in situ encapsulation.
- Q. ENCAPSULATION: Treatment of asbestos containing materials, with an encapsulant.
- R. ENCLOSURE: The construction of an air tight, impermeable, permanent barrier around asbestos containing material to control the release of asbestos fibers into the air.
- S. FILTER: A media component used in respirators to remove solid or liquid particles from the inspired air.
- T. FRIABLE ASBESTOS MATERIAL: Material that contains more than 1.0% asbestos by weight and that can be crumbled, pulverized, or reduced to powder by hand pressure when dry. A material can also be rendered friable via mechanical means.
- U. HEPA FILTER: A High Efficiency Particulate Air (HEPA) filter capable of trapping and retaining 99.97% of asbestos fibers greater than 0.3 microns in diameter.

- V. HEPA FILTER VACUUM COLLECTION EQUIPMENT (or vacuum cleaner): High efficiency particulate air filtered vacuum collection equipment with a filter system capable of collecting and retaining asbestos fibers. Filters should be of 99.97% efficiency for retaining fibers of 0.3 microns or larger.
- W. NEGATIVE PRESSURE RESPIRATOR: A respirator in which the air pressure inside the respiratory inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.
- X. PERSONAL MONITORING: Sampling of the asbestos fiber concentrations within the breathing zone of an employee.
- Y. PROTECTION FACTOR: The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.
- Z. PROJECT MONITOR: City of San Diego Asbestos & Lead Management Program staff or their designated consultant.
- AA. VISIBLE EMISSIONS: Any emissions containing particulate asbestos material that are visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.
- BB. WET CLEANING: The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils which have been dampened with amended water or diluted removal encapsulant and afterwards thoroughly decontaminated or disposed of as asbestos-contaminated waste.
- CC. WORK AREA: The area where asbestos-related work or removal operations are performed which is defined and/or isolated to prevent the spread of asbestos dust, fibers or debris, and entry by unauthorized personnel. Work area is a Regulated Area as defined by Title 8 CCR 1529

III. SITE WORK

A. INTRODUCTION

This portion of the specification describes procedures and protocols for asbestos abatement activities. The protocols/procedures described hereafter are in accordance with federal/state/local requirements. In the absence of these requirements, the procedure/protocols are based on current industry standards.

B. BACKGROUND INFORMATION

Sampling of building materials has been performed by inspectors from the City's Asbestos and Lead Management Program (ALMP) and has been provided in Appendix C of this specification.

C. GENERAL INFORMATION

1. Potential Asbestos Hazard

The disturbance of asbestos containing materials may cause exposure to workers and building occupants. All workers, supervisory personnel, subcontractors, and consultants who will be at the job site, need to be apprised of the seriousness of the hazard and of proper work practices which must be followed to minimize exposure. The procedures and methods described herein must be followed and the ABATEMENT CONTRACTOR must comply with all applicable federal/state/local requirements.

2. Stop Work

If the PROJECT MONITOR presents a verbal or written stop work order, the ABATEMENT CONTRACTOR shall immediately and automatically stop all work. Recommencement of the work may not begin until authorized by the PROJECT MONITOR.

D. PROJECT ADMINISTRATION

1. Certified Supervisor

The ABATEMENT CONTRACTOR needs to provide a full-time asbestos abatement supervisor who is experienced in administration and supervision of asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc. This supervisor must have completed an "Asbestos Abatement Supervision" course. This person will act as the competent person on the job.

In addition, all employees working on the project must have taken an "Asbestos Abatement Worker" course.

E. SPECIAL REPORTS

1. Reporting Unusual Events

When an event of unusual and significant nature occurs at the site (e.g., a spill of asbestos debris, failure of special equipment used to contain asbestos), the ABATEMENT CONTRACTOR shall prepare and submit a special report listing the chain of events, persons participating, response by ABATEMENT CONTRACTOR's personnel, evaluation of results, and other pertinent information.

2. Reporting Accidents

The ABATEMENT CONTRACTOR shall prepare and submit reports of significant accidents at the subject site. Pertinent data and actions need to be recorded. In addition, response actions should comply with industry standards. For this purpose, a significant accident is defined to include events where personal injury or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury or potential environmental contamination.

F. COMPLIANCE WITH CODES AND REGULATIONS

1. Except to the extent that more explicit, or more stringent requirements are written directly into this Asbestos Abatement Contract/Specification, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.
2. The ABATEMENT CONTRACTOR will assume full responsibility and liability for the compliance with all applicable federal/state/local regulations pertaining to work practices, protection of workers, and visitors to the site, persons occupying areas adjacent to the site, hauling, and disposal of waste. The ABATEMENT CONTRACTOR shall hold the City and its representative harmless for the ABATEMENT CONTRACTOR's failure to comply with any applicable work, hauling, disposal, safety, health, or other regulation on the part of itself, its employees, or its sub ABATEMENT CONTRACTORS.
3. State requirements which govern asbestos abatement activities or hauling and disposal of hazardous waste include, but are not limited to, the following:
 - a) As required, ABATEMENT CONTRACTOR shall notify all Local, State, and Federal agencies regulating standards for the removal of asbestos-containing materials, including but not limited to: Cal-OSHA, San Diego Air Pollution Control District, and U.S. Environmental Protection Agency. ABATEMENT CONTRACTOR shall provide Owner a copy of each notification and a copy of a certified mail receipt proving proper notification to all required agencies.
 - b) ABATEMENT CONTRACTOR shall be registered as an asbestos contractor before performing any asbestos related work; a licensee must also be registered with the Department of Industrial Relations, Division of Occupational Safety and Health.
 - c) Transportation of hazardous materials shall be in accordance with the State of California Title 22 and the Department of Transportation regulations.
 - d) ABATEMENT CONTRACTOR shall comply with all provisions of California Title 8, Section 5208 and Section 1529.
 - e) ABATEMENT CONTRACTOR shall be in compliance with all provisions of Title 40 CFR Part 61.
 - f) ABATEMENT CONTRACTOR shall assume full responsibility and liability for compliance with all applicable Federal, State, and local regulations

pertaining to work practices, hauling, disposal, and protection of workers, visitors to site, and persons occupying areas adjacent to the site.

G. PERMITS AND LICENSES

The ABATEMENT CONTRACTOR shall submit to the City in the bid submittal any permits or licenses necessary to carry out this work.

1. Permits

A valid Hazardous Waste Hauler registration is required for transporting any hazardous waste. Certain types of equipment require APCD permits (e.g., abrasive blasters).

2. Licenses

The ABATEMENT CONTRACTOR must be certified by the California Contractors State License Board. The ABATEMENT CONTRACTOR, or its subcontractor, shall have current licenses, as required by all applicable state or local jurisdictions for the removal, transportation, disposal, or other regulated activity relative to the work described in this plan.

H. HEALTH AND SAFETY

This section describes the equipment and procedures required for protecting workers from asbestos contamination and other workplace hazards.

1. Provide worker protection as required by the most stringent OSHA and/or EPA standards applicable to the work.

2. Training

a) All workers are to be trained, certified and accredited as required by state or local code or regulation.

b) Train all workers, in accordance with Title 8 CCR section 5208 and section 1529, regarding the dangers inherent in handling asbestos and breathing asbestos dust, proper work procedures, and personal and area protective measures.

c) Provide medical examinations for all workers who may encounter an airborne fiber level of 0.1 fibers/cc or greater for an 8 hour Time Weighted Average. In the absence of specific airborne fiber data, provide medical examinations for all workers who will enter the Work Area for any reason. Examination shall as a minimum meet requirements as set forth in Title 8 CCR 1529. In addition, provide an evaluation of the individual's ability to work in environments capable of producing heat stress in the worker.

3. Protective clothing

a) Coveralls: Provide disposable "full body" coveralls and disposable head covers, and require that they be worn at all times by all workers in the Work Area. Provide a sufficient number for all required changes, for all workers in the Work Area.

- b) Boots: Provide work boots with non-skid soles, and where required by OSHA, foot protection for all workers. Provide boots at no cost to workers. Do not allow boots to be removed from the Work Area for any reason, after being contaminated with asbestos-containing material. Thoroughly clean, decontaminate and bag boots before removing them from Work Area at the end of the work.
- c) Hard Hats: Provide head protection (hard hats) as required by OSHA for all workers, and provide 1 spare for use by Owner's Representative, Project Administrator, and Owner. Require hard hats to be worn at all times that work is in progress that may potentially cause head injury. Provide hard hats of the type with plastic strap suspension. Require hats to remain in the Work Area throughout the work. Thoroughly clean, decontaminate and bag hats before removing them from Work Area at the end of the work.
- d) Goggles: Provide eye protection (goggles) as required by OSHA for all workers involved in scraping, spraying, or any other activity which may potentially cause eye injury. Thoroughly clean, decontaminate and bag goggles before removing them from Work Area at the end of the work.
- e) Gloves: Provide work gloves to all workers and require that they be worn at all times in the Work Area. Do not remove gloves from Work Area and dispose of as asbestos-contaminated waste at the end of the work.

4. Respirators

- a) Air Purifying Respirators
 - (1) Respirator Bodies: Provide half face or full face type respirators based upon appropriate protection factor as determined by the ABATEMENT CONTRACTORS competent person.
 - (2) Filter Cartridges: Provide, at a minimum, HEPA type filters labeled with NIOSH and MSHA Certification for "Radionuclides, Radon Daughters, Dust, Fumes, Mists including Asbestos Containing Dusts and Mists" and color coded in accordance with ANSI Z228.2 (1980). In addition, a chemical cartridge section may be added, if required, for solvents, etc., in use. In this case, provide cartridges that have each section of the combination canister labeled with the appropriate color code and NIOSH/MSHA Certification.
 - (3) Non permitted respirators: Do not use single use, disposable or quarter face respirators.
 - (4) Require that respiratory protection be used at all times when there is any possibility of disturbance of asbestos containing materials whether intentional or accidental.
 - (5) Require that a respirator be worn by anyone in a Work Area at all times, regardless of activity, during a period that starts with any operation which could cause airborne fibers until the area has been cleared for re occupancy.

- (6) Regardless of Airborne Fiber Levels: Require that the minimum level of respiratory protection used be a half face air purifying respirators with high efficiency filters.
 - b) Fit testing
 - (1) Initial Fitting: Provide initial fitting of respiratory protection during a respiratory protection course of training. Only allow an individual to use respirators for which training and fit testing has been provided.
 - (2) Upon Each Wearing: Require that each time an air purifying respirator is put on it be checked for fit with a positive and negative pressure fit check in accordance with the manufacturer's instructions or ANSI Z88.2 (1980).
 - c) Respirators, disposable coveralls, head covers, and foot covers shall be provided by the ABATEMENT CONTRACTOR for the City of San Diego's Asbestos and Lead Management Program's PROJECT MONITOR, and other authorized representatives who may inspect the job site. Provide two (2) respirators and six (6) complete coveralls and, where applicable, six (6) respirator filter changes per day.
5. Materials and Equipment
 - a) Only material and equipment that are recognized as being suitable for the intended use, by compliance with appropriate standards, may be used.
 6. Water Service
 - a) The ABATEMENT CONTRACTOR will be able to obtain water services from on-site facilities. The City will designate the facilities from which water service may be obtained.
 7. Electrical Services
 - a) The ABATEMENT CONTRACTOR will be able to obtain electrical services from on-site facilities. The City will designate the facilities from which electrical services may be obtained. The ABATEMENT CONTRACTOR shall provide their own electrical hook-ups, i.e. spider boxes, ground fault circuit interrupter (GFCI) etc. and installed by a licensed electrician.
 - b) The electrical services need to comply with the applicable NEMA, NECA, and UL standards, and governing regulations for materials and lay-out of temporary electrical services.
 8. Sanitary Facilities
 - a) The ABATEMENT CONTRACTOR shall provide sanitary facilities on site, if none have been made available by the City.
 9. Fire Extinguisher
 - a) Applicable recommendations of the National Fire Protection Association (NFPA) Standard 10, "Standard for Portable Fire Extinguishers," must be complied with by the ABATEMENT CONTRACTOR. Fire extinguishers

need to be located where they are most convenient and effective for their intended purpose, but not less than one (1) extinguisher in each work area, the equipment room, outside/work areas, and in the clean room.

10. First Aid

a) The ABATEMENT CONTRACTOR will need to provide first aid supplies which should comply with the governing regulations and recognized recommendations within the construction industry.

I. WORK AREA PROCEDURES

1. Require that workers NOT eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the Work Area.
2. ABATEMENT CONTRACTOR shall secure work area from access by public, staff or users of the area. Accomplish this where possible, by locking doors, gates, or other means of access to the area.
3. Barricade fencing is required for securing an outside area from unauthorized access. Work area delineation shall occur at no less than twelve feet (12') from the radius of the work and/or building. Yellow caution tape shall not be used.
4. All windows, vents, mechanical systems, etc., in close proximity to the abatement area shall be sealed with plastic and tape by the ABATEMENT CONTRACTOR prior to the work beginning.
5. Provide warning signs at entry to work area in accordance with California Title 8, Section 1529.
6. A visitor entry and exit-log, and an employee daily sign-in log shall be maintained throughout the asbestos abatement activities. The ABATEMENT CONTRACTOR shall be responsible for the project site security during the operations in order to protect work efforts and equipment.

J. REMOVAL OF ASBESTOS-CONTAINING MATERIALS

1. Asbestos-containing materials shall be adequately wetted with either amended water or a removal encapsulant before and during removal process, to reduce fiber emission.
2. The ABATEMENT CONTRACTOR should exercise caution in using water, as he will be solely responsible for any water damage to the facility resulting from the work.
3. ABATEMENT CONTRACTOR is responsible for keeping all asbestos containing debris within the containment area at all times throughout removal. Any interior contamination, if created, is the responsibility of the ABATEMENT CONTRACTOR to clean at no additional cost to the City.
4. ABATEMENT CONTRACTOR shall ensure there is no loose debris around the Work Area during the removal and if found, ABATEMENT CONTRACTOR shall clean the area immediately.

K. DISPOSAL

1. Both non-friable and friable ACM shall be containerized immediately, secured in a locked container, be transported by state licensed hauler with manifest, and disposed of at appropriate landfill location.
2. The PROJECT MONITOR or designated representative will inspect each load and sign all waste manifests before waste leaves the site.
3. Copies of Waste Shipment Records for each load of asbestos waste material shall be given to the City.
4. Cordon off the Work Area, a safe zone around the building, and the dumpster area with barrier fencing. Yellow caution tape shall not be used.
5. Provide warning signs at Work Area access in accordance with Title 8 CCR 1529

L. DECONTAMINATION PROCEDURE

1. Prior to leaving the Work Area, HEPA vacuum outer suit completely and remove, turning it inside out while doing so.
2. Hygiene facilities such as change rooms and showers are not required to be adjacent to the operations on top of Work Areas on top of a roof, but these facilities must be provided [Title 8, Section 1529 (1)(3)]. Proceed to decontamination area where the second suit is to be removed while turning it inside out.
3. After wiping all areas and respirator, remove respirator and wipe facial area clean.
4. Place contaminated suits, towels, and respirator cartridges in a properly labeled asbestos waste bag.
5. At the completion of the project, boots, hard hats, and goggles should be decontaminated and bagged prior to removal from the Work Area.
6. Equipment leaving the Work Area should be HEPA vacuumed and wet wiped.

M. AIR MONITORING/WORK AREA CLEARANCE

1. The City's PROJECT MONITOR will provide ambient area air monitoring during all phases of the removal of asbestos-containing materials, including the interior and/or exterior of the facility.
2. During the project, personal air monitoring will be conducted by ABATEMENT CONTRACTOR to determine fiber levels. If fiber levels exceed 0.05 fibers/cc then work shall cease and not begin again until after PROJECT MONITOR approves the ABATEMENT CONTRACTOR's revised methodology which will lower fiber levels. Procedures shall be submitted in writing to the City prior to implementing these procedures. At a minimum, ABATEMENT CONTRACTOR shall provide air monitoring for every four workers. Testing of air samples will be by Phase Contrast Microscopy following NIOSH 7400 rules.
3. If any of the ambient area samples taken by the PROJECT MONITOR either inside or outside exceed .01 fibers/cc then ABATEMENT CONTRACTOR is required to

pay for the additional testing on those samples collected using transmission electron microscopy (TEM).

4. Release of the ABATEMENT CONTRACTOR from the asbestos-containing material removal phase of the contract will be determined by the PROJECT MONITOR based upon the results of visual inspection and/or clearance air sampling.

N. TRANSPORTATION AND DISPOSAL

1. Any packaging used to ship hazardous waste off site such as a container, roll-off bin, tank or other device, must comply with 49 CFR Parts 173, 178, 179 and be labeled and prepared for transportation in accordance with Title 22 CCR Article 3. The hazardous waste label must be affixed and filled out when the first amount of hazardous waste is placed in the container. The label must include the initial accumulation date.

2. All additional pre-transportation labeling, marking or placarding must be conducted prior to transporting off site and in accordance with Title 22 CCR Chapter 12, Article 3.

3. All containers and tanks of hazardous waste must be managed in a way which minimizes the threat of fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste to the air, soil or surface water which could threaten human health or the environment. Management techniques include containment areas capable of holding the contents of largest container within the containment area. Properly store and secure waste at all times. Do not leave hazardous waste in uncovered or unlocked trucks or dumpsters.

4. A hazardous waste manifest will be completed in accordance with Title 22 CCR Chapter 12, Article 2 for each shipment of hazardous waste leaving the work site. All waste shall leave the project site by the end of the project. Only The PROJECT MONITOR shall sign as the generator on manifests

APPENDIX A

CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

PROJECT NAME: _____ DATE: _____

PROJECT ADDRESS: _____

CONTRACTOR'S NAME: _____

Working with asbestos can be dangerous. Inhaling asbestos fibers has been linked with various types of cancer. If you smoke and inhale asbestos fibers the chance that you will develop lung cancer is greater than that of the non-smoking public.

Your employer's contract with the City for the above project requires that: You be supplied with the proper respirator and be trained in its use. You be trained in safe work practices and in the use of the equipment found on the job. You receive a medical examination. These things are to have been done at no cost to you.

RESPIRATORY PROTECTION: You must have been trained in the proper use of respirators, and informed of the type respirator to be used on the above referenced project. You must be given a copy of the written respiratory protection manual issued by your employer. You must be equipped at no cost with the respirator to be used on the above project.

TRAINING COURSE: You must have been trained in the dangers inherent in handling asbestos and breathing asbestos dust and in proper work procedures and personal and area protective measures. The topics covered in the course must have included the following:

- Physical characteristics of asbestos
- Health hazards associated with asbestos
- Respiratory protection
- Use of protective equipment
- Pressure Differential Systems
- Work practices including hands on or on job training
- Personal decontamination procedures
- Air monitoring, personal and area

MEDICAL EXAMINATION: You must have had a medical examination within the past 12 months at no cost to you. This examination must have included: health history, pulmonary function tests and may have included an evaluation of a chest x ray.

By signing this document you are acknowledging only that the City has advised you of your rights to training and protection relative to your employer, the ABATEMENT CONTRACTOR.

Signature: _____ Social Security No.: _____

Printed Name: _____

Witness (print): _____ Witness Signature: _____

APPENDIX B
CERTIFICATION OF VISUAL INSPECTION

Project # _____ Date: _____ Location: _____

Contractor: _____

The contractor hereby certifies that he/she has visually inspected the Work Area (all surfaces including pipes, counters, ledges, walls, ceiling and floor, behind critical barriers, sheet plastic, etc.) and has found no dust, debris or residue.

by: (Signature): _____ Date: _____

(Print Name): _____

(Company Name): _____

(Print Title): _____

CITY ALMP REPRESENTATIVE

The City ALMP Representative hereby certifies that he has accompanied the contractor on his/her visual inspection and verifies that this inspection has been thorough and to the best of his/her knowledge and belief, the contractor's certification above is a true and honest one.

by: (Signature): _____ Date: _____

(Print Name): _____

WORK AREA

Location: _____

Room: _____

Hazard Reduction Performed:

APPENDIX C

SUMMARY OF ASBESTOS RESULTS

Sample #	Material	Location	Condition	Asbestos (%)
6447-6A-FT	Brown 9" x 9" Floor Tile	Staff Building	Intact	<1% Chrysotile
6447-21A-M	Black Floor Mastics under 12" x 12" Floor Tiles	Staff Building, Storage rooms, Clubhouse, Range Master Office	Intact	5% Chrysotile
6447-10A	Penetration Mastic	Roof of Restrooms*	Intact	5% Chrysotile

*Clubhouse and Range Masters office abated in 2015



THE CITY OF SAN DIEGO



LEAD RELATED CONSTRUCTION SPECIFICATION

SECTION 13282

SDPD FIRING RANGE REFURBISHMENT

Located at
4008 Federal Blvd., San Diego CA 92102
ALMP Project # 6447

November 19, 2013

Prepared by:

Alan J. Johanns
Asbestos & Lead Program Manager
CDPH Inspector/Assessor, Project
Designer, Project Monitor #7770

Wm. Brad Blondet
Asbestos & Lead Program Inspector
CDPH Inspector/Assessor #5464

City of San Diego
Environmental Services Department
Office of Energy, Sustainability and Environmental Protection
Asbestos & Lead Management Program
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San Diego, CA 92123
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Fax: (858) 492-5089



THE CITY OF SAN DIEGO



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Table of Contents

DIVISION 01 - GENERAL REQUIREMENTS..... 3

1.1 SUMMARY SCOPE OF WORK..... 3

1.2 CONTRACTOR USE OF THE PREMISES 3

1.3 PROJECT COORDINATION 3

1.4 PROJECT SUBMITTALS..... 3

1.5 SCHEDULES AND REPORTS..... 4

1.6 PROJECT CLOSE-OUT 5

DIVISION 02 - DEFINITIONS..... 5

2.1 DEFINITIONS 5

DIVISION 03 - SITE WORK 9

3.1 INTRODUCTION..... 9

3.2 BACKGROUND INFORMATION 9

3.3 GENERAL INFORMATION 9

3.4 PROJECT ADMINISTRATION 9

3.5 SPECIAL REPORTS 9

3.6 COMPLIANCE WITH CODES AND REGULATIONS 10

3.7 PERMITS AND LICENSES..... 12

3.8 PERMITS 12

3.9 LICENSES..... 12

3.10 HEALTH AND SAFETY 12

3.11 WORKSITE PREPARATION 14

3.12 TEMPORARY FACILITIES 14

3.13 METHODS OF CONTROL 15

3.14 CLEANING..... 16

3.15 CLEARANCE 17

3.16 DISPOSAL OF HAZARDOUS WASTE 18

APPENDIX A 20

CERTIFICATE OF LEAD WORKER'S ACKNOWLEDGMENT..... 20

APPENDIX B 21

CERTIFICATION OF VISUAL INSPECTION 21

APPENDIX C 22

Asbestos and Lead Inspection Report..... 22

DIVISION 01 - GENERAL REQUIREMENTS

1.1 SUMMARY SCOPE OF WORK

- 1.1.1 Stabilize any loose and flaking paint which may be impacted as a result of the demolition. All paint chips are considered hazardous waste until a proper waste determination is performed by Contractor (see Appendix C for sampling results).
- 1.1.2 Demolish and remove designated bullet entrapment bunkers and shade awnings per drawings. All wood and metal components are considered hazardous waste until the Contractor has performed an appropriate waste characterization.
- 1.1.3 Remove designated soils per drawings and extract/sort recyclable lead from larger debris for lead recycling. All soils and debris are considered hazardous waste. All bullet lead is recyclable and must be handled with protective equipment.
- 1.1.4 Lead related activities shall be completed in a demarcated/regulated work area and access restricted to certified personnel only by use of orange construction fencing.
- 1.1.5 When doing lead related work, the dust and debris must be contained within the work area using removal methods and practices that prevent the materials from leaving the work area including storm water barriers. All waste collected must be stored in sealable labeled drum containers (not in bags).
- 1.1.6 Clean remaining asphaltic surfaces in the work area. Surfaces will be free of loose dust and debris.
- 1.1.7 Reference the attached Asbestos and Lead Inspection Report (see Appendix C).

1.2 CONTRACTOR USE OF THE PREMISES

All site rules and regulations affecting the work should be complied with while engaged in project activities. The existing structures should be maintained in a safe condition throughout the lead related construction activities. The Contractor will be responsible for adhering to all applicable building codes and fire safety requirements.

All public areas will be kept free of accumulated waste, materials, rubbish, and debris.

1.3 PROJECT COORDINATION

It will be the responsibility of the Contractor to coordinate all site activities with the City's Asbestos & Lead Management Program's Project Monitor including any meetings, surveys, special reports, and site usage limitations.

1.4 PROJECT SUBMITTALS

The contractor shall not commence any work until approval has been given from the City and should provide two weeks for the City to review prior to start. The Contractor shall submit the following prior to commencement of any lead related construction activities:

1. Method, equipment, and materials for lead related construction activities
2. Site plan indicating areas of work and lead decontamination facilities, if necessary
3. A description of methods to be used to control dispersion of dust
4. A description of methods used to assure the safety of workers and visitors to the site
5. Respiratory protection program
6. Copies of Blood Lead Levels and Zinc Protoporphyrin tests as specified in Section 3.10 of this specification. The Contractor will be required to submit training, certifications, and blood testing for any "new" employees in the project-specific package.
7. A list of employees who will be performing the work and the supervisor in charge of the project
8. Employee proof of lead training and California Department of Public Health (CDPH) Supervisor and Worker certifications
9. Submit product information that is to be used during the lead hazard control activities prior to commencement of work (i.e., encapsulant coatings). General information required on product date includes manufacturer's standard printed recommendations for application and use, compliance with recognized standards of trade association and testing agencies, and safety data sheets (SDSs).
10. Submit Cal/OSHA pre-job notification for lead-related construction work per Title 8 CCR 1532.1 subsection (p), "Lead-Work Pre-Job Notification"
11. Permits, notifications, and licenses needed to perform work (including hazardous waste hauler's registration)
12. Equipment Permits
13. The timing and projected completion date of the work.
14. Site specific contingency plan (for emergencies including fire, accident, power failure, or any other event that may require notification, decontamination, or work area isolation procedures)
15. Estimation of the type and amount of waste to be generated
16. Name of hazardous waste facilities receiving or processing the hazardous wastes
17. Any special reports

At the end of a project, the Contractor shall submit the following to the Project Monitor:

1. Personal Air Sample Results
2. Copies of Project Daily Logs
3. Containment Entry/Exit Logs
4. Waste Disposal Documentation
5. Certificate of Visual Inspection

1.5 SCHEDULES AND REPORTS

The Contractor shall provide the Project Monitor with a tentative time line which outlines the lead abatement schedule. These documents will be reviewed and approved by the City prior to the commencement of work.

1.6 PROJECT CLOSE-OUT

Upon completion of work and prior to payment, the Project Monitor will proceed with an initial inspection of the lead hazard control area. A Certificate of Visual Inspection (Appendix B) will be signed by both the Contractor and Project Monitor. The Contractor will not be paid until the area meets the established project-specific clearance criteria and has submitted the required information.

DIVISION 02 - DEFINITIONS

2.1 DEFINITIONS

- 2.1.1 Abatement: Any set of measures designed to permanently eliminate lead hazards including paint removal, building component removal, or near-permanent enclosure of lead based paint hazards.
- 2.1.2 Accredited or Accreditation: (when referring to a person or laboratory): A person or laboratory having the appropriate accreditation as described in the specific section of this specification.
- 2.1.3 Action Level: An 8-hour time weighted average (TWA) lead airborne concentration of $30 \mu\text{g}/\text{m}^3$.
- 2.1.4 Air Monitoring: The process of measuring the airborne concentrations of a contaminant.
- 2.1.5 Authorized Visitor: The Owner, the Owner's Representative, testing lab personnel, the Architect/Engineer, emergency personnel or a representative of a Federal, State and local regulatory or other agency having authority over the project.
- 2.1.6 Containment: A process for protecting both workers and environment by controlling exposures to lead dust and debris created during abatement.
- 2.1.7 Contaminate: Refers to lead-containing dust/debris.
- 2.1.8 Contractor: Refers to the Lead Hazard Control contractor.
- 2.1.9 Demolition: The wrecking or taking out of any building component, system, finish or assembly of a facility together with any related handling operations.
- 2.1.10 Deteriorated Lead-Based Paint: Any interior or exterior lead based paint that is peeling, chipping, blistering, flaking, worn, chalking, alligatoring, cracking, or otherwise separating from the substrate, or located on any surface or fixture that is damaged or deteriorated.

- 2.1.11 Encapsulation: Any covering or coating that acts as a barrier between lead based paint and the environment and that relies on adhesion and the integrity of the existing paint bonds between layers and with the substrate for its durability.
- 2.1.12 Enclosure: The use of rigid durable construction materials that are mechanically fastened to the substrate in order to act as a barrier between lead based paint and the living or work space.
- 2.1.13 Exterior Window Sill: The portion of the horizontal window sill that receives the window sash when closed, often located between the storm window and the interior window sash (sometimes called the window well). If there is no storm window, the exterior window sill consists of the portion of horizontal window trim immediately outside the window sash when closed.
- 2.1.14 Friction Surface: Any interior or exterior surface subject to abrasion or friction, such as windows or stair treads.
- 2.1.15 HEPA Filter: A high Efficiency Particulate Air (HEPA) filter capable of trapping and retaining 99.97% of all mono-dispersed particles greater than 0.3 microns in diameter or larger.
- 2.1.16 HEPA Filter Vacuum Collection Equipment (or vacuum cleaner): High efficiency particulate air filtered vacuum collection equipment with a filter system capable of collecting and retaining lead.
- 2.1.17 Impact surface: Any interior or exterior surface subject to damage by repeated impacts, such as surfaces on doors and door jambs.
- 2.1.18 Interim Controls: A set of measures designed to reduce temporarily human exposure or likely exposure to lead based paint hazards, including dust removal, paint stabilization, treatment of friction/abrasion points, and treatment of bare soil.
- 2.1.19 Interior Window Sill: The portion of the horizontal window ledge that protrudes into the interior of the room, adjacent to the window sash when closed; often called the window stool.
- 2.1.20 Lead: Means metallic lead, all inorganic lead compounds, and organic lead soaps.
- 2.1.21 Lead-Based Paint (LBP): For purposes of this project, LBP refers to the materials identified in these specifications as having paint that contains lead.
- 2.1.22 Lead-Related Construction Project Monitor: Means an individual who oversees lead-related construction work to ensure that contract plans and specifications are followed. This person must have received certification as a lead-related construction Project Monitor.
- 2.1.23 Lead-Related Construction Supervisor: Means an individual who is responsible for implementing lead-related construction work and enforcing work practices. This person must have received certification as a lead-related construction Supervisor.

- 2.1.24 Lead-Related Construction Work: Means any construction, alteration, painting, demolition, salvage, renovation, repair, or maintenance of a building, including preparation and cleanup, by disturbing lead-containing material that may result in exposure of individuals to lead.
- 2.1.25 Lead-Related Construction Worker: Means any individual who performs lead-related construction work in a building under the direction of lead-related construction Supervisor, and has received certification as a lead-related construction Worker.
- 2.1.26 Owner: Refers to the City of San Diego
- 2.1.27 Paint film stabilization: The process of using wet scraping, priming, and repainting a deteriorated lead based paint film in a dwelling including clean-up and clearance.
- 2.1.28 Paint removal: A strategy of abatement which entails removing lead based paint from surfaces of components using chemicals, heat guns below 11000F, and certain contained abrasive methods but not open flame burning, open abrasive blasting, sandblasting, water blasting, extensive dry scraping, or methylene chloride removers.
- 2.1.29 Permissible Exposure Limit (PEL): An 8-hour TWA lead airborne concentration of $50 \mu\text{g}/\text{m}^3$.
- 2.1.30 Personal Monitoring: Sampling of contaminant concentrations within the breathing zone of an employee.
- 2.1.31 Project Monitor: City of San Diego Asbestos & Lead Management Program staff or their designated consultant
- 2.1.32 Protection Factor: The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.
- 2.1.33 RRP: EPA's Renovation, Repair and Painting certification that requires contractor training and lead-safe work practices when performing renovation type activities in housing built prior to 1978.
- 2.1.34 Replacement: A strategy of abatement which entails the removal of components such as windows, doors, and trim that have lead painted surfaces and installing new components free of lead paint.
- 2.1.35 Respirator: A device designed to protect the wearer from the inhalation of harmful contaminants.
- 2.1.36 Testing Laboratories: A "testing laboratory" is an entity engaged to perform specific inspections or tests (either at the project site or elsewhere) and to report on, and, if required, to interpret results of, those inspections or tests.
- 2.1.37 Time-Weighted Average (TWA): The average concentration of a contaminant in air during a specific time period.

