

# City of San Diego

CONTRACTOR'S NAME: USS Cal Builders, Inc.

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TELEPHONE NO.: 714-828-4882

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Phone No. (619) 533-3622, Fax No. (619) 533-3633

ACorsi/ RWBustamante / mlw

## BIDDING DOCUMENTS



ORIGINAL



FOR

### PARK DE LA CRUZ NEIGHBORHOOD RECREATION CENTER & GYM

BID NO.:	K-17-1539-DBB-3
SAP NO. (WBS/IO/CC):	S-16059
CLIENT DEPARTMENT:	1714
COUNCIL DISTRICT:	9
PROJECT TYPE:	GB
CDBG #:	B-16-MC-06-542

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

- PHASED-FUNDING
- FEDERAL EQUAL OPPORTUNITY CONTRACTING REQUIREMENTS
- PREVAILING WAGE RATES: STATE  FEDERAL
- APPRENTICESHIP
- THIS IS A CDBG FUNDED CONTACT THROUGH THE DEPARTMENT OF HOUSING DEVELOPMENT

**BID DUE DATE:**

**2:00 PM**

**MAY 18, 2017**

**CITY OF SAN DIEGO**

**PUBLIC WORKS CONTRACTS**

**1010 SECOND AVENUE, 14<sup>th</sup> 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 Architect:

Sandra S. Gramley JAN 17 2017  
1) Registered Architect Date

Seal:



Sam M 3-17-17  
2) For City Engineer Date

Seal

C73711

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## NOTICE INVITING BIDS

1. **SUMMARY OF WORK:** This is the City of San Diego's (City) solicitation process to acquire Construction services for **Park de La Cruz Neighborhood Recreation Center & Gym**. 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 web site: <http://www.sandiego.gov>.
3. **ESTIMATED CONSTRUCTION COST:** The City's estimated construction cost for this project is **\$7,470,000**.
4. **BID DUE DATE AND TIME ARE: MAY 18, 2017 at 2:00 PM**
5. **PREVAILING WAGE RATES APPLY TO THIS CONTRACT:** Refer to Attachment D.
6. **LICENSE REQUIREMENT:** The City has determined that the following licensing classification is required for this contract: **B**
7. **SUBCONTRACTING PARTICIPATION PERCENTAGES:** Subcontracting participation percentages apply to this contract.
  - 7.1. The City affirms that in any contract entered into pursuant to this advertisement, DBE firms will be afforded full opportunity to submit Bids in response to this invitation.
  - 7.2. This Federally assisted project includes subcontracting participation percentages for DBE participation. DBE goal commitments and Good Faith Efforts (GFE) shall be made prior to bidding. DBE commitments and GFE made after the Bid opening will not be considered for the Award of Contract.
  - 7.3. This project is subject to the federal equal opportunity regulations and the following requirements. The City reserves the right to audit the Contractor's compliance with the federal requirements set forth below.
  - 7.4. Following are federally subcontracting participation percentages for this contract. For the purpose of achieving the subcontractor participation percentage, Additive or Deductive, and Type II Allowance Bid Items will not be included in the calculation.
  - 7.5. **Department of Housing and Urban Development ( HUD):**
    1. Small Disadvantaged Business (SDB): 5%
    2. Women-Owned Small Business (WoSB): 5%
    3. HUBZone Small Business (HubZone): 3%
    4. Service Disabled Veteran-owned Small Business (SDVoSB): 3%

**7.6.** Bid may be **declared non-responsive** if the Bidder fails any of the following conditions:

- I. Submission of GFE documentation, as specified in the Special Provisions.
- II. Attending the Pre-Bid Meeting.
- III. 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 DBE Subcontractors shall be submitted within **4 Working Days** of the Bid opening.

**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 Bid being deemed non-responsive. The Pre-Bid meeting is scheduled as follows:

**Date:** April 13, 2017  
**Time:** 10:00 AM  
**Location:** 1010 Second Avenue, Suite 1400, (14th floor Large Conference Room), San Diego, CA 92101

Attendance at the Pre-Bid 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 are encouraged to 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:

**Time:** 11:30 AM  
**Date:** April 13, 2017  
**Location:** 3091 Landis Street, San Diego, CA 92105

**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 plus one or more alternates.

**11. SUBMISSION OF QUESTIONS:**

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

Public Works Contracts  
1010 Second Avenue, 14<sup>th</sup> Floor  
San Diego, California, 92101  
Attention: Rosa Riego

OR:

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

- 11.2.** Questions received less than 14 days prior to the date for opening of Bids may not be considered.
- 11.3.** 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.
- 11.4.** 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.

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

**13. ADDITIVE ALTERNATES:**

**13.1.** The additive 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](mailto: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, EOCP compliance and other issues. The City may require any Bidder to furnish statement of experience, financial responsibility, technical ability, equipment, and references.
- 2.6. RECAPITULATION OF THE WORK.** Bids shall not contain any recapitulation of the Work. Conditional Bids may be rejected as being non-responsive. Alternative proposals will not be considered unless called for.
- 2.7. BIDS MAY BE WITHDRAWN** by the Bidder only up to the bid due date and time.
- 2.7.1. Important Note:** Submission of the electronic bid into the system may not be instantaneous. Due to the speed and capabilities of the user's internet service provider (ISP), bandwidth, computer hardware and other variables, it may take time for the bidder's submission to upload and be received by the City's eBidding system. It is the bidder's sole responsibility to ensure their bids are received on time by the City's eBidding system. The City of San Diego is not responsible for bids that do not arrive by the required date and time.
- 2.8. ACCESSIBILITY AND AMERICANS WITH DISABILITIES ACT (ADA) COMPLIANCE:** To request a copy of this solicitation in an alternative format, contact the Public Works Contract Specialist listed on the cover of this solicitation at least five (5) working days prior to the Bid/Proposal due date to ensure availability.

**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 7-6, "The Contractors Representative" in The GREENBOOK and 7-6.1 In The WHITEBOOK.

- 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") <a href="http://www.greenbookspecs.org/">http://www.greenbookspecs.org/</a>	2015	PWPI070116-01
City of San Diego Standard Specifications for Public Works Construction ("The WHITEBOOK")* <a href="https://www.sandiego.gov/publicworks/edocref/greenbook">https://www.sandiego.gov/publicworks/edocref/greenbook</a>	2015	PWPI070116-02
City of San Diego Standard Drawings* <a href="https://www.sandiego.gov/publicworks/edocref/standarddraw">https://www.sandiego.gov/publicworks/edocref/standarddraw</a>	2016	PWPI070116-03
Citywide Computer Aided Design and Drafting (CADD) Standards <a href="https://www.sandiego.gov/publicworks/edocref/drawings">https://www.sandiego.gov/publicworks/edocref/drawings</a>	2016	PWPI092816-04
California Department of Transportation (CALTRANS) Standard Specifications - <a href="http://www.dot.ca.gov/des/oe/construction-contract-standards.html">http://www.dot.ca.gov/des/oe/construction-contract-standards.html</a>	2015	PWPI092816-05
CALTRANS Standard Plans <a href="http://www.dot.ca.gov/des/oe/construction-contract-standards.html">http://www.dot.ca.gov/des/oe/construction-contract-standards.html</a>	2015	PWPI092816-06
California Manual on Uniform Traffic Control Devices Revision 1 (CA MUTCD Rev 1) - <a href="http://www.dot.ca.gov/trafficops/camutcd/">http://www.dot.ca.gov/trafficops/camutcd/</a>	2014	PWPI092816-07
<b>NOTE:</b> *Available online under Engineering Documents and References at: <a href="http://www.sandiego.gov/publicworks/edocref/index.shtml">http://www.sandiego.gov/publicworks/edocref/index.shtml</a>		

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 addenda are made effective as though originally issued with the Bid. The Bidders shall acknowledge the receipt of Addenda at the time of bid submission.
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:**
- 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) FOR DESIGN-BID-BUILD CONTRACTS:**
- 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 Contractor Standards.

**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:**

USS Cal Builders Inc., a corporation, as principal, and  
ARCH 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  
**Seven Million Seven Hundred Eighty-Eight Thousand Dollars and Zero Cents (\$7,788,000.00)**  
for the faithful performance of the annexed contract, and in the sum of **Seven Million Seven  
Hundred Eighty-Eight Thousand Dollars and Zero Cents (\$7,788,000.00)** for the benefit of  
laborers and materialmen designated below.

**Conditions:**

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

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

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

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

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

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

Dated JUNE 16TH, 2017

Approved as to Form

USS CAL BUILDERS INC.

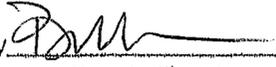
Principal

By 

Eric Othman, Secretary

Printed Name of Person Signing for Principal

Mara W. Elliott, City Attorney

By   
Deputy City Attorney

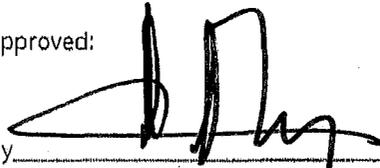
ARCH INSURANCE COMPANY

Surety

By 

Attorney in fact PHILIP E. VEGA

Approved:

  
By  
Albert P. Rechany  
Deputy Director  
Public Works Department

865 S. FIGUEROA ST. 27TH FLOOR

Local Address of Surety

LOS ANGELES, CA 90017

Local Address (City, State) of Surety

213-283-3517

Local Telephone No. of Surety

Premium \$ 51,010.00

Bond No. SU1145448

**THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON BLUE BACKGROUND.**

***This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated. Not valid for Mortgage, Note, Loan, Letter of Credit, Bank Deposit, Currency Rate, Interest Rate or Residential Value Guarantees.***

**POWER OF ATTORNEY**

Know All Persons By These Presents:

That the Arch Insurance Company, a corporation organized and existing under the laws of the State of Missouri, having its principal administrative office in Jersey City, New Jersey (hereinafter referred to as the "Company") does hereby appoint:

Britton Christensen, Kevin Vega, Myrna Smith and Phillip E. Vega of Covina, Ca (EACH)

its true and lawful Attorney(s)-in-Fact, to make, execute, seal, and deliver from the date of issuance of this power for and on its behalf as surety, and as its act and deed:

Any and all bonds, undertakings, recognizances and other surety obligations, in the penal sum not exceeding Ninety Million Dollars (\$90,000,000.00).

This authority does not permit the same obligation to be split into two or more bonds in order to bring each such bond within the dollar limit of authority as set forth herein.

The execution of such bonds, undertakings, recognizances and other surety obligations in pursuance of these presents shall be as binding upon the said Company as fully and amply to all intents and purposes, as if the same had been duly executed and acknowledged by its regularly elected officers at its principal administrative office in Jersey City, New Jersey.

This Power of Attorney is executed by authority of resolutions adopted by unanimous consent of the Board of Directors of the Company on September 15, 2011, true and accurate copies of which are hereinafter set forth and are hereby certified to by the undersigned Secretary as being in full force and effect:

"VOTED, That the Chairman of the Board, the President, or the Executive Vice President, or any Senior Vice President, of the Surety Business Division, or their appointees designated in writing and filed with the Secretary, or the Secretary shall have the power and authority to appoint agents and attorneys-in-fact, and to authorize them subject to the limitations set forth in their respective powers of attorney, to execute on behalf of the Company, and attach the seal of the Company thereto, bonds, undertakings, recognizances and other surety obligations obligatory in the nature thereof, and any such officers of the Company may appoint agents for acceptance of process."

This Power of Attorney is signed, sealed and certified by facsimile under and by authority of the following resolution adopted by the unanimous consent of the Board of Directors of the Company on September 15, 2011:

VOTED, That the signature of the Chairman of the Board, the President, or the Executive Vice President, or any Senior Vice President, of the Surety Business Division, or their appointees designated in writing and filed with the Secretary, and the signature of the Secretary, the seal of the Company, and certifications by the Secretary, may be affixed by facsimile on any power of attorney or bond executed pursuant to the resolution adopted by the Board of Directors on September 15, 2011, and any such power so executed, sealed and certified with respect to any bond or undertaking to which it is attached, shall continue to be valid and binding upon the Company.

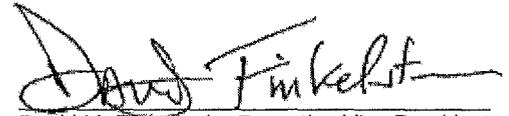
In Testimony Whereof, the Company has caused this instrument to be signed and its corporate seal to be affixed by their authorized officers, this 6<sup>th</sup> day of March, 2017.

Attested and Certified

Arch Insurance Company

  
Patrick K. Nails, Secretary

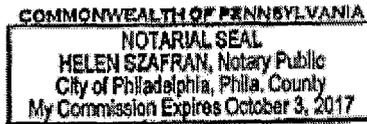


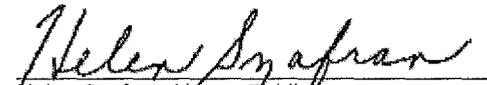
  
David M. Finkelstein, Executive Vice President

STATE OF PENNSYLVANIA SS

COUNTY OF PHILADELPHIA SS

I, Helen Szafran, a Notary Public, do hereby certify that Patrick K. Nails and David M. Finkelstein personally known to me to be the same persons whose names are respectively as Secretary and Executive Vice President of the Arch Insurance Company, a Corporation organized and existing under the laws of the State of Missouri, subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that they being thereunto duly authorized signed, sealed with the corporate seal and delivered the said instrument as the free and voluntary act of said corporation and as their own free and voluntary acts for the uses and purposes therein set forth.



  
Helen Szafran, Notary Public  
My commission expires 10/03/2017

CERTIFICATION

I, Patrick K. Nails, Secretary of the Arch Insurance Company, do hereby certify that the attached Power of Attorney dated March 6, 2017 on behalf of the person(s) as listed above is a true and correct copy and that the same has been in full force and effect since the date thereof and is in full force and effect on the date of this certificate; and I do further certify that the said David M. Finkelstein, who executed the Power of Attorney as Executive Vice President, was on the date of execution of the attached Power of Attorney the duly elected Executive Vice President of the Arch Insurance Company.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the Arch Insurance Company on this 16th day of June, 2017.

  
Patrick K. Nails, Secretary

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

PLEASE SEND ALL CLAIM INQUIRIES RELATING TO THIS BOND TO THE FOLLOWING ADDRESS:

Arch Insurance – Surety Division  
3 Parkway, Suite 1500  
Philadelphia, PA 19102



**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT**

**CIVIL CODE § 1189**

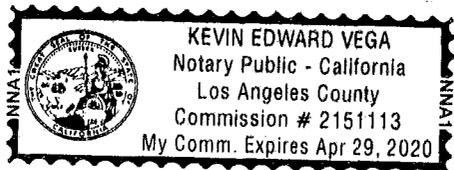
A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California )  
County of LOS ANGELES )  
On JUN 16 2017 before me, KEVIN EDWARD VEGA, NOTARY PUBLIC  
*Date Here Insert Name and Title of the Officer*  
personally appeared PHILIP E. VEGA  
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

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

WITNESS my hand and official seal.



Signature [Handwritten Signature]  
*Signature of Notary Public*

*Place Notary Seal Above*

**OPTIONAL**

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

**Description of Attached Document**

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

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

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

**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 ORANGE )

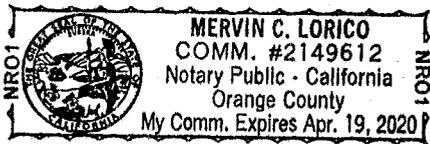
On 06/22/2017 before me, MERVIN C. LORICO, NOTARY PUBLIC  
Date Here Insert Name and Title of the Officer

personally appeared ERIC OTHMAN  
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

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

WITNESS my hand and official seal.



Signature [Handwritten Signature]  
Signature of Notary Public

Place Notary Seal Above

**OPTIONAL**

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

**Description of Attached Document**

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

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

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

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

## ATTACHMENTS

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

## SCOPE OF WORK

1. **SCOPE OF WORK:** The project scope calls for tenant improvements and accessibility of the former Copley YMCA, now called Park de la Cruz Community Center and Gym building. The community Center is a multi-level building of 24,627 square foot (SF), and an 8,640 SF Gym, in total of 33,267 SF of tenant improvements. Improvements will consist of fire suppression and life safety improvements, roof replacements (both main building and gym), heating/ventilation/air conditioning improvements (improve existing and add new to both buildings), interior furnishings, (floors, doors, ceilings, walls, etc.), energy efficient interior lighting, furnishings, and related improvements.
  - 1.1. The Work shall be performed in accordance with:
    - 1.1.1. The Notice Inviting Bids and Plans numbered **39752-1-D** through **39752-153-D**, inclusive.
2. **ESTIMATED CONSTRUCTION COST:** The City's estimated construction cost for this project is **\$7,470,000**.
3. **LOCATION OF WORK: The location of the Work is as follows:**

3901 Landis St., San Diego, CA 92105
4. **CONTRACT TIME:** The Contract Time for completion of the Work shall be **220 Working Days**.
  - 4.1. **CONTRACTOR'S LICENSE CLASSIFICATION:** In accordance with the provisions of California Law, the Contractor shall possess valid, appropriate licenses at the time that the Bid is submitted. Failure to possess the specified licenses may render the Bid as **non-responsive** and ineligible for award.
  - 4.2. The City has determined that the following licensing classification is required for this contract:
    - **CLASS B**

**ATTACHMENT B**  
**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 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**

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 Construction Cost Loaded Schedule submitted to and approved by the City.

**BID NUMBER:** K-17-1539-DBB-3

**CONTRACT OR TASK TITLE:** Park de La Cruz Recreation Center & Gym

**CONTRACTOR:** USS Cal Builders Inc.

Funding Phase	Phase Description	Phase Start	Phase Finish	Not-to-Exceed Amount
1	Tenant improvements and accessibility of the former YMCA, now called Park de La Cruz Community Center and Gym building. The community Center is a multi-level building of 24,627 square foot (SF), and an 8,640 SF Gym, in a total of 33,267 SF of tenant improvements. Improvements will consist of fire suppression and life safety improvements, roof replacements (both main building and gym), heating/ventilation/air conditioning improvements (improve existing and add new to both buildings), interior furnishings (floors, doors, ceilings, walls, etc.), energy efficient interior lighting, furnishings, and related improvements	NTP	NOC	\$7,788,000.00
Contract Total				\$7,788,000.00

**Notes:**

- 1) WHITEBOOK section 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 1 - PRICES.
- 3) This PHASED FUNDING SCHEDULE AGREEMENT will be incorporated into the CONTRACT and shall only be revised by written modifications to the CONTRACT.

**CITY OF SAN DIEGO**

**CONTRACTOR**

PRINT NAME: TONY PEREZ  
Construction Manager

PRINT NAME: ERIC OTTMAN

for Signature: [Signature]

Title: SECRETARY

Date: 7/14/17

Signature: [Signature]

PRINT NAME: ALEXANDRA CORN  
Project Manager

Date: 7.18.2017

Signature: [Signature]

Date: 7/14/17

**ATTACHMENT C**  
**INTENTIONALLY LEFT BLANK**

**ATTACHMENT D**  
**COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG)**  
**HOUSING URBAN DEVELOPMENT (HUD)**  
**FUNDING AGENCY PROVISIONS**

## FUNDING AGENCY PROVISIONS

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

**1. NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246).**

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

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

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

**1.3.** The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals.

**1.4.** The hours of minority and female employment and training shall be substantially uniform throughout the length of the Contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the Contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

**1.5.** The Contractor shall provide written notification to the Director the Office of Federal Contract Compliance Programs within 10 Working Days of award of any Subcontract in excess of \$10,000 at any tier for Work under the Contract resulting from this solicitation. The notification shall list the name, address and telephone number of the Subcontractor; employer identification number of the Subcontractor; estimated dollar amount of the Subcontract; estimated starting and completion dates of the Subcontract; and the geographical area in which the subcontract is to be performed. The "covered area" is the City of San Diego.

**2. EQUAL OPPORTUNITY CLAUSES:**

**2.1.** The following equal opportunity clauses are incorporated by reference herein:

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

**3. STANDARD FEDERAL EQUAL EMPLOYMENT SPECIFICATIONS:**

**3.1.** The Contractor is required to comply with the 16 "Standard Federal Equal Employment Specifications" located at 41 CFR 60-4.3 for federal and federally-assisted construction contracts in excess of \$10,000, set forth below.

**3.2.** The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative actions steps at least as extensive as the following:

1. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign 2 or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with

- specific attention to minority or female individuals working at such sites or in such facilities.
2. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
  3. Maintain a current file of the names, addresses and telephone numbers of each minority and female walk-in applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
  4. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
  5. Develop on-the-job training opportunities, participate in training programs for the area, or both which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under C.1. above.
  6. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreements; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
  7. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignments, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as superintendents, foreman, etc., prior to the initiation of Work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons

attending, subject matter discussed, and dispositions of the subject matter.

8. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
9. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
10. Encourage present minority and female employees to recruit other minority persons and women and where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.
11. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
12. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
13. Ensure that seniority practices, job classifications, work assignments and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
14. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
15. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
16. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

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

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

**5. MONTHLY EMPLOYMENT UTILIZATION REPORTS:**

**5.1.** Refer to GENERAL EQUAL OPPORTUNITY CONTRACTING PROGRAM REQUIREMENTS, CONSTRUCTION CONTRACTOR REQUIREMENTS in The WHITEBOOK and the following:

1. State of California Department of Transportation Payroll Report. Due to the City weekly.
2. Federal and Non-Federal Work in San Diego County. Submit an updated list only if work is complete or new contracts have been awarded during the span of this project.

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

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

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

**7.1.** The successful Bidder's work shall be required to comply with Executive Order 11246, entitled "Equal Employment Opportunity," as amended by Executive Order 11375, and as supplemented in Department of Labor regulations (41 CFR chapter 60).

**7.2.** This Executive Order pertains to Equal Employment Opportunity regulations and contains significant changes to the regulations including new goals and timetables for women in construction and revised goals and time-tables for minorities in construction.

**7.3.** Minimum wage rates for this project have been predetermined by the Secretary of Labor and are set forth in the Decision of the Secretary and bound into the specifications book. Should there be any difference between the state or federal wage rates, including health and welfare funds for any given craft, mechanic, or similar classifications needed to execute the Work, it shall be mandatory upon the Contractor or subcontractor to pay the higher of the two rates.