2.1.38 Trigger Tasks: Work tasks that require an employer to assume specified employee exposures until the employer has performed an exposure assessment [see T8CCr, 1532.1 (d) (2)].

2.1.39 Wet Cleaning: The process of eliminating lead contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils which have been dampened with amended water or diluted removal encapsulant and afterwards thoroughly decontaminated or disposed of appropriately

2.1.40 Work Area: The area where abatement work operations are performed which is defined and/or isolated to prevent the spread of contamination, and entry by unauthorized personnel.

DIVISION 03 - SITE WORK

3.1 INTRODUCTION

This portion of the specification describes procedures and protocols for lead hazard control activities. The protocols/procedures described hereafter are in accordance with federal/state/local requirements. In the absence of these requirements, the procedure/protocols are based on current industry standards.

3.2 BACKGROUND INFORMATION

Sampling has been performed by inspectors from the City's Asbestos and Lead Management Program (ALMP) and has been provided in Appendix C of this specification. Waste characterization costs are the responsibility of the contractor.

3.3 GENERAL INFORMATION

3.3.1 POTENTIAL LEAD HAZARD

The disturbance of LBP, metallic lead contaminated structures, and lead contaminated soil may cause exposure to workers and adjacent property owners. All workers, supervisory personnel, subcontractors, and consultants who will be at the job site, need to be apprised of the seriousness of the hazard and of proper work practices which must be followed to minimize exposure to lead-containing dust. The procedures and methods described herein must be followed and the Contractor must comply with all applicable federal/state/local requirements.

3.3.2 STOP WORK

If the Project Monitor presents a verbal or written stop work order, the Contractor shall immediately and automatically stop all work. Recommencement of the work may not begin until authorized by the Project Monitor.

3.4 PROJECT ADMINISTRATION

3.4.1 CERTIFIED SUPERVISOR

The Contractor needs to provide a full-time lead related construction supervisor who is experienced in administration and supervision of lead hazard control projects including work practices, protective measures for building and personnel, disposal procedures, etc. This supervisor must have completed a "Lead Related Construction Supervision" course and have certification from the California Department of Public Health (CDPH) as a "supervisor." This person will act as the competent person on the job.

In addition, all employees working on the project must have taken a "Lead Related Construction Worker" course and have obtained certification from State CDPH as a "worker".

3.5 SPECIAL REPORTS

3.5.1 Reporting Unusual Events

When an event of unusual and significant nature occurs at the site (e.g., a spill of lead debris, failure of special equipment used to contain lead), the Contractor shall prepare and submit a special report listing the chain of events, persons participating, response by Contractor's personnel, evaluation of results, and other pertinent information.

3.5.2 Reporting Accidents

The Contractor shall prepare and submit reports of significant accidents at the subject site. Pertinent data and actions need to be recorded. In addition, response actions should comply with industry standards. For this purpose, a significant accident is defined to include events where personal injury or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury or potential environmental contamination.

3.6 COMPLIANCE WITH CODES AND REGULATIONS

Except to the extent that more explicit, or more stringent requirements are written directly into this Lead Hazard Control Contract/Specification, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.

The Contractor will assume full responsibility and liability for the compliance with all applicable federal/state/local regulations pertaining to work practices, protection of workers, and visitors to the site, persons occupying areas adjacent to the site, hauling, and disposal of waste. The Contractor shall hold the City and its representative harmless for the Contractor's failure to comply with any applicable work, hauling, disposal, safety, health, or other regulation on the part of itself, its employees, or its subcontractors.

State requirements which govern lead hazard control activities or hauling and disposal of hazardous waste include, but are not limited to, the following:

California Occupational Safety and Health Administration (Cal/OSHA):

- Division of Industrial Safety; Chapter 4
- T8CCR, Section 1509, Construction Injury Illness Prevention Program
- T8CCR, Section 1510, Safety Training and Education
- T8CCR, Section 1512, First Aid
- T8CCR, Section 1513, Housekeeping
- T8CCR, Section 1531, Construction Respiratory Protection Standard
- T8CCR, Section 1514, Construction Personal Protective Equipment
- T8CCR, Section 1523, Illumination
- T8CCR, Section 1527, Washing Facilities
- T8CCR, Section 1530, Ventilation
- T8CCR, Section 1532.1, Lead in Construction
- T8CCR, Subchapter 4, Article 6 Excavations, Sections 1539 through 1547
- T8CCR, Section 1707, Hand and Power Tools
- T8CCR, Section 3204, Access to Employee Exposure Medical Records
- T8CCR, Section 5194, Hazard Communication Standard

- T8CCR, Section 6003-4, Accident Prevention Signs and Tags

California Environmental Protection Agency (Ca/EPA):

- T22CCR, Division 4.5, Environmental Health Standards for the Management of Hazardous Waste.

California Department of Public Health (CDPH):

- T17CCR, Division 1, Chapter 8, Accreditation of training providers and interim certification of individuals engaged in lead-related construction work.

Federal requirements which govern lead hazard control activities or hauling and disposal of hazardous waste include, but are not limited to, the following:

Federal Environmental Protection Agency (FED/EPA):

- Hazardous Waste Standards, 40 Code of Federal Regulations (CFR), Part 261
- EPA Renovate, Repair, Painting (RRP) Training

U.S. Department of Transportation (DOT):

- Hazardous Substances, 49CFR, Parts 171 through 180

American National Standards Institute, Inc. (ANSI):

- Z9.2-79 Fundamentals Governing the Design and Operation of Local Exhaust
- Z88.2-80 Practices of Respiratory Protection

Department of Housing and Urban Development (HUD):

- Guidelines for the Evaluation and Control of Lead Based Paint Hazards in Housing (most current draft or final copy)

In addition, the Contractor must comply with any applicable regulations promulgated as a result of Title X, the Residential Lead Based Paint Hazard Reduction Act and Title IV, Lead Exposure Reduction Act.

Local requirements which govern lead hazard control activities include, but are not limited to, the following:

Air Pollution Control District (APCD) - San Diego County

- APCD Rules and Regulations, Rule 51 (Public Nuisance), Rule 10-11 (permitting of equipment)

San Diego Municipal Code §54.1001 etc. seq.

- Prevents, identifies and remedies lead hazards within the City of San Diego

3.7 PERMITS AND LICENSES

The Contractor shall submit to the City in the bid submittal any permits or licenses necessary to carry out this work.

3.8 PERMITS

A valid Hazardous Waste Hauler registration is required for transporting any hazardous waste. Certain types of equipment require APCD permits (e.g., abrasive blasters, generators, etc.).

3.9 LICENSES

The Contractor must be certified by the California Contractors State License Board. The Contractor, or its subcontractor, shall have current licenses, as required by all applicable state or local jurisdictions for the removal, transportation, disposal, or other regulated activity relative to the work described in this plan.

3.10 HEALTH AND SAFETY

3.10.1 GENERAL WORKER PROTECTION/HEALTHY & SAFETY

This section describes the equipment and procedures required for protecting workers from lead contamination and other workplace hazards.

3.10.1.1 Worker Training

Contractor workers shall be trained in accordance with T8CCR, Section 1532.1 (lead). In addition, workers and supervisors must be lead-trained and have certification for lead-related work from the California Department of Public Health (CDPH).

3.10.1.2 Medical Surveillance

Workers must be provided with initial biological monitoring (blood sampling) if they are assigned to work with lead on this project. Periodic biological monitoring and medical examinations must be performed according to the schedule and criteria specified in T8CCR, Section 1532.1(j). In addition, employees performing "trigger" tasks must be included in biological monitoring and/or medical examinations based on their assumed exposure. In the absence of specific airborne exposure data, medical surveillance will need to be provided for all workers.

Blood testing (blood lead and zinc protoporphyrin) shall be performed within 2 weeks prior to the start of the project, at least every month during the first six months of the project and every two months thereafter. An additional blood test shall be performed within 5 days of completion of lead portion of project and/or upon termination of employment.

At a minimum, examinations shall meet all requirements as set forth in T8CCR, Section 1532.1. Furthermore, if an employee's blood levels are at or above 20µg/dl they will not be allowed to work on the project and shall be medically removed until two consecutive blood lead tests show the employee's blood lead level under 15µg/dl.

In addition, evaluations of each individual's ability to work in environments capable of

producing heat stress in the worker should be completed. Employees who wear respirators must be medically evaluated.

3.10.1.3 Personal Protective Equipment (PPE)

Workers must be provided and are required to wear the following personal protective equipment at all times when performing lead related construction work.

PPE should include:

- Disposable Clothing (With hood and boot coverings)
- Rubber Boots
- Hard Hats
- Eye Protection
- Gloves

3.10.1.4 Additional Protective Equipment

The Contractor is responsible for all other equipment; such as eye wash stations, plastic aprons, etc., as needed.

3.10.1.5 Decontamination Procedures

Decontamination procedures will be as follows:

1. Prior to leaving the regulated lead work Area, HEPA vacuum outer suit completely and remove, turning it inside out while doing so.
2. Hygiene facilities such as change rooms, showers, and hand washing facilities will be located adjacent to the regulated lead work area. Proceed to the decontamination area where the second suit is to be removed while turning it inside out.
3. After wiping all areas and respirator, remove respirator and wipe facial area clean.
4. Place contaminated suits, towels, and respirator cartridges in a properly labeled disposal bag.
5. Wash all exposed skin with soap and water.
6. At the completion of the project, boots, hard hats, and goggles should be decontaminated and bagged prior to removal from the Work Area.
7. Equipment leaving the Work Area should be HEPA vacuumed and wet wiped.

3.10.1.6 Activities within Work Area

Workers may NOT eat, drink, smoke, chew gum or tobacco in the work area. Before eating, chewing, drinking, or smoking, workers will need to follow the decontamination procedures specified, and then dress in street clothes before entering the non-work areas of the facility.

3.10.1.7 Certificate of Worker's Acknowledgment

Each worker is required to complete a certificate stating that he/she has been trained in respiratory protection and lead hazards, and is in a medical surveillance program (see Appendix A).

3.10.1.8 Worker Respiratory Protection

The Contractor must provide for the instruction and training of each worker in the proper use of respiratory protection. The Contractor shall require that each worker wear a properly fitted respirator during activities for which it is reasonable to expect exposures above the PEL and during the performance of trigger tasks until exposure have been measured and found to be less than the PEL. Respiratory protection, appropriate for the task encountered in the work place, or as required for other toxic or oxygen-deficient situations encountered, needs to be utilized. The Contractor is responsible for having a written respiratory protection program, proper selection of respirations, training, and initial and periodic (every six [6] months) fit testing of their employees.

3.10.1.9 Respiratory Protection Standards

Except to the extent that more stringent requirements are written directly into these Lead Related Construction Specifications, the following regulations and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies were bound herewith. Where there is a conflict in requirements set forth in these regulations and standards, the Contractor shall meet the more stringent requirement.

Cal/OSHA: T8CCR, Sections 1531, 1532.1, 1532.2, 5206, and 5216

ANSI: Practices for Respiratory Protection, ANSI Z88.2-1980

National Institute for Occupational Safety and Health (NIOSH)

3.11 WORKSITE PREPARATION

Unauthorized occupants and visitors will not be allowed to enter the specific area where lead hazard control activities are underway. Re-entry without protective equipment is only permitted after the area is deemed to be cleared for re-occupancy by a state certified Lead Project Monitor.

The work area shall be restricted to authorized personnel only. A list of authorized personnel shall be established prior to the start of work. Entry of unauthorized personnel into the work area shall be reported immediately to the Certified Supervisor, and the Project Monitor.

Warning signs for lead shall be posted as per T8CCR, Section 1532.1(m).

A visitor entry and exit-log, and an employee daily sign-in log will be maintained throughout the lead hazard control activities. The Contractor shall be responsible for the project site security during the operations in order to protect work efforts and equipment.

3.12 TEMPORARY FACILITIES

Temporary facilities for lead hazard control activities may comply with these specifications.

3.12.1 Materials and Equipment

Only material and equipment that are recognized as being suitable for the intended use, by compliance with appropriate standards, may be used.

3.12.2 Water Service

Water is available at the facility. The City will designate the facilities from which water service may be obtained. The Contractor must provide metering and back flow prevention if use of the public water system is permitted.

3.12.3 Electrical Services

Electricity is available at the facility. The contractor shall provide their own source of electrical hook-ups, i.e. spider boxes, ground fault circuit interrupter (GFCI) etc. and have the electrical devices installed by a licensed electrician.

The electrical services need to comply with the applicable NEMA, NECA, and UL standards, and governing regulations for materials and lay-out of temporary electrical services.

3.12.4 Sanitary Facilities

The Contractor will provide the temporary facilities for this site adjacent to the work area and maintain these facilities regularly. Documentation of the regular maintenance must be provided to the Project Monitor.

3.12.5 Fire Extinguisher

Applicable recommendations of the National Fire Protection Association (NFPA) Standard 10, "Standard for Portable Fire Extinguishers," must be complied with by the Contractor. Fire extinguishers need to be located where they are most convenient and effective for their intended purpose, but not less than one (1) extinguisher in each work area, the equipment room, outside/work areas, and in the clean room.

3.12.6 First Aid

The Contractor will need to provide first aid supplies which should comply with the governing regulations and recognized recommendations within the construction industry.

3.13 METHODS OF CONTROL

Below are the required methods for controlling lead based paint during demolition, and lead dust during excavation and lead soil extraction/sorting.

3.13.1 Exterior Regulated Area and Containment

Secure the regulated lead work area from access by public or unauthorized users of the area. Accomplish this where possible, by locking gates, or other means of access to the area.

Demarcate each exterior Regulated Area for paint removal with a sheet plastic drop sheet as described below.

Provide barricade fencing and signage (barrier tape is not to be used for demarcating a regulated area). Maintain egress from exits.

The containment enclosure shall be constructed to prevent lead vapor, mist, dust, debris, and contaminated storm water from leaving the work area. Materials for the enclosure shall be framed and fastened securely to prevent billowing or opening from the weather. Plywood or other hard containment materials shall be used by the Contractor if necessary to protect containment from the weather. All edges and seams shall be sealed to prevent leaks.

On a periodic basis throughout the day, collect dust and debris by HEPA vacuuming the surface and/or by wet sweeping. The daily frequency shall be determined by the wind conditions and by the observation of the Project Monitor.

On a daily basis and during final cleanup, visually examine the immediate area to ensure that no lead debris has escaped containment. Wet sweep or rake up any debris found and place in appropriate hazardous waste labeled container. Store the debris securely with other waste.

Suspend work activities during inclement weather; including but not limited to wind in excess of 20 knots, rain, snow, ice, and hail that may affect abatement operations.

3.13.2 Prohibited Practices

Prohibited abatement methods include:

1. Open flame burning or torching, propane fueled heat grids to remove paint.
2. Machine sanding or grinding without HEPA local vacuum exhaust tool.
3. Uncontained hydro-blasting or pressure washing.
4. Abrasive blasting or sandblasting without HEPA local vacuum exhaust tool.
5. Heat guns operating above 1100⁰F.
6. Methylene chloride paint removal products.
7. Dry Scraping (except for limited surface areas).

3.14 CLEANING

Daily cleaning in exterior paint removal areas includes removing large and small debris, HEPA vacuuming horizontal surfaces, wet mopping, and then HEPA vacuuming horizontal surfaces.

Final cleaning in exterior removal areas must occur no sooner than one (1) hour after lead hazard control activities are finished. All plastic should be misted, cleaned, and folded toward the center to trap any remaining dust. The order of removal should be upper plastic, the first layer of floor plastic, vent and door plastic, the second layer of floor plastic, and finally plastic separating contaminated from non-contaminated areas. Then the entire area should be cleaned

using a HEPA vacuum/wet wash/HEPA vacuum cleaning process. The Supervisor should perform an inspection for visible dust and debris.

Additional cleaning cycles may be necessary for porous surfaces, and difficult to clean surfaces (crevices). Failure to meet clearance criteria will require additional cleaning.

3.15 CLEARANCE

Clearance must be performed by a California Department of Public Health Certified Lead Project Monitor. The Clearance will be performed by the City's Project Monitor and will not be performed by the Contractor (although the Contractor is encouraged to perform testing as necessary to determine if the area is ready for clearance). Clearance testing must occur no sooner than one (1) hour after final cleaning. It consists of two steps; visual examination and possibly environmental sampling (dust and/or soil sampling for exterior work).

1. Visual Examination For Determination of Completed Work:

This is a determination that the work specified in the scope of work has been completed satisfactorily. It is important this examination occurs to determine that either all the paint has been removed at the abatement locations, or that the deteriorated paint has been stabilized on surfaces prior to detachment from the structure. The horizontal surfaces in the work area should be examined for settled dust and debris. If dust or debris is visually noted, the Contractor will be asked to re-clean prior to samples being collected.

If no such dust/debris is found, the Project Monitor will complete a Certificate of Visual Inspection (Appendix B) for the area or for multiple areas. The Certified Supervisor will also sign this Certificate. The completed form should be submitted to the City at the end of the project.

2. Environmental Sampling Clearance Criteria for Paint removal work:

Clearance sampling will be conducted on surfaces in each Work Area as identified by the Project Monitor.

Wipe clearance sampling will be conducted on surfaces in each Work Area as identified by the Project Monitor.

- a. Cleanable surface areas will be cleared using a wipe sampling clearance technique for surface area dust: Must be below 400 micrograms per square foot.

Re-cleaning, at the Contractor's expense, will be required for surfaces that do not pass the wipe clearance criteria.

The cost for additional tests, which may be required as a result of samples failing to meet the release criteria, shall be paid for the Contractor. This cost shall include all costs associated with sample analysis and collection of additional samples, including Consultant fees.

3. Environmental Sampling Clearance Criteria for Structure and Soil removal work:

Soil clearance sampling will be conducted on excavated surfaces in each Work Area as identified by the Project Monitor.

- a. Soil Sampling Clearance: Prepared graded area soil samples must be below 1,000 micrograms to allow re-entry by unprotected construction personnel.

Re-cleaning, at the Contractor's expense, will be required for soil surfaces that do not pass the clearance criteria.

The cost for additional tests, which may be required as a result of samples failing to meet the release criteria, shall be paid for the Contractor. This cost shall include all costs associated with sample analysis and collection of additional samples, including Consultant fees.

3.16 DISPOSAL OF HAZARDOUS WASTE

All waste must be handled in accordance with the City of San Diego's 'White Book' Part 7. Any waste being stored on site must be locked in leak tight containers and access to the area shall be restricted.

3.16.1 WASTE MINIMIZATION

The Contractor is required to make all reasonable efforts to minimize the amount of hazardous waste generated from this project.

3.16.2 WASTE CHARACTERIZATION

The Contractor shall test any potential hazardous waste generated in accordance with 22 CCR Division 4.5 within ten (10) days and/or prior to the end of the project to determine if it is hazardous waste and requires disposal. All paint chips will be considered hazardous waste and do not require testing. Components with lead paint that has been stabilized shall have a hazardous waste determination made prior to sending to a landfill.

3.16.3 PRE-TRANSPORTATION REQUIREMENTS

Any packaging used to ship hazardous waste off site such as a container, roll-off bin, tank or other device, must comply with 49 CFR Parts 173, 178, 179 and be labeled and prepared for transportation in accordance with 22 CCR Article 3.

The hazardous waste label must be affixed and filled out when the first amount of hazardous waste is placed in the container. The label must include the initial accumulation date.

All additional pre-transportation labeling, marking, or placarding must be conducted prior to transporting off site and in accordance with 22 CCR Chapter 12, Article 3.

All containers and tanks of hazardous waste must be managed in a way which minimizes the threat of fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste to the air, soil or surface water which could threaten human health or the environment. Management techniques include containment areas capable of holding the contents of largest container within the containment area. Properly store and secure waste at all times. Do not leave hazardous waste in uncovered or unlocked trucks or dumpsters.

3.16.4 TRANSPORTATION AND DISPOSAL

A hazardous waste manifest will be completed in accordance with 22 CCR Chapter 12, Article 2 for each shipment of hazardous waste leaving the work site. All waste shall leave the project site by the end of the project. Only The Project Monitor employees shall sign as the generator on manifests.

Disposal of the lead related hazardous wastes shall be by incineration unless otherwise

specified by the ALMP.

APPENDIX A

CERTIFICATE OF LEAD WORKER'S ACKNOWLEDGMENT

PROJECT NAME: _____ DATE: _____
PROJECT ADDRESS: _____
CONTRACTOR'S NAME: _____

Working with lead can be dangerous. Inhaling and ingesting lead dust can cause an increase in blood lead levels which can lead to adverse health effects such as kidney damage, elevated blood pressure or infertility.

Your employer's contract with the City for the above project requires that: You be supplied with the proper respirator and be trained in its use. You be trained in safe work practices and in the use of the equipment found on the job. You receive a medical examination. These items are to have been done at no cost to you.

RESPIRATORY PROTECTION: You must have been trained in the proper use of respirators, and informed of the type respirator to be used on the above referenced project. You must be given a copy of the written respiratory protection manual issued by your employer. You must be equipped at no cost with the respirator to be used on the above project.

TRAINING COURSE: You must be an EPA certified Renovation, Repair, and Painting (RRP) Contractor or received training from an RRP contractor and be able to provide onsite documentation of training. You should have been trained in the dangers inherent in handling lead and breathing and ingesting lead dust and in proper work procedures and personal and area protective measures. The topics covered in the course must have included the following:

- Possible routes of exposure to lead
- Health hazards associated with lead
- Respiratory protection
- Use of protective equipment
- Work practices including hands on or on-the-job training
- Personal decontamination procedures
- Health and safety considerations

MEDICAL EXAMINATION: You must have had a medical examination within the past 12 months at no cost to you. This examination must have included: health history, physical examination, a blood pressure measurement, pulmonary function test and blood sample and analysis for lead.

By signing this document you are acknowledging only that the City has advised you of your rights to training and protection relative to your employer, the Contractor.

Signature: _____ Social Security No.: _____

Printed Name: _____

Witness (print): _____ Witness Signature: _____

APPENDIX B

CERTIFICATION OF VISUAL INSPECTION

Project # _____ Date: _____ Location: _____

Contractor: _____

The contractor hereby certifies that he/she has visually inspected the Work Area (all surfaces including pipes, counters, ledges, walls, ceiling and floor, behind critical barriers, sheet plastic, etc.) and has found no dust, debris or residue.

by: (Signature): _____ Date: _____

(Print Name): _____

(Company Name): _____

(Print Title): _____

CITY ALMP REPRESENTATIVE

The City ALMP Representative hereby certifies that he has accompanied the contractor on his/her visual inspection and verifies that this inspection has been thorough and to the best of his/her knowledge and belief, the contractor's certification above is a true and honest one.

by: (Signature): _____ Date: _____

(Print Name): _____

WORK AREA

Location: _____

Room: _____

Hazard Reduction Performed:

APPENDIX C

Asbestos and Lead Inspection Report

The following report contains lead sample locations, diagrams, and laboratory results for the paint, surface wipes, and soil sampling performed for the SDPD Firing Range Refurbishment project. The structures were also surveyed for asbestos.



ASBESTOS AND LEAD INSPECTION REPORT

Police Firing Range

June 22, 2010
ALMP Project #6447

Prepared by:

Jeff Jones
Asbestos & Lead Program Inspector
CA Asbestos Consultant #97-2319
DHS Lead Certification # I-1963

Reviewed by:

Mike Anderson
Asbestos & Lead Program Inspector
CA Asbestos Consultant #06-3922
DHS Lead Certification # I-17780

City of San Diego
Environmental Services Department
Office of Environmental Protection and Sustainability
Asbestos & Lead Management Program
9601 Ridgehaven Court, Ste 320
San Diego, CA 92123
Tel: (858) 573-1262
Fax: (858) 492-5089

June 22, 2010

1. Overview

The City of San Diego's Asbestos and Lead Management Program (ALMP) was requested to perform asbestos and lead inspection services for the Police Firing Range at 4008 Federal Blvd. The inspection was performed on April 19, 2010.

Bulk asbestos samples were collected and analyzed under contract with a laboratory that has accreditation for asbestos analysis under the National Voluntary Laboratory Accreditation Program (NVLAP) and the California Department of Health Service's Environmental Laboratory Accreditation Program (ELAP).

Lead concentrations on painted surfaces were analyzed by state certified ALMP staff using an x-ray fluorescence elemental analyzer.

Lead dust samples and lead soil samples were collected and analyzed under contract with a laboratory that has accreditation in EPA's National Lead Laboratory Accreditation Program (NLLAP).

2. Summary of Asbestos Containing Materials

The summary below lists the asbestos that was found during this inspection:

Brown 9"x9" floor tile and black floor tile mastic in Staff Building storage rooms (3 rooms on N end of building). Estimated 200 SF.

Black roof mastic on the Rangemaster Office roof. Estimated 15 SF

Both layers of 12"x12" floor tile (brown layer and white layer) in Rangemaster Office restrooms (2) and S hall. (Floor tile mastic is negative). Estimated 200 SF.

Black roof mastic on the Clubhouse roof. Estimated 20 SF.

Black floor tile mastic under the tan 12"x12" floor tile throughout the Clubhouse. Estimated 2500 SF.

Black roof mastic on the Restroom roof. Estimated 10 SF.

A laboratory report showing results of all samples collected is attached to this report.

This survey may not have included all materials concealed behind walls and hard ceilings. If suspect materials are found during demolition or renovation activities that are not mentioned in this report, then work must stop so the materials can be tested.

Any work involving the removal or disturbance of asbestos materials must be performed by an asbestos abatement contractor.

3. Summary of Lead Paint

June 22, 2010

Lead concentrations were found to be above threshold levels in various tested components identified in the following table. Threshold concentrations are levels of lead where if it is disturbed during renovations, maintenance, or repairs, exposure to lead may occur. Such operations must be performed by lead certified workers. Components with conditions listed as Fair or Poor must be stabilized by a lead abatement contractor prior to renovation or demolition activities.

Structure	Room	Side	Component	Substrate	Condition	Color	PBC	PBC Error
staff bldg	outside	c	window sill	wood	fair	pink	1.1	0.2
staff bldg	outside	c	window	wood	fair	pink	0.5	0.1
staff bldg	outside	c	door	wood	fair	pink	0.4	0.2
staff bldg	outside	c	door frame	wood	fair	pink	0.4	0.2
staff bldg	outside	c	upper trim	wood	fair	pink	0.5	0.1
staff bldg	office	a	wall	concrete	intact	beige	0.14	0.03
staff bldg	office	c	vault door	metal	intact	brown	0.5	0.3
staff bldg	office	c	vault door frame	metal	intact	brown	0.7	0.1
staff bldg	office	b	wall	concrete	intact	beige	0.14	0.03
staff bldg	office	d	door	wood	intact	beige	0.22	0.09
staff bldg	office	d	door frame	wood	intact	beige	0.29	0.1
staff bldg	front office	c	window frame	metal	intact	beige	0.22	0.11
range office	outside	d	window frame	wood	intact	beige	9.7	3
range office	outside	d	door frame	wood	intact	beige	2.2	0.7
range office	outside	c	window	wood	intact	beige	6.4	2.8
range office	outside	c	upper trim	wood	intact	beige	3.3	1.1
range office	outside	d	door frame	wood	fair	beige	0.8	0.2
range office	outside	a	elec closet	wood	fair	pink	1.8	0.6
range office	outside	c	eaves	wood	fair	pink	1.9	0.9
range office	outside	c	beam	wood	fair	pink	24	4.3
range office	inside - rear	d	door frame	metal	fair	beige	2	0.9
range office	inside - rear	c	wall	drywall	intact	beige	1.8	0.5
range office	inside - rear	a	cabinet	drywall	intact	beige	3.5	1.6
range office	inside - rear	a	cabinet	drywall	intact	beige	3.8	2.1
range office	inside - rear	a	window sill	wood	intact	beige	0.25	0.12
range office	inside - rear	a	door frame	wood	intact	beige	1.6	0.6
range office	inside - rear	a	wall	wood	intact	beige	4.8	1.2
range office	inside - rear	c	wall	concrete	intact	beige	0.15	0.04
range office	inside - front	b	window frame	metal	intact	beige	5.3	1.1
range office	inside - front	a	window frame	wood	intact	beige	6.1	2.2
range office	inside - front	a	window	metal	intact	beige	8.4	1.3
clubhouse	outside	a	window	wood	poor	beige	1.5	0.4
clubhouse	outside	a	window sill	concrete	poor	beige	0.16	0.05
clubhouse	outside	b	window	wood	fair	beige	9.8	4
clubhouse	outside	c	eaves	wood	intact	beige	2.7	1.4

3 of 6

June 22, 2010

Structure	Room	Side	Component	Substrate	Condition	Color	PBC	PBC Error
clubhouse	outside	c	upper trim	wood	intact	beige	10.6	4.1
clubhouse	hall	b	window sill	wood	intact	brown	11	3.5
clubhouse	kitchen	a	cabinet	wood	intact	beige	0.15	0.04
clubhouse	kitchen	a	wall	wood	intact	beige	7.2	3.4
clubhouse	kitchen	a	window	wood	intact	beige	6.7	2.7
clubhouse	kitchen	c	door	wood	intact	beige	0.8	0.1
restroom bldg	outside	a	door	metal	intact	beige	0.6	0.1
restroom bldg	outside	a	door frame	metal	intact	beige	0.7	0.3
restroom bldg	mens	c	wall	concrete	intact	beige	0.14	0.03
restroom bldg	mens	c	window	metal	intact	beige	0.27	0.06
restroom bldg	womens	a	door	wood	intact	beige	0.5	0.2
restroom bldg	womens	d	window	metal	intact	beige	0.2	0.06
restroom bldg	outside	d	eaves	metal	intact	beige	0.4	0.1
restroom bldg	outside	d	uppe trim	metal	intact	beige	0.4	0.1

Location	Side	Component	Substrate	Condition	Color	PbC	PbC Error
range 1 backstop	C	column	wood	fair	green	3.4	1.8
range 2 backstop	C	horizontal beam	wood	fair	green	1	0.2
range 2 backstop	C	column	wood	fair	green	1.8	0.6
range 3 backstop	C	column	wood	fair	green	2.5	1.5
range 3 backstop	D	column	wood	fair	green	1.8	0.6
range 3 south storage	D	door	metal	intact	green	0.3	0.19
restrm 2 story	A	wall	wood	intact	green	0.16	0.06
restrm 2 story	C	door	wood	intact	green	0.14	0.04
restrm 2 story	C	door frame	wood	intact	green	0.28	0.09
range 3blue shed	B	wall	metal	intact	blue	2.4	0.8
range 3blue shed	C	door	metal	intact	blue	2.7	0.8
range 3blue shed	D	door	metal	intact	blue	1.7	0.5
range 4 backstop	D	column	wood	fair	brown	5.6	2.4
ticket booth	D	window	wood	fair	green	0.5	0.1
ticket booth	D	window frame	wood	fair	green	0.14	0.04
range 1 shade structure	A	bench	wood	fair	green	0.12	0.02
range 1 shade structure	A	column	wood	fair	green	1.8	0.5

A complete XRF report showing results of all surfaces tested is attached to this report.

All paint chips and painted components intended for disposal must have a waste characterization performed. If various components are consolidated into one trash receptacle then composite samples from the trash in that receptacle can be collected and the results can represent the entire contents of the receptacle.

June 22, 2010

4. Summary of Lead Dust on Horizontal Surfaces

Dust wipe samples were collected on exterior horizontal surfaces throughout the site that may be impacted by planned renovations. Exterior surfaces with dust levels at or over 400 ug/sq.ft are considered hazardous by State of California Title 17. Of 34 wipe samples collected, all but two came back as containing hazardous levels of lead. The two that didn't should be considered an irregularity since a large majority of samples collected on identical surfaces came back as hazardous.

Therefore all exterior horizontal surfaces at the site that will be impacted by the planned renovations are considered to contain hazardous levels of lead dust. This includes all shade structure benches, floors, and tables, and all concrete surfaces. To prevent worker contamination, these surfaces should all be cleaned by a lead abatement contractor prior to demolition or other forms of disturbance.