- 7.4. The minimum wage rate to be paid by the Contractor and the Subcontractors shall be in accordance with the Federal Labor Standards Provisions (see pages below) and Federal Wage Rates (see Wage Rates below) and General Prevailing Wage Determination made by the State of California, Director of Industrial Relations pursuant to California Labor Code Part 7, Chapter 1, Article 2, Sections 1770, 1773 and 1773.1, whichever is higher.
  - 7.5. A Contractor having 50 or more employees and its Subcontractors having 50 or more employees and who may be awarded a contract of \$50,000 or more will be required to maintain an affirmative action program, the standards for which are contained in the specifications.
  - 7.6. To be eligible for award, each Bidder shall comply with the affirmative action requirements which are contained in the specifications.
  - 7.7. Women will be afforded equal opportunity in all areas of employment. However, the employment of women shall not diminish the standards of requirements for the employment of minorities.
8. **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.
- 8.1. **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.
    - 8.1.1. 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.
    - 8.1.2. 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.

- 8.2. 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.
- 8.3. 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.
- 8.3.1.** 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.
- 8.4. 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.
- 8.5. 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.
- 8.6. 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.
- 8.7. 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."

**8.8. 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.

**8.9. 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.

**8.9.1.** A Contractor's inadvertent error in listing a subcontractor who is not registered pursuant to Labor Code section 1725.5 in response to a solicitation shall not be grounds for filing a bid protest or grounds for considering the bid non-responsive provided that any of the following apply: (1) the subcontractor is registered prior to bid opening; (2) within twenty-four hours after the bid opening, the subcontractor is registered and has paid the penalty registration fee specified in Labor Code section 1725.5; or (3) the subcontractor is replaced by another registered subcontractor pursuant to Public Contract Code section 4107.

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

- CA17001 03/10/2017
- 5
- 3/10/2017

The required wage information may be accessed and downloaded from:  
<http://www.wdol.gov/>

General Decision Number: CA170001 03/10/2017 CA1

Superseded General Decision Number: CA20160001

State: California

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

County: San Diego County in California.

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

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.20 for calendar year 2017 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.20 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Modification Number	Publication Date
0	01/06/2017
1	01/27/2017
2	02/17/2017
3	02/24/2017
4	03/03/2017
5	03/10/2017

ASBE0005-002 07/04/2016

	Rates	Fringes
Asbestos Workers/Insulator (Includes the application of all insulating materials, protective coverings, coatings, and finishes to all types of mechanical systems).....	\$ 38.37	20.13
Fire Stop Technician (Application of Firestopping Materials for wall openings and penetrations in walls, floors, ceilings and curtain walls).....	\$ 26.15	17.31
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ASBE0005-004 07/04/2016

	Rates	Fringes
Asbestos Removal worker/hazardous material handler (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from mechanical systems, whether they contain asbestos or not).....	\$ 18.38	10.82

BOIL0092-003 10/01/2012

	Rates	Fringes
BOILERMAKER.....	\$ 41.17	28.27

BRCA0004-008 11/01/2016

	Rates	Fringes
BRICKLAYER; MARBLE SETTER.....	\$ 35.30	17.35

BRCA0018-004 06/01/2016

	Rates	Fringes
MARBLE FINISHER.....	\$ 29.20	12.93
TILE FINISHER.....	\$ 24.53	11.08
TILE LAYER.....	\$ 35.89	9.08

BRCA0018-010 09/01/2016

	Rates	Fringes
TERRAZZO FINISHER.....	\$ 28.53	12.27
TERRAZZO WORKER/SETTER.....	\$ 35.57	13.14

CARP0409-002 07/01/2008

	Rates	Fringes
Diver		
(1) Wet.....	\$ 663.68	9.82
(2) Standby.....	\$ 331.84	9.82
(3) Tender.....	\$ 323.84	9.82
(4) Assistant Tender.....	\$ 299.84	9.82

Amounts in "Rates" column are per day

CARP0409-008 08/01/2010

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

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CARP0547-001 07/01/2016

	Rates	Fringes
CARPENTER		
(1) Bridge.....	\$ 37.28	10.58
(2) Commercial Building....	\$ 32.30	10.58
(3) Heavy & Highway.....	\$ 37.15	10.58
(4) Residential Carpenter..	\$ 25.84	10.58
(5) Residential		
Insulation Installer.....	\$ 18.00	8.16
MILLWRIGHT.....	\$ 40.70	17.03
PILEDRIVERMAN.....	\$ 37.28	10.58

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CARP0547-002 07/01/2009

	Rates	Fringes
Drywall		
(1) Work on wood framed construction of single family residences, apartments or condominiums under four stories		
Drywall Installer/Lather...\$	21.00	8.58
Drywall Stocker/Scrapper...\$	11.00	6.67
(2) All other work		
Drywall Installer/Lather...\$	27.35	9.58
Drywall Stocker/Scrapper...\$	11.00	6.67

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ELEC0569-001 10/01/2016

	Rates	Fringes
Electricians (Tunnel Work)		
Cable Splicer.....\$	47.72	3%+12.63
Electrician.....\$	46.97	3%+12.63
Electricians: (All Other Work, Including 4 Stories Residential)		
Cable Splicer.....\$	42.50	3%+12.63
Electrician.....\$	41.75	3%+12.63

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ELEC0569-004 06/01/2015

	Rates	Fringes
ELECTRICIAN (Sound & Communications Sound Technician).....\$	29.55	11.92
SOUND TECHNICIAN: Terminating, operating and performing final check-out		

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ELEC0569-005 06/06/2016

	Rates	Fringes
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Sound & Communications  
 Sound Technician.....\$ 30.22 12.21

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

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 \* ELEC0569-006 10/01/2016

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

	Rates	Fringes
Traffic signal, street light and underground work		
Utility Technician #1.....\$ 29.50	3%+7.42	
Utility Technician #2.....\$ 24.65	3%+7.42	

STREET LIGHT & TRAFFIC SIGNAL WORK:

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

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

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 ELEC0569-008 06/06/2016

	Rates	Fringes
ELECTRICIAN (Residential, 1-3 Stories).....\$ 31.69	3%+6.61	

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 ELEC1245-001 06/01/2015

	Rates	Fringes
LINE CONSTRUCTION		
(1) Lineman; Cable splicer..\$ 52.85	15.53	
(2) Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), overhead &		

underground distribution line equipment).....\$ 42.21	14.32
(3) Groundman.....\$ 32.28	14.03
(4) Powderman.....\$ 47.19	14.60

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

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ELEV0018-001 01/01/2017

	Rates	Fringes
ELEVATOR MECHANIC.....\$ 52.21		31.585

FOOTNOTE:

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

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ENGI0012-003 07/01/2016

	Rates	Fringes
OPERATOR: Power Equipment (All Other Work)		
GROUP 1.....\$ 39.95		23.35
GROUP 2.....\$ 40.73		23.35
GROUP 3.....\$ 41.02		23.35
GROUP 4.....\$ 42.51		23.35
GROUP 5.....\$ 41.86		23.35
GROUP 6.....\$ 41.83		23.35
GROUP 8.....\$ 42.84		23.35
GROUP 9.....\$ 42.19		23.35
GROUP 10.....\$ 42.96		23.35
GROUP 11.....\$ 42.31		23.35
GROUP 12.....\$ 43.13		23.35
GROUP 13.....\$ 43.23		23.35
GROUP 14.....\$ 43.26		23.35
GROUP 15.....\$ 43.34		23.35
GROUP 16.....\$ 43.46		23.35
GROUP 17.....\$ 43.63		23.35
GROUP 18.....\$ 43.73		23.35
GROUP 19.....\$ 43.84		23.35
GROUP 20.....\$ 43.96		23.35
GROUP 21.....\$ 44.13		23.35
GROUP 22.....\$ 44.23		23.35
GROUP 23.....\$ 44.34		23.35
GROUP 24.....\$ 44.46		23.35
GROUP 25.....\$ 44.63		23.35

OPERATOR: Power Equipment  
(Cranes, Piledriving &  
Hoisting)

GROUP 1.....	\$ 43.20	22.15
GROUP 2.....	\$ 43.98	22.15
GROUP 3.....	\$ 44.27	22.15
GROUP 4.....	\$ 44.41	22.15
GROUP 5.....	\$ 44.63	22.15
GROUP 6.....	\$ 44.74	22.15
GROUP 7.....	\$ 44.86	22.15
GROUP 8.....	\$ 45.03	22.15
GROUP 9.....	\$ 45.20	22.15
GROUP 10.....	\$ 46.20	22.15
GROUP 11.....	\$ 47.20	22.15
GROUP 12.....	\$ 48.20	22.15
GROUP 13.....	\$ 49.20	22.15
OPERATOR: Power Equipment (Tunnel Work)		
GROUP 1.....	\$ 41.80	23.35
GROUP 2.....	\$ 42.58	23.35
GROUP 3.....	\$ 42.87	23.35
GROUP 4.....	\$ 43.01	23.35
GROUP 5.....	\$ 43.23	23.35
GROUP 6.....	\$ 43.34	23.35
GROUP 7.....	\$ 43.46	23.35

PREMIUM PAY:

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

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

SEE ZONE DEFINITIONS AFTER CLASSIFICATIONS

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

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

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

GROUP 3: Asphalt-rubber blend operator; Bobcat or similar

type (Skid steer); Equipment greaser (rack); Ford Ferguson (with dragtype attachments); Helicopter radioman (ground); Stationary pipe wrapping and cleaning machine operator

GROUP 4: Asphalt plant fireman; Backhoe operator (mini-max or similar type); Boring machine operator; Boxman or mixerman (asphalt or concrete); Chip spreading machine operator; Concrete cleaning decontamination machine operator; Concrete Pump Operator (small portable); Drilling machine operator, small auger types (Texoma super economatic or similar types - Hughes 100 or 200 or similar types - drilling depth of 30' maximum); Equipment greaser (grease truck); Guard rail post driver operator; Highline cableway signalman; Hydra-hammer-aero stomper; Micro Tunneling (above ground tunnel); Power concrete curing machine operator; Power concrete saw operator; Power-driven jumbo form setter operator; Power sweeper operator; Rock Wheel Saw/Trencher; Roller operator (compacting); Screed operator (asphalt or concrete); Trenching machine operator (up to 6 ft.); Vacuum or much truck

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

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

GROUP 8: Asphalt or concrete spreading operator (tamping or finishing); Asphalt paving machine operator (Barber Greene or similar type); Asphalt-rubber distribution operator; Backhoe operator (up to and including 3/4 yd.), small ford, Case or similar; Cast-in-place pipe laying machine operator; Combination mixer and compressor operator (gunite

work); Compactor operator (self-propelled); Concrete mixer operator (paving); Crushing plant operator; Drill Doctor; Drilling machine operator, Bucket or auger types (Calweld 150 bucket or similar types - Watson 1500, 2000 2500 auger or similar types - Texoma 700, 800 auger or similar types - drilling depth of 60' maximum); Elevating grader operator; Grade checker; Gradall operator; Grouting machine operator; Heavy-duty repairman; Heavy equipment robotics operator; Kalamazoo balliste regulator or similar type; Kolman belt loader and similar type; Le Tourneau blob compactor or similar type; Loader operator (Athey, Euclid, Sierra and similar types); Mobark Chipper or similar; Ozzie padder or similar types; P.C. slot saw; Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pumpcrete gun operator; Rock Drill or similar types; Rotary drill operator (excluding caisson type); Rubber-tired earth-moving equipment operator (single engine, caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator (multiple engine up to and including 25 yds. struck); Rubber-tired scraper operator (self-loading paddle wheel type-John Deere, 1040 and similar single unit); Self-propelled curb and gutter machine operator; Shuttle buggy; Skiploader operator (crawler and wheel type over 1-1/2 yds. up to and including 6-1/2 yds.); Soil remediation plant operator; Surface heaters and planer operator; Tractor compressor drill combination operator; Tractor operator (any type larger than D-5 - 100 flywheel h.p. and over, or similar-bulldozer, tamper, scraper and push tractor single engine); Tractor operator (boom attachments), Traveling pipe wrapping, cleaning and bending machine operator; Trenching machine operator (over 6 ft. depth capacity, manufacturer's rating); trenching Machine with Road Miner attachment (over 6 ft depth capacity); Ultra high pressure waterjet cutting tool system mechanic; Water pull (compaction) operator

GROUP 9: Heavy Duty Repairman

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

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

GROUP 12: Auto grader operator; Automatic slip form operator; Drilling machine operator, bucket or auger types (Calweld, auger 200 CA or similar types - Watson, auger 6000 or similar types - Hughes Super Duty, auger 200 or similar types - drilling depth of 175' maximum); Hoe ram or similar with compressor; Mass excavator operator less than 750 cu. yards; Mechanical finishing machine operator; Mobile form traveler operator; Motor patrol operator (multi-engine); Pipe mobile machine operator; Rubber-tired earth-moving equipment operator (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck); Rubber-tired self-loading scraper operator (paddle-wheel-auger type self-loading - two (2) or more units)

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

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

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

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

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

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

GROUP 19: Rotex concrete belt operator (or similar types); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, Caterpillar, Euclid, Athey Wagon and similar types with any

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

GROUP 20: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

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

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

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

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

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

#### CRANES, PILEDRIVING AND HOISTING EQUIPMENT CLASSIFICATIONS

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

GROUP 2: Truck crane oiler

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

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

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

GROUP 6: Bridge crane operator; Cretor crane operator; Hoist  
operator (Chicago boom and similar type); Lift mobile  
operator; Lift slab machine operator (Vagtborg and similar  
types); Material hoist and/or manlift operator; Polar  
gantry crane operator; Self Climbing scaffold (or similar  
type); Shovel, backhoe, dragline, clamshell operator (over  
3/4 yd. and up to 5 cu. yds. mrc); Tugger hoist operator

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

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

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

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

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

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

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

Mobile tower crane operator (over 300 tons)

#### TUNNEL CLASSIFICATIONS

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

GROUP 2: Power-driven jumbo form setter operator

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

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

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

GROUP 6: Heavy Duty Repairman

GROUP 7: Tunnel mole boring machine operator

#### ENGINEERS ZONES

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

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

MDM. Continue S to the SW corner of T32S, R31E, MDM. Continue W to SW corner of SE quarter of Section 34, T32S, R30E, MDM. Continue S to SW corner of T11N, R17W, SBM. Continue E along south boundary of T11N, SBM to SW corner of T11N, R7W, SBM. Continue S to SW corner of T9N, R7W, SBM. Continue E along south boundary of T9N, SBM to SW corner of T9N, R1E, SBM. Continue S along west boundary of R1E, SBM to Riverside County line at the SW corner of T1S, R1E, SBM. Continue E along south boundary of T1S, SBM (Riverside County Line) to SW corner of T1S, R10E, SBM. Continue S along west boundary of R10E, SBM to Imperial County line at the SW corner of T8S, R10E, SBM. Continue W along Imperial and Riverside county line to NW corner of T9S, R9E, SBM. Continue S along the boundary between Imperial and San Diego Counties, along the west edge of R9E, SBM to the south boundary of Imperial County/California state line. Follow the California state line west to Arizona state line, then north to Nevada state line, then continuing NW back to start at the point which is the NW corner of Section 1, T17N, R14E, SBM

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

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

\$2.00 additional per hour for INYO and MONO Counties and the

Northern portion of SAN BERNARDINO County as defined below:

That area within the following Boundary: Begin at the intersection of the northern boundary of Mono County and the California state line at the point which is the center of Section 17, T10N, R22E, Mt. Diablo Meridian. Continue S then SE along the entire western boundary of Mono County, until it reaches Inyo County at the point which is the NE corner of the Western half of the NW quarter of Section 2, T8S, R29E, MDM. Continue SSE along the entire western boundary of Inyo County, until the intersection with Kern County at the point which is the SW corner of the SE 1/4 of Section 32, T24S, R37E, MDM. Continue E along the Inyo and Kern County boundary until the intersection with San Bernardino County at that point which is the SE corner of section 34, T24S, R40E, MDM. Continue E along the Inyo and San Bernardino County boundary until the point which is the NE corner of the Western half of the NW quarter of Section 6, T25S, R42E, MDM. Continue S to that point which is the SW corner of the NW quarter of Section 6, T27S, R42E, MDM. Continue E in a straight line to the California and Nevada state border at the point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Then continue NW along the state line to the starting point, which is the center of Section 18, T10N, R22E, MDM.

REMAINING AREA NOT DEFINED ABOVE RECIEVES BASE RATE

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 ENGI0012-004 08/01/2015

	Rates	Fringes
OPERATOR: Power Equipment (DREDGING)		
(1) Leverman.....	\$ 49.50	23.60
(2) Dredge dozer.....	\$ 43.53	23.60
(3) Deckmate.....	\$ 43.42	23.60
(4) Winch operator (stern winch on dredge).....	\$ 42.87	23.60
(5) Fireman-Oiler, Deckhand, Bargeman, Leveehand.....	\$ 42.33	23.60
(6) Barge Mate.....	\$ 42.94	23.60

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 IRON0377-002 07/01/2016

	Rates	Fringes
Ironworkers:		
Fence Erector.....	\$ 28.33	20.64
Ornamental, Reinforcing and Structural.....	\$ 34.75	29.20

PREMIUM PAY:

\$6.00 additional per hour at the following locations:

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

\$4.00 additional per hour at the following locations:

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

\$2.00 additional per hour at the following locations:

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

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LABO0089-001 07/18/2016

	Rates	Fringes
LABORER (BUILDING and all other Residential Construction)		
Group 1.....	\$ 29.42	19.78
Group 2.....	\$ 30.10	<del>19.78</del>
Group 3.....	\$ 30.81	19.78
Group 4.....	\$ 31.61	19.78
Group 5.....	\$ 33.54	19.78
LABORER (RESIDENTIAL CONSTRUCTION - See definition below)		
(1) Laborer.....	\$ 27.32	18.11
(2) Cleanup, Landscape, Fencing (Chain Link & Wood).....	\$ 26.03	18.11

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

LABORER CLASSIFICATIONS

GROUP 1: Cleaning and handling of panel forms; Concrete Screeding for Rought Strike-off; Concrete, water curing; Demolition laborer; Flagman; Gas, oil and/or water pipeline laborer; General Laborer; General clean-up laborer; Landscape laborer; Jetting laborer; Temporary water and air lines laborer; Material hoseman (walls, slabs, floors and decks); Plugging, filling of Shee-bolt holes; Dry packing of concrete; Railroad maintenance, Repair Trackman and road beds, Streetcar and railroad construction trac laborers; Slip form raisers; Slurry seal crews (mixer

operator, applicator operator, squeegee man, Shuttle man, top man), filling of cracks by any method on any surface; Tarman and mortar man; Tool crib or tool house laborer; Window cleaner; Wire Mesh pulling-all concrete pouring operations

GROUP 2: Asphalt Shoveler; Cement Dumper (on 1 yard or larger mixer and handling bulk cement); Cesspool digger and installer; Chucktender; Chute man, pouring concrete, the handling of the concrete from ready mix trucks, such as walls, slabs, decks, floors, foundations, footings, curbs, gutters and sidewalks; Concrete curer-impervious membrane and form oiler; Cutting torch operator (demolition); Guinea chaser; Headboard man-asphalt; Laborer, packing rod steel and pans; membrane vapor barrier installer; Power broom sweepers (small); Riprap, stonepaver, placing stone or wet sacked concrete; Roto scraper and tiller; Tank sealer and cleaner; Tree climber, faller, chain saw operator, Pittsburgh Chipper and similar type brush shredders; Underground laborers, including caisson bellower

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

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

installer; Sandblaster (nozzleman), Porta shot-blast, water blasting

GROUP 5: Blasters Powderman-All work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Driller-all power drills, excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and any and all other types of mechanical drills without regard to the form of motive power.

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LABO0089-002 11/01/2016

	Rates	Fringes
LABORER (MASON TENDER).....	\$ 29.62	15.89

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LABO0089-004 07/03/2016

HEAVY AND HIGHWAY CONSTRUCTION

	Rates	Fringes
Laborers:		
Group 1.....	\$ 30.54	17.89
Group 2.....	\$ 31.00	17.89
Group 3.....	\$ 31.41	17.89
Group 4.....	\$ 32.25	17.89
Group 5.....	\$ 36.37	17.89

LABORER CLASSIFICATIONS

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

GROUP 2: Asphalt abatement; Buggymobile; Cement dumper (on 1 yd. or larger mixers and handling bulk cement); Concrete curer, impervious membrane and form oiler; Chute man, pouring concrete; Concrete cutting torch; Concrete pile cutter; driller/Jackhammer, with drill steel 2 1/2 feet or

longer; Dry pak-it machine; Fence erector; Pipeline wrapper, gas, oil, water, pot tender & form man; Grout man; Installation of all asphalt overlay fabric and materials used for reinforcing asphalt; Irrigation laborer; Kettleman-Potman hot mop, includes applying asphalt, lay-kold, creosote, lime caustic and similar tyhpes of materials (dipping, brushing, handling) and waterproofing; Membrane vapor barrier installer; Pipelayer backup man (coating, grouting, making of joints, sealing caulkiing, diapering including rubber basket joints, pointing); Rotary scarifier, multiple head concrete chipper; Rock slinger; Roto scraper & tiller; Sandblaster pot tender; Septic tank digger/installer; Tamper/wacker operator; Tank scaler & cleaner; Tar man & mortar man; Tree climber/faller, chainb saw operator, Pittsburgh chipper & similar type brush shredders.

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

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

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

unit, and all other types of mechanical drills without regard to form of motive power. Environmental remediation, Monitoring well, Toxic waste and Geotechnical driller, Toxic waste removal. Welding in connection with Laborer's work.

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LABO0300-005 01/01/2017

	Rates	Fringes
Asbestos Removal Laborer.....	\$ 31.88	16.82

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

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LABO1184-001 07/04/2016

	Rates	Fringes
Laborers: (HORIZONTAL DIRECTIONAL DRILLING)		
(1) Drilling Crew Laborer...	\$ 33.65	13.95
(2) Vehicle Operator/Hauler.	\$ 33.82	13.95
(3) Horizontal Directional Drill Operator.....	\$ 35.67	13.95
(4) Electronic Tracking Locator.....	\$ 37.67	13.95
Laborers: (STRIPING/SLURRY SEAL)		
GROUP 1.....	\$ 34.86	17.03
GROUP 2.....	\$ 36.16	17.03
GROUP 3.....	\$ 38.17	17.03
GROUP 4.....	\$ 39.91	17.03

LABORERS - STRIPING CLASSIFICATIONS

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

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

GROUP 3: Traffic delineating device applicator: Layout and

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

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

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LABO1414-003 08/03/2016

	Rates	Fringes
LABORER		
PLASTER CLEAN-UP LABORER....	\$ 31.60	19.28
PLASTER TENDER.....	\$ 34.15	19.28

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

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

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\* PAIN0036-001 08/01/2016

	Rates	Fringes
Painters: (Including Lead Abatement)		
(1) Repaint (excludes San Diego County).....	\$ 27.59	13.24
(2) All Other Work.....	\$ 31.12	13.24

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

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PAIN0036-010 10/01/2015

Rates	Fringes
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DRYWALL FINISHER/TAPER

(1) Building & Heavy Construction.....	\$ 27.84	15.20
(2) Residential Construction (Wood frame apartments, single family homes and multi-duplexes up to and including four stories).....	\$ 21.00	13.91

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PAIN0036-012 10/01/2016

	Rates	Fringes
GLAZIER.....	\$ 41.55	11.93

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PAIN0036-019 01/01/2017

	Rates	Fringes
SOFT FLOOR LAYER.....	\$ 28.77	13.31

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PLAS0200-005 08/06/2015

	Rates	Fringes
PLASTERER.....	\$ 38.44	13.77

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

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PLAS0500-001 07/01/2016

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER		
GROUP 1.....	\$ 23.84	21.17
GROUP 2.....	\$ 25.49	21.17
GROUP 3.....	\$ 27.57	21.17

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

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

GROUP 2: Work classified as type I and II construction

GROUP 3: All other work

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PLUM0016-006 07/01/2016

	Rates	Fringes
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PLUMBER, PIPEFITTER,  
STEAMFITTER

Camp Pendleton.....	\$ 51.69	21.41
Plumber and Pipefitter All other work except work on new additions and remodeling of bars, restaurant, stores and commercial buildings not to exceed 5,000 sq. ft. of floor space and work on strip malls, light commercial, tenant improvement and remodel work.....	\$ 47.19	21.41
Work ONLY on new additions and remodeling of commercial buildings, bars, restaurants, and stores not to exceed 5,000 sq. ft. of floor space.....	\$ 45.73	20.43
Work ONLY on strip malls, light commercial, tenant improvement and remodel work.....	\$ 35.69	18.76

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PLUM0016-011 07/01/2016

	Rates	Fringes
PLUMBER/PIPEFITTER Residential.....	\$ 38.17	17.33

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PLUM0345-001 07/01/2014

	Rates	Fringes
PLUMBER Landscape/Irrigation Fitter..	\$ 29.27	19.75
Sewer & Storm Drain Work....	\$ 33.24	17.13

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ROOF0045-001 07/01/2014

	Rates	Fringes
ROOFER.....	\$ 27.73	8.12

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SFCA0669-001 04/01/2016

	Rates	Fringes
SPRINKLER FITTER.....	\$ 37.67	19.56

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SHEE0206-001 07/01/2015

Rates	Fringes
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SHEET METAL WORKER

Camp Pendleton.....	\$ 37.55	23.23
Except Camp Pendleton.....	\$ 35.33	23.23
Sheet Metal Technician.....	\$ 25.22	6.69

SHEET METAL TECHNICIAN - SCOPE:

a. Existing residential buildings, both single and multi-family, where each unit is heated and/or cooled by a separate system b. New single family residential buildings including tracts. c. New multi-family residential buildings, not exceeding five stories of living space in height, provided each unit is heated or cooled by a separate system. Hotels and motels are excluded. d. LIGHT COMMERCIAL WORK: Any sheet metal, heating and air conditioning work performed on a project where the total construction cost, excluding land, is under \$1,000,000 e. TENANT IMPROVEMENT WORK: Any work necessary to finish interior spaces to conform to the occupants of commercial buildings, after completion of the building shell

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TEAM0036-001 07/04/2016

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 15.90	30.69
GROUP 2.....	\$ 23.49	30.69
GROUP 3.....	\$ 23.69	30.69
GROUP 4.....	\$ 23.89	30.69
GROUP 5.....	\$ 24.09	30.69
GROUP 6.....	\$ 24.59	30.69
GROUP 7.....	\$ 26.09	30.69

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

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Fuel Man, Swamper

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

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

GROUP 4: Off-road Dump Truck under 35 tons 4-axles but less than 7-axles, Low-Bed Truck & Trailer, Transit Mix Trucks under 8 yd, 3-axle Water Truck, Erosion Control Driver,

Grout Mixer Truck, Dump Crete 6.5yd and over, Dumpster Trucks, DW 10, DW 20 and over, Fuel Truck and Dynamite, Truck Greaser, Truck Mounted Mobile Sweeper 2-axle Winch Truck

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

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

GROUP 7: Repairman

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

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

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

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

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed

in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

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

#### Survey Rate Identifiers

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

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

#### Union Average Rate Identifiers

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

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

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#### WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

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

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

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

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

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

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END OF GENERAL DECISION

**10. SECTION 3 OF THE HOUSING AND URBAN DEVELOPMENT ACT OF 1968:**

- 10.1.** The work to be performed under this contract is on a project assisted under a program providing direct Federal financial assistance from the Department of Housing and Urban Development and is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u. Section 3 requires that to the greatest extent feasible opportunities for training and employment be given lower income residents of the project area and contracts for work in connection with the project be awarded to business concerns which are located in or owned in substantial part by persons residing in the area of the project.
- 10.2.** The parties to this contract will comply with the provisions of said Section 3 and the regulations issued pursuant thereto by the Secretary of Housing and Urban Development set forth in 24 CFR Part 135, and all applicable rules and orders of the Department issued thereunder prior to the execution of this contract. The parties to this contract certify and agree that they are under no contractual or other disability which would prevent them from complying with these requirements.
- 10.3.** The Contractor will send to each labor organization or representative of workers with which he has a collective bargaining agreement or other contract or understanding, if any, a notice advising the said labor organization or workers' representative of his commitments under this Section 3 clause and shall post copies of the notice in conspicuous places available to employees and applicants for employment or training.
- 10.4.** The Contractor will include this Section 3 clause in every subcontract for work in connection with the project and will, at the direction of the applicant for or recipient of Federal financial assistance, take appropriate action pursuant to the subcontract upon a finding that the Subcontractor is in violation of regulations issued by the Secretary of Housing and Urban Development, 24 CFR Part 135. The Contractor will not subcontract with any Subcontractor where it has notice or knowledge that the latter has been found in violation of regulations under 24 CFR Part 135 and will not let any subcontract unless the Subcontractor has first provided it with a preliminary statement of ability to comply with the requirements of these regulations.
- 10.5.** Compliance with the provisions of Section 3, the regulations set forth in 24 CFR Part 135, and all applicable rules and orders of the Department issued thereunder prior to the execution of the contract, shall be a condition of the Federal financial assistance provided to the project, binding upon the applicant or recipient for such assistance, its successors and assigns. Failure to fulfill these requirements shall subject the applicant or recipient, its Contractors and Subcontractors, its successors, and assigns to those sanctions specified by the grant or loan agreement or contract through which Federal assistance is provided, and to such sanctions as are specified by 24 CFR Part 135.

## 11. FEDERAL LABOR STANDARDS PROVISIONS:

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### Federal Labor Standards Provisions

U.S. Department of Housing and Urban  
Development  
Office of Labor Relations

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#### Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

**A. 1. (i) Minimum Wages.** All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4).

Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

**(ii) (a)** Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

**(1)** The work to be performed by the classification requested is not performed by a classification in the wage determination; and

**(2)** The classification is utilized in the area by the construction industry; and

**(3)** The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

**(b)** If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

**(c)** In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

**(d)** The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

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

**(iv)** If the contractor does not make payments to a trustee or other third person, the contractor may consider as part

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of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

**2. Withholding.** HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

**3. (i) Payrolls and basic records.** Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of 3 years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been

communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

**(ii) (a)** The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i) except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired.

Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at

<http://www.dol.gov/esa/whd/forms/wh347instr.htm>

or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

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

**(1)** That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5 (a)(3)(i), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

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(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph A.3.(ii)(b).

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

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

#### **4. Apprentices and Trainees.**

(i) **Apprentices.** Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who

is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination.

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

(ii) **Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by

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the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

**(iii) Equal employment opportunity.** The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

**5. Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract **6. Subcontracts.** The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 in this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

**7. Contract termination; debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8. Compliance with Davis-Bacon and Related Act Requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

**9. Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

**10. (i) Certification of Eligibility.** By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be

awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24. **(ii)** No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

**(iii)** The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1 01 0, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of...influencing in any way the action of such Administration..... makes, utters or publishes any statement knowing the same to be false..... shall be fined not more than \$5,000 or imprisoned not more than two years, or both".

**11. Complaints, Proceedings, or Testimony by Employees.**

No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

**B. Contract Work Hours and Safety Standards Act.** The provisions of this paragraph B are applicable where the amount of the prime contract exceeds \$100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

**(1) Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

**(2) Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in sub paragraph (1) of this paragraph.

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**(3) Withholding for unpaid wages and liquidated damages.**

HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

**(4) Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

**C. Health and Safety.** The provisions of this paragraph C are applicable where the amount of the prime contract exceeds \$100,000.

**(1)** No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

**(2)** The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96), 40 USC 3701 et seq.

**(3)** The contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

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Previous editions are obsolete

form HUD-4010 (06/2009)  
ref. Handbook 1344.1

**12. AGENCY SPECIFIC PROVISIONS:**

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

**12.1. HUD Requirements**

**12.1.1.** Affirmative Good Faith Effort Steps shall include the steps listed at 24 CFR 85.36(e)(2), set forth below:

1. Placing qualified DBE business enterprises on solicitation lists;
2. Assuring that DBE business enterprises are solicited whenever they are potential sources;
3. Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by DBE business enterprises;
4. Establishing delivery schedules, where the requirement permits, which encourage participation by DBE business enterprises;
5. Using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the Department of Commerce; and
6. Requiring the Subcontractors to take the affirmative steps listed in this section.
7. See "DBE Potential Resources Centers" Section in a later part these specifications. Include a completed copy of the form AA61, "List of Work Made Available" with the GFE documentation.

**13. DBE POTENTIAL RESOURCES CENTERS:**

**13.1.** Utilization of SBA and MBDA resources is required at no cost. These agencies offer several services, including Internet access to databases of DBEs.

**13.2.** For additional assistance, the recipient or contractor can telephone the local offices of both agencies in their area (SBA Minority Enterprise Development Offices and DOC MBDA Regional Centers). The Internet web sites also include names, addresses, and phone or fax numbers of local SBA and MBDA centers. Do not write to these sources

**13.3.** The Contractor shall provide documentation that the local SBA/MBDA offices or web sites were notified of the contracting bid opportunity at least 15 Working Days prior to Bid opening and solicitation to DBE subcontractors at least 10 Working Days prior to Bid opening. Documentation shall not only include the efforts to contact the information sources and list the Contract opportunity, but also the solicitation and response to the bid request.

**13.4.** Include qualified DBEs on solicitation lists and record the information on Form AA63. Solicitation shall be as broad as possible. The following web sites include a list of available sources for expanding the search for eligible DBEs:

1. <http://www.sba.gov>
2. <http://www.ccr.gov>
3. <http://www.mbd.gov>

**13.5.** If DBE sources are not located, explain why and describe the efforts made.

**13.6.** The Contractor shall send invitations to at least 3 (or all, if less than 3) DBE vendors for each item of work referred by sources contacted. The invitations shall adequately specify the items for which bids are requested. The record of "good faith" efforts shall indicate a real desire for a positive response, such as a certified mail receipt or a documented telephone conversation.

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

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

Name and Address	Telephone and Web Site
<b>U.S. Small Business Administration</b>	(415) 744-6820 Extension 0
455 Market Street, Suite 600	PRO-Net Database: <a href="http://www.ccr.gov/">http://www.ccr.gov/</a> <sup>1</sup>
San Francisco, CA 94105	Bid Notification: <a href="http://web.sba.gov/subnet/">http://web.sba.gov/subnet/</a> <sup>2</sup>
RE: Minority Enterprise Development Offices	
<b>U.S. Department of Commerce</b>	(415) 744-3001
Minority Business Development Agency	Phoenix/ Opportunity Database:
211 Main Street, Room 1280	<a href="http://www.mbd.gov">http://www.mbd.gov</a>
San Francisco, CA 94105	RE: Business Development Centers

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

Name and Address	Telephone and Web Site
<b>California Department of Transportation</b>	Mailing Address: PO Box 942874

(CALTRANS) Business Enterprise Program <sup>4</sup>	Sacramento, CA 94274-0015
1820 Alhambra Blvd.	(916) 227-9599
Sacramento, CA 95816	<a href="http://www.dot.ca.gov/hq/bep">www.dot.ca.gov/hq/bep</a>
<b>CA Public Utilities Commission (CPUC)<sup>5</sup></b>	
505 Van Ness Avenue	
San Francisco, CA 94102-3298	<a href="http://www.cpuc.ca.gov/static/supplierdiversity">http://www.cpuc.ca.gov/static/supplierdiversity</a>

Notes:

1. PRO-Net new database is the SBA's electronic search engine that was put on line January 1, 2004, containing business profiles for nearly 200,000 businesses. The SBA requests Internet contact only for a list of potential DBE subcontractors that can be downloaded from PRO-Net: <http://www.ccr.gov>. Downloading will verify that the prime contractor made the required contact with the SBA. Provide copy of search records with GFE documentation.
2. The Contractor shall use SUB-Net to post subcontracting opportunities. The Contractor shall post Subcontractor opportunities at least 15 Working Days prior to bid opening. Small businesses can review this web site to identify opportunities in their areas of expertise. The web site is designed primarily as a place for large businesses to post solicitations and notices. Provide copy of the Display Solicitation Record with the GFE documentation.
3. The Contractors shall use MBDA web portal to post subcontracting opportunities. The Contractor shall post subcontractor opportunities at least 15 Working Days prior to Bid opening. Small businesses can review this web site to identify opportunities in their areas of expertise. The web site is designed primarily as a place for large businesses to post solicitations and notices. Provide copy of the Offer Overview with the GFE documentation.
4. Based on the federal DBE program, CALTRANS maintains a database and provides directories of minority and woman-owned firms. Provide copy of search records with GFE documentation.
5. CPUC maintains a database of DBE-owned business enterprises and serves to inform the public. Provide copy of search records with GFE documentation.

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

- 14.1.** The affirmative GFE steps documentation shall be submitted **within 4 Working Days of the Bid Opening**. If this documentation is not submitted when due, the City will declare the Bid **non-responsive** and reject it.

- 14.2. The required documentation shall be submitted and logged in at the following address:

CITY OF SAN DIEGO  
PUBLIC WORKS CONTRACTS  
1010 SECOND AVENUE, 14<sup>TH</sup> FLOOR, MS 614C  
SAN DIEGO, CA 92101  
SUBJECT: AFFIRMATIVE GOOD FAITH EFFORT DOCUMENTATION  
BID NO. **K-17-1539-DBB-3**

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

15. **FORMS:**

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

- 15.2. **E-BIDDING FORMS** - The following forms shall be completed and submitted within **4 Working Days of the Bid opening**. Failure to include any of the forms shall cause the Bid to be deemed **non-responsive**.

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

**CDBG FUNDING AGENCY PROVISIONS  
FORMS**

**LIST OF WORK MADE AVAILABLE**

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

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





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

## **SUPPLEMENTARY SPECIAL PROVISIONS**

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

1. The **2015 Edition** of the Standard Specifications for Public Works Construction (The "GREENBOOK").
2. The **2015 Edition** of the City of San Diego Standard Specifications for Public Works Construction (The "WHITEBOOK"), including the following:
  - a) General Provisions (A) for all Contracts.

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### **SECTION 1 - TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE, AND SYMBOLS**

- 1-2 TERMS AND DEFINITIONS.** To the "WHITEBOOK", item 54, "Normal Working Hours", 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.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. You shall perform, with your own organization, Contract Work amounting to at least 50% of the base Bid **AND** 50% of any alternates.
2. The self performance percentage requirement will be waived for Prime Contractors meeting the Class B License requirement of this Contract.

- 2-16 CONTRACTOR REGISTRATION AND ELECTRONIC REPORTING SYSTEM.** To the "WHITEBOOK", item 1, DELETE in its entirety.

### **SECTION 3 - CHANGES IN WORK**

- 3-5.1 Claims.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

**ADD:**

- 3-5.1 Claims.**

1. A Claim is a written demand by you that seeks an adjustment in the Contract Price, Contract Time, or other relief associated with a dispute arising under or

relating to the Contract, including a breach of any provision thereof. A voucher, invoice, or other routine request for payment is not a Claim.

2. A Claim shall conform to these specifications and may be considered after the City has previously denied a request by you for a Change Order seeking the demanded relief.
3. You shall submit a Claim to the Engineer if a dispute occurs that arises from or relates to the Contract. The Claim shall seek all relief to which you assert you are entitled as a result of the event(s) giving rise to the dispute. Your failure to process a Claim in accordance with these specifications shall constitute a waiver of all relief associated with the dispute. Claims are subject to 6-11, "Right to Audit".
4. You shall continue to perform the Services and Work and shall maintain the Schedule during any dispute proceedings. The Engineer will continue to make payments for undisputed Services and Work.
5. The City's Claims process specified herein shall not relieve you of your statutory obligations to present claims prior to any action under the California Government Code.

#### **3-5.1.1 Initiation of Claim.**

1. You shall promptly, but no later than 30 Days after the event(s) giving rise to the Claim, deliver the Claim to the Engineer.
2. You shall not process a Claim unless the Engineer has previously denied a request by you for a Change Order that sought the relief to be pursued in the claim.

#### **3-5.1.1.1 Claim Certification Submittal.**

1. If your Claim seeks an increase in the Contract Price, the Contract Time, or both, submit with the Claim an affidavit certifying the following:
  - a) The Claim is made in good faith and covers all costs and delays to which you are entitled as a result of the event(s) giving rise to the Claim.
  - b) The amount claimed accurately reflects the adjustments in the Contract Price, the Contract Time, or both to which you believe you are entitled.
  - c) All supporting costs and pricing data are current, accurate, and complete to the best of your knowledge. The cost breakdown per item of Work shall be supplied.
  - d) You shall ensure that the affidavit is executed by an official who has the authority to legally bind you.

#### **3-5.1.2 Initial Determination.**

1. The Engineer will respond in writing to your Claim within 30 Days of receipt of the Claim.

**3-5.1.3 Settlement Meeting.**

1. If you disagree with the Initial Determination, you shall request a Settlement Meeting within 30 Days. Upon receipt of this request, the Engineer will schedule the Settlement Meeting within 15 Working Days.

**3-5.1.7 City's Final Determination.**

1. If a settle agreement is not reached, the City shall make a written Final Determination within 10 Working Days after the Settlement Meeting.
2. If you disagree with the City's Final Determination, notify the Engineer in writing of your objection within 15 Working Days after receipt of the written determination and file a "Request for Mediation" in accordance with 3-5.2, "Dispute Resolution Process".
3. Failure to give notice of objection within the 15 Working Days period shall waive your right to pursue the Claim.

**3-5.1.8 Mandatory Assistance.**

1. If a third party dispute, litigation, or both arises out of or relates in any way to the Services provided under the Contract, upon the City's request, you shall agree to assist in resolving the dispute or litigation. Your assistance includes, but is not limited to the following:
  - a) Providing professional consultations.
  - b) Attending mediations, arbitrations, depositions, trials, or any event related to the dispute resolution and litigation.

**3-5.1.8.1 Compensation for Mandatory Assistance.**

1. The City will reimburse you for reasonable fees and expenses incurred by you for any required assistance rendered in accordance with 3-5.1.8, "Mandatory Assistance" as Extra Work.
2. The Engineer will determine whether these fees and expenses were necessary due to your conduct or failure to act.
3. If the Engineer determines that the basis of the dispute or litigation in which these fees and expenses were incurred were the result of your conduct or your failure to act in part or in whole, you shall reimburse the City for any payments made for these fees and expenses.
4. Reimbursement may be through any legal means necessary, including the City's withholding of your payment.

**3-5.2.3 Selection of Mediator.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. A single mediator, knowledgeable in construction aspects and acceptable to both parties, shall be used to mediate the dispute.

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

**3-5.3 Forum of Litigation.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. It is the express intention that all legal actions and proceedings related to the Contract or Agreement with the City or to any rights or any relationship between the parties arising therefrom shall be solely and exclusively initiated and maintained in courts of the State of California for the County of San Diego.

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

**ADD:**

**4-1.3.1 General.** To the "WHITEBOOK", ADD the following:

1. Steel pipe in sizes larger than 18 inches shall require inspection at the source of production.
2. City lab staff or a qualified inspection agency approved by the Engineer shall witness all welding, lining, coating, and testing. You shall incur additional inspection costs outlined in 4-1.3.3, "Inspection of Items Not Locally Produced".
3. All parts of production (including but not limited to product fabrication, welding, testing, lining, and coating of straight pieces and specials) shall be performed or produced in the United States.
4. Welding and all testing shall be performed by certified welders and testing staff with credentials traceable in the United States.

**4-1.3.2**      **Inspection by the Agency.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1.      The City will provide inspection and testing laboratory services within the continental United States within a 200-mile radius of the geographical limits of the City.

**4-1.3.3**      **Inspection of Items Not Locally Produced.** To the "WHITEBOOK", DELETE in its entirety.

**ADD:**

**4-1.3.3**      **Inspection of Items Not Locally Produced.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1.      When you intend to purchase materials, fabricated products, or equipment from sources located more than 200 miles (321.9 km) outside the geographical limits of the City, City Lab staff or a qualified inspection agency approved by the Engineer, shall be engaged at your expense to inspect the materials, equipment, or process.
2.      This approval shall be obtained before producing any material or equipment. City Lab staff or inspector shall evaluate the materials for conformance with the requirements of the Plans and Specifications. You shall forward reports required by the Engineer. No materials or equipment shall be shipped nor shall any processing, fabrication or treatment of such materials be done without proper inspection by City Lab staff or the approved agent. Approval by said agent shall not relieve you of responsibility for complying with the requirements of the Contract Documents.
3.      The Engineer may elect City Lab staff to perform inspection of an out-of-town manufacturer. You shall incur additional inspection costs of the Engineer including lodging, meals, and incidental expenses based on Federal Per Diem Rates, along with travel and car rental expenses. If the manufacturing plant operates a double shift, a double shift shall be figured in the inspection costs.
  - a)      At the option of the Engineer, full time inspection shall continue for the length of the manufacturing period. If the manufacturing period will exceed 3 consecutive weeks, you shall incur additional inspection expenses of the Engineer's supervisor for a trip of 2 Days to the site per month.
  - b)      When the Engineer elects City Lab staff to perform out-of-town inspections, the wages of staff employed by the City shall not be part of the additional inspection expenses paid by you.
  - c)      Federal Per Diem Rates can be determined at the location below:

<https://www.gsa.gov/portal/content/104877>

**4-1.3.4 Inspection Paid For By the Contractor.** To the "WHITEBOOK", ADD the following:

2. The special inspections required are listed as follows:
  - a) Welding, Playground, Rubber Surfacing, and Footing.

**4-1.3.5 Special Inspection.** To the "WHITEBOOK", ADD the following:

5. The payment for special inspection Work specified under this section shall be paid in accordance with 4-1.3.4.1, "Payment".