A laboratory report showing results of all dust samples collected along with a schematic of their locations is attached to this report.

5. Summary of Title 22 Metals in Soil

Surface soil samples were collected in all areas of the site where soil may be removed or otherwise impacted by planned renovations. The samples were then analyzed to determine whether any metals exceeded thresholds that would require disposal of the soil as hazardous. A Total Threshold Limit Concentration (TTLIC) was performed for all Title 22 metals. For those samples below the TTLIC hazardous threshold (1000 for lead) and still greater than 10x the STLC threshold (50 for lead) a second test, Solubility Threshold Limit Concentration (STLC), was performed as required by the California Department of Substance Control (DTSC). Of 62 samples collected, all but five exceeded regulatory thresholds for lead that would classify it as hazardous. Each of the five that passed should be considered an irregularity since a large majority of samples collected in similar areas with similar history came back as hazardous. Areas sampled include the embankment behind the firing berm structures up to and including the dirt road, all berms, the bare soil north of the shade structure of range 1, the bare soil west of the staff offices, soil on range 3 just south of where the concrete ends, and soil 10 and 20 feet south of the shade structure of range 4. Berms used for catching bullets were not sampled during this inspection but are assumed to be very high in lead concentrations.

All soil disposed of will have to be disposed of as hazardous waste unless additional testing of below surface soil can identify specific below surface areas as nonhazardous.

Any areas tested that will not be impacted by removal or other forms of disturbance will require an abatement option since bare soil on public facilities containing over 1000 ppm is illegal. Abatement options fall into two categories, over 20 year and under 20 year abatement. Over 20 year abatement options include covering the bare surfaces with concrete, or removing the soil from the site. Under 20 year abatement options include planting grass or other vegetation over the bare soil. Over 20 year abatement must be performed by a lead abatement contractor with CDPH certified supervisors and workers.

A laboratory report showing results of all soil samples collected along with a schematic of their locations is attached to this report.

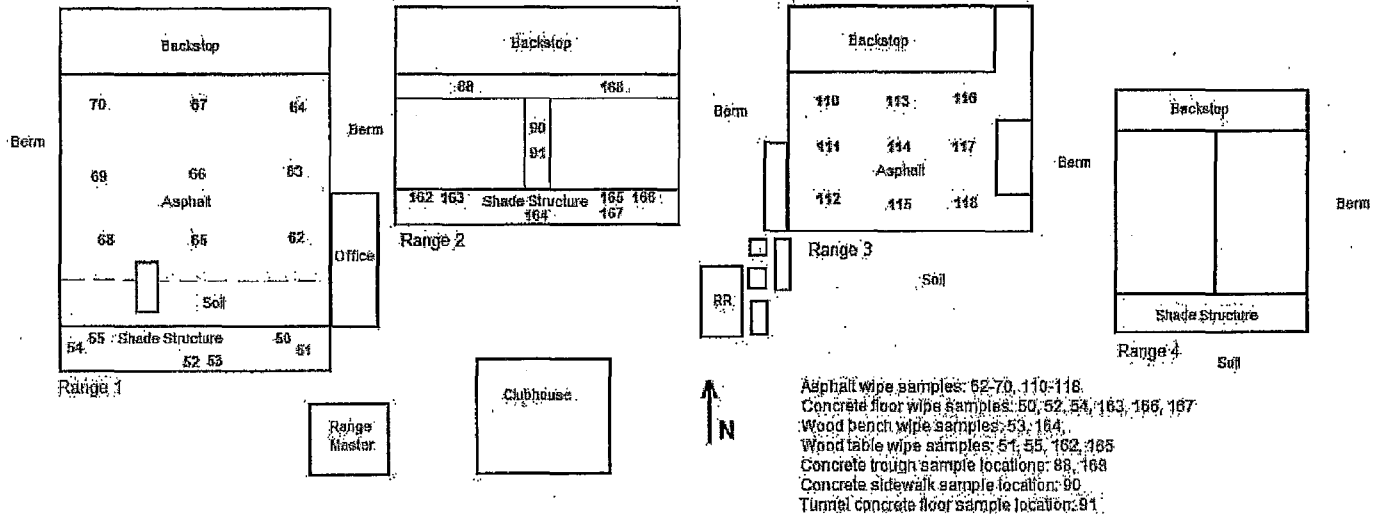
June 22, 2010

6. Attachments

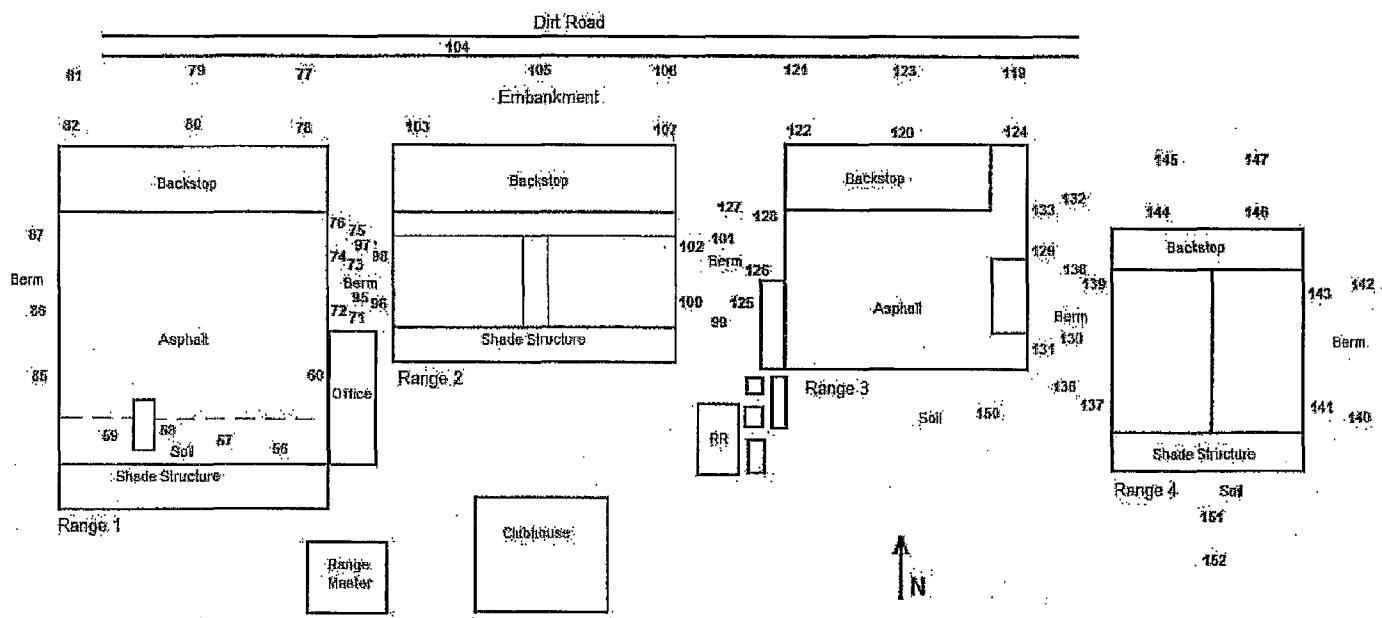
Schematic of Lead Dust Sample Locations
Schematic of Lead Soil Sample Locations
Lead in Dust Laboratory Report
Title 22 Metals Laboratory Report
Lead XRF Report
Asbestos Laboratory Report

Dirt Road

Embankment



Police Firing Range Lead Dust Wipe Sample Locations



Police Firing Range Soil Sample Locations

DATE: May 10, 2010

Page 1 of 13

CLIENT: City of San Diego
9601 Ridgehaven Court Suite 310
San Diego, CA 92123

ATTENTION: Jeff Jones

REFERENCE: 1078974, 6447
Contract No. C008100143

REPORT NO: 1373671.2/31.4/5

DATE OF SAMPLE COLLECTION: by Jeff Jones

DATE RECEIVED: April 30, 2010

DATE ANALYZED: April 30, 2010; May 3-7 and 10, 2010

ACCREDITATION: American Industrial Hygiene Association (101634),
Environmental Lead NLLAP
California Dept. of Health Services ELAP 1119


SUBJECT: ANALYSIS AS REQUESTED

The sample(s) was/were identified as:

<u>Sample No.:</u>	<u>Analysis</u>	<u>Method</u>
6447-50 to -55, 6447-62 to -70, 6447-88, 6647-90, 6647-91, 6447-110 to -118, 6447-162 to -168	Pb - Wipe	NIOSH 7082 - ISSUE 2
6447-56 to -60, 6447-71 to -82, 6447-85 to -87, 6447-95 to -107, 6447-119 to -133, 6447-136 to -147, 6447-150 to -152	Be, V, Cr, Co, Ni, Cu, Zn, AS, Se, Mo, Ag, Cd, Ba, Tl, Pb, Sb, Hg	EPA 6010B EPA 7471A

The results of the analyses and the detection limit(s) are summarized on the following page(s).

Respectfully submitted,
EMS Laboratories, Inc.


A. J. Kolk Jr.
Technical Director

AJK/mt

*Note: The report shall not be reproduced, except in full, without the written approval of EMS Laboratories, Inc.
Note: The results of the analysis are based upon the sample submitted to the laboratory. No representation is made regarding the sampling area other than that implied by the analytical results for the immediate vicinity of the samples analyzed as calculated from the data presented with those samples. Any deviation or exclusion from the test method is noted in this cover letter. All the analytical quality control data meet the requirement of the procedure, unless otherwise indicated. Unless otherwise noted in this cover letter the samples were received properly packaged, clearly identified and intact.*

Results have not been corrected for field blank or EMS Blank for lead samples that fall under the AIHA ELPA T program.

RECEIVED
MAY 27 2010
ENVIRONMENTAL PROTECTION

Laboratory Report

Sample Info

Date of Analysis: 4/30/2010
 Lab ID: 137367
 Client: City of San Diego
 Date Received: 4/30/2010
 Project Number: 1078974
 Analyte: Pb
 Matrix: WIPE
 Method: NIOSH 7082,ISSUE 2
 Comments:

Reporting Limit (ug): 8
 Method blank (ug): <8

Sample Results

Sample Name	Wipe Area (sq. ft.)	Pb Weight (ug)	Pb Concentration (ug/sq.ft)
6647-60	1.00	570	570
6647-61	1.00	280	280
6647-52	1.00	1100	1100
6647-63	0.92	130	140
6647-54	1.00	2100	2100
6647-65	1.00	1200	1200
6647-62	1.00	1900	1900
6647-63	1.00	2600	2600
6647-64	1.00	3000	3000
6647-65	1.00	750	750
6647-66	1.00	2800	2800
6647-67	1.00	19000	19000
6647-68	1.00	2000	2000
6647-69	1.00	2000	2000
6647-70	1.00	12000	12000
6647-88	1.00	79000	79000
6647-90	1.00	990	990
6647-91	1.00	11000	11000

Chemist:

Laboratory Report

Sample Info

Date of Analysis: 4/30/2010
 Lab ID: 137367
 Client: City of San Diego
 Date Received: 4/30/2010
 Project Number: 1078974
 Analyte: Pb
 Matrix: WIPE
 Method: NIOSH 7082,ISSUE 2
 Comments:

Reporting Limit (ug): 8
 Method blank (ug): <8

Sample Results

Sample Name	Wipe Area (sq. ft.)	Pb Weight (ug)	Pb Concentration (ug/sq.ft)
6447-110	1.00	7000	7000
6447-111	1.00	3400	3400
6447-112	1.00	23000	23000
6447-113	1.00	10000	10000
6447-114	1.00	8600	8600
6447-115	1.00	480	480
6447-116	1.00	4200	4200
6447-117	1.00	1100	1100
6447-118	1.00	4300	4300
6447-162	1.00	4700	4700
6447-163	1.00	6500	6500
6447-164	1.00	1100	1100
6447-165	1.00	730	730
6447-166	1.00	8000	8000
6447-167	1.00	2100	2100
6447-168	1.00	13000	13000

Chemist: JYL

EMS LABORATORIES CHEMISTRY REPORT

CLIENT: City of San Diego
 LABORATORY ID: 137367
 PROJECT NO: 6447
 MATRIX: BULK
 ANALYTICAL METHOD: EPA 6010B
 DATE OF ANALYSIS: 5/3/2010

Sample ID	Unit	Be	V	Cr	Co	Ni	Cu	Zn	As
6447-56	ppm	<1.0	24	53	3.4	8.2	278	522	<5.0
6447-57	ppm	<1.0	18	39	3.0	5.1	89	100	<5.0
6447-58	ppm	<1.0	19	17	2.4	<5.0	1680	326	<5.0
6447-59	ppm	<1.0	43	50	6.9	10	176	528	<5.0
6447-60	ppm	<1.0	11	6.8	<2.0	<5.0	37	188	<5.0
6447-71	ppm	<1.0	17	7.1	2.2	<5.0	13	36	<5.0
6447-72	ppm	<1.0	18	9.1	2.3	<5.0	15	51	<5.0
6447-73	ppm	<1.0	18	10	<2.0	<5.0	8.1	18	<5.0
6447-74	ppm	<1.0	21	12	2.6	5.5	45	158	<5.0
6447-75	ppm	<1.0	22	6.4	2.8	<5.0	11	16	<5.0
Reporting Limit	µg	1.0	5.0	2.0	2.0	5.0	5.0	5.0	5.0

Sample ID	Unit	Se	Mo	Ag	Cd	Ba	Tl	Pb	Sb
6447-56	ppm	<5.0	<5.0	<2.0	2.5	541	<5.0	5180	34
6447-57	ppm	<5.0	<5.0	<2.0	1.8	362	<5.0	5590	59
6447-58	ppm	<5.0	<5.0	<2.0	1.6	197	<5.0	1800	17
6447-59	ppm	<5.0	<5.0	<2.0	4.6	456	<5.0	6150	44
6447-60	ppm	<5.0	<5.0	<2.0	1.0	82	<5.0	880	<5.0
6447-71	ppm	<5.0	<5.0	<2.0	1.1	29	<5.0	370	<5.0
6447-72	ppm	<5.0	<5.0	<2.0	1.4	37	<5.0	362	<5.0
6447-73	ppm	<5.0	<5.0	<2.0	1.0	21	<5.0	201	<5.0
6447-74	ppm	<5.0	<5.0	<2.0	1.5	59	<5.0	1350	<5.0
6447-75	ppm	<5.0	<5.0	<2.0	1.3	26	<5.0	153	<5.0
Reporting Limit	µg	5.0	5.0	2.0	1.0	5.0	5.0	5.0	5.0

Chemist *JSA*

CHEM-13A/B/C

EMS LABORATORIES CHEMISTRY REPORT

CLIENT: City of San Diego
 LABORATORY ID: 137367
 PROJECT NO: 6447
 MATRIX: BULK
 ANALYTICAL METHOD: EPA 6010B
 DATE OF ANALYSIS: 5/3/2010

Sample ID	Unit	Be	V	Cr	Co	Ni	Cu	Zn	As
6447-76	ppm	<1.0	17	6.6	<2.0	<5.0	33	34	<5.0
6447-77	ppm	<1.0	14	10	2.1	<5.0	8.2	19	<5.0
6447-78	ppm	<1.0	21	8.6	<2.0	<5.0	<5.0	14	<5.0
6447-79	ppm	<1.0	12	11	<2.0	<5.0	<5.0	12	<5.0
6447-80	ppm	<1.0	25	14	4.6	<5.0	<5.0	21	<5.0
6447-81	ppm	<1.0	21	13	2.5	<5.0	8.4	26	<5.0
6447-82	ppm	<1.0	23	11	3.3	<5.0	<5.0	17	<5.0
6447-85	ppm	<1.0	26	16	3.4	<5.0	19	59	<5.0
6447-86	ppm	<1.0	22	9.3	3.1	<5.0	37	40	<5.0
6447-87	ppm	<1.0	17	8.1	<2.0	<5.0	50	24	<5.0
Reporting Limit	µg	1.0	5.0	2.0	2.0	5.0	5.0	5.0	5.0

Sample ID	Unit	Se	Mo	Ag	Cd	Ba	Tl	Pb	Sb
6447-76	ppm	<5.0	<5.0	<2.0	1.0	47	<5.0	22200	12
6447-77	ppm	<5.0	<5.0	<2.0	<1.0	48	<5.0	389	<5.0
6447-78	ppm	<5.0	<5.0	<2.0	1.1	22	<5.0	8.0	<5.0
6447-79	ppm	<5.0	<5.0	<2.0	<1.0	22	<5.0	135	<5.0
6447-80	ppm	<5.0	<5.0	<2.0	1.3	41	<5.0	<5.0	<5.0
6447-81	ppm	<5.0	<5.0	<2.0	1.4	47	<5.0	138	<5.0
6447-82	ppm	<5.0	<5.0	<2.0	1.3	35	<5.0	33	<5.0
6447-85	ppm	<5.0	<5.0	<2.0	1.8	34	<5.0	319	<5.0
6447-86	ppm	<5.0	<5.0	<2.0	1.5	33	<5.0	1210	7.7
6447-87	ppm	<5.0	<5.0	<2.0	<1.0	26	<5.0	5870	117
Reporting Limit	µg	5.0	5.0	2.0	1.0	5.0	5.0	5.0	5.0

Chemist *FVA*

CHEM-13A/B/C

EMS LABORATORIES CHEMISTRY REPORT

CLIENT: City of San Diego
 LABORATORY ID: 137367
 PROJECT NO: 6447
 MATRIX: BULK
 ANALYTICAL METHOD: EPA 6010B
 DATE OF ANALYSIS: 5/3/2010

Sample ID	Unit	Be	V	Cr	Co	Ni	Cu	Zn	As
6447-95	ppm	<1.0	10	5.6	2.4	<5.0	12	26	<5.0
6447-96	ppm	<1.0	10	5.9	2.1	<5.0	16	47	<5.0
6447-97	ppm	<1.0	9.5	3.4	<2.0	<5.0	16	20	<5.0
6447-98	ppm	<1.0	8.4	5.4	<2.0	<5.0	8.3	14	<5.0
6447-99	ppm	<1.0	15	12	3.4	<5.0	16	44	<5.0
6447-100	ppm	<1.0	12	8.6	3.2	<5.0	20	56	<5.0
6447-101	ppm	<1.0	10	4.8	<2.0	<5.0	27	29	<5.0
6447-102	ppm	<1.0	13	5.6	3.1	<5.0	26	44	<5.0
6447-103	ppm	<1.0	10	5.4	2.7	<5.0	13	17	<5.0
6447-104	ppm	<1.0	11	7.9	2.7	<5.0	14	22	<5.0
Reporting Limit	µg	1.0	5.0	2.0	2.0	5.0	5.0	5.0	5.0

Sample ID	Unit	Se	Mo	Ag	Cd	Ba	Tl	Pb	Sb
6447-95	ppm	<5.0	<5.0	<2.0	<1.0	31	<5.0	233	<5.0
6447-96	ppm	<5.0	<5.0	<2.0	<1.0	37	<5.0	522	<5.0
6447-97	ppm	<5.0	<5.0	<2.0	<1.0	32	<5.0	710	<5.0
6447-98	ppm	<5.0	<5.0	<2.0	<1.0	21	<5.0	369	<5.0
6447-99	ppm	<5.0	<5.0	<2.0	1.5	48	<5.0	542	<5.0
6447-100	ppm	<5.0	<5.0	<2.0	1.3	59	<5.0	680	<5.0
6447-101	ppm	<5.0	<5.0	<2.0	<1.0	33	<5.0	3900	<5.0
6447-102	ppm	<5.0	<5.0	<2.0	1.4	80	<5.0	2040	<5.0
6447-103	ppm	<5.0	<5.0	<2.0	<1.0	39	<5.0	450	<5.0
6447-104	ppm	<5.0	<5.0	<2.0	1.1	36	<5.0	817	<5.0
Reporting Limit	µg	5.0	5.0	2.0	1.0	5.0	5.0	5.0	5.0

Chemist *FSL*

CHEM-13A/B/C

EMS LABORATORIES CHEMISTRY REPORT

CLIENT: City of San Diego
 LABORATORY ID: 137367
 PROJECT NO: 6447
 MATRIX: BULK
 ANALYTICAL METHOD: EPA 6010B
 DATE OF ANALYSIS: 5/3/2010

Sample ID	Unit	Be	V	Cr	Co	Ni	Cu	Zn	As
6447-105	ppm	<1.0	9.0	6.8	2.3	<5.0	6.2	14	<5.0
6447-106	ppm	<1.0	10	5.8	<2.0	<5.0	19	15	<5.0
6447-107	ppm	<1.0	15	6.1	3.2	<5.0	26	37	<5.0
6447-119	ppm	<1.0	12	5.8	2.5	<5.0	10	24	<5.0
6447-120	ppm	<1.0	9.2	7.5	2.2	<5.0	15	20	<5.0
6447-121	ppm	<1.0	6.9	2.9	2.3	<5.0	<5.0	9.2	<5.0
6447-122	ppm	<1.0	11	4.6	3.0	484	22	24	<5.0
6447-123	ppm	<1.0	10	5.0	2.5	<5.0	7.7	13	<5.0
6447-124	ppm	<1.0	7.7	3.2	<2.0	<5.0	8.8	14	<5.0
6447-125	ppm	<1.0	12	6.4	2.8	<5.0	19	35	<5.0
Reporting Limit	µg	1.0	5.0	2.0	2.0	5.0	5.0	5.0	5.0

Sample ID	Unit	Se	Mo	Ag	Cd	Ba	Tl	Pb	Sb
6447-105	ppm	<5.0	<5.0	<2.0	<1.0	31	<5.0	899	<5.0
6447-106	ppm	<5.0	<5.0	<2.0	<1.0	22	<5.0	335	<5.0
6447-107	ppm	<5.0	<5.0	<2.0	1.4	55	<5.0	3400	<5.0
6447-119	ppm	<5.0	<5.0	<2.0	1.0	39	<5.0	2440	<5.0
6447-120	ppm	<5.0	<5.0	<2.0	<1.0	26	<5.0	31300	183
6447-121	ppm	<5.0	<5.0	<2.0	<1.0	20	<5.0	220	<5.0
6447-122	ppm	<5.0	<5.0	<2.0	<1.0	33	<5.0	26900	120
6447-123	ppm	<5.0	<5.0	<2.0	<1.0	27	<5.0	433	<5.0
6447-124	ppm	<5.0	<5.0	<2.0	<1.0	20	<5.0	1920	<5.0
6447-125	ppm	<5.0	<5.0	<2.0	1.1	42	<5.0	653	<5.0
Reporting Limit	µg	5.0	5.0	2.0	1.0	5.0	5.0	5.0	5.0

Chemist *FVL*

CHEM-13A/B/C

EMS LABORATORIES CHEMISTRY REPORT

CLIENT: City of San Diego
 LABORATORY ID: 137367
 PROJECT NO: 6447
 MATRIX: BULK
 ANALYTICAL METHOD: EPA 6010B
 DATE OF ANALYSIS: 5/4/2010

Sample ID	Unit	Be	V	Cr	Co	Ni	Cu	Zn	As
6447-126	ppm	<1.0	6.6	2.6	<2.0	<5.0	46	33	<5.0
6447-127	ppm	<1.0	12	4.5	2.1	<5.0	17	18	<5.0
6447-128	ppm	<1.0	8.4	3.1	<2.0	<5.0	19	11	<5.0
6447-129	ppm	<1.0	7.1	3.6	<2.0	<5.0	7.4	14	<5.0
6447-130	ppm	<1.0	12	6.3	2.9	<5.0	<5.0	11	<5.0
6447-131	ppm	<1.0	16	7.4	2.7	<5.0	21	26	<5.0
6447-132	ppm	<1.0	16	8.0	3.2	<5.0	5.7	15	<5.0
6447-133	ppm	<1.0	14	7.7	2.8	<5.0	<5.0	14	<5.0
6447-136	ppm	<1.0	14	6.8	2.6	<5.0	10	30	<5.0
6447-137	ppm	<1.0	13	5.6	2.9	<5.0	14	30	<5.0
6447-138	ppm	<1.0	11	4.9	<2.0	<5.0	6.5	20	<5.0
Reporting Limit	µg	1.0	5.0	2.0	2.0	5.0	5.0	5.0	5.0

Sample ID	Unit	Se	Mo	Ag	Cd	Ba	Tl	Pb	Sb
6447-126	ppm	<5.0	<5.0	<2.0	<1.0	28	<5.0	2510	<5.0
6447-127	ppm	<5.0	<5.0	<2.0	<1.0	45	<5.0	2630	<5.0
6447-128	ppm	<5.0	<5.0	<2.0	<1.0	28	<5.0	3260	<5.0
6447-129	ppm	<5.0	<5.0	<2.0	<1.0	21	<5.0	932	<5.0
6447-130	ppm	<5.0	<5.0	<2.0	<1.0	29	<5.0	9.4	<5.0
6447-131	ppm	<5.0	<5.0	<2.0	1.2	35	<5.0	2390	<5.0
6447-132	ppm	<5.0	<5.0	<2.0	1.2	31	<5.0	433	<5.0
6447-133	ppm	<5.0	<5.0	<2.0	1.2	30	<5.0	18	<5.0
6447-136	ppm	<5.0	<5.0	<2.0	1.2	35	<5.0	321	<5.0
6447-137	ppm	<5.0	<5.0	<2.0	1.1	37	<5.0	4080	12
6447-138	ppm	<5.0	<5.0	<2.0	<1.0	24	<5.0	214	<5.0
Reporting Limit	µg	5.0	5.0	2.0	1.0	5.0	5.0	5.0	5.0

Chemist *ASL*

CHEM-13A/B/C

EMS LABORATORIES CHEMISTRY REPORT

CLIENT: City of San Diego
 LABORATORY ID: 137367
 PROJECT NO: 6447
 MATRIX: BULK
 ANALYTICAL METHOD: EPA 6010B
 DATE OF ANALYSIS: 5/4/2010

Sample ID	Unit	Be	V	Cr	Co	Ni	Cu	Zn	As
6447-139	ppm	<1.0	15	5.6	2.9	<5.0	19	26	<5.0
6447-140	ppm	<1.0	15	6.1	2.5	<5.0	29	22	<5.0
6447-141	ppm	<1.0	13	5.4	2.2	<5.0	27	67	<5.0
6447-142	ppm	<1.0	15	6.5	2.8	<5.0	19	29	<5.0
6447-143	ppm	<1.0	14	6.5	2.7	<5.0	421	95	<5.0
6447-144	ppm	<1.0	13	7.0	2.6	<5.0	25	45	<5.0
6447-145	ppm	<1.0	11	5.7	2.2	<5.0	84	36	<5.0
6447-146	ppm	<1.0	11	7.3	2.7	<5.0	27	50	<5.0
6447-147	ppm	<1.0	8.9	6.1	<2.0	<5.0	22	29	<5.0
6447-150	ppm	<1.0	11	6.8	2.1	<5.0	119	53	<5.0
6447-151	ppm	<1.0	7.5	3.1	<2.0	<5.0	19	38	<5.0
6447-152	ppm	<1.0	8.0	4.0	<2.0	<5.0	26	28	<5.0
Reporting Limit	µg	1.0	5.0	2.0	2.0	5.0	5.0	5.0	5.0

Sample ID	Unit	Se	Mo	Ag	Cd	Ba	Tl	Pb	Sb
6447-139	ppm	<5.0	<5.0	<2.0	1.1	33	<5.0	826	<5.0
6447-140	ppm	<5.0	<5.0	<2.0	1.0	28	<5.0	129	<5.0
6447-141	ppm	<5.0	<5.0	<2.0	<1.0	35	<5.0	4290	<5.0
6447-142	ppm	<5.0	<5.0	<2.0	1.2	40	<5.0	672	<5.0
6447-143	ppm	<5.0	<5.0	<2.0	1.3	56	56	13000	9.2
6447-144	ppm	<5.0	<5.0	<2.0	1.2	39	39	1810	<5.0
6447-145	ppm	<5.0	<5.0	<2.0	<1.0	43	<5.0	14200	27
6447-146	ppm	<5.0	<5.0	<2.0	<1.0	39	<5.0	22400	165
6447-147	ppm	<5.0	<5.0	<2.0	<1.0	32	<5.0	3030	6.7
6447-150	ppm	<5.0	<5.0	<2.0	1.0	45	<5.0	16100	18
6447-151	ppm	<5.0	<5.0	<2.0	<1.0	25	<5.0	2690	9.5
6447-152	ppm	<5.0	<5.0	<2.0	<1.0	24	<5.0	2680	<5.0
Reporting Limit	µg	5.0	5.0	2.0	1.0	5.0	5.0	5.0	5.0

Chemist FSZ

CHEM-13A/B/C

Chemistry Report

Date of Analysis: 5/5/2010
 Lab Number: 137367
 Client: City of San Diego
 Date Received: 4/30/2010
 Project Number: 6447
 Analyte: Hg
 Matrix: Bulk
 Method: EPA 7471A
 Comment:

Reporting Limit (ppm): 2.0
 Blank (ppm): <2.0

Sample ID	Bulk Weight (g)	Hg Weight (µg)	Concentration (ppm)
6447-56	0.6928	< 0.40	< 2.0
6447-57	0.6175	< 0.40	< 2.0
6447-58	0.6721	< 0.40	< 2.0
6447-59	0.6629	< 0.40	< 2.0
6447-60	0.6725	< 0.40	< 2.0
6447-71	0.6764	< 0.40	< 2.0
6447-72	0.6603	< 0.40	< 2.0
6447-73	0.6777	< 0.40	< 2.0
6447-74	0.6789	< 0.40	< 2.0
6447-75	0.6652	< 0.40	< 2.0
6447-76	0.6828	< 0.40	< 2.0
6447-77	0.6716	< 0.40	< 2.0
6447-78	0.6880	< 0.40	< 2.0
6447-79	0.8175	< 0.40	< 2.0
6447-80	0.8509	< 0.40	< 2.0

Chemist

Chemistry Report

Date of Analysis: 5/6/2010
 Lab Number: 137367
 Client: City of San Diego
 Date Received: 4/30/2010
 Project Number: 6447
 Analyte: Hg
 Matrix: Bulk
 Method: EPA 7471A
 Comment:

Reporting Limit (ppm): 2.0
 Blank (ppm): <2.0

Sample ID	Bulk Weight (g)	Hg Weight (µg)	Concentration (ppm)
6447-81	0.8379	< 0.40	< 2.0
6447-82	0.8041	< 0.40	< 2.0
6447-85	0.8765	< 0.40	< 2.0
6447-86	0.8716	< 0.40	< 2.0
6447-87	0.8485	< 0.40	< 2.0
6447-95	0.8264	< 0.40	< 2.0
6447-96	0.8652	< 0.40	< 2.0
6447-97	0.8620	< 0.40	< 2.0
6447-98	0.8715	< 0.40	< 2.0
6447-99	0.8297	< 0.40	< 2.0
6447-100	0.8169	< 0.40	< 2.0
6447-101	0.8696	< 0.40	< 2.0
6447-102	0.8738	< 0.40	< 2.0
6447-103	0.8200	< 0.40	< 2.0
6447-104	0.7986	< 0.40	< 2.0

Chemist

[Handwritten Signature]

Chemistry Report

Date of Analysis: 5/7/2010
 Lab Number: 137367
 Client: City of San Diego
 Date Received: 4/30/2010
 Project Number: 6447
 Analyte: Hg
 Matrix: Bulk
 Method: EPA 7471A
 Comment:

Reporting Limit (ppm): 2.0
 Blank (ppm): <2.0

Sample ID	Bulk Weight (g)	Hg Weight (µg)	Concentration (ppm)
6447-105	0.7758	< 0.40	< 2.0
6447-106	0.8012	< 0.40	< 2.0
6447-107	0.8105	< 0.40	< 2.0
6447-119	0.7891	< 0.40	< 2.0
6447-120	0.8015	< 0.40	< 2.0
6447-121	0.7984	< 0.40	< 2.0
6447-122	0.8128	< 0.40	< 2.0
6447-123	0.8107	< 0.40	< 2.0
6447-124	0.8111	< 0.40	< 2.0
6447-125	0.7971	< 0.40	< 2.0
6447-126	0.7873	< 0.40	< 2.0
6447-127	0.7799	< 0.40	< 2.0
6447-128	0.8008	< 0.40	< 2.0
6447-129	0.8409	< 0.40	< 2.0
6447-130	0.8043	< 0.40	< 2.0

Chemist *JSL*

Chemistry Report

Date of Analysis: 5/10/2010
 Lab Number: 137367
 Client: City of San Diego
 Date Received: 4/30/2010
 Project Number: 6447
 Analyte: Hg
 Matrix: Bulk
 Method: EPA 7471A
 Comment:

Reporting Limit (ppm): 2.0
 Blank (ppm): <2.0

Sample ID	Bulk Weight (g)	Hg Weight (µg)	Concentration (ppm)
6447-131	0.8654	< 0.40	< 2.0
6447-132	0.8231	< 0.40	< 2.0
6447-133	0.8566	< 0.40	< 2.0
6447-136	0.8412	< 0.40	< 2.0
6447-137	0.8263	< 0.40	< 2.0
6447-138	0.844	< 0.40	< 2.0
6447-139	0.852	< 0.40	< 2.0
6447-140	0.8105	< 0.40	< 2.0
6447-141	0.8126	< 0.40	< 2.0
6447-142	0.817	< 0.40	< 2.0
6447-143	0.8211	< 0.40	< 2.0
6447-144	0.8254	< 0.40	< 2.0
6447-145	0.8188	< 0.40	< 2.0
6447-146	0.8235	< 0.40	< 2.0
6447-147	0.8254	< 0.40	< 2.0
6447-150	0.8425	< 0.40	< 2.0
6447-151	0.8336	< 0.40	< 2.0
6447-152	0.8102	< 0.40	< 2.0

Chemist SVL

Chemistry Report

Date of Analysis: 5/21/2010
 Lab Number: 137836
 Client: City of San Diego
 Date Received: 5/19/2010
 Project Number: 6447
 Analyte: Pb
 Matrix: STLC Extract
 Method: Extraction Wet (Title 22)/Analysis per EPA 7420/3050B
 Sample Weight: 50g

 Detection Limit (mg/l): 0.4
 Blank (mg/l): <0.4

Sample ID	Pb Concentration (mg/l)
6447-60	103
6447-71	45
6447-72	34
6447-73	20
6447-75	14
6447-77	38
6447-81	11
6447-85	28
6447-95	25
6447-96	390
6447-97	70
6447-98	65
6447-99	393
6447-100	105

Chemist *FVL*

Date: Wed, 19 May 2010 12:56:40 -0700
From: "Jones, Jeff" <JJones@sandiego.gov>
To: Meaghan Truong <meaghan.truong@emslabs.com>
Subject: RE: CHEM Results, 1078974 - 6447
Meaghan,

137836

Please perform a 5 day lead STLC for the following samples (all starting with 6447-):

- 60
- 71
- 72
- 73
- 75
- 77
- 81
- 85
- 95
- 96
- 97
- 98
- 99
- 100
- 103
- 104
- 105
- 106
- 121
- 123
- 125
- 129
- 132
- 136
- 138
- 139
- 140
- 142

Thanks.

Jeff Jones
Asbestos and Lead Management Program Inspector
City of San Diego Environmental Services Department
Office: 858-573-1277 Fax: 858-492-5089

-----Original Message-----

From: Meaghan Truong [mailto:meaghan.truong@emslabs.com]
Sent: Thursday, May 06, 2010 3:47 PM
To: Jones, Jeff
Subject: CHEM Results, 1078974 - 6447

Jeff,

I have attached the results for project 6447 that are ready as of today.

Thank You

EMS Labs
Meaghan
626-568-4065

SUBMITTAL FORM/Laboratory Services

137367

PAGE 1 OF 8

Standard T/A

RELINQUISHED BY Jeff Jones
 TIME / DATE 4/29/10
 CLIENT City of San Diego DATE OF SHIPMENT 4/29/10 CARRIER FedEx
 ADDRESS 9601 Ridgehaven Ct. #320 CLIENT P.O. NO. 1078974
San Diego, CA 92123 CLIENT JOB/PROJECT ID NO(S). 6447
 TELEPHONE 858-573-1277
 CONTACT Jeff Jones PACKAGE SHIPPED FROM San Diego

RESULTS REQUESTED VIA Email: jjones@sandiego.gov
 (NOTE: Complete written reports will follow in accordance with the location to any prior transmitted verbal or fax results.)

DATE/TIME OF SAMPLE COLLECTION _____
 SAMPLE PRESERVATIVES _____ HOLDING TIMES _____
 NO. OF SAMPLES SENT _____ SAMPLER'S NAME Jeff Jones
 TYPE: WATER WASTE WATER SOIL FILTER SORBENT TUBE IMPINGER OTHER _____

(FOR EMS ONLY)	CLIENT SAMPLE NO.	DESCRIPTION/LOCATION/ANALYSIS	VOLUME/ TIME/WEIGHT (IF APPLICABLE)
EMS Sample No. <u>137367-50</u>	6447-50	Wipe	AA/Pb 1 SF
	6447-51	Wipe	AA/Pb 1 SF
	6447-52	Wipe	AA/Pb 1 SF
	6447-53	Wipe	AA/Pb 92 SF
	6447-54	Wipe	AA/Pb 1 SF
	6447-55	Wipe	AA/Pb 1 SF
	6447-56	Soil	All Metal TTLC
	6447-57	Soil	All Metal TTLC
	6447-58	Soil	All Metal TTLC
	6447-59	Soil	All Metal TTLC
	6447-60	Soil	All Metal TTLC
	6447-62	Wipe	AA/Pb 1 SF
	6447-63	Wipe	AA/Pb 1 SF
	6447-64	Wipe	AA/Pb 1 SF
	6447-65	Wipe	AA/Pb 1 SF

(SF 5/00)

Laboratory No. 137367 Shipped By [Signature] Time 945
 Date of Package Delivery 4/30/10 Shipping Bill Retained: YES NONE
 Condition of Package on Receipt OK Condition of Custody Seal NONE
 (NOTE: If the package has sustained substantial damage or the custody seal is broken, stop and contact the project manager and the shipper.)
 No. of Samples 99 + 13 Chain-of-Custody Signature [Signature]
 Date of Acceptance into Sample Bank 4/30/10 Misc. Info. _____
 Disposition of Samples EMC LABS

EMS LABORATORIES 117 West Bellevue Drive / Pasadena CA 91105-2503 / 626-568-4065

SUBMITTAL FORM/Laboratory Services

137367

Standard T/A

RELINQUISHED BY Jeff Jones
 TIME / DATE 4/29/10
 DATE OF SHIPMENT 4/29/10 CARRIER FedEx
 CLIENT P.O. NO. 1078974
 CLIENT JOB/PROJECT ID NO(S). 6447
 PACKAGE SHIPPED FROM San Diego

RESULTS REQUESTED VIA Email: jjones@sandiego.gov
 (NOTE: Complete written reports will follow all analyses, in addition to any prior transmitted verbal or fax results.)

DATE/TIME OF SAMPLE COLLECTION _____
 SAMPLE PRESERVATIVES _____ HOLDING TIMES _____
 NO. OF SAMPLES SENT _____ SAMPLER'S NAME Jeff Jones
 TYPE: WATER WASTE WATER SOIL FILTER SORBENT TUBE IMPINGER OTHER _____

(FOR EMS ONLY) EMS Sample No.	CLIENT SAMPLE NO.	DESCRIPTION/LOCATION/ANALYSIS	VOLUME/ TIME/WEIGHT (IF APPLICABLE)
137367-66	6447-66	Wipe AA/Pb	1 SF
	6447-67	Wipe AA/Pb	1 SF
	6447-68	Wipe AA/Pb	1 SF
	6447-69	Wipe AA/Pb	1 SF
	6447-70	Wipe AA/Pb	1 SF
	6447-71	Soil All Metal TTLC	
	6447-72		
	6447-73		
	6447-74		
	6447-75		
	6447-76		
	6447-77		
	6447-78		
	6447-79		
	6447-80		

(SF 5/00)

Laboratory No. _____
 Date of Package Delivery 4/30/10
 Condition of Package on Receipt OK
 No. of Samples 99 + 13
 Date of Acceptance into Sample Bank 4/30/10
 Disposition of Samples EMS LABS

Received By [Signature] Time 9:45
 Shipping Bill Retained: YES NONE
 Condition of Custody Seal NONE
 Chain-of-Custody Signature [Signature]
 Misc. Info. _____

EMS LABORATORIES 117 West Bellevue Drive / Pasadena CA 91105-2503 / 626-568-4065

SUBMITTAL FORM / Laboratory Services

137367

PAGE 3 OF 8

Standard T/A

CLIENT City of San Diego
 ADDRESS 9601 Ridgehaven Ct. #320
 San Diego, CA 92123
 TELEPHONE 858-573-1277
 CONTACT Jeff Jones

RELINQUISHED BY Jeff Jones
 TIME / DATE 4/29/10
 DATE OF SHIPMENT 4/29/10 CARRIER FedEx
 CLIENT P.O. NO. 1078974
 CLIENT JOB/PROJECT ID NO(S). 6447
 PACKAGE SHIPPED FROM San Diego

RESULTS REQUESTED VIA Email: jjones@sandiego.gov
 (NOTE: Complete written reports will follow all analyses, in addition to any prior transmitted verbal or fax results.)

DATE/TIME OF SAMPLE COLLECTION _____
 SAMPLE PRESERVATIVES _____ HOLDING TIMES _____
 NO. OF SAMPLES SENT _____ SAMPLER'S NAME Jeff Jones
 TYPE: WATER WASTE WATER SOIL FILTER SORBENT TUBE IMPINGER OTHER _____

(FOR EMS ONLY) EMS Sample No.	CLIENT SAMPLE NO.	DESCRIPTION/LOCATION/ANALYSIS	VOLUME/ TIME/WEIGHT (IF APPLICABLE)
137367-81	6447-81	Soil	All Metal TTLC
↓ -82	6447-82	Soil	All Metal TTLC
137367.1-83	6447-83	Roof core	PLM
↓ -84	6447-84	Roof core Stop Positive	PLM
137367-85	6447-85	Soil	All Metal TTLC
↓	6447-86	↓	↓
↓	6447-87	↓	↓
↓	6447-88	Wipe	AA/Pb 1 SF
↓	6447-90	↓	↓
↓	6447-91	↓	↓
↓	6447-95	Soil	All Metal TTLC
↓	6447-96	↓	↓
↓	6447-97	↓	↓
↓	6447-98	↓	↓
↓ -99	6447-99	↓	↓

(SF 5/00)

137367

FOR EMS ONLY

Laboratory No. _____ Received By Kristin Wilce Time 9:45
 Date of Package Delivery 4/30/10 Shipping Bill Retained: YES NONE
 Condition of Package on Receipt OK Condition of Custody Seal NONE
 (NOTE: If the package has sustained substantial damage or the custody seal is broken, stop and contact the project manager and the shipper.)
 No. of Samples 99 + 13 Chain-of-Custody Signature FJR
 Date of Acceptance into Sample Bank 4/30/10 Misc. Info. _____
 Disposition of Samples EMC LABS

EMS LABORATORIES 117 West Bellevue Drive / Pasadena CA 91105-2503 / 626-568-4065

SUBMITTAL FORM/Laboratory Services

137367

PAGE 4 OF 8

Standard T/A

CLIENT City of San Diego
 ADDRESS 9601 Ridgehaven Ct. #320
 San Diego, CA 92123
 TELEPHONE 858-573-1277
 CONTACT Jeff Jones

RELINQUISHED BY Jeff Jones
 TIME / DATE 4/29/10
 DATE OF SHIPMENT 4/29/10
 CARRIER FedEx
 CLIENT P.O. NO. 1078974
 CLIENT JOB/PROJECT ID NO(S). 6447
 PACKAGE SHIPPED FROM San Diego

RESULTS REQUESTED VIA Email: jjones@sandiego.gov
 (NOTE: Complete written reports will follow all analyses, in addition to any pilot transmitted verbal or fax results.)

DATE/TIME OF SAMPLE COLLECTION _____
 SAMPLE PRESERVATIVES _____ HOLDING TIMES _____
 NO. OF SAMPLES SENT _____ SAMPLER'S NAME Jeff Jones
 TYPE: WATER WASTE WATER SOIL FILTER SORBENT TUBE IMPINGER OTHER _____

(FOR EMS ONLY)	CLIENT SAMPLE NO.	DESCRIPTION/LOCATION/ANALYSIS	VOLUME/ TIME/WEIGHT (IF APPLICABLE)
EMS Sample No. 137367-100	6447-100	Soil	All Metal TTLC
↓	6447-101	↓	↓
↓	6447-102	↓	↓
↓	6447-103	↓	↓
↓	6447-104	↓	↓
↓	6447-105	↓	↓
↓	6447-106	↓	↓
↓ -107	6447-107	↓	↓
EMS Sample No. 137367-1-108	6447-108	Roof core	PLM
↓ -109	6447-109	Roof core Stop Positive	PLM
EMS Sample No. 137367-110	6447-110	Wipe	AA/Pb 1 SF
↓	6447-111	↓	↓
↓	6447-112	↓	↓
↓	6447-113	↓	↓
↓ -114	6447-114	↓	↓

(SF 5/00)

Laboratory No. 137367 Received By: Kip M. Wood Time: 9:45
 Date of Package Delivery: 4/30/10 Shipping Bill Retained: YES NONE
 Condition of Package on Receipt: OK Condition of Custody Seal: NONE
 (NOTE: If the package has sustained substantial damage or the custody seal is broken, stop and contact the project manager and the shipper.)
 No. of Samples: 99+13 Chain-of-Custody Signature: [Signature]
 Date of Acceptance into Sample Bank: 4/30/10 Misc. Info.: _____
 Disposition of Samples: EMC LABS

EMS LABORATORIES 117 West Bellevue Drive / Pasadena CA 91105-2503 / 626-568-4065

SUBMITTAL FORM/Laboratory Services

137367

Standard T/A

RELINQUISHED BY Jeff Jones
 TIME / DATE 4/29/10
 DATE OF SHIPMENT 4/29/10 CARRIER FedEx
 CLIENT P.O. NO. 1078974
 CLIENT JOB/PROJECT ID NO(S). 6447
 PACKAGE SHIPPED FROM San Diego

RESULTS REQUESTED VIA Email: jjones@sandiego.gov
 (NOTE: Complete written reports will follow all analyses, in addition to any prior transmitted verbal or fax results.)

DATE/TIME OF SAMPLE COLLECTION _____
 SAMPLE PRESERVATIVES _____ HOLDING TIMES _____
 NO. OF SAMPLES SENT _____ SAMPLER'S NAME Jeff Jones
 TYPE: WATER WASTE WATER SOIL FILTER SORBENT TUBE IMPINGER OTHER _____

(FOR EMS ONLY) EMS Sample No.	CLIENT SAMPLE NO.	DESCRIPTION/LOCATION/ANALYSIS	VOLUME: TIME/WEIGHT (IF APPLICABLE)
137367-115	6447-115	Wipe	AA/Pb 1 SF
	6447-116	↓	↓
	6447-117	↓	↓
	6447-118	↓	↓
	6447-119	Soil	All Metal TTLC
	6447-120	↓	↓
	6447-121	↓	↓
	6447-122	↓	↓
	6447-123	↓	↓
	6447-124	↓	↓
	6447-125	↓	↓
	6447-126	↓	↓
	6447-127	↓	↓
	6447-128	↓	↓
	6447-129	↓	↓

(SF 5/00)

Laboratory No. 137367 Received By Kilgus Time 945
 Date of Package Delivery 4/30/10 Shipping Bill Retained: YES NONE
 Condition of Package on Receipt OK Condition of Custody Seal NOTE
 (NOTE: If the package has sustained substantial damage or the custody seal is broken, stop and contact the project manager and the shipper.)
 No. of Samples 99 + 13 Chain-of-Custody Signature [Signature]
 Date of Acceptance into Sample Bank 4/30/10 Misc. Info. _____
 Disposition of Samples EMS LABS

EMS LABORATORIES 117 West Bellevue Drive / Pasadena CA 91105-2503 / 626-568-4065

SUBMITTAL FORM/Laboratory Services

137367

PAGE 6 OF 8

Standard T/A

RELINQUISHED BY Jeff Jones
 TIME / DATE 4/29/10
 CLIENT City of San Diego DATE OF SHIPMENT 4/29/10 CARRIER FedEx
 ADDRESS 9601 Ridgehaven Ct. #320 CLIENT P.O. NO. 1078974
San Diego, CA 92123 CLIENT JOB/PROJECT ID NO(S). 6447
 TELEPHONE 858-573-1277 PACKAGE SHIPPED FROM San Diego
 CONTACT Jeff Jones

RESULTS REQUESTED VIA Email: jjones@sandiego.gov
 (NOTE: Complete written reports will follow all analyses, in addition to any prior transmitted verbal or fax results.)

DATE/TIME OF SAMPLE COLLECTION _____
 SAMPLE PRESERVATIVES _____ HOLDING TIMES _____
 NO. OF SAMPLES SENT _____ SAMPLER'S NAME Jeff Jones
 TYPE: WATER WASTE WATER SOIL FILTER SORBENT TUBE IMPINGER OTHER _____

(FOR EMS ONLY)	CLIENT SAMPLE NO.	DESCRIPTION/LOCATION/ANALYSIS	VOLUME/ TIME/WEIGHT (IF APPLICABLE)
EMS Sample No. <u>137367-130</u>	6447-130	Soil	All Metal TTLC
	6447-131		
	6447-132		
	6447-133		
	6447-136		
	6447-137		
	6447-138		
	6447-139		
	6447-140		
	6447-141		
	6447-142		
	6447-143		
	6447-144		
	6447-145		
✓ -146	6447-146		

(SF 5/00)

Laboratory No. 137367 Received By [Signature] Time 9:45
 Date of Package Delivery 4/30/10 Shipping Bill Retained: YES NONE
 Condition of Package on Receipt OK Condition of Custody Seal NONE
 (NOTE: If the package has sustained substantial damage or the custody seal is broken, stop and contact the project manager and the shipper.)
 No. of Samples 99 + 13 Chain-of-Custody Signature [Signature]
 Date of Acceptance into Sample Bank 4/30/10 Misc. Info. _____
 Disposition of Samples EMC LABS

EMS LABORATORIES 117 West Bellevue Drive / Pasadena CA 91105-2503 / 626-568-4065

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 SAMPLE PRESERVATIVES _____ HOLDING TIMES _____
 NO. OF SAMPLES SENT _____ SAMPLER'S NAME Jeff Jones
 TYPE: WATER WASTE WATER SOIL FILTER SORBENT TUBE IMPINGER OTHER _____

(FOR EMS ONLY) EMS Sample No.	CLIENT SAMPLE NO.	DESCRIPTION/LOCATION/ANALYSIS	VOLUME, TIME/WEIGHT (IF APPLICABLE)
137367-147	6447-147	Soil	All Metal TTLC
	6447-148	Wipe	AA/Pb 1 SF
	6447-149	Wipe	AA/Pb 1 SF
	6447-150	Soil	All Metal TTLC
	6447-151	↓	↓
	6447-152	↓	↓
137367.1-153	6447-153	Roof core	PLM
	6447-154	Roof core	
	6447-155	Roof core	
	6447-156	Roof core	
	6447-157	Window putty	
	6447-158	Roof core	
	6447-159	Roof core	
	6447-160	Roof core	
	6447-161	Roof core	

(SF 5/00)

Laboratory No. 137367 Received By Kip Fulmer Time 9:45
 Date of Package Delivery 4/30/10 Shipping Bill Retained: YES NONE
 Condition of Package on Receipt OK Condition of Custody Seal NONE
 (NOTE: If the package has sustained substantial damage or the custody seal is broken, stop and contact the project manager and the shipper.)
 No. of Samples 99+13 Chain-of-Custody Signature [Signature]
 Date of Acceptance into Sample Bank 4/30/10 Misc. Info _____
 Disposition of Samples EMS LABS

EMS LABORATORIES 117 West Bellevue Drive / Pasadena CA 91105-2503 / 626-568-4065

SUBMITTAL FORM/Laboratory Services

137367

PAGE 8 OF 8

Standard T/A

CLIENT City of San Diego
 ADDRESS 9601 Ridgehaven Ct. #320
 San Diego, CA 92123
 TELEPHONE 858-573-1277
 CONTACT Jeff Jones

RELINQUISHED BY Jeff Jones
 TIME / DATE 4/29/10
 DATE OF SHIPMENT 4/29/10 CARRIER FedEx
 CLIENT P.O. NO. 1078974
 CLIENT JOB/PROJECT ID NO(S). 6447
 PACKAGE SHIPPED FROM San Diego

RESULTS REQUESTED VIA Email: jjones@sandiego.gov
 (NOTE: Complete written reports will follow all analyses, in addition to any prior transmitted verbal or fax results.)

DATE/TIME OF SAMPLE COLLECTION _____
 SAMPLE PRESERVATIVES _____ HOLDING TIMES _____
 NO. OF SAMPLES SENT _____ SAMPLER'S NAME Jeff Jones
 TYPE: WATER WASTE WATER SOIL FILTER SORBENT TUBE IMPINGER OTHER _____

(FOR EMS ONLY) EMS Sample No.	CLIENT SAMPLE NO.	DESCRIPTION/LOCATION/ANALYSIS	VOLUME/ TIME/WEIGHT (IF APPLICABLE)
137367-162	6447-162	Wipe AA/Pb	1 SF
	6447-163		
	6447-164		
	6447-165		
	6447-166		
	6447-167		
	6447-168		

(SF 5/00)

Laboratory No. 137367 Received By [Signature] Time 945
 Date of Package Delivery 4/30/10 Shipping Bill Retained: YES NONE
 Condition of Package on Receipt OK Condition of Custody Seal NONE
 (NOTE: If the package has sustained substantial damage or the custody seal is broken, stop and contact the project manager and the shipper.)
 No. of Samples 99 F13 Chain-of-Custody Signature [Signature]
 Date of Acceptance into Sample Bank 4/30/10 Misc. Info _____
 Disposition of Samples EMC LABS

EMS LABORATORIES 117 West Bellevue Drive / Pasadena CA 91105-2503 / 626-568-4065



City of San Diego/Asbestos and Lead Management Program

Project 6447 Firing Range

XRF Assay Results



Reading No	Time	Type	Duration	Units	Sequence	Component	Substrate	Side	Condition	Color	Site	Inspector	Room	Misc 1	PbC	PbC Error
5	4/8/10 7:57	SHUTTER CAL	114.61	cps	Final										3.32	0
6	4/8/10 8:15	PAINT	8.62	mg / cm ²	Final	cal				RED	firing range				1.1	0.1
7	4/8/10 8:15	PAINT	4.01	mg / cm ²	Final	cal				RED	firing range				1.1	0.1
8	4/8/10 8:16	PAINT	4.75	mg / cm ²	Final	cal				RED	firing range				1.2	0.1
9	4/8/10 8:17	PAINT	8.48	mg / cm ²	Final	WINDOW sill	WOOD	C	FAIR	PINK	firing range	ma	OUTSIDE	staff	1.1	0.2
10	4/8/10 8:18	PAINT	5.76	mg / cm ²	Final	WINDOW	WOOD	C	FAIR	PINK	firing range	ma	OUTSIDE	staff	0.6	0.1
11	4/8/10 8:19	PAINT	2	mg / cm ²	Final	DOOR	WOOD	C	FAIR	PINK	firing range	ma	OUTSIDE	staff	0.4	0.2
12	4/8/10 8:19	PAINT	1.76	mg / cm ²	Final	DOOR frame	WOOD	C	FAIR	PINK	firing range	ma	OUTSIDE	staff	0.4	0.2
13	4/8/10 8:20	PAINT	3.61	mg / cm ²	Final	upper trim	WOOD	C	FAIR	PINK	firing range	ma	OUTSIDE	staff	0.5	0.1
15	4/8/10 8:54	PAINT	6.77	mg / cm ²	Final	WALL	CONCRETE	A	INTACT	BEIGE	firing range	ma	OFFICE	staff	0.14	0.03
16	4/8/10 8:55	PAINT	3.51	mg / cm ²	Final	desk	WOOD	A	INTACT	BROWN	firing range	ma	OFFICE	staff	<LOD	0.03
17	4/8/10 8:56	PAINT	6.99	mg / cm ²	Final	DOOR	WOOD	C	INTACT	BROWN	firing range	ma	OFFICE	staff	<LOD	0.03
18	4/8/10 8:56	PAINT	4.51	mg / cm ²	Final	DOOR frame	WOOD	C	INTACT	BROWN	firing range	ma	OFFICE	staff	<LOD	0.03
19	4/8/10 8:57	PAINT	1.75	mg / cm ²	Final	vault door	METAL	C	INTACT	BROWN	firing range	ma	OFFICE	staff	0.5	0.3
20	4/8/10 8:58	PAINT	5.5	mg / cm ²	Final	vault door frame	METAL	C	INTACT	BROWN	firing range	ma	OFFICE	staff	0.7	0.1
21	4/8/10 8:59	PAINT	3.75	mg / cm ²	Final	WALL	CONCRETE	B	INTACT	BEIGE	firing range	ma	OFFICE	staff	0.14	0.03
22	4/8/10 8:59	PAINT	3.73	mg / cm ²	Final	DOOR	WOOD	D	INTACT	BEIGE	firing range	ma	OFFICE	staff	0.22	0.09
23	4/8/10 9:00	PAINT	4.5	mg / cm ²	Final	DOOR frame	WOOD	D	INTACT	BEIGE	firing range	ma	OFFICE	staff	0.29	0.1
24	4/8/10 9:01	PAINT	5.75	mg / cm ²	Final	WALL	DRYWALL	C	INTACT	BEIGE	firing range	ma	front office	staff	<LOD	0.03
25	4/8/10 9:02	PAINT	1.75	mg / cm ²	Final	WALL	DRYWALL	B	INTACT	BEIGE	firing range	ma	front office	staff	<LOD	0.03
26	4/8/10 9:02	PAINT	1.5	mg / cm ²	Final	DOOR	WOOD	B	INTACT	BEIGE	firing range	ma	front office	staff	<LOD	0.03
27	4/8/10 9:03	PAINT	2	mg / cm ²	Final	DOOR frame	WOOD	B	INTACT	BEIGE	firing range	ma	front office	staff	<LOD	0.03
28	4/8/10 9:04	PAINT	3.51	mg / cm ²	Final	WINDOW frame	METAL	C	INTACT	BEIGE	firing range	ma	front office	staff	0.22	0.11
29	4/8/10 9:04	PAINT	1.75	mg / cm ²	Final	CEILING	DRYWALL	C	INTACT	WHITE	firing range	ma	front office	staff	<LOD	0.03
30	4/8/10 9:07	PAINT	2	mg / cm ²	Final	WINDOW frame	WOOD	D	INTACT	BEIGE	firing range	ma	OUTSIDE	revolver club	9.7	3
31	4/8/10 9:08	PAINT	1.76	mg / cm ²	Final	DOOR frame	WOOD	D	INTACT	BEIGE	firing range	ma	OUTSIDE	revolver club	2.2	0.7
32	4/8/10 9:10	PAINT	3.5	mg / cm ²	Final	WINDOW sill	WOOD	D	INTACT	BEIGE	firing range	ma	OUTSIDE	revolver club	<LOD	0.04
33	4/8/10 9:10	PAINT	1.5	mg / cm ²	Final	WINDOW	WOOD	C	INTACT	BEIGE	firing range	ma	OUTSIDE	revolver club	6.4	2.8
34	4/8/10 9:11	PAINT	2	mg / cm ²	Final	upper trim	WOOD	C	INTACT	BEIGE	firing range	ma	OUTSIDE	revolver club	3.3	1.1
35	4/8/10 9:12	PAINT	2	mg / cm ²	Final	DOOR	WOOD	D	FAIR	BEIGE	firing range	ma	OUTSIDE	revolver club	<LOD	0.03
36	4/8/10 9:13	PAINT	4.01	mg / cm ²	Final	DOOR frame	WOOD	D	FAIR	BEIGE	firing range	ma	OUTSIDE	revolver club	0.8	0.2
37	4/8/10 9:14	PAINT	2.49	mg / cm ²	Final	elec closet	WOOD	A	FAIR	PINK	firing range	ma	OUTSIDE	revolver club	1.8	0.6
38	4/8/10 9:15	PAINT	1.5	mg / cm ²	Final	eaves	WOOD	C	FAIR	PINK	firing range	ma	OUTSIDE	revolver club	1.9	0.9
39	4/8/10 9:16	PAINT	2.52	mg / cm ²	Final	beam	WOOD	C	FAIR	PINK	firing range	ma	OUTSIDE	revolver club	24	4.3
40	4/8/10 9:17	PAINT	3.24	mg / cm ²	Final	WALL	CONCRETE	C	FAIR	PINK	firing range	ma	OUTSIDE	revolver club	<LOD	0.03
42	4/8/10 9:25	PAINT	2.75	mg / cm ²	Final	DOOR frame	METAL	D	FAIR	BEIGE	firing range	ma	INSIDE-REAR	revolver club	2	0.9
43	4/8/10 9:26	PAINT	1.24	mg / cm ²	Final	DOOR	METAL	D	FAIR	BEIGE	firing range	ma	INSIDE-REAR	revolver club	<LOD	0.05
44	4/8/10 9:26	PAINT	2.25	mg / cm ²	Final	DOOR	METAL	D	FAIR	BEIGE	firing range	ma	INSIDE-REAR	revolver club	<LOD	0.03
45	4/8/10 9:27	PAINT	3.51	mg / cm ²	Final	WALL	DRYWALL	C	INTACT	BEIGE	firing range	ma	INSIDE-REAR	revolver club	1.8	0.5
46	4/8/10 9:35	PAINT	2.51	mg / cm ²	Final	CABINET	DRYWALL	A	INTACT	BEIGE	firing range	ma	INSIDE-REAR	revolver club	3.5	1.6
47	4/8/10 9:35	PAINT	1.75	mg / cm ²	Final	CABINET	DRYWALL	A	INTACT	BEIGE	firing range	ma	INSIDE-REAR	revolver club	3.8	2.1