**4-1.3.6 Preapproved Materials.** To the "WHITEBOOK", ADD the following:

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

**4-1.6 Trade Names or Equals.** To the "WHITEBOOK", ADD the following:

11. You shall submit your list of proposed substitutions for an "equal" item **no less than 15 Working Days prior to the Bid due date** and on the City's Product Submittal Form available at:

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

## SECTION 5 - UTILITIES

**5-2 PROTECTION.** To the "WHITEBOOK", item 2, ADD the following:

- g) Refer to Appendix "K" for more information on the protection of AMI devices.

**5-6 COOPERATION.** To the "GREENBOOK", ADD the following:

1. Notify SDG&E at least 10 Working Days prior to excavating within 10 feet of SDG&E Underground High Voltage Transmission Power Lines (69 KV and higher).

## SECTION 6 - PROSECUTION, PROGRESS AND ACCEPTANCE OF WORK

**ADD:**

**6-3.2.1.1 Environmental Document.**

1. The U.S. Department of Housing and Urban Department and The City of San Diego Environmental Analysis Section (EAS) of the Development Services Department prepared a NEPA, CEQA, and NOE for Park De La Cruz Community Center & Gymnasium Improvements, as referenced in the Contract Appendix. You shall comply with all requirements of the NEPA, CEQA and NOE as set forth in Appendix A.

2. Compliance with the City's environmental document shall be included in the Contract Price.

## **SECTION 7 - RESPONSIBILITIES OF THE CONTRACTOR**

**7-3 INSURANCE.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

**7-3 INSURANCE.**

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

**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.

**7-3.2.4 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 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.

**7-3.5.4.2 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 shall 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.

**7-4 NOT USED.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

**7-4 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. 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.

**7-8.6 Water Pollution Control.** To the "WHITEBOOK", ADD the following:

6. Based on a preliminary assessment by the City, this Contract is subject to WPCP.

**7-20 ELECTRONIC COMMUNICATION.** To the "WHITEBOOK", ADD the following:

2. Virtual Project Manager shall be used on this Contract.

**7-21.1 General.** To the "WHITEBOOK", item 3, DELETE in its entirety and SUBSTITUTE with the following:

3. During the construction phase of projects, the minimum waste management reduction goal is 90% of the inert material (a material not subject to decomposition such as concrete, asphalt, brick, rock, block, dirt, metal, glass, and etc.) and 65% of the remaining project waste. You shall provide appropriate documentation, including a Waste Management Form attached as an appendix, and evidence of recycling and reuse of materials to meet the waste reduction goals specified.

## SECTION 9 - MEASUREMENT AND PAYMENT

**9-3.2 Partial and Final Payment.** To the "GREENBOOK", paragraph (3), DELETE in its entirety and SUBSTITUTE with the following:

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

**ADD:**

**9-3.7 Compensation Adjustments for Price Index Fluctuations.** To the "WHITEBOOK" ADD the following:

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

**SECTION 217 – BEDDING AND BACKFILL MATERIALS**

**217-2.2** **Stones, Boulders, and Broken Concrete.** To the “GREENBOOK”, Table 217-2.2, DELETE in its entirety and SUBSTITUTE with the following:

**TABLE 217-2.2**

<b>Zone</b>	<b>Zone Limits</b>	<b>Maximum Size (greatest dimension)</b>	<b>Backfill Requirements in Addition to 217-2.1</b>
Street or Surface Zone	From ground surface to 12" (300 mm) below pavement subgrade or ground surface	2.5" (63 mm)	As required by the Plans or Special Provisions.
Street or Surface Zone Backfill of Tunnels beneath Concrete Flatwork		Sand	Sand equivalent of not less than 30.
Trench Zone	From 12" (300 mm) below pavement subgrade or ground surface to 12" (300 mm) above top of pipe or box	6" (150 mm)	
Deep Trench Zone (Trenches 3' (0.9 m) wide or wider)	From 60" (1.5 m) below finished surface to 12" (300 mm) above top of pipe or box	Rocks up to 12" (300 mm) excavated from trench may be placed as backfill	
Pipe Zone	From 12" (300 mm) above top of pipe or box to 6" (150 mm) below bottom of pipe or box exterior	2.5" (63 mm)	Sand equivalent of not less than 30 or a coefficient of permeability greater than 1-½ inches/hour (35 mm per hour).
Overexcavation	Backfill more than 6" (150 mm) below bottom of pipe or box exterior	6" (150 mm)	Sand equivalent of not less than 30 or a coefficient of permeability greater than 1-½ inches/hour (35 mm per hour). Trench backfill slurry (100-E-100) per 201-1 may also be used.

**SECTION 304 –METAL FABRICATION AND CONSTRUCTION**

**304-5** **PAYMENT.** To the “WHITEBOOK”, REVISE section “304-5” to “304-6”.

**EQUAL OPPORTUNITY CONTRACTING PROGRAM (EOCP) SECTION A – GENERAL REQUIREMENTS**

**4.1** **Nondiscrimination in Contracting Ordinance.** To the “WHITEBOOK”, subsection 4.1.1, paragraph (2), sentence (1), DELETE in its entirety and SUBSTITUTE with the following:

You shall not discriminate on the basis of race, gender, gender expression, gender identity, religion, national origin, ethnicity, sexual orientation, age, or disability in the solicitation, selection, hiring, or treatment of subcontractors, vendors, or suppliers.

**END OF SUPPLEMENTARY SPECIAL PROVISIONS (SSP)**

## TECHNICALS

**PARK DE LA CRUZ**

**COMMUNITY CENTER AND GYMNASIUM IMPROVEMENTS**

Division	Section Title
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*General Requirements Subgroup*

**DIVISION 01 - GENERAL REQUIREMENTS**

01 10 00	SUMMARY
01 73 00	EXECUTION
01 74 19	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
01 79 00	DEMONSTRATION AND TRAINING
01 81 13.17	SUSTAINABLE DESIGN REQUIREMENTS - LEED V4 ID+C

*Facility Construction Subgroup*

**DIVISION 02 - EXISTING CONDITIONS**

02 41 19	SELECTIVE DEMOLITION
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**DIVISION 03 - CONCRETE**

03 30 53	MISCELLANEOUS CAST-IN-PLACE CONCRETE
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**DIVISION 05 - METALS**

05 52 13	PIPE AND TUBE RAILINGS
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**DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES**

06 10 00	ROUGH CARPENTRY
06 16 00	SHEATHING
06 41 16	PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

**DIVISION 07 - THERMAL AND MOISTURE PROTECTION**

07 01 50.19	PREPARATION FOR REROOFING
07 17 00	BENTONITE WATERPROOFING
07 21 00	THERMAL INSULATION
07 52 16	STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS MEMBRANE ROOFING
07 54 19	POLYVINYL-CHLORIDE (PVC) ROOFING
07 62 00	SHEET METAL FLASHING AND TRIM
07 92 00	JOINT SEALANTS
07 92 19	ACOUSTICAL JOINT SEALANTS

**DIVISION 08 - OPENINGS**

08 11 13	HOLLOW METAL DOORS AND FRAMES
08 14 16	FLUSH WOOD DOORS

08 31 13	ACCESS DOORS AND FRAMES
08 41 13	ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS
08 45 23	FIBERGLASS-SANDWICH-PANEL ASSEMBLIES
08 51 13	ALUMINUM WINDOWS
08 51 23.13	HOT ROLLED
08 62 00	UNIT SKYLIGHTS
08 62 23	TUBULAR SKYLIGHTS
08 71 00	DOOR HARDWARE
08 80 00	GLAZING
08 91 19	FIXED LOUVERS

**DIVISION 09 - FINISHES**

09 22 16	NON-STRUCTURAL METAL FRAMING
09 24 00	CEMENT PLASTERING
09 29 00	GYPHUM BOARD
09 30 13	CERAMIC TILING
09 51 13	ACOUSTICAL PANEL CEILINGS
09 64 00	WOOD FLOORING
09 65 13	RESILIENT BASE AND ACCESSORIES
09 65 19	RESILIENT TILE FLOORING
09 65 43	LINOLEUM FLOORING
09 68 13	TILE CARPETING
09 77 00	WALL SURFACE PADDING SYSTEM
09 84 36	SOUND-ABSORBING WALL AND CEILING UNITS
09 91 13	EXTERIOR PAINTING
09 91 23	INTERIOR PAINTING

**DIVISION 10 - SPECIALTIES**

10 12 00	DISPLAY CASES
10 14 19	DIMENSIONAL LETTER SIGNAGE
10 14 23	PANEL SIGNAGE
10 21 13.19	PLASTIC TOILET COMPARTMENTS
10 26 00	WALL AND DOOR PROTECTION
10 28 00	TOILET, BATH, AND LAUNDRY ACCESSORIES
10 44 13	FIRE PROTECTION CABINETS
10 44 16	FIRE EXTINGUISHERS

**DIVISION 11 - EQUIPMENT**

11 31 00	RESIDENTIAL APPLIANCES
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**DIVISION 12 - FURNISHINGS**

12 21 13	HORIZONTAL LOUVER BLINDS
12 36 61.16	SOLID SURFACING COUNTERTOPS

**DIVISION 14 - CONVEYING EQUIPMENT**

14 24 00	MODULAR HYDRAULIC ELEVATOR - ADDITIVE ALTERNATE B
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*Facility Services Subgroup*

**DIVISION 21 - FIRE SUPPRESSION**

- 21 13 00 FIRE SUPPRESSION SYSTEM – ADDITIVE ALTERNATE A
- 21 13 00.01 SPRINKLER BASIS OF DESIGN – ADDITIVE ALTERNATE A

**DIVISION 22 - PLUMBING**

- 22 05 17 SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
- 22 05 18 ESCUTCHEONS FOR PLUMBING PIPING
- 22 05 23 GENERAL-DUTY VALVES FOR PLUMBING PIPING
- 22 05 29 HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT
- 22 05 53 IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT
- 22 07 00 PLUMBING INSULATION
- 22 11 16 DOMESTIC WATER PIPING
- 22 11 19 DOMESTIC WATER PIPING SPECIALTIES
- 22 13 16 SANITARY WASTE AND VENT PIPING
- 22 13 19 SANITARY WASTE PIPING SPECIALTIES
- 22 40 00 PLUMBING FIXTURES

**DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)**

- 23 01 30.52 EXISTING HVAC AIR DISTRIBUTION SYSTEM CLEANING
- 23 05 13 COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT
- 23 05 17 SLEEVES AND SLEEVE SEALS FOR HVAC PIPING
- 23 05 18 ESCUTCHEONS FOR HVAC PIPING
- 23 05 29 HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
- 23 05 48 VIBRATION AND SEISMIC CONTROLS FOR HVAC
- 23 05 53 IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
- 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC
- 23 07 13 DUCT INSULATION
- 23 07 19 HVAC PIPING INSULATION
- 23 11 23 FACILITY NATURAL-GAS PIPING
- 23 21 13 HYDRONIC PIPING
- 23 23 00 REFRIGERANT PIPING
- 23 31 13 METAL DUCTS
- 23 33 00 AIR DUCT ACCESSORIES
- 23 34 23 HVAC POWER VENTILATORS
- 23 37 13 DIFFUSERS, REGISTERS, AND GRILLES
- 23 37 23 HVAC GRAVITY VENTILATORS
- 23 51 23 GAS VENTS
- 23 55 33.16 GAS-FIRED UNIT HEATERS
- 23 74 13 PACKAGED, OUTDOOR, CENTRAL-STATION AIR-HANDLING UNITS
- 23 81 26 SPLIT-SYSTEM AIR-CONDITIONERS
- 23 99 99 GYMNASIUM AIR CONDITIONING BASIS OF DESIGN (PHASE 2 BASE BID)

**DIVISION 26 - ELECTRICAL**

- 26 05 19 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
- 26 05 26 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
- 26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
- 26 05 33 RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS
- 26 05 43 UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS
- 26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS
- 26 09 23 LIGHTING CONTROL DEVICES
- 26 09 43 NETWORK LIGHTING, HVAC AND ENERGY MANAGEMENT
- 26 22 00 LOW-VOLTAGE TRANSFORMERS
- 26 24 13 SWITCHBOARDS
- 26 24 16 PANELBOARDS
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**DIVISION 27 - COMMUNICATIONS**

- 27 51 24 ASSISTIVE LISTENING SYSTEMS

**DIVISION 28 – ELECTRONIC SAFETY AND SECURITY**

- 28 31 10 FIRE DETECTION AND ALARM SYSTEM

*Site and Infrastructure Subgroup*

**DIVISION 31 - EARTHWORK**

- 31 20 00 EARTH MOVING

**DIVISION 32 - EXTERIOR IMPROVEMENTS**

- 32 31 13 CHAIN LINK FENCES AND GATES

**END OF TABLE OF CONTENTS**

**SECTION 01 10 00 - SUMMARY**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section Includes:
  - 1. Project information.
  - 2. Access to site.
  - 3. Coordination with occupants.
  - 4. Work restrictions.
  - 5. Specification and drawing conventions.

1.2 PROJECT INFORMATION

- A. Project Identification: Park de la Cruz Recreation Center Improvements.
  - 1. Project Location: 3901 Landis Street, San Diego, CA 92105.
- B. Owner: City of San Diego.
- C. Project Manager: Alexandra Corsi, Engineering and Capital Projects, 525B Street, Suite 750, MS 908A, San Diego CA 92101. (619) 533-4644.
- D. Architect Identification: Platt/Whitelaw Architects, 4034 30<sup>th</sup> Street, San Diego, CA 92104. (619) 546-4326.

1.3 CONTRACT

- A. The Project will be constructed under a single prime contract.

1.4 ACCESS TO SITE

- A. General: Contractor shall have full use of Recreation Building for construction operations during construction period. Contractor will have partial use of Gymnasium Building for construction operations and must schedule with Owner. Contractor's use of Project site is limited and construction operations and storage must be coordinated with Resident Engineer prior to Construction.
- B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1.5 COORDINATION WITH OCCUPANTS

- A. Partial Owner Occupancy: City will occupy the premises (gymnasium building only) during the construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage.
  - 1. Maintain access to all adjacent park activity areas, and other used facilities. Do not close or obstruct walkways, or other occupied or used facilities without written permission from Resident Engineer.
  - 2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner operations.

1.6 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
  - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to hours indicated in the "Whitebook". Exceptions to these hours include utility shutdowns and noisy activity.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by City or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
  - 1. Notify Owner not less than seven days in advance of proposed utility interruptions.
  - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Controlled Substances: Use of tobacco products and other controlled substances on Owner property is not permitted.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
  - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01 10 00**

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**SECTION 01 73 00 - EXECUTION**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Installation of the Work.
2. Cutting and patching.
3. Progress cleaning.
4. Starting and adjusting.
5. Protection of installed construction.
6. Correction of the Work.

B. Related Requirements:

1. Section 01 10 00 "Summary" for limits on use of Project site.
2. Section 02 41 19 "Selective Demolition" for demolition and removal of selected portions of the building.

1.2 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.3 INFORMATIONAL SUBMITTALS

A. Cutting and Patching Notification: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

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- a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- B. Landfill Receipts: Submit copies of waste hauler slips indicating the amount of waste hauled in tons and the amount of waste in tons diverted from landfill and recycled, composted or salvaged.

1.4 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  - 1. Structural Elements: When cutting and patching structural elements, notify the Construction Manager of locations and details of cutting and await directions from the Construction Manager before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
  - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include but are not limited to the following:
    - a. Primary operational systems and equipment.
    - b. Fire separation assemblies.
    - c. Air or smoke barriers.
    - d. Fire-suppression systems.
    - e. Mechanical systems piping and ducts.
    - f. Control systems.
    - g. Communication systems.
    - h. Fire-detection and -alarm systems.
    - i. Conveying systems.
    - j. Electrical wiring systems.
    - k. Operating systems of special construction.
  - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
    - a. Water, moisture, or vapor barriers.
    - b. Membranes and flashings.
    - c. Exterior curtain-wall construction.
    - d. Sprayed fire-resistive material.
    - e. Equipment supports.
    - f. Piping, ductwork, vessels, and equipment.
    - g. Noise- and vibration-control elements and systems.
  - 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in the Construction Manager's opinion, reduce the building's aesthetic

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qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

**PART 2 - PRODUCTS**

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Resident Engineer for the visual and functional performance of in-place materials.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site to Resident Engineer 10 days prior to start of work.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

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- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
  - 1. Description of the Work.
  - 2. List of detrimental conditions, including substrates.
  - 3. List of unacceptable installation tolerances.
  - 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Resident Engineer.

3.3 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb and make horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

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- E. Sequence the Work and allow clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce noise levels above 90db.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by the Resident Engineer.
  - 2. Allow for building movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. 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.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."

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- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
  5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
  3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
  4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
  5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

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- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management and Disposal."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

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3.6 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 81 13.17 "Sustainable Design Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.8 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
  - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

**END OF SECTION 01 73 00**

**SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

**PART 1 - GENERAL (Not Applicable)**

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
  - 1. Recycling nonhazardous **demolition and construction** waste.
  - 2. Disposing of nonhazardous **demolition and construction** waste.
- B. Related Requirements:
  - 1. Section 024119 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements, **and for disposition of hazardous waste.**
- C. Construction Waste Management for the project must comply with Municipal Code Section 66.0601 and the City of San Diego's CEQA Significance Determination Thresholds. See the City of San Diego "Whitebook" for additional information.

1.2 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Achieve end-of-Project rates for salvage/recycling of **75** percent by weight of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials.
  - 1. Demolition Waste:
    - a. Concrete.

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- b. Concrete reinforcing steel.
- c. Wood studs.
- d. Wood joists.
- e. Plywood and oriented strand board.
- f. Wood paneling.
- g. Wood trim.
- h. Miscellaneous steel.
- i. Rough hardware.
- j. Roofing.
- k. Insulation.
- l. Doors and frames.
- m. Door hardware.
- n. Windows.
- o. Glazing.
- p. Gypsum board.
- q. Acoustical tile and panels.
- r. Carpet.
- s. Carpet pad.
- t. Demountable partitions.
- u. Equipment.
- v. Cabinets.
- w. Plumbing fixtures.
- x. Piping.
- y. Supports and hangers.
- z. Valves.
- aa. Sprinklers.
- bb. Mechanical equipment.
- cc. Refrigerants.
- dd. Electrical conduit.
- ee. Copper wiring.
- ff. Lighting fixtures.
- gg. Lamps.
- hh. Ballasts.
- ii. Electrical devices.
- jj. Switchgear and panelboards.
- kk. Transformers.

- 2. Construction Waste:
  - a. Lumber.
  - b. Wood sheet materials.
  - c. Wood trim.
  - d. Metals.
  - e. Roofing.
  - f. Insulation.
  - g. Carpet and pad.
  - h. Gypsum board.
  - i. Piping.
  - j. Electrical conduit.

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k. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:

- 1) Paper.
- 2) Cardboard.
- 3) Boxes.
- 4) Plastic sheet and film.
- 5) Polystyrene packaging.
- 6) Wood crates.
- 7) Plastic pails.

1.4 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 7 days of date established for **the Notice to Proceed**.

1.5 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Submit the City of San Diego Waste Management Forms at 50% progress payment and at completion of the work. Concurrent with each Application for Payment, submit Part 2 of the form. Include the following information:

1. Material category.
2. Generation point of waste.
3. Total quantity of waste in tons.
4. Quantity of waste salvaged, both estimated and actual in tons.
5. Quantity of waste recycled, both estimated and actual in tons.
6. Total quantity of waste recovered (salvaged plus recycled) in tons.
7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

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- G. LEED Submittal: Submit documentation to USGBC, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met. Respond to questions and requests from USGBC regarding construction waste management and disposal until the USGBC has made its determination on the Project's LEED certification application. Document correspondence with USGBC as informational submittals.
- H. LEED Submittal: Submit documentation to USGBC, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met. Respond to questions and requests from USGBC regarding construction waste management and disposal until the USGBC has made its determination on the Project's LEED certification application. Document correspondence with USGBC as informational submittals.
- I. Statement of Refrigerant Recovery: 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.

## 1.6 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Firm with a record of successful waste management coordination of projects with similar requirements.
  - 1. Firm employs a LEED-Accredited Professional, certified by the USGBC, as waste management coordinator.
  - 2. Waste management coordinator may also serve as LEED coordinator.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Waste Management Conference: Conduct conference at Project site. Review methods and procedures related to waste management including, but not limited to, the following:
  - 1. Review and discuss waste management plan including responsibilities of waste management coordinator.
  - 2. Review requirements for documenting quantities of each type of waste and its disposition.
  - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
  - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
  - 5. Review waste management requirements for each trade.

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## 1.7 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition and construction waste generated by the Work. Use. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator.. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
  - 1. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
  - 2. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
  - 3. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

**PART 2 - PRODUCTS (Not Used)****PART 3 - EXECUTION**

## 3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
  - 1. Distribute waste management plan to everyone concerned within seven days of submittal return.
  - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

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## 3.2 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
  - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - a. Inspect containers and bins for contamination and remove contaminated materials if found.
  - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
  - 4. Store components off the ground and protect from the weather.
  - 5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

## 3.3 RECYCLING DEMOLITION WASTE

- A. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
  - 1. Break up and transport to concrete recycling facility
- C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
  - 1. Break up and transport to recycling facility.
- D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- E. Metals: Separate metals by type.
  - 1. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- F. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- G. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

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- H. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.
- I. Carpet: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
  - 1. Store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.
- J. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- K. Conduit: Reduce conduit to straight lengths and store by type and size.

3.4 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
  - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
  - 2. Polystyrene Packaging: Separate and bag materials.
  - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
  - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
  - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
  - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

3.5 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
  - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

**END OF SECTION 017419**

**SECTION 017900 - DEMONSTRATION AND TRAINING**

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for instructing the Owner's personnel, including the following:
  - 1. Demonstration of operation of systems, subsystems, and equipment.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.

1.2 SUBMITTALS

- A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
  - 1. At completion of training, submit one complete training manual to Resident Engineer.

1.3 COORDINATION

- A. Coordinate instruction schedule with the Resident Engineer. Adjust schedule as required to minimize disrupting the Owners operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved operation and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Resident Engineer.

1.4 INSTRUCTION PROGRAM

- A. Develop a training program that includes instruction for the following:
  - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.