City of San Diego/Asbestos and Lead Management Program



Project 6447 Firing Range

XRF Assay Results

Reading No	Time	Type	Duration	Units	Sequence	Component	Substrate	Side	Condition	Color	Site	Inspector	Room	Misc 1	PbC	PbC Error
48	4/8/10 9:36	PAINT	2.28	mg / cm ^2	Final	WINDOW sill	WOOD	A	INTACT	BEIGE	firing range	ma	INSIDE - REAR	revolver club	0.25	0.12
50	4/8/10 9:37	PAINT	6.26	mg / cm ^2	Final	door frame	WOOD	A	INTACT	BEIGE	firing range	ma	INSIDE - REAR	revolver club	1.6	0.6
61	4/8/10 9:38	PAINT	1.75	mg / cm ^2	Final	door	WOOD	A	INTACT	BEIGE	firing range	ma	INSIDE - REAR	revolver club	< LOD	0.11
62	4/8/10 9:38	PAINT	3.5	mg / cm ^2	Final	WALL	WOOD	A	INTACT	BEIGE	firing range	ma	INSIDE - REAR	revolver club	4.8	1.2
53	4/8/10 9:40	PAINT	4.01	mg / cm ^2	Final	WALL	CONCRETE	C	INTACT	BEIGE	firing range	ma	INSIDE - REAR	revolver club	< LOD	0.04
64	4/8/10 9:41	PAINT	1.99	mg / cm ^2	Final	CABINET	WOOD	D	INTACT	BEIGE	firing range	ma	INSIDE - REAR	revolver club	< LOD	0.03
55	4/8/10 9:41	PAINT	2	mg / cm ^2	Final	WINDOW	WOOD	B	INTACT	BEIGE	firing range	ma	INSIDE - FRONT	revolver club	< LOD	0.03
56	4/8/10 9:42	PAINT	3.74	mg / cm ^2	Final	WINDOW frame	METAL	B	INTACT	BEIGE	firing range	ma	INSIDE - FRONT	revolver club	5.3	1.1
57	4/8/10 9:42	PAINT	2.26	mg / cm ^2	Final	WINDOW frame	WOOD	A	INTACT	BEIGE	firing range	ma	INSIDE - FRONT	revolver club	8.1	2.2
58	4/8/10 9:43	PAINT	3.61	mg / cm ^2	Final	WINDOW	METAL	A	INTACT	BEIGE	firing range	ma	INSIDE - FRONT	revolver club	8.4	1.3
59	4/8/10 10:21	PAINT	2.26	mg / cm ^2	Final	WINDOW	WOOD	A	POOR	BEIGE	firing range	ma	OUTSIDE	clubhouse	1.6	0.4
60	4/8/10 10:23	PAINT	3.49	mg / cm ^2	Final	WINDOW sill	CONCRETE	A	POOR	BEIGE	firing range	ma	OUTSIDE	clubhouse	0.16	0.05
61	4/8/10 10:24	PAINT	1.5	mg / cm ^2	Final	DOOR	WOOD	A	FAIR	BEIGE	firing range	ma	OUTSIDE	clubhouse	< LOD	0.03
62	4/8/10 10:24	PAINT	2.25	mg / cm ^2	Final	DOOR frame	WOOD	A	FAIR	BEIGE	firing range	ma	OUTSIDE	clubhouse	< LOD	0.03
63	4/8/10 10:25	PAINT	1.25	mg / cm ^2	Final	WINDOW	WOOD	B	FAIR	BEIGE	firing range	ma	OUTSIDE	clubhouse	9.0	4
64	4/8/10 10:26	PAINT	3.75	mg / cm ^2	Final	WINDOW sill	WOOD	B	FAIR	BEIGE	firing range	ma	OUTSIDE	clubhouse	0.06	0.03
65	4/8/10 10:26	PAINT	3.75	mg / cm ^2	Final	DOOR	WOOD	C	FAIR	BEIGE	firing range	ma	OUTSIDE	clubhouse	< LOD	0.03
66	4/8/10 10:27	PAINT	2	mg / cm ^2	Final	patio post	WOOD	C	INTACT	BROWN	firing range	ma	OUTSIDE	clubhouse	< LOD	0.05
67	4/8/10 10:29	PAINT	2.5	mg / cm ^2	Final	downspout	WOOD	C	INTACT	BROWN	firing range	ma	OUTSIDE	clubhouse	< LOD	0.03
68	4/8/10 10:47	PAINT	0.75	mg / cm ^2	Final	eaves	WOOD	C	INTACT	BEIGE	firing range	ma	OUTSIDE	clubhouse	2.7	1.4
69	4/8/10 10:48	PAINT	1.26	mg / cm ^2	Final	upper trim	WOOD	C	INTACT	BEIGE	firing range	ma	OUTSIDE	clubhouse	10.6	4.1
70	4/8/10 10:50	PAINT	3.99	mg / cm ^2	Final	upper trim	WOOD	C	INTACT	BEIGE	firing range	ma	OUTSIDE	clubhouse	< LOD	0.03
71	4/8/10 11:00	PAINT	3.49	mg / cm ^2	Final	DOOR	METAL	A	INTACT	BEIGE	firing range	ma	OUTSIDE	clubhouse	0.6	0.1
72	4/8/10 11:00	PAINT	2.61	mg / cm ^2	Final	DOOR frame	METAL	A	INTACT	BEIGE	firing range	ma	OUTSIDE	clubhouse	0.7	0.3
73	4/8/10 11:01	PAINT	3.5	mg / cm ^2	Final	WALL	CONCRETE	A	INTACT	BEIGE	firing range	ma	mens	outdoor restroom	< LOD	0.1
74	4/8/10 11:01	PAINT	5.25	mg / cm ^2	Final	WALL	CONCRETE	C	INTACT	BEIGE	firing range	ma	mens	outdoor restroom	0.14	0.03
75	4/8/10 11:04	PAINT	53.56	mg / cm ^2	Final	WALL	CONCRETE	C	INTACT	BEIGE	firing range	ma	mens	outdoor restroom	0.07	0.02
76	4/8/10 11:05	PAINT	6.24	mg / cm ^2	Final	WINDOW	METAL	C	INTACT	BEIGE	firing range	ma	mens	outdoor restroom	0.27	0.06
77	4/8/10 11:06	PAINT	7.75	mg / cm ^2	Final	WINDOW	CONCRETE	B	INTACT	BEIGE	firing range	ma	mens	outdoor restroom	0.05	0.03
79	4/8/10 11:08	PAINT	17.76	mg / cm ^2	Final	stall divider	WOOD	C	INTACT	BEIGE	firing range	ma	mens	outdoor restroom	0.06	0.03
80	4/8/10 11:10	PAINT	3.25	mg / cm ^2	Final	DOOR	WOOD	A	INTACT	BEIGE	firing range	ma	womens	outdoor restroom	0.5	0.2
81	4/8/10 11:11	PAINT	9.76	mg / cm ^2	Final	stall door	WOOD	A	INTACT	BEIGE	firing range	ma	womens	outdoor restroom	0.06	0.02
82	4/8/10 11:11	PAINT	4.73	mg / cm ^2	Final	WINDOW	METAL	D	INTACT	BEIGE	firing range	ma	womens	outdoor restroom	0.2	0.06
83	4/8/10 11:12	PAINT	1.26	mg / cm ^2	Final	eaves	METAL	D	INTACT	BEIGE	firing range	ma	OUTSIDE	clubhouse	< LOD	0.45
84	4/8/10 11:13	PAINT	3.75	mg / cm ^2	Final	eaves	METAL	D	INTACT	BEIGE	firing range	ma	OUTSIDE	clubhouse	0.4	0.1
85	4/8/10 11:14	PAINT	3.61	mg / cm ^2	Final	uppo trim	METAL	D	INTACT	BEIGE	firing range	ma	OUTSIDE	clubhouse	0.4	0.1
86	4/8/10 11:20	PAINT	4.74	mg / cm ^2	Final	deck	WOOD	D	INTACT	BEIGE	firing range	ma	OUTSIDE	clubhouse	< LOD	0.03
87	4/8/10 11:21	PAINT	7.52	mg / cm ^2	Final	beam	WOOD	D	INTACT	BEIGE	firing range	ma	OUTSIDE	clubhouse	< LOD	0.07
88	4/8/10 11:22	PAINT	2.26	mg / cm ^2	Final	WALL	WOOD	D	INTACT	BEIGE	firing range	ma	OUTSIDE	clubhouse	< LOD	0.03
89	4/8/10 11:25	PAINT	4.01	mg / cm ^2	Final	CABINET	WOOD	D	INTACT	BROWN	firing range	ma	HALL	clubhouse	< LOD	0.04
90	4/8/10 11:26	PAINT	3.01	mg / cm ^2	Final	DOOR	WOOD	A	INTACT	BROWN	firing range	ma	HALL	clubhouse	< LOD	0.04



City of San Diego/Asbestos and Lead Management Program

Project 6447 Firing Range

XRF Assay Results



Reading No	Time	Type	Duration	Units	Sequence	Component	Substrate	Slide	Condition	Color	Site	Inspector	Rocm	Misc 1	PbC	PbC Error
91	4/8/10 11:27	PAINT	3.25	mg / cm ^2	Final	WINDOW sill	CONCRETE	A	INTACT	BROWN	firing range	ma	HALL	clubhouse	< LOD	0.05
92	4/8/10 11:28	PAINT	1.75	mg / cm ^2	Final	WINDOW sill	WOOD	B	INTACT	BROWN	firing range	ma	HALL	clubhouse	11	3.5
93	4/8/10 11:30	PAINT	6.24	mg / cm ^2	Final	rafters	WOOD	B	INTACT	WHITE	firing range	ma	HALL	clubhouse	0.06	0.03
98	4/8/10 11:34	PAINT	14.75	mg / cm ^2	Final	CABINET	WOOD	A	INTACT	BEIGE	firing range	ma	KITCHEN	clubhouse	0.15	0.04
98	4/8/10 11:35	PAINT	1.25	mg / cm ^2	Final	WALL	WOOD	A	INTACT	BEIGE	firing range	ma	KITCHEN	clubhouse	7.2	3.4
99	4/8/10 11:36	PAINT	7.5	mg / cm ^2	Final	WALL	stone	A	INTACT	BEIGE	firing range	ma	KITCHEN	clubhouse	< LOD	0.03
100	4/8/10 11:37	PAINT	5.01	mg / cm ^2	Final	CABINET	stone	A	INTACT	BEIGE	firing range	ma	KITCHEN	clubhouse	< LOD	0.03
101	4/8/10 11:38	PAINT	1.75	mg / cm ^2	Final	WINDOW	WOOD	A	INTACT	BEIGE	firing range	ma	KITCHEN	clubhouse	6.7	2.7
102	4/8/10 11:38	PAINT	12.26	mg / cm ^2	Final	DOOR	WOOD	C	INTACT	BEIGE	firing range	ma	KITCHEN	clubhouse	0.8	0.1
103	4/8/10 11:45	PAINT	20.21	mg / cm ^2	Final	cal				RED	firing range	ma			1	0.1
104	4/8/10 11:46	PAINT	20.26	mg / cm ^2	Final	cal				RED	firing range	ma			1	0.1
105	4/8/10 11:47	PAINT	20.23	mg / cm ^2	Final	cal				RED	firing range	ma			1	0.1



City of San Diego/Asbestos and Lead Management Program

Project 6447 Firing Range

XRF Assay Results



Reading No	Time	Type	Duration	Units	Component	Substrate	Side	Condition	Color	Site	Inspector	Location	PbC	PbC Error
1	4/19/2010 11:54	SHUTTER CAL	118.58	cps									3.36	0
2	4/19/2010 11:56	PAINT	6.41	mg / cm ²	cal				RED	shooting range			0.9	0.1
3	4/19/2010 11:57	PAINT	20.19	mg / cm ²	cal				RED	shooting range			1	0.1
4	4/19/2010 11:58	PAINT	11.06	mg / cm ²	cal				RED	shooting range			1	0.1
5	4/19/2010 11:59	PAINT	20.39	mg / cm ²	cal				RED	shooting range			1	0.1
6	4/19/2010 12:00	PAINT	10.06	mg / cm ²	cal				RED	shooting range			1	0.1
7	4/19/2010 12:01	PAINT	20.16	mg / cm ²	cal				RED	shooting range			1	0.1
8	4/19/2010 12:03	PAINT	1.97	mg / cm ²	COLUMN	WOOD	C	FAIR	GREEN	shooting range	ma	range 1 - backstop	3.4	1.6
9	4/19/2010 12:04	PAINT	1.71	mg / cm ²	COLUMN	WOOD	B	FAIR	GREEN	shooting range	ma	range 1 - backstop	< LOD	0.19
10	4/19/2010 12:04	PAINT	1.96	mg / cm ²	POST	WOOD	B	FAIR	GREEN	shooting range	ma	range 1 - backstop	< LOD	0.07
11	4/19/2010 12:07	PAINT	1.98	mg / cm ²	COLUMN	WOOD	C	FAIR	GREEN	shooting range	ma	range 2 - backstop	< LOD	0.2
12	4/19/2010 12:07	PAINT	1.47	mg / cm ²	horizontal beam	WOOD	C	FAIR	GREEN	shooting range	ma	range 2 - backstop	< LOD	0.03
13	4/19/2010 12:08	PAINT	3.93	mg / cm ²	horizontal beam	WOOD	C	FAIR	GREEN	shooting range	ma	range 2 - backstop	1	0.2
14	4/19/2010 12:09	PAINT	3.69	mg / cm ²	COLUMN	WOOD	C	FAIR	GREEN	shooting range	ma	range 2 - backstop	1.8	0.6
15	4/19/2010 12:10	PAINT	3.95	mg / cm ²	COLUMN	WOOD	C	FAIR	GREEN	shooting range	ma	range 2 - backstop	0.12	0.04
16	4/19/2010 13:16	PAINT	1.98	mg / cm ²	COLUMN	WOOD	C	FAIR	GREEN	shooting range	ma	range 3 - backstop	2.5	1.5
17	4/19/2010 13:17	PAINT	3.93	mg / cm ²	COLUMN	WOOD	D	FAIR	GREEN	shooting range	ma	range 3 - backstop	1.8	0.6
18	4/19/2010 13:19	PAINT	1.48	mg / cm ²	WALL	WOOD	C	FAIR	BEIGE	shooting range	ma	range 3 north storage	< LOD	0.13
19	4/19/2010 13:20	PAINT	1.48	mg / cm ²	WALL	WOOD	D	FAIR	BEIGE	shooting range	ma	range 3 north storage	< LOD	0.05
20	4/19/2010 13:20	PAINT	1.24	mg / cm ²	WALL	WOOD	D	INTACT	BEIGE	shooting range	ma	range 3 north storage	< LOD	0.06
21	4/19/2010 13:20	PAINT	1.96	mg / cm ²	WALL	WOOD	D	INTACT	BEIGE	shooting range	ma	range 3 north storage	< LOD	0.05
22	4/19/2010 13:21	PAINT	2.22	mg / cm ²	DOOR	WOOD	D	INTACT	BEIGE	shooting range	ma	range 3 north storage	< LOD	0.06
23	4/19/2010 13:21	PAINT	1.97	mg / cm ²	DOOR	WOOD	A	INTACT	BEIGE	shooting range	ma	range 3 north storage	< LOD	0.06
24	4/19/2010 13:22	PAINT	3.91	mg / cm ²	WALL	METAL	C	INTACT	BEIGE	shooting range	ma	range 3 south storage	< LOD	0.03
25	4/19/2010 13:23	PAINT	2.48	mg / cm ²	WALL	METAL	D	INTACT	BEIGE	shooting range	ma	range 3 south storage	< LOD	0.04
26	4/19/2010 13:23	PAINT	2.71	mg / cm ²	DOOR	METAL	D	INTACT	BEIGE	shooting range	ma	range 3 south storage	0.3	0.19
27	4/19/2010 13:26	PAINT	1.96	mg / cm ²	DOOR	METAL	D	INTACT	GREEN	shooting range	ma	restrn 1 story storage	< LOD	0.03
28	4/19/2010 13:26	PAINT	1.73	mg / cm ²	DOOR	METAL	D	INTACT	GREEN	shooting range	ma	restrn 1 story storage	< LOD	0.03
29	4/19/2010 13:27	PAINT	2.21	mg / cm ²	WALL	WOOD	D	INTACT	GREEN	shooting range	ma	restrn 1 story storage	< LOD	0.03
30	4/19/2010 13:27	PAINT	4.68	mg / cm ²	WALL	WOOD	C	INTACT	GREEN	shooting range	ma	restrn 1 story storage	< LOD	0.05
31	4/19/2010 13:29	PAINT	27.13	mg / cm ²	WALL	WOOD	C	INTACT	GREEN	shooting range	ma	restrn 2 story	0.09	0.02
32	4/19/2010 13:31	PAINT	24.39	mg / cm ²	WALL	WOOD	C	INTACT	GREEN	shooting range	ma	restrn 2 story	0.09	0.02
33	4/19/2010 13:32	PAINT	5.9	mg / cm ²	WALL	WOOD	A	INTACT	GREEN	shooting range	ma	restrn 2 story	0.16	0.06
34	4/19/2010 13:33	PAINT	8.61	mg / cm ²	DOOR	WOOD	C	INTACT	GREEN	shooting range	ma	restrn 2 story	0.14	0.04
35	4/19/2010 13:33	PAINT	3.95	mg / cm ²	DOOR frame	WOOD	C	INTACT	GREEN	shooting range	ma	restrn 2 story	0.28	0.09
36	4/19/2010 13:36	PAINT	1.48	mg / cm ²	WALL	METAL	B	INTACT	BLUE	shooting range	ma	range 3blue shed	2.4	0.8
37	4/19/2010 13:37	PAINT	3.2	mg / cm ²	DOOR	METAL	B	INTACT	BLUE	shooting range	ma	range 3blue shed	< LOD	0.03
38	4/19/2010 13:37	PAINT	1.47	mg / cm ²	DOOR	METAL	C	INTACT	BLUE	shooting range	ma	range 3blue shed	2.7	0.8
39	4/19/2010 13:37	PAINT	1.97	mg / cm ²	DOOR	METAL	D	INTACT	BLUE	shooting range	ma	range 3blue shed	1.7	0.5
40	4/19/2010 13:40	PAINT	3.45	mg / cm ²	COLUMN	WOOD	A	FAIR	BEIGE	shooting range	ma	range 4 shade structure	< LOD	0.04
41	4/19/2010 13:41	PAINT	1.97	mg / cm ²	WALL	WOOD	D	FAIR	BEIGE	shooting range	ma	range 4 shade structure	< LOD	0.05



City of San Diego/Asbestos and Lead Management Program

Project 6447 Firing Range



XRF Assay Results


Reading No	Time	Type	Duration	Units	Component	Substrate	Side	Condition	Color	Site	Inspector	Location	PbC	PbC Error
42	4/19/2010 13:42	PAINT	2.94	mg / cm ^2	upper trim	WOOD	D	FAIR	BEIGE	shooting range	ma	range 4 shade structure	< LOD	0.04
43	4/19/2010 13:44	PAINT	1.73	mg / cm ^2	COLUMN	WOOD	D	FAIR	BROWN	shooting range	ma	range 4 backstop	5.6	2.4
44	4/19/2010 13:48	PAINT	1.97	mg / cm ^2	WALL	PLASTER	D	INTACT	GREEN	shooting range	ma	ticket booth	< LOD	0.04
45	4/19/2010 13:48	PAINT	6.4	mg / cm ^2	WALL	PLASTER	D	INTACT	GREEN	shooting range	ma	ticket booth	< LOD	0.03
46	4/19/2010 13:48	PAINT	4.69	mg / cm ^2	WALL	PLASTER	D	INTACT	GREEN	shooting range	ma	ticket booth	< LOD	0.04
47	4/19/2010 13:50	PAINT	3.46	mg / cm ^2	WINDOW	WOOD	D	FAIR	GREEN	shooting range	ma	ticket booth	0.6	0.1
48	4/19/2010 13:51	PAINT	52.29	mg / cm ^2	WINDOW frame	WOOD	D	FAIR	GREEN	shooting range	ma	ticket booth	0.14	0.04
49	4/19/2010 13:53	PAINT	17.43	mg / cm ^2	uper trim	WOOD	A	FAIR	GREEN	shooting range	ma	ticket booth	0.1	0.03
50	4/19/2010 13:54	PAINT	2.47	mg / cm ^2	DOOR	WOOD	A	FAIR	BEIGE	shooting range	ma	ticket booth	< LOD	0.03
51	4/19/2010 13:58	PAINT	26.1	mg / cm ^2	bench	WOOD	A	FAIR	GREEN	shooting range	ma	range 1 shade structure	0.12	0.02
62	4/19/2010 13:58	PAINT	2.46	mg / cm ^2	COLUMN	WOOD	A	FAIR	GREEN	shooting range	ma	range 1 shade structure	1.8	0.6
53	4/19/2010 13:59	PAINT	4.2	mg / cm ^2	table	WOOD	A	FAIR	GREEN	shooting range	ma	range 1 shade structure	0.05	0.03
54	4/19/2010 13:59	PAINT	2.21	mg / cm ^2	deck	WOOD	A	FAIR	GREEN	shooting range	ma	range 1 shade structure	< LOD	0.03
55	4/19/2010 14:01	PAINT	8.66	mg / cm ^2	cal				RED	shooting range	ma	range 1 shade structure	1	0.1
56	4/19/2010 14:02	PAINT	9.13	mg / cm ^2	cal				RED	shooting range	ma	range 1 shade structure	1.1	0.1
57	4/19/2010 14:03	PAINT	16.8	mg / cm ^2	cal				RED	shooting range	ma	range 1 shade structure	1	0.1
58	4/19/2010 14:04	PAINT	20.76	mg / cm ^2	cal				RED	shooting range	ma	range 1 shade structure	1	0.1
59	4/19/2010 14:05	PAINT	20.75	mg / cm ^2	cal				RED	shooting range	ma	range 1 shade structure	1	0.1

PLM Report

Report No: 136889 Customer: City of San Diego
 Date: April 15, 2010 9601 Ridgehaven Ct. #320
 Date Received: April 9, 2010 San Diego, CA 92123
 Date Analyzed: April 15, 2010 Attention: Jeff Jones
 Date/Time Collected: by Jeff Jones Reference: 1078974; 6447
 Subject: Polarized Light Microscopy Analysis for Asbestos 65 Samples
 Methodology: "Method for Determination of Asbestos in Bulk Building Materials." EPA 600/R-93/116
 Accredited: NVLAP Lab Code 101218-D
 Certified: California Department of Health Services Environmental Testing Laboratory ELAP 1119
 County Sanitation Districts of Los Angeles County, Lab ID No. 10120

Quality Control Sample (SRM 1866 Glass Fibers as the blank): None Detected

Sample ID	Location / Description	Visual Description	Asbestiform Minerals	Other Fibrous Materials	Non-fibrous Materials
6447-1A	NON-FRIABLE	BLACK/BROWN TAR LIKE	NONE DETECTED	SYNTHETICS 15%	GRANULAR MINERALS, OPAQUES
6447-1B SHINGLE	NON-FRIABLE	BLACK/BROWN TAR LIKE	NONE DETECTED	SYNTHETICS 15%	GRANULAR MINERALS, OPAQUES
6447-1B FELT	NON-FRIABLE	BLACK TAR LIKE	NONE DETECTED	SYNTHETICS 15%	GRANULAR MINERALS, OPAQUES
6447-2	NON-FRIABLE	WHITE/GRAY RUBBERY	NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-3A	NON-FRIABLE	WHITE/TAN SOLID	NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-3B	NON-FRIABLE	WHITE/TAN SOLID	CHRYSTOTILE - LESS THAN 1%	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-4A FT	NON-FRIABLE	BEIGE SOLID	**NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-4A M	NON-FRIABLE	YELLOW STICKY	NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-4B FT	NON-FRIABLE	GREEN SOLID	**NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-4B M	NON-FRIABLE	YELLOW STICKY	NONE DETECTED	CELLULOSE - LESS THAN 1%	GRANULAR MINERALS, OPAQUES
6447-5A	NON-FRIABLE	WHITE/BROWN FIBROUS	NONE DETECTED	CELLULOSE 98%	OPAQUES
6447-5B	NON-FRIABLE	BLACK/BROWN FIBROUS	NONE DETECTED	CELLULOSE 98%	OPAQUES
6447-6A FT	NON-FRIABLE	BROWN SOLID	CHRYSTOTILE - GREATER THAN 1%	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-6A M	NON-FRIABLE	BLACK STICKY	NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-6B FT	NOT ANALYZED - STOP AT FIRST POSITIVE				
6447-6B M	NON-FRIABLE	BLACK STICKY	NONE DETECTED	CELLULOSE - LESS THAN 1%	GRANULAR MINERALS, OPAQUES


 Wesene Sebhat, Optical Microscopist
 BMK/mt

B.M. Kolk, Laboratory Director

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** Negative floor tile samples may contain significant amounts (>1%) of very thin asbestos fibers which cannot be detected by PLM. Confirmation by XRD or TEM is recommended by the EPA (Federal Register Vol. 58, No. 146).

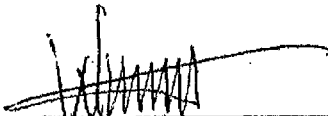
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Samples were received in good condition unless otherwise noted.

PLM Report

Report No: 136889 Client: City of San Diego

Sample ID	Location / Description	Visual Description	Asbestiform Minerals	Other Fibrous Materials	Non-fibrous Materials
6447-7A FT	NON-FRIABLE	BEIGE SOLID	**NONE DETECTED	CELLULOSE 2%	GRANULAR MINERALS, OPAQUES
6447-7A M	NON-FRIABLE	BLACK STICKY	NONE DETECTED	CELLULOSE 2%	GRANULAR MINERALS, OPAQUES
6447-7B FT	NON-FRIABLE	BLACK STICKY	**NONE DETECTED	CELLULOSE 4%	GRANULAR MINERALS, OPAQUES
6447-7B M	NON-FRIABLE	BEIGE SOLID	NONE DETECTED	CELLULOSE - LESS THAN 1%	GRANULAR MINERALS, OPAQUES
6447-8A	NON-FRIABLE	WHITE GRANULAR, BROWN FIBROUS	NONE DETECTED	CELLULOSE 20%	GRANULAR MINERALS, OPAQUES
6447-8B	NON-FRIABLE	WHITE GRANULAR, BROWN FIBROUS	NONE DETECTED	CELLULOSE 20%	GRANULAR MINERALS, OPAQUES
6447-9A SHINGLE	NON-FRIABLE	BLACK/GREEN TAR LIKE	NONE DETECTED	CELLULOSE 20%	OPAQUES
6447-9A FELT	NON-FRIABLE	BLACK TAR LIKE	NONE DETECTED	CELLULOSE 60%	OPAQUES
6447-9B SHINGLE	NON-FRIABLE	BLACK/GRAY TAR LIKE	NONE DETECTED	CELLULOSE 30%	OPAQUES
6447-9B FELT	NON-FRIABLE	BLACK TAR LIKE	NONE DETECTED	CELLULOSE 60%	OPAQUES
6447-10A	NON-FRIABLE	BLACK/GRAY STICKY, FIBROUS	CHRYSTOLE 5%	NONE DETECTED	OPAQUES
6447-10B	NOT ANALYZED - STOP AT FIRST POSITIVE				
6447-11A	NON-FRIABLE	WHITE/GRAY SOLID	NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-11B	NON-FRIABLE	WHITE/GRAY SOLID	NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-12A	NON-FRIABLE	WHITE/BROWN FIBROUS	NONE DETECTED	CELLULOSE 95%; FIBERGLASS 2%	OPAQUES
6447-12B	NON-FRIABLE	WHITE/BROWN FIBROUS	NONE DETECTED	CELLULOSE 95%; FIBERGLASS 2%	OPAQUES
6447-13A FT(1)	NON-FRIABLE	GRAY SOLID	CHRYSTOLE - GREATER THAN 1%	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-13A M(1)	NON-FRIABLE	BLACK STICKY	NONE DETECTED	CELLULOSE 5%	OPAQUES
6447-13A FT(2)	NON-FRIABLE	BROWN SOLID	CHRYSTOLE - GREATER THAN 1%	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-13A M(2)	NON-FRIABLE	BROWN STICKY	NONE DETECTED	CELLULOSE - LESS THAN 1%	GRANULAR MINERALS, OPAQUES
6447-13B FT	NOT ANALYZED - STOP AT FIRST POSITIVE				
6447-13B M	NON-FRIABLE	BROWN STICKY	NONE DETECTED	CELLULOSE - LESS THAN 1%	GRANULAR MINERALS, OPAQUES



Wesene Sebat, Optical Microscopist
BMK/ml

B.M. Kolk, Laboratory Director

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Report No:

136889

Client:

City of San Diego

Sample ID	Location / Description	Visual Description	Asbestiform Minerals	Other Fibrous Materials	Non-fibrous Materials
6447-14A	NON-FRIABLE	WHITE/GRAY GRANULAR	NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-14B	NON-FRIABLE	WHITE/GRAY GRANULAR	NONE DETECTED	CELLULOSE 2%	GRANULAR MINERALS, OPAQUES
6447-14C	NON-FRIABLE	WHITE/GRAY GRANULAR	NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-15A SHINGLE	NON-FRIABLE	WHITE/GRAY GRANULAR	NONE DETECTED	CELLULOSE 25%	OPAQUES
6447-15A FELT	NON-FRIABLE	BLACK TAR LIKE	NONE DETECTED	CELLULOSE 60%	OPAQUES
6447-15B SHINGLE	NON-FRIABLE	WHITE/BLACK TAR LIKE	NONE DETECTED	CELLULOSE 20%	OPAQUES
6447-15B FELT	NON-FRIABLE	BLACK FIBROUS	NONE DETECTED	CELLULOSE 60%	OPAQUES
6447-16A	NON-FRIABLE	BLACK/GRAY TAR LIKE	CHRYSTILE 3%	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-16B	NOT ANALYZED - STOP AT FIRST POSITIVE				
6447-17A	NON-FRIABLE	WHITE/BEIGE SOLID	NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-17B	NON-FRIABLE	WHITE/TAN SOLID	NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-18A	NON-FRIABLE	WHITE/BLACK TAR LIKE	NONE DETECTED	FIBERGLASS 20%	OPAQUES
6447-18B	NON-FRIABLE	WHITE/GRAY TAR LIKE	NONE DETECTED	FIBERGLASS 20%	OPAQUES
6447-18C LAYER 1	NON-FRIABLE	WHITE/BLACK TAR LIKE	NONE DETECTED	FIBERGLASS 15%	GRANULAR MINERALS, OPAQUES
6447-18C LAYER 2	NON-FRIABLE	WHITE/BLACK TAR LIKE	NONE DETECTED	CELLULOSE 30%	GRANULAR MINERALS, OPAQUES
6447-18C LAYER 3	NON-FRIABLE	WHITE/BLACK/BROWN TAR LIKE	NONE DETECTED	CELLULOSE 30%	GRANULAR MINERALS, OPAQUES
6447-19A	NON-FRIABLE	BLACK/GRAY FIBROUS	CHRYSTILE 5%	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-19B	NOT ANALYZED - STOP AT FIRST POSITIVE				
6447-20A	NON-FRIABLE	BEIGE/GRAY SOLID	NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-20B	NON-FRIABLE	BEIGE/GRAY SOLID	NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-21A FT	NON-FRIABLE	GRAY SOLID	**NONE DETECTED	CELLULOSE 2%	GRANULAR MINERALS, OPAQUES
6447-21A M	NON-FRIABLE	BLACK STICKY	CHRYSTILE 5%	NONE DETECTED	OPAQUES
6447-21A LC	NON-FRIABLE	WHITE GRANULAR	NONE DETECTED	CELLULOSE - LESS THAN 1%	GRANULAR MINERALS, OPAQUES
6447-21B FT	NON-FRIABLE	BEIGE STICKY	NONE DETECTED	CELLULOSE 2%	GRANULAR MINERALS, OPAQUES

Wesene Sebnal, Optical Microscopist
BMK/mt

B.M. Kolk, Laboratory Director

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Report No: 136889 Client: City of San Diego

Sample ID	Location / Description	Visual Description	Asbestiform Minerals	Other Fibrous Materials	Non-fibrous Materials
6447-21B M	NOT ANALYZED - STOP AT FIRST POSITIVE				
6447-21C FT	NON-FRIABLE	GRAY SOLID	NONE DETECTED	CELLULOSE 2%	GRANULAR MINERALS, OPAQUES
6447-21C M	NOT ANALYZED - STOP AT FIRST POSITIVE				



Wesene Sebhat, Optical Microscopist
BMK/ml

B.M. Kolk, Laboratory Director

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Samples were received in good condition unless otherwise noted.

SUBMITTAL FORM/Laboratory Services

136889

PAGE 1 OF 3

5 day T/A

CLIENT City of San Diego
 ADDRESS 9601 Ridgeway Ct. #320
San Diego, CA 92123
 TELEPHONE 858-573-1277
 CONTACT Jeff Jones

RELINQUISHED BY Jeff Jones
 TIME / DATE 4/8/10
 DATE OF SHIPMENT 4/8/10 CARRIER FedEx
 CLIENT P.O. NO. 1078974
 CLIENT JOB/PROJECT ID NO(S). 6447
 PACKAGE SHIPPED FROM San Diego

RESULTS REQUESTED VIA Email: jjones@sandiego.gov
 (NOTE: Complete written reports will follow all analyses, in addition to any p/lor transmitted verbal or fax results.)

DATE/TIME OF SAMPLE COLLECTION _____
 SAMPLE PRESERVATIVES _____ HOLDING TIMES _____
 NO. OF SAMPLES SENT 44 SAMPLER'S NAME Jeff Jones
 TYPE: WATER WASTE WATER SOIL FILTER SORBENT TUBE IMPINGER OTHER _____

36889

(FOR EMS ONLY)	EMS Sample No.	CLIENT SAMPLE NO.	DESCRIPTION/LOCATION/ANALYSIS	VOLUME, TIME/WEIGHT (IF APPLICABLE)
	-1A	6447-1A	Roof core	PLM
	1B	6447-1B	Roof core	stop pos
	2	6447-2	Rubber penetration mastic	
	3A	6447-3A	Window putty	
	3B	6447-3B	Window putty	stop pos
	4A	6447-4A	Floor tile	
	4B	6447-4B	Floor tile	stop pos
	5A	6447-5A	Ceiling tile	
	5B	6447-5B	Ceiling tile	stop pos
	6A	6447-6A	Floor tile and black mastic	
	6B	6447-6B	Floor tile and black mastic	stop pos
	7A	6447-7A	Floor tile and black mastic	
	7B	6447-7B	Floor tile and black mastic	stop pos
	8A	6447-8A	Drywall/mud composite	
	8B	6447-8B	Drywall/mud composite	stop pos

(SF 5/00)

Laboratory No. 136889 Received By [Signature] Time 9:34
 Date of Package Delivery 4/9/10 Shipping Bill Retained: YES NONE
 Condition of Package on Receipt OK Condition of Custody Seal None
 (NOTE: If the package has sustained substantial damage or the custody seal is broken, stop and contact the project manager and the shipper.)
 No. of Samples 44 Chain-of-Custody Signature _____
 Date of Acceptance into Sample Bank 4/9/10 Misc. Info. stop pos: stop if > 1%
 Disposition of Samples EMS Labs

EMS LABORATORIES 117 West Bellevue Drive / Pasadena CA 91105-2503 / 626-568-4065

SUBMITTAL FORM *Laboratory Services*

PAGE **2** OF **3**

5 day T/A

◆ CLIENT City of San Diego
 ◆ ADDRESS 9601 Ridgehaven Ct. #320
San Diego, CA 92123
 ◆ TELEPHONE 858-573-1277
 ◆ CONTACT Jeff Jones

◆ RELINQUISHED BY Jeff Jones
 ◆ TIME / DATE 4/8/10
 ◆ DATE OF SHIPMENT 4/8/10 ◆ CARRIER FedEx
 ◆ CLIENT P.O. NO. 1078974
 ◆ CLIENT JOB/PROJECT ID NO(S). 6447
 ◆ PACKAGE SHIPPED FROM San Diego

◆ RESULTS REQUESTED VIA Email: jjones@sandiego.gov
 (NOTE: Complete written reports will follow all analyses, in addition to any prior transmitted verbal or fax results.)

◆ DATE/TIME OF SAMPLE COLLECTION _____
 ◆ SAMPLE PRESERVATIVES _____
 ◆ NO. OF SAMPLES SENT _____ SAMPLER'S NAME Jeff Jones HOLDING TIMES _____
 ◆ TYPE: WATER WASTE WATER SOIL FILTER SORBENT TUBE IMPINGER OTHER _____
SIGNATURE PRINTED

(FOR EMS ONLY) EMS Sample No.	CLIENT SAMPLE NO.	DESCRIPTION/LOCATION/ANALYSIS	VOLUME/ TIME/WEIGHT (IF APPLICABLE)
<u>136889-9A</u>	6447-9A	Roof shingles (2 layers) PLM	
<u>CB</u>	6447-9B	Roof shingles (2 layers) } stop pos	
<u>10A</u>	6447-10A	Roof penetration mastic	
<u>10B</u>	6447-10B	Roof penetration mastic } stop pos	
<u>11A</u>	6447-11A	Window putty	
<u>11B</u>	6447-11B	Window putty } stop pos	
<u>12A</u>	6447-12A	Ceiling tile	
<u>12B</u>	6447-12B	Ceiling tile } stop pos	
<u>13A</u>	6447-13A	Floor tile (2 layers) and black mastic	
<u>13B</u>	6447-13B	Floor tile	
<u>14A</u>	6447-14A	Wall plaster	
<u>14B</u>	6447-14B	Wall plaster } stop pos	
<u>14C</u>	6447-14C	Wall plaster	
<u>15A</u>	6447-15A	Roof shingles (2 layers)	
<u>15B</u>	6447-15B	Roof shingles (2 layers) } stop pos	

(SF 5/00)

◆ Laboratory No. 136889 ◆ Received By _____ ◆ Time _____
 ◆ Date of Package Delivery _____ ◆ Shipping Bill Retained: YES NONE
 ◆ Condition of Package on Receipt _____ ◆ Condition of Custody Seal _____
 (NOTE: If the package has sustained substantial damage or the custody seal is broken, stop and contact the project manager and the shipper.)
 ◆ No. of Samples _____ ◆ Chain-of-Custody Signature _____
 ◆ Date of Acceptance into Sample Bank _____ ◆ Misc. Info. _____
 ◆ Disposition of Samples _____

EMS LABORATORIES 117 West Bellevue Drive / Pasadena CA 91105-2503 / 626-568-4065

SUBMITTAL FORM/Laboratory Services

5 day T/A

RELINQUISHED BY Jeff Jones
 TIME / DATE 4/8/10
 DATE OF SHIPMENT 4/8/10 CARRIER FedEx
 CLIENT P.O. NO. 1078974
 CLIENT JOB/PROJECT ID NO(S) 6447
 PACKAGE SHIPPED FROM San Diego

CLIENT City of San Diego
 ADDRESS 9601 Ridgehaven Ct. #320
San Diego, CA 92123
 TELEPHONE 858-573-1277
 CONTACT Jeff Jones

RESULTS REQUESTED VIA Email: jjones@sandiego.gov
 (NOTE: Complete written reports will follow all analyses, in addition to any pilot transmitted verbal or fax results.)

DATE/TIME OF SAMPLE COLLECTION _____
 SAMPLE PRESERVATIVES _____ HOLDING TIMES _____
 NO. OF SAMPLES SENT _____ SAMPLER'S NAME Jeff Jones
 TYPE: WATER WASTE WATER SOIL FILTER SORBENT TUBE IMPINGER OTHER _____

(FOR EMS ONLY) EMS Sample No.	CLIENT SAMPLE NO.	DESCRIPTION/LOCATION/ANALYSIS	VOLUME, TIME, WEIGHT (IF APPLICABLE)
<u>136889-16A</u>	6447-16A	Roof mastic → PLM	↓
<u>16B</u>	6447-16B	Roof mastic → stop pos	
<u>17A</u>	6447-17A	Window putty →	
<u>17B</u>	6447-17B	Window putty → stop pos	
<u>18A</u>	6447-18A	Roof core →	
<u>18B</u>	6447-18B	Roof core → stop pos	
<u>18C</u>	6447-18C	Roof core →	
<u>19A</u>	6447-19A	Roof mastic →	
<u>19B</u>	6447-19B	Roof mastic → stop pos	
<u>20A</u>	6447-20A	Window putty →	
<u>20B</u>	6447-20B	Window putty → stop pos	
<u>21A</u>	6447-21A	Floor tile and black mastic →	
<u>21B</u>	6447-21B	Floor tile and black mastic → stop pos	
<u>21C</u>	6447-21C	Floor tile and black mastic →	

(SF 5/00)

FOR EMS ONLY

Laboratory No. 136889 Received By _____ Time _____
 Date of Package Delivery see pg. 1 Shipping Bill Retained: YES NONE
 Condition of Package on Receipt _____ Condition of Custody Seal _____
 (NOTE: If the package has sustained substantial damage or the custody seal is broken, stop and contact the project manager and the shipper.)
 No. of Samples _____ Chain-of-Custody Signature _____
 Date of Acceptance into Sample Bank _____ Misc. Info. _____
 Disposition of Samples _____

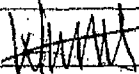
EMS LABORATORIES 117 West Bellevue Drive / Pasadena CA 91105-2503 / 626-568-4065

PLM Report

Report No: 137367.1 Customer: City of San Diego
 Date: May 7, 2010 9601 Ridgehaven Ct. #320
 Date Received: April 30, 2010 San Diego, CA 92123
 Date Analyzed: May 5, 2010 Attention: Jeff Jones
 Date/Time Collected: by Jeff Jones Reference: 1078974; 6447
 Subject: Polarized Light Microscopy Analysis for Asbestos 25 Samples
 Methodology: "Method for Determination of Asbestos in Bulk Building Materials." EPA 600/R-93/116
 Accredited: NVLAP Lab Code 101218-0
 Certified: California Department of Health Services Environmental Testing Laboratory ELAP 1119
 County Sanitation Districts of Los Angeles County, Lab ID No. 10120

Quality Control Sample (SRM 1866 Glass Fibers as the blank): None Detected

Sample ID	Location / Description	Visual Description	Asbestiform Minerals	Other Fibrous Materials	Non-fibrous Materials
6447-83 SHINGLE	NON-FRIABLE	WHITE/BLACK TAR LIKE	NONE DETECTED	FIBERGLASS 15%	GRANULAR MINERALS, OPAQUES
6447-83 FELT	NON-FRIABLE	BLACK FIBROUS	NONE DETECTED	FIBERGLASS 60%	GRANULAR MINERALS, OPAQUES
6447-84 SHINGLE	NON-FRIABLE	WHITE/BLACK TAR LIKE	NONE DETECTED	FIBERGLASS 15%	GRANULAR MINERALS, OPAQUES
6447-84 FELT	NON-FRIABLE	BLACK TAR LIKE	NONE DETECTED	FIBERGLASS 60%	GRANULAR MINERALS, OPAQUES
6447-108 SHINGLE	NON-FRIABLE	BLACK/GRAY TAR LIKE	NONE DETECTED	CELLULOSE 30%	OPAQUES
6447-108 FELT	NON-FRIABLE	BLACK TAR LIKE	NONE DETECTED	CELLULOSE 60%	OPAQUES
6447-109	NON-FRIABLE	BLACK/GRAY TAR LIKE	NONE DETECTED	FIBERGLASS 20%	GRANULAR MINERALS, OPAQUES
6447-148	NON-FRIABLE	BLACK/TAN TAR LIKE	NONE DETECTED	FIBERGLASS 20%	GRANULAR MINERALS, OPAQUES
6447-149	NON-FRIABLE	BLACK/TAN TAR LIKE	NONE DETECTED	FIBERGLASS 15%	GRANULAR MINERALS, OPAQUES
6447-153 SHINGLE	NON-FRIABLE	WHITE/BLACK TAR LIKE	NONE DETECTED	FIBERGLASS 20%	GRANULAR MINERALS, OPAQUES
6447-153 FELT	NON-FRIABLE	BLACK TAR LIKE	NONE DETECTED	CELLULOSE 40%	OPAQUES
6447-154 SHINGLE	NON-FRIABLE	WHITE/BLACK TAR LIKE	NONE DETECTED	FIBERGLASS 20%	GRANULAR MINERALS, OPAQUES
6447-154 FELT	NON-FRIABLE	BLACK TAR LIKE	NONE DETECTED	CELLULOSE 40%	OPAQUES
6447-155 SHINGLE	NON-FRIABLE	WHITE/BLACK TAR LIKE	NONE DETECTED	FIBERGLASS 20%	GRANULAR MINERALS, OPAQUES
6447-155 FELT	NON-FRIABLE	BLACK TAR LIKE	NONE DETECTED	CELLULOSE 40%	OPAQUES


 Wesene Sebhat, Optical Microscopist
 BMK/mt

B.M. Kolk, Laboratory Director

The EPA method is a semi-quantitative procedure. The detection limit is between 0.1 - 1% by area and is dependent upon the size of the asbestos fibers, the means of sampling and the matrix of the sampled material.

The test results reported are for the sample(s) delivered to us and may not represent the entire material from which the samples was taken. The EPA recommends three samples or more be taken from a "homogenous sampling area" before friable material is considered non-asbestos-containing.

** Negative floor tile samples may contain significant amounts (>1%) of very thin asbestos fibers which cannot be detected by PLM. Confirmation by XRD or TEM is recommended by the EPA (Federal Register Vol. 59, No. 146).

This report, from a NIST-accredited laboratory through NVLAP, must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. government. This report shall not be reproduced, except in full, without the written approval of EMS Laboratories.

Samples were received in good condition unless otherwise noted.

Report No: 137367.1

Client: City of San Diego

Sample ID	Location / Description	Visual Description	Asbestiform Minerals	Other Fibrous Materials	Non-fibrous Materials
6447-156 SHINGLE	NON-FRIABLE	WHITE/BLACK TAR LIKE	NONE DETECTED	FIBERGLASS 15%	GRANULAR MINERALS, OPAQUES
6447-156 FELT	NON-FRIABLE	BLACK TAR LIKE	NONE DETECTED	CELLULOSE 60%	OPAQUES
6447-157	NON-FRIABLE	WHITE/GREEN SOLID	NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-158 SHINGLE	NON-FRIABLE	WHITE/BLACK TAR LIKE	NONE DETECTED	CELLULOSE 20%	GRANULAR MINERALS, OPAQUES
6447-158 FELT	NON-FRIABLE	BLACK TAR LIKE	NONE DETECTED	NONE DETECTED	GRANULAR MINERALS, OPAQUES
6447-159	NON-FRIABLE	WHITE/BLACK TAR LIKE	NONE DETECTED	FIBERGLASS 15%	GRANULAR MINERALS, OPAQUES
6447-160 SHINGLE	NON-FRIABLE	WHITE/BLACK GRANULAR, TAR LIKE	NONE DETECTED	FIBERGLASS 15%	GRANULAR MINERALS, OPAQUES
6447-160 FELT	NON-FRIABLE	BLACK TAR LIKE	NONE DETECTED	CELLULOSE 30%	GRANULAR MINERALS, OPAQUES
6447-161 SHINGLE	NON-FRIABLE	WHITE/BLACK TAR LIKE	NONE DETECTED	FIBERGLASS 15%	GRANULAR MINERALS, OPAQUES
6447-161 FELT	NON-FRIABLE	BLACK TAR LIKE	NONE DETECTED	CELLULOSE 60%	OPAQUES



Wesene Sebhat, Optical Microscopist
BMK/mt

B.M. Kolk, Laboratory Director

The EPA method is a semi-quantitative procedure. The detection limit is between 0.1 - 1% by area and is dependent upon the size of the asbestos fibers, the means of sampling and the matrix of the sampled material.

The test results reported are for the sample(s) delivered to us and may not represent the entire material from which the samples were taken. The EPA recommends three samples or more be taken from a "homogenous sampling area" before friable material is considered non-asbestos-containing.

** Negative floor tile samples may contain significant amounts (>1%) of very thin asbestos fibers which cannot be detected by PLM. Confirmation by XRD or TEM is recommended by the EPA (Federal Register Vol. 59, No. 146).

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Samples were received in good condition unless otherwise noted.



APPENDIX G

SAMPLE OF PUBLIC NOTICES



CONSTRUCTION NOTICE

PROJECT NAME

The work will consist of:

- *Edit this information:* The construction work will include pot holing in the northbound curb lane of Torrey Pines Road between Coast Walk and Princess Street.

How your neighborhood may be impacted:

- *Edit this information:* Traffic delays due to lane closure.
- Two-way traffic will be maintained at all times.

Anticipated Construction Schedule

- *Edit this information:* The project upgrades for the entire neighborhood have been ongoing and now are scheduled to start on your street.
- The entire neighborhood project started in ____ and is anticipated to be complete in ____.

Hours and Days of Operation

- *Edit this information:* Monday to Friday (7:30 a.m. to 4 p.m.)

For questions related to this work

Call: (619) 533-4207

Email: engineering@sandiego.gov

Visit: sandiego.gov/CIP



This information is available in alternative formats upon request.



CONSTRUCTION NOTICE

PROJECT NAME

The work will consist of:

- *Edit this information:* The construction work will include pot holing in the northbound curb lane of Torrey Pines Road between Coast Walk and Princess Street.

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- *Edit this information:* Monday to Friday (7:30 a.m. to 4 p.m.)

For questions related to this work

Call: (619) 533-4207

Email: engineering@sandiego.gov

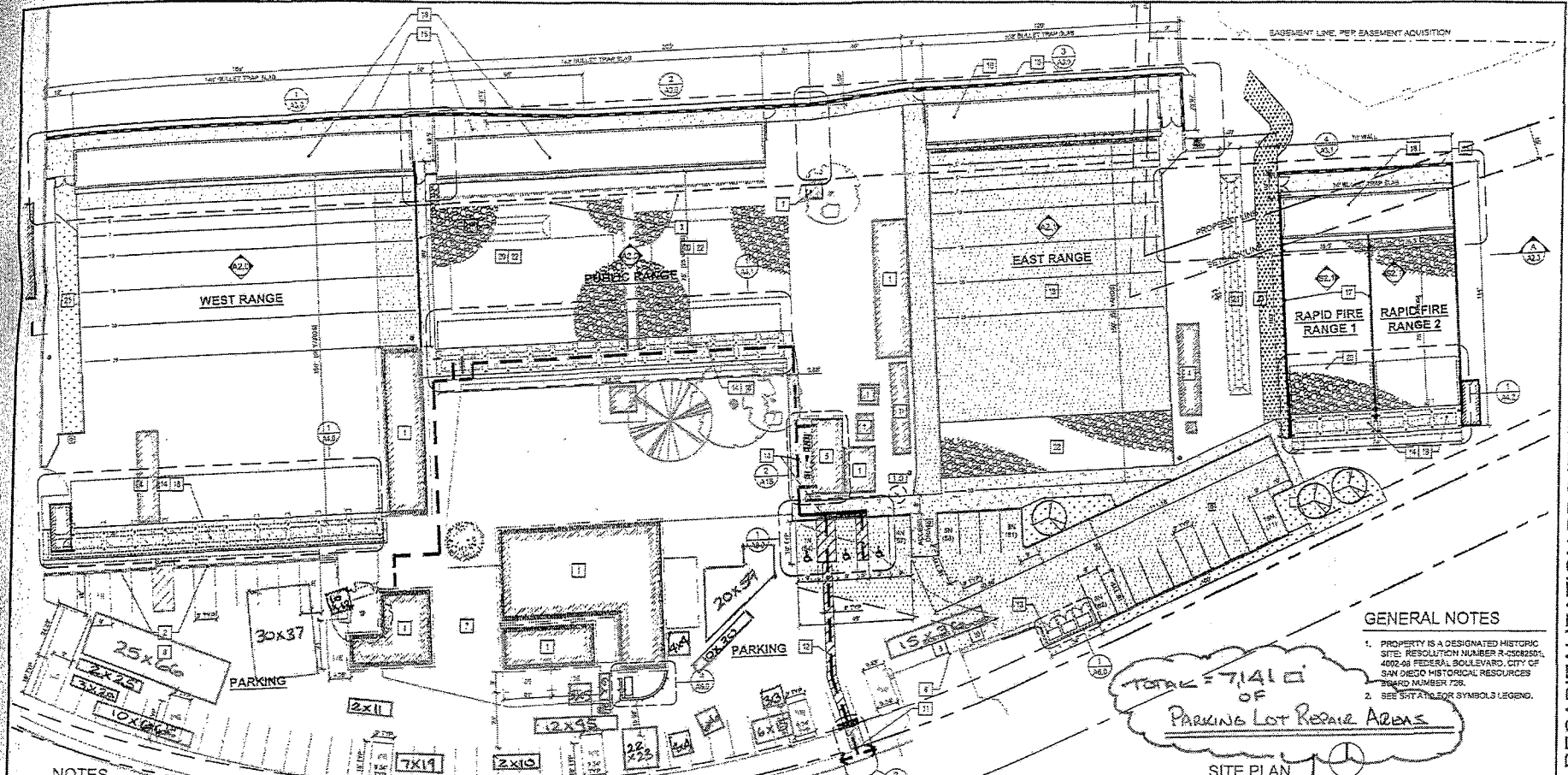
Visit: sandiego.gov/CIP



This information is available in alternative formats upon request.

APPENDIX H

AREAS NECESSARY ASPHALT REPAIR



GENERAL NOTES

1. PROPERTY IS A DESIGNATED HISTORIC SITE. RESOLUTION NUMBER R-55082505, 4002-08 FEDERAL BOLLIVARD, CITY OF SAN DIEGO HISTORICAL RESOURCES BOARD NUMBER 738.
2. SEE SITE PLAN FOR SYMBOLS LEGEND.

TOTAL = 7,141 sq ft OF
PARKING LOT REPAIR AREAS

SITE PLAN
SCALE 1" = 20'

NOTES

- | | | | | |
|--|---|---|--|---|
| 1 (E) BUILDING TO REMAIN, PROTECT IN PLACE | 5 (E) MASONRY BUILDING, RESTROOM, SEE SHIT AS-2 | 20 NEW ASPHALT PARKING AREA, PER CIVIL SHITS | 15 NEW RETAINING WALL, CONCRETE, INTEGRALLY COLORED | 20 GRAVEL SURFACE LIMITS OF ENTIRE RANGE AND AS INDICATED |
| 2 (E) COBBLE PAVEMENT WALL, PROTECT IN PLACE | 6 (E) GATED ENTRY TO SITE AND PARKING AREA, TO REMAIN | 11 NEW ACCESSIBLE PEDESTRIAN ENTRANCE TO SITE, GATED | 16 NEW BULLET TRAP / LEAD CONTAINMENT SYSTEM ON CONC SLAB | 21 NEW VEGETATED SWALE, SEE CIVIL AND LANDSCAPE SHITS |
| 3 (E) BELOW GRADE TUNNEL AND STRUCTURES, VERIFY EXACT LOCATION PRIOR TO CONSTRUCTION, PROTECT IN PLACE | 7 (E) CONC PAVING, TO REMAIN | 12 NEW ACCESSIBLE STRIPPED WALK ACROSS PARKING AREA, 48" WIDE MIN | 17 NEW RANGE DIVIDER WALL, 10' HIGH CONC TILT-UP, INTEGRALLY COLORED | 22 NEW BIoretENTION AREA, SEE CIVIL AND LANDSCAPE SHITS |
| 4 (E) STEEL SHIPPING CONTAINER, RELOCATE AS NECESSARY TO COMPLETE WORK | 8 (E) ASPHALT PARKING AREA, TO REMAIN | 3 NEW MASONRY TRASH ENCLOSURE | 18 NEW SHADE STRUCTURE | 23 NEW GRAVEL MAINTENANCE ROAD |
| | 9 (E) PROPANE TANK, TO REMAIN | 14 NEW CONC PAVING, SEE GENERAL NOTES SHITS G-3 AND G-4 | 19 A/C PAVING, RESURFACE LIMITS OF ENTIRE RANGE AS INDICATED | |

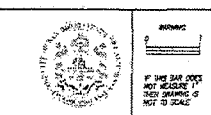
CONSTRUCTION CHANGE / ADDENDUM		APPROVAL NO.
CHANGE DATE	AFFECTED OR ADDED SHEET NUMBERS	

CONSULTANT

YOGA

YOGA CONSULTANTS
1000 LA JOLLA VILLAGE CENTER
SUITE 100
LA JOLLA, CA 92037
TEL: 619-451-1000
WWW.YOGACONSULTANTS.COM

CITY OF SAN DIEGO
PUBLIC WORKS PROJECT



DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

CONTRACTOR **DATE STARTED** **DATE COMPLETED**

35568-20-D

APPENDIX I

SDG&E DESIGN PACKAGE



FILE NO. PLA 580
Project No. 358670-010

April 25, 2016

George S. Freiha
Senior Civil Engineer
City of San Diego
gfreiha@sandiego.gov

Attn.: GEORGE FREIHA

PROJECT: SAN DIEGO PD/SHOOTING RANGE

The Design for the electric service upgrade for your project has been completed. Meter and service location information and other technical information is enclosed for your use. Construction responsibilities are outlined following. And, the related costs are attached as the "Cost Summary Sheet".

ELECTRIC SERVICE

Underground service will be supplied under the provisions of Electric Rule 16. Accordingly, you are responsible for providing a clear path, the trench, backfill, conduit and concrete substructure(s) from Transformer 167-640 / D214432 to Your New Switch Gear. (Also, you will be responsible for the on-going maintenance of these facilities.) We will install and connect the electric service conductors. Your cost for conductors, material, and connectors is outlined in the Cost Summary Sheet.

The manufacturer of your electrical equipment --if rated 1000 amperes or above-- must submit four (4) copies of the drawings to: SDG&E ENERGY MEASUREMENT and SERVICE STANDARDS at: 8316 Century Park Ct., Suite CP52F, San Diego, CA 92123-1582. The submittal must be made prior to fabrication and must include the project address. One copy will be returned with approvals or corrections, as needed.

Please note that when five-inch service conduits are to be installed, a minimum of six-feet clear and level working space must be provided in front of the underground pull section to permit setup and operation of cable pulling equipment.

Please have your contractor/plumber/electrician work closely with the SDG&E inspector to avoid any problems or delays.

SITE ACCESS – LINE TRUCK, METER, SERVICE, AND TRANSFORMER

SDG&E must have line truck access to gas and electric facilities for the purpose of installation, reading, testing, inspection, maintenance, and emergencies (refer to SDG&E Service Standards and guide sections 016, 005, 604, and 1006-1008).

If you are installing an electrically operated gate for your project, there are several things you need to know. First, 24-hour access to the gas and electric meters is required by the Fire Department and

SDG&E. Because of the serious safety issues involved, we cannot set meters until access is guaranteed. You should contact the Fire Department to obtain their specific requirements, but our minimum requirements are:

1. A Schlage VTQP Quad Section cylinder in a key switch wired to the gate controller. A list of locksmiths authorized to sell SDG&E approved locks is available on request.
2. A means of opening the gate from the inside without the use of a vehicle to activate the controller. This will require the installation of an additional key switch inside the gate if there is no unsecured switch available.

TRENCHING, CONSTRUCTION, INSPECTION

After you have been notified by us that your construction order has been issued, you or your contractor must notify our Construction Department by phone, 48 hours prior to having the trench ready. Please call 619-699-1039 to arrange a pre-construction meeting or to discuss any construction-related questions.

So that you may effectively schedule your work, you should know that our Inspector is required to inspect your work at the following stages and you will need to call 619-699-1039 as each stage is ready.

- Trenching
- Conduit installation and mandrelling
- Backfill and compaction
- Substructure installation
- Completion stage (final inspection)

When calling our Construction Department, the following will identify your project:

Project Name: **SAN DIEGO PD/SHOOTING RANGE**

Electric Work Order: **2337300**

TRENCHING ADVISORIES

Prior to trenching /excavating, please contact DigAlert (USA Markout) at least 48 hours in advance at 811. We will locate and mark-out our facilities. Failure to call may result in serious injuries and/or substantial damage for which you will be responsible.

You, probably, will need an excavation permit from the City of San Diego prior to your excavation work. Additionally, you are responsible for obtaining any other necessary permits and for adhering to all applicable governmental and regulatory statutes, codes, and rules.

Finally, before you begin trenching, I strongly suggest you contact the local telephone and cable television companies for their requirements and any charges they may have.

Your responsibility for trenching includes all final street and sidewalk repair per City of San Diego Standards. Be sure you have checked with the City on the requirements for paver, brick, sidewalk, and street final repairs.

CHECKLIST

There are, of course, a few other things to be done before the meters actually can be set. I have prepared a checklist for your use.

- Your work must be completed and accepted, and SDG&E's portion of the work must be completed.
- Ensure that the address we have on record and your permit address match.
- We must receive either permanent or temporary inspection clearances from the City of San Diego.

COSTS

All costs and offers quoted in this letter shall expire at the end of the business day on July 25, 2016. If business negotiations are not completed, or if you request revised costs after that date, an engineering fee may be required. Also, please understand that SDG&E is subject to California Public Utilities Commission decisions – any changes directed by the Commission can affect the quotes.

The costs quoted in this letter include a cost component to cover SDG&E's estimated liability for State and Federal Income Tax.

Since a portion of the work required to complete your project is to be performed by you, it is imperative that you complete that work in a timely manner. Within one year of the date SDG&E first releases your job for construction, all trench, conduit, and substructure work required of you must be completed. Should you not complete that work within one year, subsequently not allowing SDG&E to complete its required work, your job will be placed on hold pending review. If, at that time, you wish to continue, SDG&E will re-estimate the cost of the job. You may be asked to pay a cost update fee and to submit additional funds, if applicable, to cover SDG&E's current cost of construction. If you elect not to proceed with your project it will be cancelled.

Note: if you cancel your request, we will retain a portion of your payment to cover SDG&E's expense for processing. The remaining amount, if any, will be refunded to you.

Project Management offices are unable to accept payments. If you wish to proceed, please mail all of the required paper work associated with the project, the enclosed Customer Payment Remittance, and your check for \$14,844.00 to:

Customer Payment Services - CP61C
San Diego Gas & Electric
P.O. Box 129831
San Diego, CA 92112-9831

Once your check is received, your work order will be issued.

THANK YOU

We appreciate your business and hope you are very satisfied with our service. For additional general information, you can visit our website at <http://sdge.com>. If I may be of further assistance or should you have any non-construction-related questions (easements, charges, etc.), please call me or my assistant at the number below. Our normal office hours are 7:00 a.m. to 4:00 p.m., Monday through Friday.

Sincerely,


MICHAEL WIESNER

Customer Project Planner

Telephone: (858) 637-7923

Enclosures

COSTS SUMMARY SHEET**Rule 16 Service Lateral - Electric**

a. Rule 16 service costs	\$ 17,296.00	
b. Amount due		\$ 17,296.00
c. Engineering fee	\$ -<2,452.00>	
d. Total electric service lateral cost		\$ 14,844.00
Grand Total due		\$ 14,844.00

<input checked="" type="checkbox"/> SDG&E	
CUSTOMER PAYMENT REMITTANCE	
Invoice/CR #	278767
Project #	358670
Date	April 22, 2016
Preparer	Huerta, Veronica
Customer/Project Name:	SAN DIEGO PD/SHOOTING RANGE R-16 SV
Project Location:	4110 FEDERAL BL, SD
SDG&E Contact:	Wiesner, Mike
Telephone:	858-637-7923
PAYMENT DUE: \$14,844.00	
- Make checks payable to SDG&E -	
MAIL TO: Customer Payment Services - CP61C San Diego Gas & Electric PO Box 129831 San Diego, CA 92112-9831	
THIS REMITTANCE MUST BE RETURNED WITH PAYMENT	



SDG&E BRANCH OFFICE LOCATIONS

Customers may hand carry their planning payment to one of the following SDG&E Branch Offices. **Customer must have the "Customer Payment Remittance" form in order to make payment at a Branch Office.**

FOR DOWNTOWN SAN DIEGO

M-F 9AM-5PM
California Coast Credit Union
440 Beech Street.
San Diego, CA 92101

ESCONDIDO

M-F 9AM-5PM
644 West Mission Avenue
Escondido, CA 92025

EL CAJON

M-F 9AM-5PM
104 N. Johnson Avenue
El Cajon, CA 92020

NATIONAL CITY

M-F 9AM-5PM
(near the 805 Freeway)
2405 Plaza Blvd.
National City, CA 91950

CHULA VISTA

M-F 9AM-5PM
436 H Street
Chula Vista, CA 91910

MARKET CREEK

M-F 9AM-5PM
336 Euclid Avenue #502
San Diego, CA 92214

CARLSBAD

M-F 8AM-5:30PM, S 9AM-4PM
The U.P.S. Store
2604 El Camino Real Suite B
Carlsbad, CA 92008

Mail payments for Projects Coordinated by Project Management to:

Customer Payment Services – CP61C
San Diego Gas & Electric
PO BOX 129831
San Diego, CA 92112-9831
Customer remittance form must be included with check.

Important Note:

Payments made for projects coordinated by SDG&E's Project Management Department must be submitted in the form of check, cashier's check or money order.

Redemption of returned checks for projects coordinated by SDG&E's Project Management Department must be made in the form of a cashier's check or money order.

For all other types of returned checks, payment may be made in the form of cash, check or money order with the exception of our Downtown location, which requires cashier's check or money order.

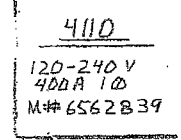
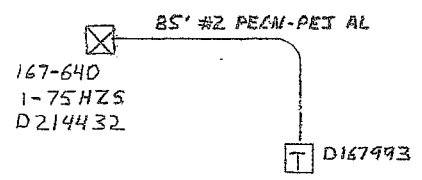
The "Customer Payment Remittance" form must accompany payments for Projects coordinated by the Project Management Department.