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- h. Performance curves.
2. Documentation: Review the following items in detail:
- a. Operations manuals.
  - b. Maintenance manuals.
  - c. Project Record Documents.
  - d. Identification systems.
  - e. Warranties and bonds.
  - f. Maintenance service agreements and similar continuing commitments.
3. Operations: Include the following, as applicable:
- a. Startup procedures.
  - b. Equipment or system break-in procedures.
  - c. Routine and normal operating instructions.
  - d. Regulation and control procedures.
  - e. Control sequences.
  - f. Safety procedures.
  - g. Instructions on stopping.
  - h. Normal shutdown instructions.
  - i. Operating procedures for emergencies.
  - j. Operating procedures for system, subsystem, or equipment failure.
  - k. Seasonal and weekend operating instructions.
  - l. Required sequences for electric or electronic systems.
  - m. Special operating instructions and procedures.
4. Adjustments: Include the following:
- a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
5. Troubleshooting: Include the following:
- a. Diagnostic instructions.
  - b. Test and inspection procedures.
6. Maintenance: Include the following:
- a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
7. Repairs: Include the following:

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- a. Diagnosis instructions.
- b. Repair instructions.
- c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
- d. Instructions for identifying parts and components.
- e. Review of spare parts needed for operation and maintenance.

1.5 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.
- B. Set up instructional equipment at instruction location.

1.6 INSTRUCTION

- A. Engage qualified instructor(s) to instruct the Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
- C. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

PART 2 – PRODUCTS

PART 3 – EXECUTION

**END OF SECTION 017900**

**SECTION 018113.17 - SUSTAINABLE DESIGN REQUIREMENTS - LEED v4 ID+C**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section includes general requirements and procedures for compliance with certain prerequisites and credits needed for Project to obtain "LEED Version 4 for Interior Design and Construction" (LEED v4 ID+C) Silver certification based on USGBC's LEED v4 ID+C.
  - 1. Specific requirements for LEED are also included in other Sections.
  - 2. Some LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
  - 3. A copy of the LEED Project checklist is attached at the end of this Section for information only.

1.2 DEFINITIONS

- A. LEED: USGBC's "LEED Version 4 for Interior Design and Construction."
  - 1. Definitions that are a part of "LEED Version 4 for Interior Design and Construction" (LEED v4 ID+C) apply to this Section.
- B. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001. Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.
- C. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.
- D. Recycled Content: The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.
  - 1. "Postconsumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
  - 2. "Preconsumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials, such as rework, regrind, or scrap, generated in a process and capable of being reclaimed within the same process that generated it.

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## 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site. Review LEED requirements and action plans for meeting requirements.

## 1.4 ADMINISTRATIVE REQUIREMENTS

- A. Respond to questions and requests from Architect and the USGBC regarding LEED credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until the USGBC has made its determination on the Project's LEED certification application. Document responses as informational submittals.

## 1.5 ACTION SUBMITTALS

- A. General: Submit additional sustainable design submittals required by other Specification Sections.
- B. Sustainable design submittals are in addition to other submittals.
  - 1. If submitted item is identical to that submitted to comply with other requirements, include an additional copy with other submittal as a record copy of compliance with indicated LEED requirements instead of separate sustainable design submittal. Mark additional copy "Sustainable design submittal."
- C. Sustainable Design Documentation Submittals:
  - 1. Environmental product declarations complying with LEED requirements.
  - 2. Documentation for products that comply with LEED requirements for multi-attribute optimization.
    - a. Include documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.
  - 3. Sustainability reports for products that comply with LEED requirements for raw material and source extraction reporting.
  - 4. Documentation for products that comply with LEED requirements for leadership extraction practices. Include the following:
    - a. Product data and certification letter from product manufacturers, indicating participation in an extended producer responsibility program and statement of costs.
    - b. Product data and certification for bio-based materials, indicating that they comply with requirements. Include statement of costs.
    - c. Product data and chain-of-custody certificates for products containing certified wood. Include statement of costs.
    - d. Receipts for salvaged and refurbished materials used for Project, indicating sources and costs.

## COMMUNITY CENTER AND GYM IMPROVEMENTS

- e. Product data and certification letter from product manufacturers, indicating percentages by weight of postconsumer and preconsumer recycled content for products having recycled content. Include statement of costs.
  - f. Documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.
5. Material ingredient reports for products that comply with LEED requirements for material ingredient reporting.
  6. Documentation for products that comply with LEED requirements for material ingredient optimization.
  7. Documentation for products that comply with LEED requirements for product manufacturer supply chain optimization.
    - a. Include documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.
  8. Documentation complying with Section 017419 "Construction Waste Management and Disposal."
  9. Product data for adhesives and sealants used inside the weatherproofing system, indicating VOC content and laboratory test reports showing compliance with requirements for low-emitting materials.
  10. Product data for paints and coatings used inside the weatherproofing system, indicating VOC content and laboratory test reports showing compliance with requirements for low-emitting materials.
  11. Laboratory test reports for flooring, indicating compliance with requirements for low-emitting materials.
  12. Laboratory test reports for products containing composite wood or agrifiber products or wood glues, indicating compliance with requirements for low-emitting materials.
  13. Laboratory test reports for ceilings, walls, and thermal insulation, indicating compliance with requirements for low-emitting materials.
  14. Laboratory test reports for furniture, indicating compliance with requirements for low-emitting materials.
  15. Construction Indoor-Air-Quality (IAQ) Management:
    - a. Construction indoor-air-quality (IAQ) management plan.
    - b. Product data for temporary filtration media.
    - c. Product data for filtration media used during occupancy.
    - d. Construction Documentation: Six photographs at three different times during the construction period, along with a brief description of the SMACNA approach employed, documenting implementation of the IAQ management measures, such as protection of ducts and on-site stored or installed absorptive materials.
  16. IAQ Assessment:
    - a. Signed statement describing the building air flush-out procedures, including the dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.
    - b. Product data for filtration media used during flush-out and during occupancy.

## COMMUNITY CENTER AND GYM IMPROVEMENTS

- c. Report from testing and inspecting agency, indicating results of IAQ testing and documentation showing compliance with IAQ testing procedures and requirements.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For LEED coordinator.
- B. Project Materials Cost Data: Provide statement indicating total cost for materials used for Project. Costs exclude labor, overhead, and profit. Include breakout of costs for the following categories of items:
  1. Plumbing.
  2. Mechanical.
  3. Electrical.
  4. Specialty items, such as elevators and equipment.
- C. Sustainable Design Action Plans: Provide preliminary submittals within 30 days of date established for the Notice to Proceed, indicating how the following requirements will be met:
  1. List of proposed products with Environmental Product Declarations.
  2. List of proposed products complying with requirements for multi-attribute optimization.
  3. List of proposed products complying with requirements for raw material and source extraction reporting.
  4. List of proposed products complying with requirements for leadership extraction practices.
  5. List of proposed products complying with requirements for material ingredient reporting.
  6. List of proposed products complying with requirements for material ingredient optimization.
  7. List of proposed products complying with requirements for product manufacturer supply chain optimization.
  8. Waste management plan complying with Section 017419 "Construction Waste Management and Disposal."
  9. Construction IAQ management plan.
- D. Sustainable Design Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with sustainable design action plans.

## 1.7 QUALITY ASSURANCE

- A. LEED Coordinator: Engage a LEED-accredited professional to coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator.

**PART 2 - PRODUCTS****2.1 MATERIALS**

- A. Provide products and procedures necessary to obtain LEED credits required in this Section. Although other Sections may specify some requirements that contribute to these LEED credits, the Contractor shall provide additional materials and procedures necessary to obtain LEED credits indicated.
- B. At least 20 different products from at least five different manufacturers shall have Environmental Product Declarations that comply with LEED requirements. Industry-wide (generic) Environmental Product Declarations shall be valued as one-half of a product.
- C. At least 50 percent, by cost, of the permanently installed products for the Project shall comply with LEED requirements for multi-attribute optimization.
- D. At least 20 different products from at least five different manufacturers shall have publically released reports that comply with LEED requirements for raw material source and extraction reporting. Self-declared reports by manufacturers shall be valued as one-half of a product.
- E. At least 20 different products from at least five different manufacturers shall comply with LEED requirements for material ingredient reporting.
- F. At least 25 percent, by cost, of the permanently installed products for the Project shall comply with LEED requirements for material ingredient optimization.
- G. At least 25 percent, by cost, of the permanently installed products for the Project shall comply with LEED requirements for product manufacturer supply chain optimization.
- H. Not less than 25 percent of building materials, by cost, shall comply with LEED requirements for leadership extraction practices.
  - 1. Structure and enclosure materials shall not be more than 30 percent, by cost, of the materials used to comply with this requirement.

**2.2 LOW-EMITTING MATERIALS**

- A. Paints and Coatings: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
  - 1. Flat Paints and Coatings: 50 g/L.
  - 2. Nonflat Paints and Coatings: 50 g/L.
  - 3. Primers, Sealers, and Undercoaters: 100 g/L.
  - 4. Rust-Preventive Coatings: 100 g/L.
  - 5. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
  - 6. Pretreatment Wash Primers: 420 g/L.
  - 7. Floor Coatings: 50 g/L.
  - 8. Stains: 100 g/L.

## COMMUNITY CENTER AND GYM IMPROVEMENTS

- B. Paints and Coatings: For field applications that are inside the weatherproofing system, 90 percent of paints and coatings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Adhesives and Sealants: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
1. Wood Glues: 30 g/L.
  2. Metal-to-Metal Adhesives: 30 g/L.
  3. Adhesives for Porous Materials (Except Wood): 50 g/L.
  4. Subfloor Adhesives: 50 g/L.
  5. Plastic Foam Adhesives: 50 g/L.
  6. Carpet Adhesives: 50 g/L.
  7. Cove Base Adhesives: 50 g/L.
  8. Gypsum Board and Panel Adhesives: 50 g/L.
  9. Rubber Floor Adhesives: 60 g/L.
  10. Ceramic Tile Adhesives: 65 g/L.
  11. Multipurpose Construction Adhesives: 70 g/L.
  12. Contact Adhesive: 80 g/L.
  13. Wood Flooring Adhesive: 100 g/L.
  14. Structural Wood Member Adhesive: 140 g/L.
  15. Single-Ply Roof Membrane Adhesive: 250 g/L.
  16. Special-Purpose Contact Adhesive (Used to Bond Melamine-Covered Board, Metal, Unsupported Vinyl, Rubber, or Wood Veneer 1/16 Inch or Less in Thickness to Any Surface): 250 g/L.
  17. Top and Trim Adhesive: 250 g/L.
  18. Plastic Cement Welding Compounds: 250 g/L.
  19. ABS Welding Compounds: 325 g/L.
  20. CPVC Welding Compounds: 490 g/L.
  21. PVC Welding Compounds: 510 g/L.
  22. Adhesive Primer for Plastic: 550 g/L.
  23. Sheet-Applied Rubber Lining Adhesive: 850 g/L.
  24. Aerosol Adhesive, General-Purpose Mist Spray: 65 percent by weight.
  25. Aerosol Adhesive, General-Purpose Web Spray: 55 percent by weight.
  26. Special-Purpose Aerosol Adhesive (All Types): 70 percent by weight.
  27. Other Adhesives: 250 g/L.
  28. Architectural Sealants: 250 g/L.
  29. Nonmembrane Roof Sealants: 300 g/L.
  30. Single-Ply Roof Membrane Sealants: 450 g/L.
  31. Other Sealants: 420 g/L.
  32. Sealant Primers for Nonporous Substrates: 250 g/L.
  33. Sealant Primers for Porous Substrates: 775 g/L.
  34. Modified Bituminous Sealant Primers: 500 g/L.
  35. Other Sealant Primers: 750 g/L.
- D. Adhesives and Sealants: For field applications that are inside the weatherproofing system, 90 percent of adhesives and sealants shall comply with the requirements of the California

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Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

- E. Flooring: Flooring shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- F. Composite Wood: Composite wood, agrifiber products, and adhesives shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.
- G. Ceilings and Walls: Ceilings, walls, and thermal insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

**PART 3 - EXECUTION**

3.1 NONSMOKING BUILDING

- A. Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.

3.2 CONSTRUCTION WASTE MANAGEMENT

- A. Comply with Section 017419 "Construction Waste Management and Disposal."

3.3 CONSTRUCTION IAQ MANAGEMENT

- A. Comply with SMACNA's "SMACNA IAQ Guideline for Occupied Buildings under Construction."
  - 1. Replace air filters immediately prior to occupancy.

3.4 IAQ ASSESSMENT

- A. Flush-Out:
  - 1. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total volume of 14,000 cu. ft. of outdoor air per sq. ft. of floor area while maintaining an internal temperature of at least 60 deg F and a relative humidity of no higher than 60 percent.
- B. Air-Quality Testing: Engage testing agency to perform the following:
  - 1. Conduct baseline IAQ testing, after construction ends and prior to occupancy, using testing protocols consistent with the EPA's "Compendium of Methods for the Determination of

## COMMUNITY CENTER AND GYM IMPROVEMENTS

Air Pollutants in Indoor Air," and as additionally detailed in the USGBC's "LEED Reference Guide for Interior Design and Construction v4."

2. Demonstrate that the contaminant maximum concentrations listed below are not exceeded:
  - a. Formaldehyde: 27 ppb.
  - b. Particulates (PM10): 50 micrograms/cu. m.
  - c. Ozone: 0.075 ppm, according to ASTM D 5149.
  - d. Total Volatile Organic Compounds: 500 micrograms/cu. m.
  - e. 4-Phenylcyclohexene (4-PH): 6.5 micrograms/cu. m.
  - f. Carbon Monoxide: 9 ppm and no greater than 2 ppm above outdoor levels.
  - g. Target Chemicals in California Department of Public Health "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Table 4-1 (except formaldehyde): Allowable concentrations in California Department of Public Health "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Table 4-1.
3. For each sampling point where the maximum concentration limits are exceeded, take corrective action until requirements have been met.
4. Air-sample testing shall be conducted as follows:
  - a. All measurements shall be conducted prior to occupancy but during normal occupied hours, and with building ventilation system starting at the normal daily start time and operated at the minimum outside-air flow rate for the occupied mode throughout the duration of the air testing.
  - b. Building shall have all interior finishes installed, including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Nonfixed furnishings, such as workstations and partitions, are required to be in place for the testing.
  - c. Number of sampling locations varies depending on the size of building and number of ventilation systems. For each portion of building served by a separate ventilation system, the number of sampling points shall not be less than one per 5,000 sq. ft..
  - d. Air samples shall be collected between 3 and 6 feet from the floor to represent the breathing zone of occupants, and over a minimum four-hour period.

**END OF SECTION 018113.17**

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**LEED v4 for ID+C: Commercial Interiors**  
Project Checklist

Project Name: PARK DE LA CRUZ COMMUNITY CENTER  
Date: \*FEBRUARY 2017

Y ? N

<input type="checkbox"/>	<input checked="" type="checkbox"/>	Credit	Integrative Process	2
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<b>10</b>	<b>5</b>	<b>0</b>	<b>Location and Transportation</b>	<b>18</b>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit LEED for Neighborhood Development Location	18
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Surrounding Density and Diverse Uses	8
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Access to Quality Transit	7
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Credit Bicycle Facilities - NO SHOWERS	1
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Credit Reduced Parking Footprint	2

<b>8</b>	<b>0</b>	<b>0</b>	<b>Water Efficiency</b>	<b>12</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Indoor Water Use Reduction	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Indoor Water Use Reduction	12

<b>15</b>	<b>5</b>	<b>0</b>	<b>Energy and Atmosphere</b>	<b>38</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Fundamental Commissioning and Verification	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Minimum Energy Performance	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Fundamental Refrigerant Management	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Credit Enhanced Commissioning	5
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Credit Optimize Energy Performance	25
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Credit Advanced Energy Metering	2
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Credit Renewable Energy Production - CITY IS PLANNING ON PUTTING PV'S ON SITE	3
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Enhanced Refrigerant Management	1
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Credit Green Power and Carbon Offsets	2

<b>4</b>	<b>2</b>	<b>0</b>	<b>Materials and Resources</b>	<b>13</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Storage and Collection of Recyclables	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Construction and Demolition Waste Management Planning	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Long-Term Commitment	1
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Credit Interiors Life-Cycle Impact Reduction	4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Building Product Disclosure and Optimization - Environmental Product Declarations	2
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Building Product Disclosure and Optimization - Material Ingredients	2
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Construction and Demolition Waste Management	2

<b>6</b>	<b>3</b>	<b>0</b>	<b>Indoor Environmental Quality</b>	<b>17</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Minimum Indoor Air Quality Performance	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq Environmental Tobacco Smoke Control	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Enhanced Indoor Air Quality Strategies	2
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Low-Emitting Materials	3
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Construction Indoor Air Quality Management Plan	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Indoor Air Quality Assessment	2
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Thermal Comfort EXISTING ENVELOPE	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Interior Lighting	2
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Credit Daylight	3
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Credit Quality Views	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Acoustic Performance	2

<b>5</b>	<b>0</b>	<b>0</b>	<b>Innovation</b>	<b>6</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Innovation	5
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit LEED Accredited Professional	1

<b>4</b>	<b>0</b>	<b>0</b>	<b>Regional Priority</b>	<b>4</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Regional Priority: Specific Credit	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Regional Priority: Specific Credit	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Regional Priority: Specific Credit	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit Regional Priority: Specific Credit	1

<b>52</b>	<b>15</b>	<b>0</b>	<b>TOTALS</b>	<b>Possible Points: 110</b>
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Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80+

**SECTION 02 41 19 - SELECTIVE DEMOLITION**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Salvage of existing items to be reused or recycled.

B. Related Requirements:

1. Section 01 10 00 "Summary" for use of the premises, phasing requirements, interim housing considerations, coordination with occupants, etc.
2. Section 01 74 19 "Construction Waste Management and Disposal".
3. Section 01 73 00 "Execution" for cutting and patching procedures.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and **deliver to the Owner ready for reuse.**
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.4 PRE-INSTALLATION MEETINGS

- A. Pre-demolition Conference: Conduct conference at Project site.
  1. Inspect and discuss condition of construction to be selectively demolished.

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2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Proposed Protection Measures: Submit 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.
- C. Schedule of Selective Demolition Activities: Indicate the following:
  1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
  2. Interruption of utility services. Indicate how long utility services will be interrupted.
  3. Coordination for shutoff, capping, and continuation of utility services.
  4. Use of stairs.
  5. Means of protection for items to remain and items in path of waste removal from building.
- D. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces that might be misconstrued as damage caused by demolition operations. Comply with Section 01 32 33 "Photographic Documentation." Submit before Work begins.
- E. Statement of Refrigerant Recovery: 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.
- F. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.
- B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.7 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

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1.8 FIELD CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by the Owner as far as practical.
- B. Notify the Resident Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
  - 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
  - 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
  - 3. Hazardous materials and locations are shown in the Drawings. The mitigation of this material is included in the Base Bid.
  - 4. If hazardous materials are encountered that are not shown in the Drawings, do not disturb; immediately notify the Resident Engineer. Remove hazardous materials in accordance with Specification Sections 02 82 33, 02 83 33 and 02 84 33. The costs associated with such work shall be paid out of the appropriate Allowance, as approved by the Resident Engineer.
- D. Termite Infestation: It is not expected that active termite infestations will be encountered in the Work.
  - 1. If active termite infestations are encountered, do not disturb; immediately notify the Resident Engineer who will have the infestations investigated. Allow three days when no work will be permitted on those portions of the Work suspected of having active termite infestations.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  - 1. Maintain fire-protection facilities in service during selective demolition operations.

**PART 2 - PRODUCTS**

2.1 PERFORMANCE REQUIREMENTS

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

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**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by the Owner. The Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs or video.
  - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
- D. 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 Resident Engineer.

**3.2 PREPARATION**

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

**3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS**

- 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 utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Arrange to shut off utilities with utility companies.
  - 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. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
    - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.

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- d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
  - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to the Owner.
  - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
  - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.
4. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
- a. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.

3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent damage to adjacent buildings and facilities to remain.
  - 1. 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.
  - 2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  - 3. Cover and protect furniture, furnishings, and equipment that have not been removed.
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports 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.
  - 1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.5 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. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next 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

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tools or small power tools designed for sawing or grinding, not hammering and chopping. 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 fire watch and 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 structural 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.
  9. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 19 "Construction Waste Management and Disposal."
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
1. Clean salvaged items.
  2. Pack or crate items after cleaning. Identify contents of containers.
  3. Store items in a secure area until delivery to the Owner.
  4. Protect items from damage during transport and storage.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Resident 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.

## 3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- B. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- C. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.
  1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI (Resilient Floor Covering Institute).

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- D. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Section 070150.16 "Preparation for Reroofing" and 075216 "SBS Modified Bituminous Membrane Roofing" for new roofing requirements.
  - 1. Remove existing roof membrane, flashings, copings, and roof accessories.
  - 2. Remove existing roofing system down to substrate.
- E. Air-Conditioning Equipment: Remove equipment without releasing refrigerants. Cap all ducts to remain, if new equipment is not immediately installed.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
  - 4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

3.8 CLEANING

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

3.9 SELECTIVE DEMOLITION SCHEDULE

- A. Remove: Items as shown on plans.
- B. Remove and Salvage: Swamp Cooler in window of Room 205..
- C. Existing to Remain: Items as shown on plans.

**END OF SECTION 02 41 19**

**SECTION 033053 - MISCELLANEOUS CAST-IN-PLACE CONCRETE**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section includes cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
  - 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
  - 2. Product Certificates: For materials manufactured within 100 miles of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
- C. Design Mixtures: For each concrete mixture.

1.3 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

**PART 2 - PRODUCTS**

2.1 CONCRETE, GENERAL

- A. Comply with the following sections of ACI 301 unless modified by requirements in the Contract Documents:
  - 1. "General Requirements."
  - 2. "Formwork and Formwork Accessories."
  - 3. "Reinforcement and Reinforcement Supports."
  - 4. "Concrete Mixtures."
  - 5. "Handling, Placing, and Constructing."
- B. Comply with ACI 117.

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## 2.2 STEEL REINFORCEMENT

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- C. Plain-Steel Wire: ASTM A 1064/A 1064M, as drawn.
- D. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

## 2.3 CONCRETE MATERIALS

- A. Regional Materials: Concrete shall be manufactured within 100 miles of Project site from aggregates and cementitious materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.
- B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- C. Cementitious Materials:
  - 1. Portland Cement: ASTM C 150/C 150M, **Type II**.
- D. Normal-Weight Aggregate: ASTM C 33/C 33M, **1-inch** nominal maximum aggregate size.
- E. Air-Entraining Admixture: ASTM C 260/C 260M.
- F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
- G. Water: ASTM C 94/C 94M.

## 2.4 RELATED MATERIALS

- A. Vapor Retarder: Plastic sheet, ASTM E 1745, Class A or B.
- B. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

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2.5 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth or cotton mats.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.

2.6 CONCRETE MIXTURES

- A. Comply with ACI 301.
- B. Normal-Weight Concrete:
  - 1. Minimum Compressive Strength: **3000 psi** at 28 days.
  - 2. Maximum W/C Ratio: **0.45**.
  - 3. Slump Limit: **4 inches**, plus or minus 1 inch.
  - 4. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of trowel-finished floor slabs to exceed 3 percent.