Revised: 3/28/14

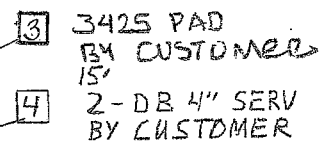
SDPD Shooting Range

4
NORTH

ONE LINE

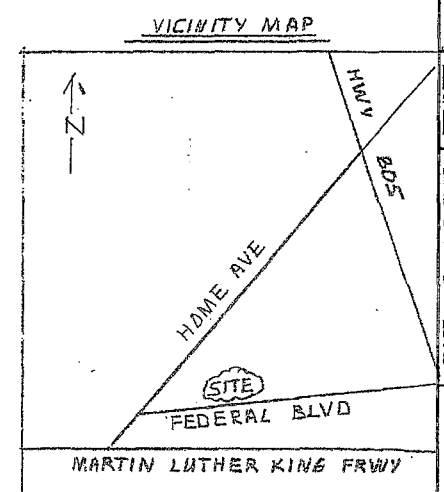
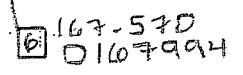
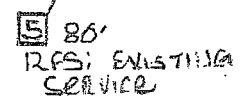
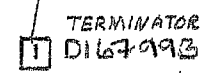
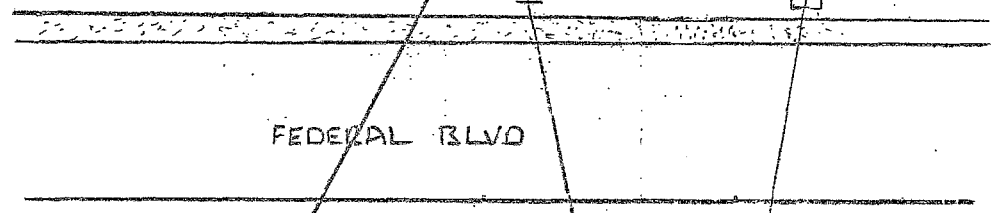
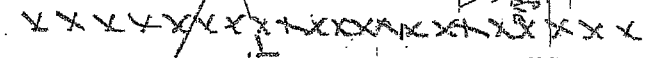
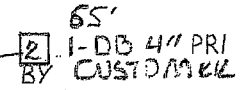


167-640
1-75 HBS
D214432



30'
2-RUNX 350 USA

120-240V
800A 3Ø 4W



NOTES!

ALL EXCAVATION, TRENCH,
CONDUIT, SUBSTRUCTURES
AND SURFACE REPAIR
BY CUSTOMER.
GATE KEYED FOR SDGE
7/24 ACCESS REQUIRED

	ELECTRIC CONSTRUCTION ORDER - OULOUS BASE DRAWING 11-15-15	CONSTRUCTION ORDER NO. 2337300	REV/SUPP
	SEE POLE LIST OF	PROJECT NO. 167-640-D10	SHIT 1 OF 1

WORK ORDER: 2337300 PROJECT: 358670 JOB:01 REV:0 TYPE: UD NAME: SAN DIEGO PD/SHOOTING RANGE R-16 SERVICE STATUS: ACT

LOCATION: ADDRESS: 4110 FEDERAL BL CITY: SD THOMAS BROTHERS: 1289-G2

DISTRICT: CM ADDRESS: 701-C 33RD ST SAN DIEGO 92102 PH: 619-699-1039 COST CENTER: SLO:

DESIGNED BY: MICHAEL WIESNER PH: 858-637-7923 DATE ISSUED: SIO:

JOB COORD: MICHAEL WIESNER PH: 858-637-7923 PROJECT MGR: MICHAEL WIESNER PH: 858-637-7923

APPROVED BY: *[Signature]* DATE: 4/20/16 COMBO JOB:N

WORK REQ#	RULE	OPT	BILL CODE	ORDER TYPE	QTY	BUDGET	BUDGET %	TOTAL CAPITAL	BILLABLE CAPITAL	%	DEPREC CREDIT	NET CAPITAL	TOTAL O&M	BILLABLE O&M	%	NET O&M
001	E-16	D	X	20	0001	16225.1	100.0	9453	887	9.4		8566	1034	91	8.8	943

SCHED START DATE: / / SCHED COMP DATE: / / COMPLETED/APPROVED BY: DATE:

REQUIRED ACCOUNTS

5108.40000 5184.63200 5366.00000 5367.10000 5369.20000 5594.50000

JOINT CONSTRUCTION CONTRACTOR DESIGN: APPLICANT DESIGN:

UG ELECT: Y
GAS: N
TELCO: N TELCO ENG: PHONE:
MPOE: N
CATV: N CATV ENG: PHONE:
COMMENTS:

RIGHT-OF-WAY REQUIRED: N INFO:
PERMITS REQUIRED: N AGENCY:
TRAFFIC CONTROL REQ: N PLAN NO: STREET RESURFACE MORATORIUM: CUSTOMER OUTAGE REQUIRED: N
COMMENTS:

EXISTING FACILITIES INSTALLED ON: 2814020

RELATED CONSTRUCTION JOBS

PLANS / REFERENCE MAPS

WO#	PROJ	JOB	REV	TYPE	NAME	TYPE	NUMBER	DESCRIPTION
NO RELATED CONSTRUCTION JOBS FOUND						EF	16085-118770	ELECTRIC FACILITY MP
						UO	16085-118770	UNDERGROUND OPER MAP

WORK ORDER: 2337300 PROJECT: 358670 JOB:01 REV:0 TYPE: UD NAME: SAN DIEGO PD/SHOOTING RANGE R-16 SERVICE STATUS: ACT

STANDARD CONSTRUCTION NOTES

SPECIFIC CONSTRUCTION NOTES

STAKED BY

DEVELOPER

NO CONSTRUCTION NOTES FOUND

UNLESS OTHERWISE NOTED, ALL TERMINATIONS OF PRIMARY CONDUIT RUNS AND SECONDARY CONDUIT RUNS OTHER THAN 2" IN ABOVE GROUND PADS WILL BE MADE WITH 36" RADIUS 90 DEGREE BENDS. TERMINATIONS OF 2" SECONDARY CONDUIT RUNS IN ABOVE GROUND PADS WILL BE MADE WITH 24" RADIUS 90 DEGREE BENDS. ALL HORIZONTAL BENDS WILL BE MADE WITH 25' RADIUS SWEEPS, UNLESS OTHERWISE NOTED. STANDARD CONDUIT BENDS TO BE USED. THE MINIMUM TERMINATION FOR ANY SERVICE CONDUIT IS A 24" RADIUS 90 DEGREE BEND.

UNLESS OTHERWISE NOTED, IF SERVICES ARE NOT INSTALLED WITH THE MAIN SYSTEM, INSTALL CONDUIT STUBS FROM PADS AND HANDHOLES TO P/L. ALL STUBS REQUIRE CONDUIT STUB AND BALL MARKERS PER UG STANDARD 3377. SERVICE STUBS TO BE _____.

APPLICANT NOTES

IN THE EVENT OF CONFLICT BETWEEN THIS DRAWING AND THE GENERAL CONDITIONS, THE GENERAL CONDITIONS SHALL TAKE PRECEDENCE. A COMPLETE SET OF UTILITY CONSTRUCTION SPECIFICATIONS IS AVAILABLE ON REQUEST.

CHECK CONFLICTS IN AREA PRIOR TO ANY EXCAVATION. CALL 'USA' AT 1-800-422-4133 48 HOURS IN ADVANCE OF ANY GRADING OR EXCAVATION IN THE VICINITY OF SDGE FACILITIES. IT IS NECESSARY TO OBTAIN AN EXCAVATION PERMIT FROM THE LOCAL AUTHORITY.

AFTER NOTIFICATION THAT CONSTRUCTION CAN PROCEED, PHONE NOTIFICATION 48 HOURS PRIOR TO THE START OF CONSTRUCTION MUST BE MADE TO THE CONSTRUCTION DEPARTMENT AT THE DISTRICT PHONE NUMBER INDICATED ON THE PREVIOUS PAGE.

FOR INSPECTION OF YOUR INSTALLATION AND ANY FIELD CHANGES PHONE SDGE INSPECTOR AT THE DISTRICT OPERATING CENTER.

PRECONSTRUCTION CONFERENCE WITH DISTRICT OPERATING DEPARTMENT REQUIRED.

TRENCH FOOTAGE - APPLICANT: *ALL* SDGE: *Ø*

GAS WORK ORDER IS APPLICANT INSTALLATION. WO# _____

WORK ORDER: 2337300 PROJECT: 358670 JOB: 01 REV: 0 TYPE: UD NAME: SAN DIEGO PD/SHOOTING RANGE R-16 SERVICE STATUS: ACT

DISTRICT: CM DESIGNED BY: MICHAEL WIESNER PHONE: 637-7923

LOCATION	WRK F-C	MU ID	AU ID	DESCRIPTION	QTY RQD	UM	WORK RESP	MAIL RESP	STANDARD PAGE
001	I-N		LDB4-B	1-4 IN DB 90 D 36 IN R BEND PRI	1	EA	C	C	3373.2
002	I-N		TR/C-P	PRIMARY CUSTOMER TRENCH	65	FT	C	C	3370.1
	I-N		SHD--C	SHADE TRENCH WITH SAND - CUSTOMER	65	FT	C	C	D7403
	I-N		LDB4PS	1-4 IN DB 22.5 D 25 FT R BEND PRI	4	EA	C	C	3373.2
	I-N		LDB4-P	1-4 IN DB CONDUIT PRI	25	FT	C	C	3373.1
003	I-N		3425-3	PAD 3425 3-PHASE TRANSFORMER	1	EA	C	C	3425.1
	I-N		X25-3P	PAD PREP 3425 PAD (3-PHASE TRANSFORMER)	1	EA	C	C	3425.2
	I-N		GD-T/R	PAD GROUND TRANSFORMER/CAP PAD (RODS)	1	EA	C	C	4512.1
	I-N		LDB4-B	1-4 IN DB 90 D 36 IN R BEND PRI	1	EA	C	C	3373.2
	I-N		2-4"SB	2-4 IN DB SERV COND BENDS BY CUSTOMER	1	EA	C	C	
004	I-N		TR/CSV	SERVICE CUSTOMER TRENCH	15	FT	C	C	
	I-N		SHD-SC	SHADE SERVICE TRENCH W/SAND - CUSTOMER	15	FT	C	C	
	I-N		2-4"SR	2-4 IN DB SERV COND RUN BY CUSTOMER	1	EA	C	C	
007			NO DESIGN UNITS FOUND						

WORK ORDER: 2337300 PROJECT: 358670 JOB: 01 REV: 0 TYPE: UD NAME: SAN DIEGO PD/SHOOTING RANGE R-16 SERVICE STATUS: ACT
 DISTRICT: CM ADDRESS: 701-C 33RD ST SAN DIEGO 92102 PHONE: 699-1039 COST CENTER:
 DESIGNED BY: MICHAEL WIESNER PHONE: 637-7923 LOCATIONS: THROUGH:

MATERIAL TO BE PROVIDED BY CUSTOMER AND INSTALLED BY CUSTOMER

SHEET: 1

STOCK NUMBER	DESCRIPTION	ACCT STAT	ACCOUNT	QUANTITY REQUIRED	UM	ISSUED	CREDIT
249710	CONDUIT DB 100 4 IN 20 FT LENGTH	NE	369.20000	25	FT		
321826	4 IN DB 100 22.5 D R BEND	NE	369.20000	4	EA		
322082	4 IN DB 100 90 D 36 IN R BEND	NE	369.20000	2	EA		
424390	INHIBITOR, GROUND ENHANCING POWDER	NE	366.00000	5	EA		
513998	PAD 3-PHASE TRANSFORMER 3425	NE	369.20000	1	EA		
603072	GROUND ROD 5/8 IN X 8 FT COPPERWELD	NE	366.00000	2	EA		
812816	WIRE BARE COPPER #2-7 STR SOFT DRAWN	NE	366.00000	8	LB		
230016	5/8" GROUND ROD CLAMP	EE	EXEMPT	2	EA		
X20042	PRI, SEC, & GAS ONLY TRENCH BY CUSTOMER	DC	369.20000	65	FT		

WORK ORDER: 2337300 PROJECT: 358670 JOB:01 REV:0 TYPE: UD NAME: SAN DIEGO PD/SHOOTING RANGE R-16 SERVICE STATUS: ACT

LOCATION: 001 SHEET: 01 DISTRICT: CM DESIGNED BY: MICHAEL WIESNER PHONE: 637-7923 LOCATION 001 OF 007

WRK F-C-T	MU ID	AU ID	STOCK#	DESCRIPTION/CONSTRUCTION NOTES	QTY RQD	UM	ACT QTY	WRK RSP	MAT RSP	ACCOUNT	STNDRD PAGE	INST/APP BY	DATE
I-N-S		1DB4-B	322082	1-4 IN DB 90 D 36 IN R BEND PRI 4 IN DB 100 90 D 36 IN R BEND	1 1	EA EA		C	C	369.20000	3373.2		

WORK FAC
FUNC CODE DESC EXIST TAG NEW TAG CONSTRUCTION NOTES

D167993 NO LOCATION CONSTRUCTION NOTES FOUND

LOC 001 SHEET 01 COMPLETED PARTIALLY COMPLETED ENERGIZED

AS-BUILT RECORDED BY: _____ DATE: _____ MATERIAL CHECK BY: _____ DATE: _____

WORK ORDER: 2337300 PROJECT: 358670 JOB:01 REV:0 TYPE: UD NAME: SAN DIEGO PD/SHOOTING RANGE R-16 SERVICE STATUS: ACT
LOCATION: 002 SHEET: 01 DISTRICT: CM DESIGNED BY: MICHAEL WLESNER PHONE: 637-7923 LOCATION 002 OF 007

WRK F-C-T	MU ID	AU ID	STOCK#	DESCRIPTION/CONSTRUCTION NOTES	QTY RQD	UM	ACT QTY	WRK RSP	MAT RSP	ACCOUNT	STNDRD PAGE	INST/APP BY	DATE
I-N-S		TR/C-P	X20042	PRIMARY CUSTOMER TRENCH PRI, SEC, & GAS ONLY TRENCH BY CUSTOMER	65 65	FT FT		C	C	369.20000	3370.1		
I-N-S		SHD--C		SHADE TRENCH WITH SAND - CUSTOMER	65	FT		C		369.20000	D7403		
I-N-S		1DB4PS	321826	1-4 IN DB 22.5 D 25 FT R BEND PRI 4 IN DB 100 22.5 D R BEND	4 4	EA EA		C	C	369.20000	3373.2		
I-N-S		1DB4-P	249710	1-4 IN DB CONDUIT PRI CONDUIT DB 100 4 IN 20 FT LENGTH	25 25	FT FT		C	C	369.20000	3373.1		

WORK FAC
FUNC CODE DESC EXIST TAG NEW TAG CONSTRUCTION NOTES
NO FACILITY TAGS FOUND NO LOCATION CONSTRUCTION NOTES FOUND

LOC 002 SHEET 01 COMPLETED PARTIALLY COMPLETED ENERGIZED
AS-BUILT RECORDED BY: _____ DATE: _____ MATERIAL CHECK BY: _____ DATE: _____

WORK ORDER: 2337300 PROJECT: 358670 JOB:01 REV:0 TYPE: UD NAME: SAN DIEGO PD/SHOOTING RANGE R-16 SERVICE STATUS: ACT
LOCATION: 003 SHEET: 01 DISTRICT: CM DESIGNED BY: MICHAEL WIESNER PHONE: 637-7923 LOCATION 003 OF 007

WRK F-C-T	MU ID	AU ID	STOCK#	DESCRIPTION/CONSTRUCTION NOTES	QTY RQD	UM	ACT QTY	WRK RSP	MAT RSP	ACCOUNT	STNDRD PAGE	INST/APP BY	DATE
I-N-S		3425-3	513998	PAD 3425 3-PHASE TRANSFORMER PAD 3-PHASE TRANSFORMER 3425	1	EA		C		369.20000	3425.1		
I-N-S		X25-3P		PAD PREP 3425 PAD (3-PHASE TRANSFORMER)	1	EA		C		369.20000	3425.2		
I-N-S		GD-T/R	230016 424390 603072 812816	PAD GROUND TRANSFORMER/CAP PAD (RODS) 5/8" GROUND ROD CLAMP INHIBITOR, GROUND ENHANCING POWDER GROUND ROD 5/8 IN X 8 FT COPPERWELD WIRE BARE COPPER #2-7 STR SOFT DRAWN	1 2 5 2 8	EA EA EA EA LB		C		366.00000 EXEMPT	4512.1		
I-N-S		1DB4-B	322082	1-4 IN DB 90 D 36 IN R BEND PRI 4 IN DB 100 90 D 36 IN R BEND	1 1	EA EA		C		369.20000	3373.2		
I-N-S		2-4"SB		2-4 IN DB SERV COND BENDS BY CUSTOMER	1	EA		C		369.20000			

WORK FUNC	FAC CODE	DESC	EXIST TAG	NEW TAG	CONSTRUCTION NOTES
I	PD	PAD		D214432	NO LOCATION CONSTRUCTION NOTES FOUND
I	TR	3 PHASE XFORMER		167-640	

LOC 003 SHEET 01 COMPLETED PARTIALLY COMPLETED ENERGIZED
AS-BUILT RECORDED BY: _____ DATE: _____ MATERIAL CHECK BY: _____ DATE: _____

WORK ORDER: 2337300 PROJECT: 358670 JOB:01 REV:0 TYPE: UD NAME: SAN DIEGO PD/SHOOTING RANGE R-16 SERVICE STATUS: ACT
LOCATION: 004 SHEET: 01 DISTRICT: CM DESIGNED BY: MICHAEL WIESNER PHONE: 637-7923 LOCATION 004 OF 007

WRK F-C-T	MU ID	AU ID	STOCK#	DESCRIPTION/CONSTRUCTION NOTES	QTY RQD	UM	ACT QTY	WRK RSP	MAT RSP	ACCOUNT	STNDRD PAGE	INST/APP BY	DATE
I-N-S		TR/CSV		SERVICE CUSTOMER TRENCH	15	FT		C		369.20000			
I-N-S		SHD-SC		SHADE SERVICE TRENCH W/SAND - CUSTOMER	15	FT		C		369.20000			
I-N-S		2-4"SR		2-4 IN DB SERV COND RUN BY CUSTOMER	1	EA		C		369.20000			

WORK FAC
FUNC CODE DESC EXIST TAG NEW TAG CONSTRUCTION NOTES
NO FACILITY TAGS FOUND NO LOCATION CONSTRUCTION NOTES FOUND

LOC 004 SHEET 01 COMPLETED PARTIALLY COMPLETED ENERGIZED
AS-BUILT RECORDED BY: _____ DATE: _____ MATERIAL CHECK BY: _____ DATE: _____

WORK ORDER: 2337300 PROJECT: 358670 JOB:01 REV:0 TYPE: UD NAME: SAN DIEGO PD/SHOOTING RANGE R-16 SERVICE STATUS: ACT
LOCATION: 005 SHEET: 01 DISTRICT: CM DESIGNED BY: MICHAEL WIESNER PHONE: 637-7923 LOCATION 005 OF 007

WRK F-C-T	MU ID	AU ID	STOCK#	DESCRIPTION/CONSTRUCTION NOTES	QTY RQD	UM	ACT QTY	WRK RSP	MAT RSP	ACCOUNT	STNDRD PAGE	INST/APP BY	DATE
				NO DESIGN UNITS FOR THIS LOCATION									

WORK FUNC	FAC CODE	DESC	EXIST TAG	NEW TAG	CONSTRUCTION NOTES
			D167994		NO LOCATION CONSTRUCTION NOTES FOUND

LOC 005 SHEET 01 COMPLETED PARTIALLY COMPLETED ENERGIZED
AS-BUILT RECORDED BY: _____ DATE: _____ MATERIAL CHECK BY: _____ DATE: _____

Submitted to Applicant by
Michael Wiesner



A  Sempra Energy utility™

General Conditions for Underground
Electric Distribution, Service Systems
Construction and Gas Trench

PROJECT WORK ORDER NUMBER AND PROJECT TITLE
2337300

San Diego PD/Shooting Range

CONSTRUCTION / TRENCH INSPECTIONS

PH: 619-699-1039

MARK-OUT 1-800-227-2600

NOTICE

**ALL WORK DONE PURSUANT TO THE ATTACHED MUST BE
ACCOMPLISHED IN COMPLIANCE WITH THE FEDERAL AND
STATE OF CALIFORNIA OCCUPATIONAL SAFETY AND
HEALTH ACT.**

ONE COPY TO BE KEPT AT PROJECT SITE

- 1.0 SCOPE OF GENERAL CONDITIONS
- 2.0 DEFINITION OF TERMS
- 3.0 CONTRACT DOCUMENTS
- 4.0 INSPECTION OF WORK AND INTERPRETATION OF CONTRACT DOCUMENTS
- 5.0 SDG&E'S RIGHT TO DO WORK
- 6.0 SCHEDULING
- 7.0 SURVEY AND EASEMENTS
- 8.0 PAVEMENT REMOVAL AND REPLACEMENT
- 9.0 EXCAVATIONS
- 10.0 INSTALLATION OF CONDUIT
- 11.0 BACKFILL AND COMPACTION
- 12.0 SUBSTRUCTURES
- 13.0 CABLE INSTALLATIONS (NEW)
- 14.0 SAFEGUARDS
- 15.0 CHANGES IN WORK
- 16.0 PHASING FOR ENERGIZING
- 17.0 DRAWINGS AND PRINTS
- 18.0 RELATIONSHIP OF PARTIES
- 19.0 FINAL ACCEPTANCE
- 20.0 WARRANTY
- 21.0 PERMITS AND LICENSES
- 22.0 INDEMNITY
- 23.0 PUBLIC RELATIONS
- 24.0 UNION LABOR IF APPLICABLE
- 25.0 RISK OF LOSS OR DAMAGE
- 26.0 NOTICE OR DEMAND

1.0 SCOPE OF GENERAL CONDITIONS

These General Conditions apply to new underground electric facilities and gas trench where the facilities being installed by an Applicant or by an applicant's contractor are for operations by SDG&E.

2.0 DEFINITION OF TERMS

The following terms in these General Conditions shall be applied as follows:

- 2.1 "Agent" - Those persons authorized to act for or represent the Applicant or SDG&E.
- 2.2 "Applicant" - The party or parties contracting with SDG&E for underground facilities and to perform work described in these General Conditions.
- 2.3 "Contract Documents" - The Contracts, Agreements, Specifications, General Conditions, SDG&E Standards, drawings, permits and other papers for the purpose of construction or pertaining to construction of underground electric facilities and gas trench.
- 2.4 "Day or Days" - Normal SDG&E work days (Monday through Friday) unless otherwise specified.
- 2.5 "Excavation" - Trenching, boring, and removal of soil required for the installation of substructures, all necessary backfilling including required imported backfill material and removal of trench spoil, and acceptable surface repair to the local governing authority's specifications.
- 2.6 "Final Acceptance" - SDG&E's acceptance of all work performed by the Applicant includes "as-built" drawings and reconciliation of all material obtained for SDG&E.
- 2.7 "Final Grade" - The grade after paving and landscaping are completed.
- 2.8 "Finish Grade" - The grade shown on plans.
- 2.9 "Improvements" - The requirements of either the governing municipality or SDG&E which will ensure protection for SDG&E facilities and provide verification of finish grade. Improvements include, but are not limited to, curbs, sidewalks, berms, barricades, bridle or pedestrian paths, raised planters or parking lot berms in residential, commercial, manufacturing, or industrial projects, when these improvements are specified adjacent to SDG&E's facilities.
- 2.10 "Inspector" - The SDG&E employee assigned to inspect and accept or reject work on the basis of compliance or lack thereof with the Contract Documents, SDG&E standards, specifications and policies.
- 2.11 "Issued and Released" - When the specifications have been issued to the Construction Department and all related holds (monies, contracts, Right of Ways, etc.) have been removed.
- 2.12 "Landowner" - Public or private entity, or a natural person or persons, whose property is affected in any way by construction performed by Applicant.
- 2.13 "Project Coordinator" - The SDG&E employee assigned to coordinate projects through construction. The Project Coordinator will work with the SDG&E Inspector and Applicant to coordinate the scheduling of SDG&E crews.
- 2.14 "SDG&E" - San Diego' Gas & Electric Company (including its contractors, subcontractors, employees, representatives or agents).
- 2.15 "SDG&E Standards" - SDG&E Gas and Electric Construction Standards, including SDG&E's "Service Guide" (available upon request).

- 2.16 "Specifications" - The construction drawings (including any revisions, supplements or SDG&E approved field changes) furnished to the Applicant detailing the work to be performed.
- 2.17 "Substructures" - Includes, but are not limited to, manholes, handholes, vaults, pads (for transformers, terminators or fuse cabinets), grounding grids and other structures needed to accommodate cables, connections, transformers and appurtenances.
- 2.18 "Vault Book" - SDG&E transformer vault specifications.
- 2.19 "Work" - The performing of all labor and the furnishing and installing of all material and equipment, necessary to accomplish all the duties and obligations imposed by the Contract Documents and Specifications.

3.0 CONTRACT DOCUMENTS

- 3.1 These Contract Documents are mutually binding on all and the Applicant must be thoroughly familiar with them. Technical trade terminology shall retain well known meanings. All Applicant work responsibility and any work reasonably inferred necessary to produce the intended results, shall be supplied by the Applicant. Specified dimensions (except as provided in section 15.0) shall govern. Work not specified shall be performed in the same manner as similar work specified. Specific details take precedence in the manner of construction.

4.0 INSPECTION OF WORK AND INTERPRETATION OF CONTRACT DOCUMENTS

- 4.1 All work and materials shall be of SDG&E approved manufacture class or grade specified in the Contract Documents. It shall be the Applicant's responsibility to thoroughly familiarize all of its Agents with the contents of the Contract Documents and to accurately advise SDG&E of its construction schedule. SDG&E will be represented in the field by an Inspector, and all work and material shall be subject at all times to inspection by the Inspector.
- 4.2 Applicant is required to call the number on the cover sheet for inspection of his work by 2:30 p.m. one workday prior to the date inspection is requested. The Inspector will inspect each completed stage of Applicant's work including; trenching, substructure installation, conduit installation, backfill, compaction, and cabling. As each stage is completed, the Inspector will approve it. If SDG&E crews are needed, they will be dispatched as available after the Inspector has verified that the Applicant has satisfactorily performed his portion of the work.
- 4.3 Any workmanship or material supplied by the Applicant which does not meet the criteria specified in the Contract Documents may be rejected by the Inspector whose decisions shall be final and conclusive. The decision of SDG&E shall be final as to all matters of interpretation of the Contract Documents.
- 4.4 Any workmanship or material rejected by the Inspector shall be replaced by Applicant at Applicant's expense. Inspections and final acceptance shall not relieve the Applicant's obligation to complete the work in accordance with the Contract Documents and SDG&E Standards.

5.0 SDG&E'S RIGHT TO WORK

If the Applicant fails to perform the work in accordance with the standards, within the prescribed time period, or any obligation imposed by the contract documents, SDG&E, except as indicated below, after giving seven days written notice to the Applicant, may take over and finish the Applicant's work or may correct any defects at the Applicant's expense. If SDG&E is unable to collect reimbursement for its cost of work after 30 days from completion of the work, the actual cost may be deducted from Applicant's refundable monies on deposit with SDG&E, or, at its option, SDG&E may recover such cost by claim against the surety on the performance bond furnished by the Applicant.

6.0 SCHEDULING

After receipt of written notification from SDG&E that construction orders have been released and issued, the Applicant shall immediately advise SDG&E of the construction schedule, arrange a pre-construction meeting with the Project Coordinator and verbally confirm the start date two working days in advance of trenching.

- 6.1 All work by Applicant shall be coordinated with SDG&E in a manner that will permit SDG&E or its Agents to perform its work without delay and in an efficient manner throughout the period of construction without being required to reschedule its construction forces after starting the field installation.
- 6.2 The Applicant understands that trenching and backfilling must be coordinated with the installation of facilities such as gas piping and/or equipment by SDG&E. The Applicant shall contact the Project Coordinator to avoid SDG&E construction schedule delays. The Inspector will specify the amount of clear open trench for SDG&E work. Inspector and Construction Crew work will be performed during normal business hours. The Applicant shall continue trenching to allow the project to be completed in an efficient manner. Joint trench agreements with other underground utilities must be approved by SDG&E before the start of construction and coordinated to avoid conflicts between construction forces.
- 6.3 The Applicant should call Underground Service Alert (1-800-277-2600) for mark-out two working days before trenching. The Applicant must locate all existing facilities before construction and protect them throughout the construction period. Gas and electric facilities will not be installed until all wet utilities have been installed and backfilled. Pressurized sprinklers and irrigation lines installed after SDG&E's facilities must maintain the minimum clearances specified in SDG&E Standards.
- 6.4 Applicant shall report to Project Coordinator any damage to any facilities resulting from the construction and shall file a complete written report with SDG&E of the surrounding circumstances within 24-hours of the incident or by the end of the next working day.

7.0 SURVEY AND EASEMENTS

The Applicant shall be responsible for establishing and maintaining alignment and finish grade for SDG&E substructures and trenches throughout the construction of the project. SDG&E will survey, obtain easements and stake trench positions when easements dictate a definite route on private property, or in a dedicated street position.

8.0 PAVEMENT REMOVAL AND REPLACEMENT

- 8.1 Applicant agrees, that when trenching or excavating in paved streets or sidewalks, all cutting, removal and replacement of pavement or concrete shall be performed by methods which meet the requirements of all governmental authorities having jurisdiction.
- 8.2 Applicant agrees that any curtailment or rerouting of traffic necessitated by Applicant's work within streets or sidewalk areas shall be coordinated with all governmental authorities having jurisdiction.

9.0 EXCAVATIONS

- 9.1 Excavations for substructures shall be made to such dimensions and grade lines as are necessary to perform the work shown by Specifications and to a depth that will provide the ground coverage between the top of the conduit entering the substructures and finish grade directed in the appropriate SDG&E Standards. Applicant shall verify in writing that all substructures are set to finish grade prior to backfilling. The Applicant shall maintain finish grade stakes for all four corners of all substructures until final backfill and compaction has been completed and accepted by Inspector. Should any adjustments to substructures be required due to variations in final grade not previously submitted to SDG&E, all costs for adjustments made by SDG&E shall be borne by the Applicant.

- 9.2 Trenches shall be excavated in accordance with location and alignment shown on the Specifications and to provide minimum width and depth necessary to install the substructures, electric lines or gas pipe as specified in SDG&E Standards.
- 9.3 Bottom of excavations and trenches shall be free of rocks, dirt clods and pockets and shall be graded with a base so that sags will not occur in any conduit or gas pipe placed therein as specified in SDG&E Standards.
- 9.4 Any excavation made to an incorrect depth shall be adjusted to the correct depth and thoroughly compacted by Applicant in accordance with the compaction requirements of the Contract Documents.
- 9.5 Where excavations occur in soil, which is, in the opinion of the Inspector, unstable and unsuitable for adequately supporting the conduit, gas pipe or substructures, reinforcement shall be required and constructed to accommodate the individual case as determined by SDG&E.
- 9.6 The Applicant shall not place excavated soil where it would pose a hazard to pedestrian or vehicular traffic or interfere with the installation of SDG&E facilities. The Applicant is responsible for the disposal of all excess soil.
- 9.7 If SDG&E encounters hazardous or toxic material while performing construction on the project, SDG&E will halt work immediately, and it will be the Applicant's responsibility to remove and or clean up all hazardous toxic material. SDG&E will have no liability or obligation whatsoever to clean up, remove or remediate any hazardous or toxic materials discovered during the course of construction, unless the material were deposited through the negligence of SDG&E.
- 9.8 The location of all excavation is subject to change as necessitated by conflicts, obstacles, or field conditions revealed by actual examination during construction and Applicant agrees to pay any additional trenching, excavation, backfill, compaction, pavement replacement or other costs required by such changes in location.
- 9.9 When padmount equipment is to be installed in a location which requires equipment barriers or retaining walls, Applicant shall install them in accordance with SDG&E Standards.
- 9.10 Retaining walls may be used as an acceptable alternative to establishment of proper grade. They shall be provided and installed at Applicant's expense per SDG&E Standards. If retaining walls are required for any reason during the warranty period, they also shall be provided and installed at Applicant's expense.

10.0 INSTALLATION OF CONDUIT

THE FOLLOWING PROVISIONS APPLY TO APPLICANT'S INSTALLATION OF CONDUIT:

- 10.1 Conduits shall be installed in the trench in the alignment shown on the Specifications and all material used shall be those specified in SDG&E Standards.
- 10.2 On approval of Inspector, ground cover may be reduced where the specified minimum ground cover cannot be obtained in crossing over storm drains, foreign substructures, or other obstacles.
- 10.3 Extreme care shall be exercised to ensure that foreign matter does not enter the conduits during installation, or at any other time thereafter.
- 10.4 When such responsibilities are shown on the Specifications, cable pole conduits shall be SDG&E approved and installed per SDG&E Standards unless otherwise instructed by the Inspector.

- 10.5 Manufactured horizontal bends in the conduit shall be installed according to SDG&E Standards. Should field conditions warrant a lesser radius, the Applicant shall obtain SDG&E approval.
- 10.6 All concrete, unless otherwise permitted by Inspector, shall be ready mixed and shall meet the requirements of SDG&E Standards.
- 10.7 The installation of conduit by Applicant must be coordinated with SDG&E or its Agent to permit the installation of substructures and any conduit which may be installed by SDG&E. After the substructures are placed in position, the conduits shall be terminated in the substructure per SDG&E Standards.
- 10.8 Service conduit stubs shall be extended and marked three feet beyond the substructure or retaining wall according to SDG&E Standards.
- 10.9 Any trench or excavation of 5 feet or more in depth, which will be entered by SDG&E employees, requires spoil to be placed a minimum of 24 inches from edge of excavation. Depths of less than 5 feet require a minimum clearance of 12 inches. Shoring or sloping may be required in depths less than 5 feet and is required for depths 5 feet or more (OSHA).
- 10.10 Gas and electric facilities in conflict with other construction must be shown on plans provided by Applicant, and SDG&E must be notified prior to trenching.
- 10.11 Street light circuits, CATV and telephone positions must be verified by the Applicant with each serving agency and installed to their specifications in addition to SDG&E Specifications.
- 10.12 Each run between substructures, pads, customer's service, risers, etc., shall be one size conduit continuously, i.e., no reducers are allowed except where the conduit enters the substructure or above the ground level on a riser pole. Deviations must be approved by SDG&E.
- 10.13 All plastic conduit shall comply with SDG&E Standards, identified by manufacturer's marking, and be verified that it is an approved conduit. Conduit found to be defective or not on approved supplier's list shall not be acceptable.
- 10.14 Installation of electric conduits with concrete substructures must be coordinated with SDG&E. All conduits shall enter a substructure in a horizontal plane, using bottom set of knockouts first, exception being a 3315, 3316 and 3324 manhole in which part of the job package are pages showing conduit placement to assure correct cable training and connections. Conduits shall be terminated in substructures per SDG&E Standards. Open conduit ends shall be sealed during construction to prevent contamination inside conduit. Conduits must be watertight and mechanically sound at entry point.
- 10.15 Core boring can only be authorized by SDG&E to insure against structural damage. All work must be performed per SDG&E Standards. Conduits used with core boring must be grouted.
- 10.16 Mandreling of conduit must be performed by the installer in the presence of SDG&E Inspector. The conduit installer must provide a 3/16-inch polypropylene pullrope in each conduit. The rope shall be approved by SDG&E and have a minimum average tensile strength of 720 lbs. Pullrope tails of 24 inches shall be secured at each end of the conduit.

11.0 BACKFILL AND COMPACTION

When Applicant's responsibility under the Contract Documents includes base, shading, backfill and compaction, the following provisions apply:

- 11.1 Backfill, base and shading shall be made with materials and by methods which will meet the requirements of all applicable codes, ordinances and SDG&E Standards. It must be approved by SDG&E Inspector.
- 11.2 Compaction shall be performed in accordance with governmental agencies and shall have a minimum of 90% relative compaction.
- 11.3 When gas piping is installed and not energized, shading will be done the same day, if practical, but not later than the following calendar day. Gas mains must be shaded and backfilled before they are energized. Gas services, when energized, must be covered during the same working day. During construction, new service lines must be made safe from normally anticipated hazards. Energized service lines left unattended must have a minimum of 12 inches cover on private property and 18 inches on public property. Completion of the backfill must be made in a timely manner.
- 11.4 Shading between the different levels of jointly used trench must be compacted with reasonable care to prevent damage to the facilities installed and shall be compacted before proceeding with the next utility installation.
- 11.5 Soil filled sacks or redwood timber breakers shall be installed across trenches as required by the Inspector in banks exceeding 25% slope. Water diversion berms shall be cut diagonally across trenches and working strips on banks exceeding 35% slope. The Inspector may require cement slurry backfill on slopes as specified in SDG&E Standards.

12.0 SUBSTRUCTURES

12.1 GENERAL

Unless otherwise specified, all substructures, and related hardware including, but not limited to, frames, covers, barrier posts, ladders, ground rods, ground grids and cable supports shall be provided and installed by the party responsible for installing the substructures and shall comply with SDG&E Standards and SDG&E Vault Books. All of the substructures and related hardware used are to be approved by SDG&E. The above facilities, if applicable, will be installed at locations specified by the Specifications and in a manner prescribed by SDG&E Standards.

12.2 PRIMARY MANHOLES AND VAULTS

The location of conduit entrances or recesses and sumps shall be as shown in SDG&E Standards. Manhole or Vault entrances shall be installed as shown on the specifications. Neck extensions shall be ordered with the manhole or vault and shall be adjusted to permit installation of the cover at final grade.

12.3 PRIMARY HANDHOLES

When Applicant's responsibility under the Contract Documents includes all or a portion of the substructures, Applicant shall adjust the top section and lid to final grade per SDG&E Standards. Conduits entering handholes shall be terminated in accordance with section 10.8.

Where any substructures are to be installed by SDG&E or its contractors and Applicant is responsible for excavation, finish grade must be established to within 3 inches before substructure can be set. The top section and lid shall be adjusted to final grade by SDG&E or its contractor if less than a 3-inch adjustment is required. The developer is responsible for

maintaining the excavations for substructures for a period of five days. If SDG&E has not installed the substructures within the five-day period, SDG&E assumes responsibility for the excavation.

12.4 TRANSFORMER AND EQUIPMENT PADS AND SECONDARY HANDHOLES

Prior to the installation of these facilities, the Applicant must complete the improvements adjacent to these facilities including barrier posts. Proper compaction and final grade must be established by Applicant and inspected by SDG&E for the transformer and equipment pads. Applicant must complete the required excavation for secondary handholes and site preparation for pads.

12.5 COMPLETION OF IMPROVEMENTS

The Applicant must complete improvements (including proper compaction, final grade, excavation and site preparation) adjacent to pads and secondary handholes prior to scheduling SDG&E crews for installation and energizing of facilities. If improvements are to be installed in segments, a minimum of 10 feet of improvements fronting electric facilities is required. Any damaged substructure shall be replaced by the Applicant before the system is energized.

13.0 CABLE INSTALLATIONS

THE FOLLOWING PROVISIONS APPLY TO APPLICANT'S INSTALLATION OF CABLE:

13.1 It shall be Contractor's responsibility to protect the cable and other material furnished by SDG&E against damage. Cable pulling methods shall be subject to the approval of the Project Coordinator. If cable or associated materials are damaged due to Contractor's negligence or faulty equipment, Contractor shall replace damaged section in a manner satisfactory to SDG&E and at no additional cost to SDG&E. All sections of cable that are damaged by the application of grips shall be discarded.

13.2 All cable ends shall be sealed to effectively prevent moisture from entering the cable.

13.3 HANDLING REELS

Inspection Contractor shall inspect each reel upon receipt to determine whether or not visible damage has occurred during transit and/or storage.

Loading and Unloading Reels shall be handled in such manner as to prevent smashing, nicking, cutting or other damage to the cable. When unloading reels from trucks, reels shall not be dropped to the ground or allowed to roll freely down ramps. Cranes or other equipment of adequate capacity shall be utilized, and care shall be taken to avoid damage to the cable or reels.

Final Inspection After removing lagging or other protective covering from reels, Contractor shall examine outside layer of each reel to be sure that the cable is undamaged and that no nails, staples, or other sharp objects which would damage the cable during unreeling protrude on the inside of the reelheads.

Empty Reels Contractor shall return all empty returnable reels prior to completion of the work as instructed by the Project Coordinator. Contractor shall dispose of all empty non-refundable reels.

13.4 SPLICES

Unless otherwise directed, splices shall be made in accordance with SDG&E Standards.

The Project Coordinator shall be present when all primary splices are performed, and shall reject those splices which do not comply with SDG&E Standards. Failure to notify the Project Coordinator is justification for rejection of the splices not performed in the Project Coordinator's presence.

The tools required for splicing the cable shall be furnished by Contractor and approved by SDG&E.

13.5 PROOF TESTING

All primary installations shall be proof-tested prior to permanent connection to the distribution system. The Project Coordinator shall be present during all proof testing. Failure to notify the Project Coordinator is justification for rejection of the tests not performed in the Project Coordinators presence.

The devices and methods utilized by Contractor for proof testing shall depend upon the circuit configuration and type of equipment. Testing methods shall be in accordance with approved SDG&E procedures.

14.0 **SAFEGUARDS**

All material, work, traffic control and work areas shall comply with all applicable Federal, State, and local safety laws or rules that are necessary to protect Applicant's and SDG&E's employees, the public, and workmen during the time of construction. Applicant shall take all steps to protect property adjacent to the construction project from damage resulting from work specified and performed hereunder.

15.0 **CHANGES IN WORK**

Modification of the Specifications may be made in writing by mutual agreement between the Applicant and SDG&E. Requests for changes shall be directed to Planner. Such changes may cause delays in construction and require an engineering fee and revision to the Specifications. Costs resulting from work changes are the Applicant's responsibility under section 20.0. Minor changes for adverse field conditions may be approved in writing at the job site by the Inspector to facilitate construction.

16.0 **PHASING FOR ENERGIZING** (Applies only when cabling is installed by SDG&E)

When SDG&E and the Applicant agree before the completion of final Specifications, portions of the underground facilities may be phased for energizing before Final Acceptance provided the phasing does not delay completion of the entire project, SDG&E retains control of the energized portion, and the energized area is compatible with the system design and SDG&E's safety practices. Energizing portions of systems shall in no way relieve the Applicant of any of its duties.

17.0 **DRAWINGS AND PRINTS**

- 17.1 Applicant shall at all times maintain a set of the current Specifications at the job site, and these will at all times be available for inspection by the Inspector who shall have access thereto on request. Applicant shall maintain at the job site any related project plans (e.g. alignment and finish grade of street improvements) approved by the governmental agencies having jurisdiction.
- 17.2 Prior to energizing, Applicant shall provide as-built drawings of facilities installed by the Applicant or his contractor per SDG&E Standards.

18.0 RELATIONSHIP OF PARTIES

In assuming and performing the obligations of these Contract Documents, Applicant is acting as an independent contractor. Applicant shall assume full responsibility for the ownership, custody, and control of work and facilities to be constructed. All persons employed by Applicant in connection herewith shall be employees of Applicant. SDG&E's inspections, or any suggestions or objections made by SDG&E shall not constitute or be construed as an exercise of management or supervision over the work, nor shall it be construed as acceptance of the work, or any part thereof, as it progresses, nor shall it limit or affect the right of SDG&E to reject any part or all of the work when completed in case the same does not conform to Contract Documents.

19.0 FINAL ACCEPTANCE

Final acceptance by SDG&E will be made when Applicant has provided "as-built" drawings and satisfactorily completed all work and improvements as called for in the Contract Documents including reconciliation of materials. SDG&E shall notify Applicant in writing of final acceptance of the work. Failure or neglect on the part of SDG&E to reject inferior work during the construction period shall not be construed to imply acceptance of such work nor to preclude its right to reject it. Applicant shall be required to correct all defects which become evident at any time prior to final acceptance of Applicant's work by SDG&E. The cost of all such repairs, material, labor, and overheads shall be borne by Applicant. Ownership, custody, and control of the work and facilities shall pass to SDG&E only upon Final Acceptance.

20.0 WARRANTY

The Applicant expressly represents and warrants that all work performed and all materials used are free from defects of workmanship and conform to the Applicant's Contract obligations. This warranty shall commence upon Final Acceptance and end one year from that date. The Applicant shall pay the actual cost to SDG&E for any breach of this warranty corrected by SDG&E (including labor, material and overheads). If SDG&E is unable to collect for the work after 30 days from completion, the actual cost may be deducted from the Applicant's refundable monies on deposit with SDG&E. SDG&E may recover such cost by claim against the surety on the performance bond furnished by the Applicant.

21.0 PERMITS AND LICENSES

The Applicant shall obtain and pay for all permits and licenses required by governing agencies before starting any work. In the event any governmental agency imposes conditions which necessitate any changes in the trench or conduit system shown on the Specifications, the Applicant agrees not to proceed with any work affected by the conditions until SDG&E has completed the necessary redesign of construction drawings and new agreement documents have been signed by SDG&E and the Applicant. New agreements shall be the standard agreements in effect at the time the changes are made.

22.0 INDEMNITY

Applicant will indemnify, defend, hold SDG&E its employees and agents harmless from any and all claims, demands, loss, liability or expense (including attorneys' fees) for injury to or death of any person, or damage to or destruction of any property, in any way resulting from or connected with the performance of the work by Applicant's Contractor, its agents, employees, or subcontractors regardless of the negligence of SDG&E except in those cases where SDG&E has been solely negligent or SDG&E's willful misconduct caused the damage or injury. For purposes of this indemnification, SDG&E's inspections, objections or comments shall NOT be construed as an exercise of management or supervision.

23.0 PUBLIC RELATIONS

The Applicant shall maintain a good public image. Excess soil, litter and debris around the work area shall be removed during construction. Due precaution shall be observed to avoid damage to lawns, trees, shrubs, flowers, fences and other property. All landowners and tenants shall be notified in advance when work interferes with their use of walks, driveways, roadways or entrances. Any disagreements, problems or adverse criticism in connection with the work from area landowners, tenants, the general public or public officials shall be reported promptly to the Project Coordinator.

24.0 UNION LABOR IF APPLICABLE

If for any reason, any work is performed by Applicant upon facilities that are at the time of work by Applicant, owned and maintained by SDG&E, Applicant agrees that such work shall be done in compliance with the terms and conditions of that amended Agreement between SDG&E and Local Union 465, International Brotherhood of Electrical Workers, or such other agreements as may be entered into between the Applicants' Contractor and bonafide unions of international organizations affiliated with the American Federation of Labor and Congress of Industrial Organizations or other bonafide labor organizations.

25.0 RISK OF LOSS OR DAMAGE

The Applicant must take proper care to protect, and avoid any loss or damage to, material and/or equipment furnished by the Applicant or by SDG&E until Final Acceptance. Any damage, injury or loss shall be repaired, corrected or replaced by the Applicant at his sole expense. If the Applicant fails to do so, SDG&E may complete the work and deduct such costs from any amounts due or to become due to Applicant, or SDG&E may, at its option, recover such cost by claim against the surety on the performance bond furnished by Applicant.

26.0 NOTICE OR DEMAND

Any notices or demand which may or must be given by either party to the other hereunder unless otherwise specified shall be made in writing and shall be deemed to have been duly given when delivered by personal service, or 24 hours after it is deposited for mailing at San Diego, California, by certified United States mail, postage prepaid, addressed as follows, or to such other place as the parties may hereafter in writing direct:

TO UTILITY:

San Diego Gas & Electric Company
P.O. Box 1831
San Diego, CA 92112-4150

TO APPLICANT:

Address _____

Attention: _____

Attention: _____

ATTACHMENT F
INTENTIONALLY LEFT BLANK

ATTACHMENT G

CONTRACT AGREEMENT

PHASED FUNDING PROVISIONS

PHASED FUNDING PROVISIONS

1. PHASED FUNDING:

- 1.1. For phased funded contracts, the City typically secures enough funds for the first 90 days of the contract prior to award. Within 10 Working Days after Bid opening date the Apparent Low Bidder must contact the Project Manager to discuss fund availability and the duration of the first phase and submit the Pre-Award Schedule to the City for approval and preparation of the first Phased Funding Schedule Agreement.
- 1.2. The Apparent Low Bidder will be required to provide a Pre-award Schedule in accordance with 6-1, "CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK" and 9-3, "PAYMENT" prior to award of Contract.
- 1.3. If the Bid submitted by the Apparent Low Bidder is rejected by the City for any reason, the next Apparent Low Bidder is to provide the Pre-Award Schedule within 5 Working Days after receiving notice. This process will continue until the City has selects an Awardee or rejects all Bids.
- 1.4. The first Phased Funding Schedule Agreement must show the fund availability for the first phase. Upon selection of the Awardee and acceptance by the City of the Pre-Award Schedule, the City will present the first Phased Funding Schedule Agreement to you.
- 1.5. At the City's request, meet with the City's project manager before execution of the first Phased Funding Schedule Agreement to discuss their comments and requests for revision to the Pre-Award Schedule.
- 1.6. Your failure to perform the any of the following may result in the Bid being rejected as non-responsive:
 1. Meet with the City's project manager, if requested to do so, to discuss and respond to the City's comments regarding the Pre-Award Schedule,
 2. Revise the Pre-Award Schedule as requested by the City within the specified 22 Working Days timeframe, or
 3. Execute the first Phased Funding Schedule Agreement within a day after receipt.

PHASED FUNDING SCHEDULE AGREEMENT

Check one:

- First Phased Funding Schedule Agreement
 Final Phased Funding Schedule Agreement

NOTE: THIS IS A SAMPLE PHASED FUNDING SCHEDULE AGREEMENT FORM.

The particulars left blank in this sample such as the total number of phases, and the amounts assigned to each phase will be completed with funding specific information from the Pre-Award Schedule and subsequent Schedules submitted to and approved by the City.

BID NUMBER: K-16-1419-DBB-3

CONTRACT OR TASK TITLE: SDPD Firing Range Recapitalization/Refurbishment

CONTRACTOR: Atlas Development

Funding Phase	Phase Description	Phase Start	Phase Finish	Not-to-Exceed Amount
I	Base Bid (Final Phase)	NTP	Contract Completion	\$846,718.37
	<u>Additional phases to be added</u>			
	<u>to this form as necessary.</u>			
			Total	\$846,718.37

Notes:


- (1) City Supplement 9-3.6, "PHASED FUNDING COMPENSATION" applies.
- (2) The total of all funding phases shall be equal to the TOTAL BID PRICE as shown on BID SCHEDULE I - PRICES.
- (3) This PHASED FUNDING SCHEDULE AGREEMENT will be incorporated into the CONTRACT and shall only be revised by a written modification to the CONTRACT.

CITY OF SAN DIEGO

By: 
 Name: MICHELLE GARCIA-QUILICO
 Project Manager

Department Name: PUBLIC WORKS - ENGINEERING & CAPITAL PROJECTS
 Date: 8/3/2016

CONTRACTOR

By: 
 Name: Mark Atefi

Title: President
 Date: 8/4/16

END OF PHASED FUNDING SCHEDULE 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 Atlas Development, herein called "Contractor" for construction of **SDPD Firing Range Recapitalization/Refurbishment Project**; Bid N. **K-16-1419-DBB-3**; in the amount of Eight Hundred Forty Six Thousand Seven Hundred Eighteen Dollars and 37/100 (\$846,718.37), 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) Phase Funding Schedule Agreement.
 - (e) That certain documents entitled **SDPD Firing Range Recapitalization/Refurbishment Project**, on file in the office of the Public Works Department as Document No. **S-10118**, 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 **SDPD Firing Range Recapitalization/Refurbishment Project**, Bid Number **K-16-1419-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.

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

Jan I. Goldsmith, City Attorney

By Eleida Felix Yackel
Eleida Felix Yackel
Senior Contract Specialist
Public Works Contracts

By Christina L. Rae
Print Name: Christina L. Rae
Deputy City Attorney

Date: 8/10/16

Date: 8/10/16

CONTRACTOR

By Mark Atefi

Print Name: Mark Atefi

Title: President

Date: 7/27/16

City of San Diego License No.: 20100000550

State Contractor's License No.: 858038

DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) REGISTRATION NUMBER: 1000003093

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

AMERICAN 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 American With Disabilities Act (ADA) outlined in the WHITEBOOK, Section 7-13.2, "American 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 7-13.4, ("Contractor Standards"), of the project specifications, and that Contractor has complied with those requirements.

I further certify that each of the Contractor's subcontractors whose subcontracts are greater than \$50,000 in value has completed a Pledge of Compliance attesting under penalty of perjury of having complied with City of San Diego Municipal Code § 22.3004.

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:

(Name of Project or Task)

as particularly described in said contract and identified as Bid No. _____ ; SAP No. (WBS/IO/CC) _____; 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 _____, _____.

_____ Contractor

by

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

ELECTRONICALLY SUBMITTED FORMS

**THE FOLLOWING FORMS MUST BE SUBMITTED IN PDF
FORMAT WITH BID SUBMISSION**

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. EQUAL BENEFITS ORDINANCE - CERTIFICATION OF COMPLIANCE**

**Bids will not be accepted until ALL forms are submitted as part
of the bid submittal**

BID BOND

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

KNOW ALL MEN BY THESE PRESENTS,

That Atlas Development Corporation 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

SDPD Firing Range Recapitalization / Refurbishment; Invitation/Bid No. K-16-1419-DBB-3

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 24th day of June,
20_16

Atlas Development Corporation (SEAL)
(Principal)

Great American Insurance Company (SEAL)
(Surety)

By: [Signature]
(Signature)

By: [Signature]
John R. Qualin, Attorney-in-Fact
(Signature)

(SEAL AND NOTARIAL ACKNOWLEDGEMENT OF SURETY)

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.

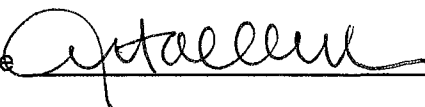
State of California
County of San Diego)

On June 24, 2016 before me, Maria Hallmark, Notary Public
(insert name and title of the officer)

personally appeared John R. Qualin,
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  (Seal)



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 FIVE

No. 0 14839

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
DALE G. HARSHAW	KYLE KING	ALL OF	ALL
GEOFFREY SHELTON	JOHN R. QUALIN	SAN DIEGO,	\$100,000,000.00
TARA BACON		CALIFORNIA	

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 23RD day of FEBRUARY, 2016

GREAT AMERICAN INSURANCE COMPANY



Atty L C B

Assistant Secretary

David C. Kitchen

Divisional Senior Vice President

STATE OF OHIO, COUNTY OF HAMILTON - ss:

DAVID C. KITCHIN (877-377-2405)

On this 23RD day of FEBRUARY, 2016, before me personally appeared DAVID C. KITCHIN, 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 24th day of June, 2016



Atty L C B

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

Contractor Name: Atlas Development

Certified By Mark Abeni Title President

Name

M. Abeni

Date 7/5/16

Signature

USE ADDITIONAL FORMS AS NECESSARY

City of San Diego

CITY CONTACT: Michelle Muñoz, Contract Specialist, Email: MichelleM@sandiego.gov

Phone No. (619) 533-3482, Fax No. (619) 533-3633

ADDENDUM "B"

 **e - Bidding** FOR



SDPD FIRING RANGE RECAPITALIZATION/REFURBISHMENT

BID NO.: K-16-1419-DBB-3
SAP NO. (WBS/IO/CC): S-10118
CLIENT DEPARTMENT: 1914
COUNCIL DISTRICT: 9
PROJECT TYPE: BA

BID DUE DATE:

2:00 PM

JULY 5, 2016

CITY OF SAN DIEGO

PUBLIC WORKS CONTRACTS

1010 SECOND AVENUE, 14th FLOOR, MS 614C

SAN DIEGO, CA 92101

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. ATTACHMENTS

1. To Attachment A, Scope of Work, Item 1, Scope of Work, Sub-item B, Additive Alternate A, page 21, **ADD** Item 4, as follows:
 4. Prior to the start of the work in the Armory area, rear side of the Rangers Staff office, the contractor shall be responsible for relocating (3) 3'x5' file cabinets and (1) 10.7 cu.ft. refrigerator during work remodel and return back to the same location upon completion of the work.
2. To Attachment E, Supplementary Special Provisions, **ADD** "Section 8 - Facilities for Agency Personnel" as follows:

SECTION 8 - FACILITIES FOR AGENCY PERSONNEL

8-2.5 Temporary Field Office. Prior to the start of the work in the Range Staff office, the contractor shall supply, for a period not to exceed 44 working days, a 12'x20' temporary office trailer with A/C, Electrical and Lighting (for SDPD Range Staff). Contractor is responsible for making temporary electrical connections to this same temporary trailer. Police Department staff will relocate office equipment to the temporary trailer.

8-2.6 Payment. The payment for the temporary field office shall be included in the Lump Sum Bid Item of Additive Alternate A, "Construction of SDPD Firing Range Tenant Improvement".

James Nagelvoort, Director
Public Works Department

Dated: *June 23, 2016*
San Diego, California

JN/AR/Lad

City of San Diego

CITY CONTACT: Michelle Muñoz, Contract Specialist, Email: MichelleM@sandiego.gov

Phone No. (619) 533-3482, Fax No. (619) 533-3633

ADDENDUM "A"

 - Bidding FOR



SDPD FIRING RANGE RECAPITALIZATION/REFURBISHMENT

BID NO.: K-16-1419-DBB-3
SAP NO. (WBS/IO/CC): S-10118
CLIENT DEPARTMENT: 1914
COUNCIL DISTRICT: 9
PROJECT TYPE: BA

BID DUE DATE:

2:00 PM

JULY 5, 2016

CITY OF SAN DIEGO

PUBLIC WORKS CONTRACTS

1010 SECOND AVENUE, 14th FLOOR, MS 614C

SAN DIEGO, CA 92101

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. NOTICE INVITING BIDS

1. To Item 6, License Requirement, page 4, Sub item 6.1 **DELETE** in its entirety and **SUBSTITUTE** with the following:

- 6.1 The Contractor shall possess the following California State Contractor's licensing classification(s) for this contract: Class A or B.

2. To Item 8, Pre-Bid Meeting, page 5, Sub item 8.1 **DELETE** in its entirety and **SUBSTITUTE** with the following:

- 8.1 Prospective Bidders are required to attend the Pre-Bid Meeting. The purpose of the meeting is to discuss the scope of the Project, submittal requirements, the pre-qualification process and any Equal Opportunity Contracting Program requirements and reporting procedures. To request a sign language or oral interpreter for this visit, call the Public Works Contracts Division at (619) 533-3450 at least 5 Working Days prior to the meeting to ensure availability. Failure to attend the Mandatory Pre-Bid Meeting may result in the Design-Builder's Bid being deemed non-responsive. The Pre-Bid meeting is scheduled as follows:

Date: June 20, 2016
Time 11:00 AM
Location: 1010 Second Avenue 14th Floor, San Diego, CA 92101

Attendance at the Pre-Submittal Meeting will be evidenced by the Bidder's representative's signature on the attendance roster. It is the responsibility of the Bidder's representative to complete and sign the attendance roster.

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

3. To Item 9, Pre-Bid Site Visit, page 5, **DELETE** in its entirety and **SUBSTITUTE** with the following:

- 9 **PRE-BID SITE VISIT:** All those wishing to submit a bid **MUST** visit the Work Site with the Engineer. The purpose of the Site visit is to acquaint Bidders with the Site conditions. To request a sign language or oral interpreter for this visit, call the Public Works Contracts at (619) 533-3450 at least 5 Working Days prior to the meeting to ensure availability. The Pre-Bid Site Visit is scheduled as follows:

Date: June 20, 2016

Time: 2:30 PM
Location: 4002-4008 Federal Boulevard, San Diego, CA 92101

C. INSTRUCTION TO BIDDERS

1. To Item 10, Reference Standards, page 10, **DELETE** in its entirety and **SUBSTITUTE** with the following:

10. 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")	2012	PITS070112-01
City of San Diego Standard Specifications for Public Works Construction ("The WHITEBOOK")*	2012	PITS070112-02
City of San Diego Standard Drawings*	2012	PITS070112-03
Caltrans Standard Specifications	2010	PITS070112-04
Caltrans Standard Plans	2010	PITS070112-05
California MUTCD	2012	PITS070112-06
City Standard Drawings - Updates Approved For Use (when specified)*	Varies	Varies
Standard Federal Equal Employment Opportunity Construction Contract Specifications and the Equal Opportunity Clause Dated 09-11-84	1984	769023
NOTE: *Available online under Engineering Documents and References at: http://www.sandiego.gov/publicworks/edocref/index.shtml		

D. SUPPLEMENTARY SPECIAL PROVISIONS

1. To Item 2-3.2 Self Performance, page 34, **DELETE** Item 2 in its entirety.

James Nagelvoort, Director
Public Works Department

Dated: *June 15, 2016*
San Diego, California

JN/AR/Lad

Bid Results for Project SDPD Firing Range Recapitalization/Refurbishment (K-16-1419-DBB-3)
 Issued on 06/13/2016
 Bid Due on July 5, 2016 2:00 PM (Pacific)
 Exported on 07/05/2016

VendorID	Company Name	Address	City	ZipCode	Contact	Phone	Fax	Email	Vendor Type
294226	Atlas Development	991C Lomas Santa fe Dr #115	Solana Beach	92075	Mark atefi	619-200-0902	858-350-9337	mark.atefi@atlas-corp.net	ELBE,PQUAL,Local

Responsee	Responsee Title	Responsee Phone	Responsee Email
Mark Atefi	President	619-200-0902	mark.atefi@atlas-corp.net

Bid Format	Submitted Date	Delivery Method	Responsive	Status	Confirmation #	Ranking
Electronic	July 5, 2016 1:55:47 PM (Pacific)			Submitted	83499	0

Attachments		
File Title	File Name	File Type
SDPD Firing Range - Cert of Pending Claims - Atlas	SDPD Firing Range - Cert of Pending Claims - Atlas.pdf	General Attachments
SDPD Firing Range - EBO Cert of Compliance - Atlas	SDPD Firing Range - EBO Cert of Compliance - Atlas.pdf	General Attachments
SDPD Firing Range - Subcontractor Additive Alternate - Atlas	SDPD Firing Range - Subcontractor Additive Alternate - Atlas.pdf	General Attachments
SDPD Firing Range - Bid Bond - Atlas	SDPD Firing Range - Bid Bond - Atlas.pdf	Bid Bond

Line Items							
Item Num	Section	Item Code	Description	Unit of Measure	Quantity	Unit Price	Line Total
1	Main Bid	238990	Construction of SDPD Firing Range	LS	1	\$688,275.68	\$688,275.68
2	Main Bid	524126	Bonds (Payment and Performance)	LS	1	\$21,103.58	\$21,103.58
3	Main Bid	236220	Permits - Type I	AL	1	\$4,000.00	\$4,000.00
4	Main Bid		Field Orders - Type II	AL	1	\$40,000.00	\$40,000.00
5	Main Bid	238990	Preparation of Hazardous Waste Management Plan, Reporting, Sampling, Treatment and Disposal - Type I	AL	1	\$23,000.00	\$23,000.00
6	Main Bid	238210	SDG&E Design Package	LS	1	\$50,000.00	\$50,000.00
7	Main Bid	541370	Survey Services	LS	1	\$14,749.74	\$14,749.74
8	Main Bid	541330	Water Pollution Control Program Development (WPCP)	LS	1	\$931.56	\$931.56
9	Main Bid	237990	Water Pollution Control Program Implementation (WPCP)	LS	1	\$4,657.81	\$4,657.81
						Subtotal	\$846,718.37

Alternates							
Item Num	Section	Item Code	Description	Unit of Measure	Quantity	Unit Price	Line Total
10	Alternate A	238990	Construction of SDPD Firing Range Tenant Improvements	LS	1	\$205,000.00	\$205,000.00
11	Alternate A	524126	Bonds (Payment and Performance)	LS	1	\$5,951.91	\$5,951.91
12	Alternate A	236220	Permits - Type I	AL	1	\$3,000.00	\$3,000.00
13	Alternate A		Field Orders - Type II	AL	1	\$7,000.00	\$7,000.00
14	Alternate A	238990	Preparation of Hazardous Waste Management Plan, Reporting, Sampling, Treatment and Disposal - Type I	AL	1	\$23,000.00	\$23,000.00
						Subtotal	\$243,951.91
						Total	\$1,090,670.28

Subcontractors							
Name	Description	License Num	Amount	Type	Address	State	ZipCode
H.K. Electrical, Inc.	Electrical	781415 DIR # 1000001013	\$80,000.00		17428 Lahey St	Granada Hills	91344
RAP Engineering, Inc.	Asphalt Paving	880956 DIR # 1000002968	\$46,304.00	LAT, MALE, DBE, MBE, CADIR, SD B	503 E. Mission Road	San Marcos	92069
Landmark Consulting	Surveying	977786 DIR # 1000005403	\$9,360.00	SLBE, CADIR	9555 Genesee Ave. Ste 200	San Diego	92121

Self-Performance
83.98%