2.7 CONCRETE MIXING

- A. 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 above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. 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. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
  - 2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
  - 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

**PART 3 - EXECUTION**

3.1 FORMWORK INSTALLATION

- A. Design, construct, erect, brace, and maintain formwork according to ACI 301.

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## 3.2 EMBEDDED ITEM INSTALLATION

- A. 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.

## 3.3 VAPOR-RETARDER INSTALLATION

- A. Install, protect, and repair vapor retarders according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour.
  - 1. Lap joints 6 inches and seal with manufacturer's recommended adhesive or joint tape.

## 3.4 STEEL REINFORCEMENT INSTALLATION

- A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

## 3.5 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 Resident Engineer.
- 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 groover 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 does 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.

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3.6 CONCRETE PLACEMENT

- A. Comply with ACI 301 for placing concrete.
- B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
- C. Do not add water to concrete during delivery, at Project site, or during placement.
- D. Consolidate concrete with mechanical vibrating equipment according to ACI 301.

3.7 FINISHING FORMED SURFACES

- A. 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.
  - 1. Apply to concrete surfaces exposed to public view.
- B. 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.

3.8 FINISHING UNFORMED SURFACES

- A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Screenshot surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.
  - 1. Do not further disturb surfaces before starting finishing operations.
- C. Slip-Resistive Broom Finish: Apply a slip-resistive finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.9 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing

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operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

## 3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Tests: Perform according to ACI 301.
  - 1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

**END OF SECTION 033053**

**SECTION 055213 - PIPE AND TUBE RAILINGS**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Steel pipe and tube railings.

1.2 COORDINATION

- A. Coordinate installation of anchorages for railings. 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. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Railing brackets.
2. Grout, anchoring cement, and paint products.

B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Evaluation Reports: For post-installed anchors, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

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1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. Steel Pipe and Tube Railings:
  - 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. VIVA Railings, LLC.
    - b. Wagner, R & B, Inc.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  - 1. Handrails and Top Rails of Guards:
    - a. Uniform load of 50 lbf/ ft. applied in any direction.
    - b. Concentrated load of 200 lbf applied in any direction.
    - c. Uniform and concentrated loads need not be assumed to act concurrently.
  - 2. Infill of Guards:
    - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
    - b. Infill load and other loads need not be assumed to act concurrently.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

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## 2.3 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.
  - 1. Provide type of bracket with flange tapped for concealed anchorage to threaded hanger bolt and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

## 2.4 STEEL AND IRON

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
  - 1. Provide galvanized finish for exterior installations and where indicated.
- C. Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.
- E. Hexagonal Shaped Perforated Metal: Cold-rolled steel sheet, ASTM A 1008/A 1008M, or hot-rolled steel sheet, ASTM A 1011/A 1011M, commercial steel Type B, 0.075 inch with 1/2-inch holes 9/16 inch o.c. in staggered rows.

## 2.5 FASTENERS

- A. General: Provide the following:
  - 1. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A 153/A 153M or ASTM F 2329 for zinc coating.
  - 2. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
  - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
  - 2. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.

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- D. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
  2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

## 2.6 MISCELLANEOUS MATERIALS

- A. Etching Cleaner for Galvanized Metal: Complying with MPI#25.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
- D. 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.
- E. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- F. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- G. Intermediate Coats and Topcoats: Provide products that comply with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
- H. Epoxy Intermediate Coat: Complying with MPI #77 and compatible with primer and topcoat.
- I. Polyurethane Topcoat: Complying with MPI #72 and compatible with undercoat.
- J. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- K. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- L. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
1. Water-Resistant Product: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

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## 2.7 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
  - 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 flux immediately.
  - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- I. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
  - 1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
- J. Form Changes in Direction as Follows:
  - 1. As detailed.
  - 2. By radius bends of radius indicated or by inserting prefabricated elbow fittings of radius indicated.
- K. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- L. Close exposed ends of railing members with prefabricated end fittings.

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- M. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- N. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
  - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- O. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- P. For railing posts set in concrete, provide steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.
- Q. Perforated-Metal Infill Panels: Fabricate infill panels from perforated metal made from steel.
  - 1. Edge panels with hemmed edge channels made from metal sheet, of same metal as perforated metal and not less than 0.043 inch thick.
  - 2. Orient perforated metal with pattern horizontal.

## 2.8 STEEL AND IRON FINISHES

- A. Galvanized Railings:
  - 1. Hot-dip galvanize exterior steel railings, including hardware, after fabrication.
  - 2. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
  - 3. Comply with ASTM A 153/A 153M for hot-dip galvanized hardware.
  - 4. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
  - 5. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.
- C. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
- D. For nongalvanized-steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves; however, galvanize anchors to be embedded in exterior concrete or masonry.
- E. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
  - 1. Other Railings: SSPC-SP 3, "Power Tool Cleaning."

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- F. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
  - 1. Shop prime uncoated railings with universal shop primer unless zinc-rich primer is indicated.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
  - 1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
  - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
  - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.
- B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

## COMMUNITY CENTER AND GYM IMPROVEMENTS

## 3.4 ANCHORING POSTS

- A. Use metal sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- C. Cover anchorage joint with flange of same metal as post, welded to post after placing anchoring material.
- D. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
  - 1. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.

## 3.5 ATTACHING RAILINGS

- A. Anchor railing ends at walls with round flanges anchored to wall construction and welded to railing ends.
- B. Attach railings to wall with wall brackets, except where end flanges are used. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- C. Secure wall brackets and railing end flanges to building construction as follows:
  - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
  - 2. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.

## 3.6 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.
  - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A 780/A 780M.

COMMUNITY CENTER AND GYM IMPROVEMENTS

3.7 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

**END OF SECTION 055213**

**SECTION 061000 - ROUGH CARPENTRY**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Rooftop equipment bases and support curbs.
3. Wood blocking, cants, and nailers.

B. Related Requirements:

1. Section 061600 "Sheathing" for sheathing, subflooring, and underlayment.

1.2 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.
- C. Exposed Framing: Framing not concealed by other construction.
- D. OSB: Oriented strand board.
- E. Timber: Lumber of 5 inches nominal size or greater in least dimension.

1.3 ACTION SUBMITTALS

A. 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. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

## COMMUNITY CENTER AND GYM IMPROVEMENTS

## B. Sustainable Design Submittals:

1. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
2. Chain-of-Custody Qualification Data: For manufacturer and vendor.
3. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.
4. Product Data: For installation adhesives, indicating VOC content.
5. Laboratory Test Reports: For installation adhesives, indicating compliance with requirements for low-emitting materials.

## 1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.
3. Power-driven fasteners.
4. Post-installed anchors.
5. Metal framing anchors.

## 1.5 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.

B. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

C. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

## 1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

**PART 2 - PRODUCTS**

## 2.1 WOOD PRODUCTS, GENERAL

- A. Certified Wood: The following wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
1. Dimension lumber.
- B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber 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. Dress lumber, S4S, unless otherwise indicated.
- C. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

## 2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWWA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that 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.
- D. Application: Treat items indicated on Drawings, and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  2. Wood blocking and similar concealed members in contact with masonry or concrete.

## 2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply 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.

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- 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. Treatment shall 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 to ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841.
- C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- E. Application: Treat items indicated on Drawings, and the following:
  - 1. Concealed blocking.
  - 2. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

- A. As indicated on drawings.

2.5 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.
- B. Dimension Lumber Items: Standard, Stud, or No. 3 grade lumber of any of the following species:
  - 1. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
  - 2. Western woods; WCLIB or WWPA.

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- C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 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.
- D. 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.
- E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

## 2.6 FASTENERS

- A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.
  - 1. Where rough 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 or of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction.

## 2.7 METAL FRAMING ANCHORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. KC Metals Products, Inc.
  - 2. Simpson Strong-Tie Co., Inc.
  - 3. USP Structural Connectors.
  - 4. Or equal.
- B. Allowable design loads, as published by manufacturer, shall meet or exceed those of basis of design. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.
- C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.
  - 1. Use for interior locations unless otherwise indicated.

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- D. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
  - 1. Use for wood-preservative-treated lumber and where indicated.
- E. Stainless-Steel Sheet: ASTM A 666, Type 304.
  - 1. Use for exterior locations and where indicated.

## 2.8 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chlorpyrifos as its active ingredient.

**PART 3 - EXECUTION**

## 3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- C. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- D. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.
- E. Do not splice structural members between supports unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, 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.
- G. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

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- H. Comply with AWPAC 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.
  - 2. Use copper naphthenate for items not continuously protected from liquid water.
- I. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- J. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated.
- K. Use steel common 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. Drive nails snug but do not countersink nail heads unless otherwise indicated.

## 3.2 WOOD BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for 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.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

## 3.3 STAIR FRAMING INSTALLATION

- A. Provide stair framing members of size, space, and configuration indicated or, if not indicated, to comply with the following requirements:
  - 1. Size: 2-by-12-inch nominal size, minimum.
  - 2. Material: solid lumber.
  - 3. Notching: Notch rough carriages to receive treads, risers, and supports; leave at least 3-1/2 inches of effective depth.
  - 4. Spacing: At least three framing members for each 36-inch clear width of stair.
- B. Provide stair framing with no more than 3/16-inch variation between adjacent treads and risers and no more than 3/8-inch variation between largest and smallest treads and risers within each flight.

## 3.4 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

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- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

**END OF SECTION 061000**

**SECTION 061600 - SHEATHING**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Roof sheathing.
3. Composite nail base insulated roof sheathing.
4. Subflooring.
5. Underlayment.
6. Sheathing joint and penetration treatment.

B. Related Requirements:

1. Section 092900 "Gypsum Board."

1.2 ACTION SUBMITTALS

A. 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 plywood complies 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 plywood complies with requirements. Include physical properties of treated materials.
3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

B. Sustainable Design Submittals:

1. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
2. Chain-of-Custody Qualification Data: For manufacturer and vendor.
3. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.
4. Product Data: For installation adhesives, indicating VOC content.
5. Laboratory Test Reports: For installation adhesives, indicating compliance with requirements for low-emitting materials.

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1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
  - 1. Wood-preservative-treated plywood.
  - 2. Fire-retardant-treated plywood.

1.4 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.
- B. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- C. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

**PART 2 - PRODUCTS**

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 WOOD PANEL PRODUCTS

- A. Certified Wood: The following wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
  - 1. Plywood.
- B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

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- C. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWWA U1; Use Category UC2.
  - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.4 FIRE-RETARDANT-TREATED PLYWOOD

- 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 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. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201/D 3201M at 92 percent relative humidity. Use where exterior type is not indicated.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat plywood indicated on Drawings, and the following:
  - 1. Roof and wall sheathing within 48 inches of fire walls.

2.5 WALL SHEATHING

- A. Plywood Sheathing: Either DOC PS 1 or DOC PS 2, Exposure 1 sheathing.
  - 1. Span Rating: Not less than 16/0.
  - 2. Nominal Thickness: Not less than 1/2 inch.

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- B. Gypsum Sheathing: See Specification 092900 Gypsum Board.
- C. Cementitious Backer Units: See Specification 092900 Gypsum Board.

## 2.6 SUBFLOORING AND UNDERLAYMENT

- A. Plywood Combination Subfloor-Underlayment: DOC PS 1, Exposure 1, Structural I, Underlayment single-floor panels.
  - 1. Span Rating: Not less than 16.
  - 2. Nominal Thickness: Not less than 1 inch.
  - 3. Edge Detail: Square.
- B. Underlayment: Provide underlayment in nominal thicknesses indicated or, if not indicated, not less than 1/4 inch over smooth subfloors and not less than 3/8 inch over board or uneven subfloors.
  - 1. Plywood Underlayment for Resilient Flooring: DOC PS 1, Exposure 1 Underlayment with fully sanded face.
  - 2. Plywood Underlayment for Carpet: DOC PS 1.
  - 3. Hardboard Underlayment: ANSI A135.4, Class 4 (Service), Surface S1S; with back side sanded.

## 2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Screws for Fastening Sheathing to Wood Framing: ASTM C 1002.
- E. Screws for Fastening Wood Structural Panels 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. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
  - 1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C 1002.
  - 2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

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- G. Screws for Fastening Composite Nail Base Insulated Roof Sheathing to Metal Roof Deck: Steel drill screws, in type and length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117. Provide washers or plates if recommended by sheathing manufacturer.

## 2.8 MISCELLANEOUS MATERIALS

1. Adhesive shall have a VOC content of 50 g/L or less.
2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

**PART 3 - EXECUTION**

## 3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
1. Table 2304.9.1, "Fastening Schedule," in the California Building Code.
  2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
  3. ICC-ES evaluation report for fastener.
- D. 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.
- E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

**END OF SECTION 061600**

**SECTION 064116 - PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

1.2 SUMMARY

A. Section Includes:

1. Plastic-laminate-faced architectural cabinets.
2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets that are not concealed within other construction.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.
2. Section 123661.16 "Solid Surfacing Countertops."

1.3 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product, including panel products high-pressure decorative laminate adhesive for bonding plastic laminate and cabinet hardware and accessories.

B. Sustainable Design Submittals:

1. Product Certificates: For materials manufactured within 100 miles of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
2. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
4. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.

- C. Shop Drawings: For plastic-laminate-faced architectural cabinets.

1. Include plans, elevations, sections, and attachment details.

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2. Show large-scale details.
  3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
  4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.
  5. Apply WI Certified Compliance Program label to Shop Drawings.
- D. Samples for Initial Selection: For each type of exposed finish.
1. Plastic laminates.
  2. PVC edge material.
- E. Samples for Verification: For the following:
1. Plastic Laminates: 12 by 12 inches, for each type, color, pattern, and surface finish required.
    - a. Provide one sample applied to core material with specified edge material applied to one edge.
    - b. Provide edge banding on one edge.
  2. Corner Pieces:
    - a. Cabinet-front frame joints between stiles and rails and at exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
    - b. Miter joints for standing trim.
  3. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Product Certificates: For the following:
  1. Composite wood and agrifiber products.
  2. High-pressure decorative laminate.
  3. Adhesives.

1.6 DEFINITIONS

- A. AWS: Architectural Woodwork Standards.
- B. BHMA: Builder's Hardware Manufacturer's Association.
- C. WI: Woodwork Institute.

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1.7 QUALITY ASSURANCE

- A. Work shall be done in accordance with AWS for the grades specified.
- B. Fabricator/Installer Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project. WI will inspect work and provide certification for work that passes inspection if fabricator is not certified/licensed.
- C. Certified Compliance:
  - 1. Provide a WI Certificate of Compliance indicating that all casework meets the requirements of the AWS, the plans and specifications.
  - 2. Apply a WI Certificate of Compliance Label to each elevation of casework.
  - 3. On completion of installation, provide a WI Certified Compliance Certificate for the installation.
  - 4. All WI Certified Compliance fees are the responsibility of the casework manufacturer.
- D. A single manufacturer shall provide and install the work described in this Section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

**PART 2 - PRODUCTS****2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS**

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of cabinets indicated for construction, finishes, installation, and other requirements.
  - 1. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.
- B. Grade: Custom.
- C. Certified Wood: Wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
- D. Type of Construction: Frameless.
- E. Door and Drawer-Front Style: Flush overlay.
- F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
  - 1. Basis-of-Design Product: Subject to compliance with requirements provide Formica Infinity or a comparable product by one of the following:
    - a. Pionite; a Panolam Industries International, Inc. brand.
    - b. Wilsonart.
    - c. Or equal.
- G. Laminate Cladding for Exposed Surfaces:
  - 1. Horizontal Surfaces: Grade HGS.
  - 2. Vertical Surfaces: Grade VGS.
  - 3. Edges: PVC edge banding, 0.12 inch thick, matching laminate in color, pattern, and finish.
  - 4. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.
- H. Materials for Semiexposed Surfaces:
  - 1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade CLS.
    - a. Edges of Plastic-Laminate Shelves: PVC edge banding, 0.12 inch thick, matching laminate in color, pattern, and finish.
    - b. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade CLS.
  - 2. Drawer Sides and Backs: Solid-hardwood lumber.
  - 3. Drawer Bottoms: Hardwood plywood.
- I. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.

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- J. **Drawer Construction:** Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.
- K. **Colors, Patterns, and Finishes:** Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. As indicated by Architect, or if not indicated, as selected by Architect from laminate manufacturer's full range in the following categories:
    - a. Solid colors, gloss and matte finish.
    - b. Solid colors with core same color as surface, gloss and matte finish.
    - c. Wood grains, gloss and matte finish.
    - d. Patterns, gloss and matte finish.

## 2.2 WOOD MATERIALS

- A. **Wood Products:** Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
1. Wood Moisture Content: 4 to 9 percent.
- B. **Composite Wood Products:** Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.
1. Softwood Plywood: DOC PS 1
  2. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.

## 2.3 CABINET HARDWARE AND ACCESSORIES

- A. **General:** Provide cabinet hardware and accessory materials associated with WI grade architectural cabinets.
- B. **Butt Hinges:** 2-3/4-inch, five-knuckle steel hinges made from 0.095-inch-thick metal, and as follows:
1. Semiconcealed Hinges for Flush Doors: BHMA A156.9, B01361.
  2. Semiconcealed Hinges for Overlay Doors: BHMA A156.9, B01521.
- C. **Wire Pulls:** Back mounted, solid brushed stainless steel, 4 inches long, 5/16 inch in diameter.
- D. **Catches:** Push-in magnetic catches, BHMA A156.9, B03131.
- E. **Adjustable Shelf Standards and Supports:** BHMA A156.9, B04071; with shelf rests, B04081.

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- F. Shelf Rests: BHMA A156.9, B04013; metal.
- G. Drawer Slides: BHMA A156.9.
  - 1. Grade 1 and Grade 2: Side mounted.
    - a. Type: Full extension.
    - b. Material: Zinc-plated steel with polymer rollers.
  - 2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
  - 3. For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 1.
  - 4. For drawers more than 3 inches high, but not more than 6 inches high and not more than 24 inches wide, provide Grade 1HD-100.
  - 5. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-200.
- H. Door Locks: BHMA A156.11, E07121.
- I. Drawer Locks: BHMA A156.11, E07041.
- J. Door Silencers: BHMA A156.16, L03011.
- K. Grommets for Cable Passage: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
  - 1. Color: Selected by Architect from manufacturer's full range of color.
- L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
  - 1. Satin Stainless Steel: BHMA 630.
- M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

## 2.4 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

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## 2.5 FABRICATION

- A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.
- B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
  - 1. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
- C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

**PART 3 - EXECUTION**

## 3.1 PREPARATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

## 3.2 INSTALLATION

- A. Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
  - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
  - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
  - 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration

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into wood framing, blocking, or hanging strips or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semiexposed surfaces.

**END OF SECTION 064116**

**SECTION 070150.19 - PREPARATION FOR REROOFING**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Full tear-off of roof system at areas indicated on Drawings.
2. Re-cover preparation of roof areas indicated on Drawings.
3. Removal of flashings and counterflashings.
4. Temporary roofing.

1.2 DEFINITIONS

- A. Full Roof Tear-off: Removal of existing roofing system down to existing roof deck.
- B. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.
- C. Roof Re-Cover Preparation: Existing roofing system is to remain and be prepared for new roof installed over it.

1.3 PREINSTALLATION MEETINGS

- A. Preliminary Roofing Conference: Before starting removal Work, conduct conference at Project site.
  1. Meet with Owner, Architect, Resid, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
  2. Review methods and procedures related to roofing tear-off, including, but not limited to, the following:
    - a. Reroofing preparation, including roofing system manufacturer's written instructions.
    - b. Temporary protection requirements for existing roofing system components that are to remain.
    - c. Existing roof drainage during each stage of reroofing.
    - d. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to avoid delays.
    - e. Existing roof deck conditions requiring Architect notification.
    - f. Existing roof deck removal procedures and Owner notifications.
    - g. Condition and acceptance of existing roof deck and base flashing substrate for reuse.
    - h. Structural loading limitations of roof deck during reroofing.
    - i. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that affect reroofing.
    - j. HVAC shutdown and sealing of air intakes.
    - k. Shutdown of fire-suppression, -protection, and -alarm and -detection systems.

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- l. Asbestos removal and discovery of asbestos-containing materials.
- m. Governing regulations and requirements for insurance and certificates if applicable.
- n. Existing conditions that may require Architect notification before proceeding.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

- A. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations.
  - 1. Submit before Work begins.
- B. Landfill Records: Indicate receipt and acceptance of demolished roofing materials and hazardous wastes, such as asbestos-containing materials, by a landfill facility licensed to accept them.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements:
  - 1. Comply with governing EPA notification regulations before beginning roofing removal.
  - 2. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.7 FIELD CONDITIONS

- A. Existing Roofing System: Built-up asphalt and metal roofing.
- B. Owner will not occupy portions of building immediately below reroofing area.
  - 1. Before working over structurally impaired areas of deck, notify Owner to evacuate occupants from below affected area.
    - a. Verify that occupants below work area have been evacuated before proceeding with work over impaired deck area.
- C. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.
- D. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
- E. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.

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- F. Limit construction loads on existing roof areas to remain, and existing roof areas scheduled to be reroofed to 200 lb for rooftop equipment wheel loads and 20 psf for uniformly distributed loads.
- G. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.
  - 1. Remove only as much roofing in one day as can be made watertight in the same day.
- A. Hazardous Materials: A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
  - 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
  - 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except according to procedures specified elsewhere in the Contract Documents.
  - 3. Coordinate reroofing preparation with hazardous material remediation to prevent water from entering existing roofing system or building.

**PART 2 - PRODUCTS**

2.1 INFILL AND REPLACEMENT MATERIALS

- A. Use infill materials matching existing roofing system materials unless otherwise indicated.
- B. Wood blocking, curbs, and nailers are specified in Section 061000 "Rough Carpentry."
- C. Plywood roof sheathing is specified in Section 061600 "Sheathing."
- D. Fasteners: Factory-coated steel fasteners with metal or plastic plates listed in FM Approvals' RoofNav, and acceptable to new roofing system manufacturer.

2.2 AUXILIARY REROOFING MATERIALS

- A. General: Use auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of new roofing system.

**PART 3 - EXECUTION**

3.1 PREPARATION

- A. Seal or isolate windows that may be exposed to airborne substances created in removal of existing materials.
- B. Shut off rooftop utilities and service piping before beginning the Work.

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- C. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

## 3.2 ROOF TEAR-OFF

- A. Lower removed roofing materials to ground and onto lower roof levels, using dust-tight chutes or other acceptable means of removing materials from roof areas.
- B. Remove aggregate ballast from roofing.
- C. Remove loose aggregate from aggregate-surfaced, built-up bituminous roofing using a power broom.
- D. Remove pavers and accessories from roofing.
- E. Full Roof Tear-off: Where indicated on Drawings, remove existing roofing and other roofing system components down to the existing roof deck.
  - 1. Remove base flashings and counter flashings.
  - 2. Remove perimeter edge flashing and gravel stops.
  - 3. Remove copings.
  - 4. Remove expansion-joint covers.
  - 5. Remove flashings at pipes, curbs, mechanical equipment, and other penetrations.
  - 6. Remove roof drains indicated on Drawings to be removed.
  - 7. Remove wood blocking, curbs, and nailers.

## 3.3 DECK PREPARATION

- A. Inspect deck after tear-off of roofing system.
- B. If broken or loose fasteners that secure deck panels to one another or to structure are observed, or if deck appears or feels inadequately attached, immediately notify Resident Engineer.
  - 1. Do not proceed with installation until directed by Resident Engineer.
- C. If deck surface is unsuitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Resident Engineer.
  - 1. Do not proceed with installation until directed by Resident Engineer.

## 3.4 INFILL MATERIALS INSTALLATION

- A. Immediately after roof tear-off, and inspection and repair, if needed, of deck, fill in tear-off areas to match existing roofing system construction.
- B. Install new roofing patch over roof infill area.
  - 1. If new roofing is installed the same day tear-off is made, roofing patch is not required.

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3.5 ROOF RE-COVER PREPARATION

- A. Remove blisters, ridges, buckles, and other substrate irregularities from existing roofing that inhibit new recover boards from conforming to substrate.

3.6 BASE FLASHING REMOVAL

- A. Remove existing base flashings.
  - 1. Clean substrates of contaminants, such as asphalt, sheet materials, dirt, and debris.
- B. Do not damage metal counterflashings that are to remain.
  - 1. Replace metal counterflashings damaged during removal with counterflashings of same metal, weight or thickness, and finish as existing, or as specified in Section 076200 "Sheet Metal Flashing and Trim."
- C. Inspect parapet sheathing, wood blocking, curbs, and nailers for deterioration and damage.
  - 1. If parapet sheathing, wood blocking, curbs, or nailers have deteriorated, immediately notify Resident Engineer.
- D. Remove existing parapet sheathing and replace with new parapet sheathing to comply with Section 061600 "Sheathing."
  - 1. If parapet framing, wood blocking, curbs, or nailers have deteriorated, immediately notify Resident Engineer.

3.7 DISPOSAL

- A. Collect demolished materials and place in containers.
  - 1. Promptly dispose of demolished materials.
  - 2. Do not allow demolished materials to accumulate on-site.
  - 3. Storage or sale of demolished items or materials on-site is not permitted.
- B. Transport and legally dispose of demolished materials off Owner's property.

**END OF SECTION 070150.19**

**SECTION 071700 - BENTONITE WATERPROOFING**

**PART 1 - PART 1 - GENERAL**

1.1 DESCRIPTION OF WORK

- A. The extent of geotextile/bentonite clay waterproofing membrane is shown on the drawing and/or as specified herein. The work includes installation of drainage composite panels and drainage system in accordance with waterproofing manufacturer's recommendations.

1.2 RELATED WORK

- A. Concrete
- B. Backfill
- C. Expansion Joints

1.3 SUBMITTALS

- A. Manufacturer: Submit six copies of product data sheets, specifications, installation instructions and general recommendations for each type of product specified.
- B. Installer: Submit detailed drawings for installation of product specified including drainage composite panels and drainage system.
- C. Water Sample Test Result: A water sample (2 liters) is required on projects that have ground water and should be submitted to the waterproofing manufacturer to test for contamination and compatibility with waterproofing membrane. Submit to architect a letter of compatibility recommending which formulation to use.
- D. Warranty: Submit specimen of manufacturers' standard warranty.

1.4 WARRANTY

- A. Upon completion and acceptance of the work required by this section, the manufacturer will issue a warranty agreeing to promptly replace defective materials for a period of 5 years.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original manufacturer's packaging and store materials in strict accordance with manufacturer's instructions.
- B. Remove and replace products that have been prematurely exposed to moisture.

**1.6 PROJECT CONDITIONS**

- A. Install materials in accordance with all safety and weather conditions required by the manufacturer.
- B. Install materials only after work on the applicable substrate is complete.
- C. Complete cast-in-place reinforced columns prior to membrane installation.

**PART 2 - PART 2 - PRODUCTS****2.1 WATERPROOFING SYSTEM**

- A. Basis of Design Product: CCW MiraCLAY supplied by Carlisle Coatings & Waterproofing Incorporated, 900 Hensley Lane, Wylie, Texas 75098, Phone (800) 527-7092 Fax: (972) 442-0076 or approved equal.
- B. Geotextile/Bentonite membrane shall consist of geotextile panels of sodium bentonite clay sandwiched between two layers of needle-punched woven and non-woven polypropylene fabrics.
- C. Physical Properties for geotextile/bentonite clay waterproofing membrane:
  - 1. Bentonite Content: 1.0 lb/ft<sup>2</sup> (.488 kg/m<sup>2</sup>) @ 12% moisture content
  - 2. Nominal Dry Thickness: 0.25 in (6.4 mm)
  - 3. Weight: 75 lb (34.05 kg)
  - 4. Permeability (ASTM D 5084): 5 x 10<sup>-9</sup> cm/sec
  - 5. Grab Tensile Strength (ASTM D 4632): 95 lb (422 N)
  - 6. Grab Elongation (ASTM D 4632): 150%
  - 7. Puncture Resistance (ASTM D 4833): 120 psi (828 kPa)
  - 8. Hydrated Internal Shear (ASTM D 5321): 500 psf (24 kPa)
  - 9. Swell Index (ASTM D 5890): 2g (24 ml) min.
  - 10. Fluid Loss (ASTM D 5891): 18 ml max.
  - 11. Dimensions: 5.12ft x 13.62 ft (69.75 ft<sup>2</sup>)
- D. Waterproofing system accessories supplied by waterproofing membrane manufacturer:
  - 1. Mastic: Manufacturer's product used for detailing at terminations and penetrations. Also used to fill minor voids in concrete and as a fillet in angle changes.
  - 2. Granules: Manufacturer's product used for horizontal to vertical transitions and for detailing at seams and slab penetrations.
  - 3. Waterstop: Manufacturer's product used as a waterstop at cold concrete pours and between pre-cast concrete panels.
- E. Membrane to Substrate Fasteners: Fasteners, of the type and length suitable for the substrate, shall be used in conjunction with washers, of at least 1" diameter to attach the geotextile/bentonite clay waterproofing membrane to the substrate.
- F. Membrane to Membrane Fasteners: Mechanically fasten membrane sheets together with a box stapler or similar device for horizontal applications.

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- G. Drainage Composite: Product recommended by the waterproofing system manufacturer for each condition.
- H. Perimeter Drainage System: Product recommended by the waterproofing system manufacturer.

**PART 3 - PART 3 - EXECUTION**

3.1 INSPECTION

- A. Examine substrate and condition under which waterproofing will be installed. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Lagging, Concrete Cassions, Shotcrete or Guniting Applications:
  1. Fill all spaces that are over 1" (25 mm) in width with grout or concrete to a smooth and uniform surface. Cover large gaps with 1/2" (12 mm) plywood or drainage composite.
  2. Trowel mastic around all tieback plates and soldier beams a minimum of 1 1/2" (39 mm) thick and extend a minimum of 4" (10 cm) beyond the flange.
  3. Remove projections from the wall surface in excess of 3/4" (20 mm).
- B. Grade Substrates: Shall be level and uniform that is compacted to a minimum of 85% modified proctor.
- C. Concrete Application:
  1. Apply mastic to all construction joints at a minimum of 1/4" (7 mm) thickness and a 3" (8 cm) minimum width.
  2. Remove projections from the wall surface in excess of 3/4" (20 mm).
- D. Honeycombing, voids and aggregate pockets exceeding 1" in diameter or have a depth greater than 3/4" should be filled with a non-shrink cementitious grout. Fill tie-rod holes with a non-shrink cementitious grout.

3.3 INSTALLATION

- A. Prevent geotextile/bentonite clay waterproofing membrane from hydrating before being covered with overburden. When threat of rain is imminent or backfill is not immediate, geotextile/bentonite clay waterproofing membrane should be covered with polyethylene sheeting. Install in accordance with waterproofing membrane manufacturer's recommendations.
- B. Lagging Application
  1. Install a stripping piece of waterproofing membrane over each soldier beam that extends a minimum of 8" (20 cm) beyond either side of the beam. Each soldier beam shall have a double layer of waterproofing membrane.
  2. Install waterproofing membrane with the white non-woven side out, facing the installer.

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3. Starting at the bottom of the wall, unroll waterproofing membrane and nail across top of panel one nail per 12" (31cm) on center. Allow sheet to hang down, nailing only as required to stabilize.
  4. Install adjacent membrane by overlapping edges a minimum of 4" (10 cm).
  5. Fasten membrane once every 18" (45 cm) on seams or as required to prevent blousing.
  6. Extend waterproofing membrane to or above grade and fasten membrane once every 12" to 15" (31 cm to 39 cm).
  7. Install waterstop at all pour joints and exterior perimeter of tie-back box outs.
- C. Underslab Application:
1. Install waterproofing membrane with the white non-woven side up, facing the installer.
  2. Overlap edges a minimum of 4" (10 cm).
  3. Protect waterproofing membrane from damage caused by chairs with sharp edges or points by placing a patch of waterproofing membrane under the chair.
  4. Staple joints often enough to prevent excessive movement.
  5. Pour granules or trowel mastic around all penetrations and press in "cut-to-fit" collars of waterproofing membrane.
  6. Extend the installation of waterproofing membrane 12" (31 cm) up or beyond the perimeter slab forms.
  7. Inspect and repair any damaged material before concrete pour.
- D. Concrete Wall Application:
1. Install waterproofing membrane with the white non-woven side out, facing the installer.
  2. Starting at the bottom of the wall, unroll waterproofing membrane and nail across top of panel one nail per 12" (31 cm) on center. Allow sheet to hang down nailing only as required to stabilize.
  3. Install adjacent membrane by overlapping edges a minimum of 4" (10cm).
  4. Fasten membrane once every 18" (45 cm) on seams or as required to prevent blousing with 3/4" (20 mm) to 1" (25mm) concrete nails with washers.
  5. Extend waterproofing membrane to 6" below grade and fasten membrane to the substrate to maintain constant compression using a 1/8" X 1" (3 X 25 mm) minimum termination bar. Trowel a 1/2" (12 mm) thick and 2" (5cm) wide bead of mastic at top edge of membrane and cover termination bar.
  6. Create a cant at any vertical to horizontal transition by applying a 1.5" to 2" (4 cm to 5 cm) cant of granules or mastic.
  7. Strip in all corners and transitions with a 12" to 15" (31 cm to 39 cm) piece of waterproofing membrane to double cover these areas.
  8. Backfill must be compactable soils free of construction debris and must be uniformly compacted to a minimum 85% Modified Protor density on each lift.

3.4 PROTECTION AND DRAINAGE

- A. Protect the geotextile/bentonite clay waterproofing membrane with drainage composite.
- B. Install the drainage composite according in accordance with the manufacturer's recommendations for the specific installation requirements of the project.

3.5 BACKFILL

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- A. Backfill with smooth and uniform material with no sharp projections or stones larger than 3/4". Compact backfill to an 85% Modified Proctor density. Ensure backfill material is not contaminated with salt or other materials that could prevent the bentonite clay from hydrating.

**END OF SECTION 071700**

**SECTION 072100 - THERMAL INSULATION**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Polyisocyanurate foam-plastic board.
2. Mineral-wool blanket.

B. Related Requirements:

1. Section 061600 "Sheathing" for foam-plastic board sheathing installed directly over wood or steel framing.
2. Section 075216 "Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing" and Section 075419 "Polyvinyl-Chloride (PVC) Roofing" for insulation specified as part of roofing construction.
3. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
3. Laboratory Test Reports: For insulation, indicating compliance with requirements for low-emitting materials.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

B. Evaluation Reports: For foam-plastic insulation, from ICC-ES.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

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1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

**PART 2 - PRODUCTS**

2.1 POLYISOCYANURATE FOAM-PLASTIC BOARD

- A. See Section 075216 Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing.

2.2 MINERAL-WOOL BLANKETS

- A. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

- B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 30 percent.

- C. Mineral-Wool Blanket, Unfaced: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. Application: acoustical insulation within interior stud walls / partitions and thermal insulation.

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. Industrial Insulation Group, LLC (IIG-LLC).
- b. Roxul Inc.
- c. Thermafiber, Inc.; an Owens Corning company.
- d. Or equal.

- B. Mineral-Wool Blanket, Reinforced-Foil Faced: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less per ASTM E 84); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

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. Industrial Insulation Group, LLC (IIG-LLC).
- b. Roxul Inc.
- c. Thermafiber, Inc.; an Owens Corning company.
- d. Or equal.

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## 2.3 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
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. AGM Industries, Inc.
    - b. Gemco.
    - c. Or equal.
- B. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
- C. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

## 2.4 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
1. Glass-Fiber Insulation: ASTM C 764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.
  2. Spray Polyurethane Foam Insulation: ASTM C 1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
  3. Adhesives shall have a VOC content of 70 g/L or less.
  4. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

**PART 3 - EXECUTION**

## 3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

## 3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

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- C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
  - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
  - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
  - 4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
  - 1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..
  - 2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.4 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

**END OF SECTION 072100**

**SECTION 075216 - STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS  
MEMBRANE ROOFING**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Styrene-butadiene-styrene (SBS)-modified bituminous membrane roofing.
2. Hybrid roofing system that combines built-up ply sheets with styrene-butadiene-styrene (SBS)-modified bituminous membrane roofing.
3. Vapor retarder.
4. Roof insulation.

B. Related Requirements:

1. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.
2. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.2 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
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. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

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1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
  - 1. Product Test Reports: For roof materials, documentation indicating that roof materials comply with Solar Reflectance Index requirements.
  - 2. Product Data: For adhesives and sealants, indicating VOC content.
  - 3. Laboratory Test Reports: For adhesives and sealants, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:
  - 1. Base flashings and membrane terminations.
  - 2. Tapered insulation, including slopes.
  - 3. Crickets, saddles, and tapered edge strips, including slopes.
  - 4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
- D. Samples for Verification: For the following products:
  - 1. Cap sheet, of color required.
  - 2. Flashing sheet, of color required.
  - 3. Aggregate surfacing material in gradation and color required.
  - 4. Walkway pads or rolls, of color required.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.
- B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
  - 1. Submit evidence of complying with performance requirements.
- C. Product Test Reports: For components of membrane roofing system, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Research/Evaluation Reports: For components of membrane roofing system, from ICC-ES.
- E. Sample Warranties: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing system to include in maintenance manuals.

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1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for membrane roofing system identical to that used for this Project.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
  - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
  - 1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, roofing accessories, and other components of roofing system.
  - 2. Warranty Period: 10 years from date of Substantial Completion.

**PART 2 - PRODUCTS**

## 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. GAF.
  2. Johns Manville; a Berkshire Hathaway company.
  3. Malarkey Roofing Company.
  4. Or equal.
- B. Source Limitations: Obtain components including roof insulation, fasteners, cover board, accessories for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

## 2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
  2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing.
- C. Roofing System Design: Tested by a qualified testing agency to resist the following uplift pressures:
1. Corner Uplift Pressure: 80 lbf/sq. ft..
  2. Perimeter Uplift Pressure: 53 lbf/sq. ft..
  3. Field-of-Roof Uplift Pressure: 32 lbf/sq. ft..
- D. Solar Reflectance Index (SRI): Three-year-aged SRI not less than 64 or initial SRI not less than 82 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.
- E. Energy Performance: Roofing system shall have an initial solar reflectance of not less than 82 and an emissivity of not less than 0.75 when tested according to CRRC-1.
- F. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

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## 2.3 ROOFING SHEET MATERIALS

- A. Sheathing Paper: Red-rosin type, minimum 3 lb/100 sq. ft..
- B. Base Sheet: ASTM D 4601, Type II, SBS-modified asphalt-impregnated and -coated sheet, with glass-fiber-reinforcing mat, dusted with fine mineral surfacing on both sides.
  - 1. Weight: 25 lb/100 sq. ft., minimum.
- C. Roofing Membrane Sheet: ASTM D 6163, Grade S, Type I or II, SBS-modified asphalt sheet (reinforced with glass fibers); smooth surfaced; suitable for application method specified.
- D. Granule-Surfaced Roofing Cap Sheet: ASTM D 6163, Grade G, Type I or II, SBS-modified asphalt sheet (reinforced with glass fibers); granule surfaced; suitable for application method specified, and as follows:
  - 1. Granule Color: White.

## 2.4 BASE FLASHING SHEET MATERIALS

- A. Backer Sheet: ASTM D 4601, Type II, asphalt-impregnated and -coated, glass-fiber sheet, dusted with fine mineral surfacing on both sides.
- B. Backer Sheet: ASTM D 2626, asphalt-saturated and -coated organic felt, dusted with fine mineral surfacing on both sides.
- C. Backer Sheet: ASTM D 6164/D 6164M, Grade S, Type I or II, SBS-modified asphalt sheet (reinforced with polyester fabric); smooth surfaced; suitable for application method specified.
- D. Granule-Surfaced Flashing Sheet: ASTM D 6163, Grade G, Type I or II, SBS-modified asphalt sheet (reinforced with glass fibers); granule surfaced; suitable for application method specified, and as follows:
  - 1. Granule Color: White.
- E. Glass-Fiber Fabric: Woven glass-fiber cloth, treated with asphalt, complying with ASTM D 1668, Type I.

## 2.5 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
  - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
  - 2. Adhesives and sealants shall comply with the following limits for VOC content:
    - a. Plastic Foam Adhesives: 50 g/L.
    - b. Gypsum Board and Panel Adhesives: 50 g/L.

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- c. Multipurpose Construction Adhesives: 70 g/L.
- d. Fiberglass Adhesives: 80 g/L.
- e. Contact Adhesives: 80 g/L.
- f. PVC Welding Compounds: 510 g/L.
- g. Other Adhesives: 250 g/L.
- h. Single-Ply Roof Membrane Sealants: 450 g/L.
- i. Nonmembrane Roof Sealants: 300 g/L.
- j. Sealant Primers for Nonporous Substrates: 250 g/L.
- k. Sealant Primers for Porous Substrates: 775 g/L.

3. Adhesives and sealants shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

- B. Roofing Asphalt: ASTM D 312, Type III or IV as recommended by roofing system manufacturer for low fuming application.
- C. Cold-Applied Adhesive: Roofing system manufacturer's standard asphalt-based, one- or two-part, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with base flashings.
- D. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.
- E. Mastic Sealant: Polyisobutylene, plain or modified bitumen; nonhardening, nonmigrating, nonskinning, and nondrying.
- F. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
- G. Roofing Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 sieve and 98 percent of mass retained on No. 40 sieve, color to match roofing.
- H. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

## 2.6 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CertainTeed Corporation.

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- b. GAF.
  - c. Johns Manville; a Berkshire Hathaway company.
- C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/8 inch per 12 inches unless otherwise indicated.
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

## 2.7 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.
- B. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
- 1. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
- C. Cover Board: ASTM C 208, Type II, Grade 2, cellulosic-fiber insulation board, 1/2 inch thick.
- D. Substrate Joint Tape: 6- or 8-inch-wide, coated, glass fiber.

## 2.8 WALKWAYS

- A. Walkway Cap-Sheet Strips: ASTM D 6163, Grade G, Type I or II, SBS-modified asphalt sheet (reinforced with glass fibers); granule surfaced; suitable for application method specified, and as follows:
- 1. Granule Color: White.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
- 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
  - 2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
  - 3. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane relative to adjoining deck.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

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## 3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

## 3.3 INSTALLATION, GENERAL

- A. Comply with roofing system manufacturer's written instructions.
- B. Asphalt Heating: Heat asphalt to its equiviscous temperature, measured at the mop cart or mechanical spreader immediately before application. Circulate asphalt during heating. Do not raise asphalt temperature above equiviscous temperature range more than one hour before time of application. Do not exceed asphalt manufacturer's recommended temperature limits during asphalt heating. Do not heat asphalt within 25 deg F of flash point. Discard asphalt maintained at a temperature exceeding finished blowing temperature for more than four hours.
  - 1. Apply hot roofing asphalt within plus or minus 25 deg F of equiviscous temperature.
- C. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

## 3.4 INSULATION INSTALLATION

- A. Install tapered insulation under area of roofing to conform to slopes indicated.
- B. Install insulation with long joints of insulation in a continuous straight line, with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
  - 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- C. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- D. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:
  - 1. Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
  - 2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.
  - 3. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
- E. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each

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direction. Loosely butt cover boards together and fasten to roof deck. Tape joints if required by roofing system manufacturer.

1. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.
2. Apply hot roofing asphalt to underside, and immediately bond cover board to substrate.

### 3.5 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing" and as follows:

1. Deck Type: N (nailable) and I (insulated).
2. Adhering Method: M (mopped).
3. Number of Glass-Fiber Base-Ply Sheets: One.
4. Number of SBS-Modified Asphalt Sheets: Two.
5. Surfacing Type: M (mineral-granule-surfaced cap sheet).

B. Start installation of roofing in presence of manufacturer's technical personnel.

1. Backnail roofing sheets to substrate according to roofing system manufacturer's written instructions.

C. Coordinate installation of roofing system so insulation and other components of the roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

1. Provide tie-offs at end of each day's work to cover exposed roofing sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt, with joints and edges sealed.
2. Complete terminations and base flashings, and provide temporary seals to prevent water from entering completed sections of roofing system.
3. Remove and discard temporary seals before beginning work on adjoining roofing.

### 3.6 BASE-PLY SHEET INSTALLATION

A. Install glass-fiber base-ply sheets according to roofing system manufacturer's written instructions starting at low point of roofing system. Align glass-fiber base-ply sheets without stretching. Extend sheets over and terminate beyond cants.

1. Embed each glass-fiber base-ply sheet in a continuous void-free mopping of hot roofing asphalt to form a uniform membrane without glass-fiber base-ply sheets touching.

### 3.7 SBS-MODIFIED BITUMINOUS MEMBRANE INSTALLATION

A. Install modified bituminous roofing sheet and cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:

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1. Adhere to substrate in a solid mopping of hot roofing asphalt applied at not less than 425 deg F.
  2. Unroll roofing sheets and allow them to relax for minimum time period required by manufacturer.
- B. Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.
1. Repair tears and voids in laps and lapped seams not completely sealed.
  2. Apply roofing granules to cover exuded bead at laps while bead is hot.
- C. Install roofing sheets so side and end laps shed water.

## 3.8 FLASHING AND STRIPPING INSTALLATION

- A. Install base flashing over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:
1. Prime substrates with asphalt primer if required by roofing system manufacturer.
  2. Backer-Sheet Application: Mechanically fasten backer sheet to walls or parapets. Adhere backer sheet over roofing membrane at cants in cold-applied adhesive.
  3. Flashing-Sheet Application: Adhere flashing sheet to substrate in cold-applied adhesive at rate required by roofing system manufacturer.
- B. Extend base flashing up walls or parapets a minimum of 8 inches above roofing membrane and 6 inches onto field of roofing membrane.
- C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
1. Seal top termination of base flashing with a strip of glass-fiber fabric set in asphalt roofing cement.
- D. Install roofing cap-sheet stripping where metal flanges and edgings are set on roofing according to roofing system manufacturer's written instructions.

## 3.9 WALKWAY INSTALLATION

- A. Walkway Cap-Sheet Strips: Install walkway cap-sheet strips over roofing membrane, using same application method as used for roofing cap sheet. Install walkway cap-sheet strips before flood coat.

## 3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

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- C. Roofing system will be considered defective if it does not pass tests and inspections.
  - 1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.11 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.12 ROOFING INSTALLER'S WARRANTY SAMPLE

A. WHEREAS \_\_\_\_\_ of \_\_\_\_\_, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

- 1. Owner: .
- 2. Address: .
- 3. Building Name/Type: .
- 4. Address: .
- 5. Area of Work: .
- 6. Acceptance Date: \_\_\_\_\_.
- 7. Warranty Period: .
- 8. Expiration Date: \_\_\_\_\_.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. IN WITNESS THEREOF, this instrument has been duly executed this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

- 1. Authorized Signature: \_\_\_\_\_.
- 2. Name: \_\_\_\_\_.
- 3. Title: \_\_\_\_\_.

**END OF SECTION 075216**

**SECTION 075419 - POLYVINYL-CHLORIDE (PVC) ROOFING**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Adhered polyvinyl chloride (PVC) roofing system.
2. Cover board.
3. Walkways.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking; and for wood-based, structural-use roof deck panels.
2. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.
3. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.2 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Resident Engineer, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
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. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

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## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.
- B. Sustainable Design Submittals:
  - 1. Product Test Reports: For roof materials, documentation indicating that roof materials comply with Solar Reflectance Index requirements.
  - 2. Product Data: For adhesives and sealants, indicating VOC content.
  - 3. Laboratory Test Reports: For adhesives and sealants, indicating compliance with requirements for low-emitting materials.
  - 4. Environmental Product Declaration: For each product.
  - 5. Health Product Declaration: For each product.
  - 6. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.
- C. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:
  - 1. Base flashings and membrane terminations.
  - 2. Flashing details at penetrations.
- D. Samples for Verification: For the following products:
  - 1. Roof membrane and flashing, of color required.
  - 2. Walkway pads or rolls, of color required.
- E. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.
- B. Manufacturer Certificates:
  - 1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
    - a. Submit evidence of compliance with performance requirements.
  - 2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.
- C. Product Test Reports: For roof membrane and insulation, tests performed by independent qualified testing agency indicating compliance with specified requirements.
- D. Evaluation Reports: For components of roofing system, from ICC-ES.

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- E. Sample Warranties: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing system to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for roofing system identical to that used for this Project.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
  - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

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1. Special warranty includes roof membrane, base flashings, fasteners, cover boards, and other components of roofing system.
  2. Warranty Period: 20 years from date of Substantial Completion.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as roof membrane, base flashing, fasteners, cover boards, and walkway products, for the following warranty period:
1. Warranty Period: Two years from date of Substantial Completion.

**PART 2 - PRODUCTS**

## 2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings shall remain watertight.
1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
  2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746, ASTM D 4272/D 4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing.
- C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:
1. Zone 1 (Roof Area Field): 32 lbf/sq. ft..
  2. Zone 2 (Roof Area Perimeter): 53 lbf/sq. ft..
    - a. Location: From roof edge to 12' inside roof edge.
  3. Zone 3 (Roof Area Corners): 80 lbf/sq. ft..
    - a. Location: 12' in each direction from building corner.
  4. Fire/Windstorm Classification: Class 1A-90.
  5. Hail-Resistance Rating: MH.
- D. Solar Reflectance Index (SRI): Three-year-aged SRI not less than 64 or initial SRI not less than 82 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.

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- E. Energy Performance: Roofing system shall have an initial solar reflectance of not less than 0.82 and an emissivity of not less than 0.75 when tested according to CRRC-1.
- F. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.2 POLYVINYL CHLORIDE (PVC) ROOFING

- A. PVC Sheet: ASTM D 4434/D 4434M, Type III, fabric reinforced.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. GAF.
    - b. Johns Manville; a Berkshire Hathaway company.
    - c. Sika Sarnafil.
  - 2. Thickness: 80 mills.
  - 3. Exposed Face Color: White.
- B. Source Limitations: Obtain components for roofing system from roof membrane manufacturer or manufacturers approved by roof membrane manufacturer.

2.3 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
  - 1. Adhesives and Sealants: Comply with VOC limits of authorities having jurisdiction.
  - 2. Adhesives and sealants shall comply with the following limits for VOC content:
    - a. Plastic Foam Adhesives: 50 g/L.
    - b. Gypsum Board and Panel Adhesives: 50 g/L.
    - c. Multipurpose Construction Adhesives: 70 g/L.
    - d. Fiberglass Adhesives: 80 g/L.
    - e. Contact Adhesives: 80 g/L.
    - f. PVC Welding Compounds: 510 g/L.
    - g. Other Adhesives: 250 g/L.
    - h. Single-Ply Roof Membrane Sealants: 450 g/L.
    - i. Nonmembrane Roof Sealants: 300 g/L.
    - j. Sealant Primers for Nonporous Substrates: 250 g/L.
    - k. Sealant Primers for Porous Substrates: 775 g/L.
  - 3. Adhesives and sealants shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

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- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet.
- C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- D. Roof Vents: As recommended by roof membrane manufacturer.
  - 1. Size: Not less than 4-inch diameter.
- E. Bonding Adhesive: Manufacturer's standard.
- F. Slip Sheet: Manufacturer's standard, of thickness required for application.
- G. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- H. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.
- I. Ballast Retaining Bar: Perimeter securement system consisting of a slotted extruded-aluminum retention bar with an integrated compression fastening strip.
  - 1. Fasteners: 1-1/2-inch stainless steel fasteners with neoprene washers.
- J. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.
- K. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.4 SUBSTRATE BOARDS

- A. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate or ASTM C 1278/C 1278M, fiber-reinforced gypsum board.
  - 1. Thickness: 1/4 inch.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

2.5 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch thick and acceptable to roofing system manufacturer.
  - 1. Size: Approximately 36 by 60 inches.
  - 2. Color: Contrasting with roof membrane.

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
  - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
  - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction.

**3.3 ROOFING INSTALLATION, GENERAL**

- A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

**3.4 SUBSTRATE BOARD INSTALLATION**

- A. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches in adjacent rows.
  - 1. At steel roof decks, install substrate board at right angle to flutes of deck.
    - a. Locate end joints over crests of steel roof deck.
  - 2. Tightly butt substrate boards together.
  - 3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.

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4. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to roofing system manufacturers' written instructions.

3.5 ADHERED ROOFING INSTALLATION

- A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.
- B. Unroll roof membrane and allow to relax before installing.
- C. Start installation of roofing in presence of roofing system manufacturer's technical personnel and Owner's testing and inspection agency.
- D. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- E. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.
- F. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.
- G. Apply roof membrane with side laps shingled with slope of roof deck where possible.
- H. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roof membrane and sheet flashings to ensure a watertight seam installation.
  1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
  2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
  3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- I. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.6 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

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- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.7 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products according to manufacturer's written instructions.
  - 1. Install flexible walkways at the following locations:
    - a. Perimeter of each rooftop unit.
    - b. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
    - c. Between each roof hatch or access ladder and each rooftop unit location or path connecting rooftop unit locations.
    - d. As required by roof membrane manufacturer's warranty requirements.
  - 2. Provide 6-inch clearance between adjoining pads.
  - 3. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to inspect substrate conditions, surface preparation, roof membrane application, sheet flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.
- C. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.9 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Resident Engineer.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

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- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

**END OF SECTION 075419**

**SECTION 076200 - SHEET METAL FLASHING AND TRIM**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Formed roof-drainage sheet metal fabrications.
2. Formed low-slope roof sheet metal fabrications.
3. Formed wall sheet metal fabrications.
4. Formed equipment support flashing.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking.
2. Section 075216 "Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing" for materials and installation of sheet metal flashing and trim integral with roofing.
3. Section 075419 "Polyvinyl-Chloride (PVC) Roofing" for materials and installation of sheet metal flashing and trim integral with roofing

1.2 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
3. Review requirements for insurance and certificates if applicable.
4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

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1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Sustainable Design Submittals:

C. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.
9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
10. Include details of special conditions.
11. Include details of connections to adjoining work.
12. Detail formed flashing and trim at scale of not less than 3 inches per 12 inches.

D. Samples for Verification: For each type of exposed finish.

1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Certificates: For each type of coping and roof edge flashing that is FM Approvals approved.

C. Product Test Reports: For each product, for tests performed by a qualified testing agency.

D. Sample Warranty: For special warranty.

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1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
  - 1. For copings and roof edge flashings that are FM Approvals approved, shop shall be listed as able to fabricate required details as tested and approved.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.9 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Finish Warranty Period: 10 years from date of Substantial Completion.

**PART 2 - PRODUCTS**

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

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- C. FM Approvals Listing: Manufacture and install copings and roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-90. Identify materials with name of fabricator and design approved by FM Approvals.
- D. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressure:
  - 1. Design Pressure: As indicated on Drawings.
- E. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 75 percent.
- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

## 2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
  - 1. Clear Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
  - 2. Color Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
    - a. Color: Black.
  - 3. Application: Wall flashings at louvers and windows. Finish to match adjacent anodic finish.
- C. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 coating designation; prepainted by coil-coating process to comply with ASTM A 755/A 755M.
  - 1. Surface: Embossed.
  - 2. Application: roof flashings and equipment support flashings.

## 2.3 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.
- B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. minimum.

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## 2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
  - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
    - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
    - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
  - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
  - 3. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.
- C. Solder:
  - 1. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead with maximum lead content of 0.2 percent.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.
- I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

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## 2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
  2. Obtain field measurements for accurate fit before shop fabrication.
  3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
  4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
1. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.
- G. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- H. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- I. Do not use graphite pencils to mark metal surfaces.

## 2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch-long sections. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than dimension

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indicated on Drawings. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.

1. Gutter Profile: As indicated on drawings.
  2. Expansion Joints: Lap type.
  3. Accessories: Continuous, removable leaf screen with sheet metal frame and hardware cloth screen and wire-ball downspout strainer.
  4. Gutters with Girth 16 to 20 Inches: Fabricate from the following materials:
    - a. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.
- B. Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.
1. Hanger Style: As indicated on drawings.
  2. Fabricate from the following materials:
    - a. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

## 2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long sections. Furnish with 6-inch-wide, joint cover plates. Shop fabricate interior and exterior corners.
1. Joint Style: Overlapped, 4 inches wide.
  2. Fabricate from the Following Materials:
    - a. Galvanized Steel: 0.028 inch thick.
- B. Copings: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, fasten and seal watertight. Shop fabricate interior and exterior corners.
1. Coping Profile: As indicated on drawings.
  2. Joint Style: Butted with expansion space and 6-inch-wide, concealed backup plate.
  3. Fabricate from the Following Materials:
    - a. Aluminum-Zinc Alloy-Coated Steel: 0.040 inch thick.
- C. Roof, Roof-to-Wall Transition, and Roof-to-Roof Edge-Flashing (Gravel-Stop) and Fascia-Cap Transition Expansion-Joint Cover: Fabricate from the following materials: Shop fabricate interior and exterior corners.
1. Galvanized Steel: 0.034 inch thick.
- D. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

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1. Galvanized Steel: 0.028 inch thick.
- E. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
  1. Galvanized Steel: 0.022 inch thick.
- F. Flashing Receivers: Fabricate from the following materials:
  1. Galvanized Steel: 0.022 inch thick.
- G. Roof-Penetration Flashing: Fabricate from the following materials:
  1. Galvanized Steel: 0.028 inch thick.
- H. Roof-Drain Flashing: Fabricate from the following materials:
  1. Stainless Steel: 0.016 inch thick.

2.8 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:
  1. Aluminum: 0.032 inch thick.
- B. Wall Expansion-Joint Cover: Fabricate from the following materials:
  1. Aluminum: 0.040 inch thick.

2.9 MISCELLANEOUS SHEET METAL FABRICATIONS

- A. Equipment Support Flashing: Fabricate from the following materials:
  1. Galvanized Steel: 0.028 inch thick.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
  1. Verify compliance with requirements for installation tolerances of substrates.

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2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
  3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 UNDERLAYMENT INSTALLATION

- A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.
- B. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

## 3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
  2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
  4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
  5. Torch cutting of sheet metal flashing and trim is not permitted.
  6. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
  2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

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2. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws or substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
  1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
  2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- G. Rivets: Rivet joints in uncoated aluminum and zinc where necessary for strength.

## 3.4 ROOF-DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.
- B. Hanging Gutters: Join sections with joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.
  1. Fasten gutter spacers to front and back of gutter.
  2. Anchor and loosely lock back edge of gutter to continuous cleat.
  3. Anchor back of gutter that extends onto roof deck with cleats spaced not more than 24 inches apart.
  4. Anchor gutter with gutter brackets spaced not more than 36 inches apart to roof deck, unless otherwise indicated, and loosely lock to front gutter bead.
  5. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet apart. Install expansion-joint caps.
  6. Install continuous gutter screens on gutters with noncorrosive fasteners, removable for cleaning gutters.
- C. Downspouts: Join sections with 1-1/2-inch telescoping joints.
  1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c.
  2. Provide elbows at base of downspout to direct water away from building.
  3. Connect downspouts to underground drainage system.

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- D. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints minimum of 4 inches in direction of water flow.

## 3.5 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
- C. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.
  - 1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch centers.
  - 2. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch centers.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches. Secure in waterproof manner by means of snap-in installation and sealant or lead wedges and sealant unless otherwise indicated.
- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric or butyl sealant and clamp flashing to pipes that penetrate roof.

## 3.6 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

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3.7 MISCELLANEOUS FLASHING INSTALLATION

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.8 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.9 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

**END OF SECTION 076200**

**SECTION 079200 - JOINT SEALANTS**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Nonstaining silicone joint sealants.
2. Urethane joint sealants.
3. Mildew-resistant joint sealants.

B. Related Requirements:

1. Section 07 92 19 "Acoustical Joint Sealants".
2. Section 08 80 00 "Glazing".
3. Section 09 30 13 "Ceramic Tiling".
4. Section 09 51 13 "Acoustical Panel Ceilings".

1.2 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Sustainable Design Submittals:

1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

C. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.

C. Sample Warranties: For special warranties.

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1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.5 PRECONSTRUCTION TESTING

- 1. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

1.6 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
  - 2. When joint substrates are wet.
  - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
  - 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
  - 2. Disintegration of joint substrates from causes exceeding design specifications.
  - 3. Mechanical damage caused by individuals, tools, or other outside agents.
  - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

**PART 2 - PRODUCTS**

## 2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing.
- B. VOC Content: Sealants and sealant primers shall comply with the following:
  - 1. Architectural sealants shall have a VOC content of 250 g/L or less.
  - 2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
  - 3. Sealants and sealant primers for porous substrates shall have a VOC content of 775 g/L or less.
  - 4. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

## 2.2 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
- B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Dow Corning Corporation.
    - b. Pecora Corporation.
    - c. Tremco Incorporated.
    - d. Or equal.

## 2.3 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 25, T, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Uses T and NT.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. BASF Corporation; Construction Systems.
    - b. LymTal International Inc.

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- c. Or equal.

## 2.4 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Dow Corning Corporation.
    - b. Pecora Corporation.
    - c. Tremco Incorporated.
    - d. Or equal.

## 2.5 BUTYL JOINT SEALANTS

- A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Bostik, Inc.
    - b. Pecora Corporation.
    - c. Or equal.

## 2.6 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on laboratory testing.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Alcot Plastics Ltd.
    - b. BASF Corporation; Construction Systems.
    - c. Construction Foam Products; a division of Nomaco, Inc.
    - d. Or equal.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

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- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

## 2.7 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

**PART 3 - EXECUTION**

## 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Concrete.
    - b. Unglazed surfaces of ceramic tile.
    - c. Exterior insulation and finish systems.

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3. Remove laitance and form-release agents from concrete.
  4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    - a. Metal.
    - b. Glass.
    - c. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  1. Do not leave gaps between ends of sealant backings.
  2. Do not stretch, twist, puncture, or tear sealant backings.
  3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  1. Place sealants so they directly contact and fully wet joint substrates.
  2. Completely fill recesses in each joint configuration.
  3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth,

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uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

## 3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

## 3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

## 3.6 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
  1. Joint Locations:
    - a. Isolation and contraction joints in cast-in-place concrete slabs.
    - b. Tile control and expansion joints.
    - c. Joints between different materials listed above.
    - d. Other joints as indicated on Drawings.
  2. Joint Sealant: S, NS, 25, T, NT.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
  1. Joint Locations:
    - a. Construction joints in cast-in-place concrete.
    - b. Joints in exterior insulation and finish systems.
    - c. Joints between metal panels.
    - d. Joints between different materials listed above.
    - e. Perimeter joints between materials listed above and frames of doors windows and louvers.
    - f. Control and expansion joints in overhead surfaces.
    - g. Other joints as indicated on Drawings.

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2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
1. Joint Locations:
    - a. Isolation joints in cast-in-place concrete slabs.
    - b. Control and expansion joints in tile flooring.
    - c. Other joints as indicated on Drawings.
  2. Joint Sealant: S, NS, 25, T, NT.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Tile control and expansion joints.
    - c. Vertical joints on exposed surfaces of walls and partitions.
    - d. Other joints as indicated on Drawings.
  2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
    - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - b. Tile control and expansion joints where indicated.
    - c. Other joints as indicated on Drawings.
  2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Concealed mastics.
1. Joint Locations:
    - a. Aluminum thresholds.
    - b. Sill plates.
    - c. Other joints as indicated on Drawings.
  2. Joint Sealant: Butyl-rubber based.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

**END OF SECTION 079200**

**SECTION 079219 - ACOUSTICAL JOINT SEALANTS**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section includes acoustical joint sealants.
- B. Related Requirements:
  - 1. Section 079200 "Joint Sealants" for elastomeric and butyl-rubber-based joint sealants for nonacoustical applications.

1.2 ACTION SUBMITTALS

- A. Product Data: For each acoustical joint sealant.
- B. Sustainable Design Submittals:
  - 1. Product Data: For sealants, indicating VOC content.
  - 2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- D. Acoustical-Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each kind of acoustical joint sealant, for tests performed by a qualified testing agency.
- B. Sample Warranties: For special warranties.

1.4 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

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1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish acoustical joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  1. Warranty Period: Manufacturer's Standard.

**PART 2 - PRODUCTS**

2.1 PERFORMANCE REQUIREMENTS

- A. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E 90.
  1. Sealant shall have a VOC content of 250 g/L or less.
  2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C 834.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Pecora Corporation.
    - b. Tremco Incorporated.
    - c. United States Gypsum Company.
    - d. Or equal.
  2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.

2.3 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by acoustical-joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

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- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine joints indicated to receive acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical-joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C 919, ASTM C 1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

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3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect acoustical joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

**END OF SECTION 079219**

**SECTION 081113 - HOLLOW METAL DOORS AND FRAMES**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section includes:

1. Interior hollow-metal doors and frames.
2. Exterior hollow-metal doors and frames.

B. Related Requirements:

1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.
2. Section 08 80 00 "Glazing" for glazing installed in doors.
3. Section 09 91 13 "Exterior Painting" for field painting of exterior doors and frames.
4. Section 09 91 23 "Interior Painting" for field painting of interior doors and frames.

1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.3 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

B. Sustainable Design Submittals:

1. Environmental Product Declaration: For each product.
2. Health Product Declaration: For each product.
3. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.

C. Shop Drawings: Include the following:

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1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

D. Samples for Verification:

1. Finishes: For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.

E. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
  1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Ceco Door; ASSA ABLOY.

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2. Curries Company; ASSA ABLOY.
3. Steelcraft; an Allegion brand.
4. Or equal.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
  1. Smoke- and Draft-Control Assemblies: Provide assemblies with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
- B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 INTERIOR HOLLOW METAL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2; SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule.
  1. Doors:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 1-3/4 inches.
    - c. Edge Construction: Model 2, Seamless.
    - d. Edge Bevel: Provide manufacturer's standard beveled or square edges.
    - e. Core: Honeycomb.
    - f. Fire-Rated Core: Manufacturer's standard vertical steel stiffener core for fire-rated doors.
  2. Frames:
    - a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
    - b. Construction: Full profile welded.
  3. Exposed Finish: Prime.

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2.4 EXTERIOR HOLLOW METAL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors: SDI A250.8, Level 3 At locations indicated in the Door and Frame Schedule.
  - 1. Doors:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 1-3/4 inches.
    - c. Face: Metallic-coated steel sheet, Type A, minimum thickness of 0.053 inch, with minimum A40 coating.
    - d. Edge Construction: Model 2, Seamless.
    - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
    - f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
    - g. Bottom Edges: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
    - h. Core: Honeycomb.
    - i. Fire-Rated Core: Manufacturer's standard vertical steel stiffener core for fire-rated doors.
  - 2. Frames:
    - a. Materials: Metallic-coated steel sheet, Type A, minimum thickness of 0.067 inch, with minimum A40 coating.
    - b. Construction: Full profile welded.
  - 3. Exposed Finish: Prime.

2.5 BORROWED LITES

- A. Fabricate of metallic-coated steel sheet, minimum thickness of 0.053 inch.
- B. Construction: Full profile welded.
- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.
- D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

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## 2.6 HOLLOW-METAL PANELS

- A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

## 2.7 FRAME ANCHORS

- A. Jamb Anchors:
  - 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
  - 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
  - 3. Postinstalled Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.
- D. Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
  - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M; hot-dip galvanized according to ASTM A 153/A 153M, Class B.

## 2.8 MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- F. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-

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developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

- G. Glazing: Comply with requirements in Section 088000 "Glazing."

## 2.9 FABRICATION

- A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
  2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
    - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- B. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
  2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
- C. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.
1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.
  2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
  3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
  4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
  5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

## 2.10 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

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1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.11 LOUVERS

- A. Provide louvers for interior doors, where indicated, which comply with SDI 111, with blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.
  1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
  2. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.
- B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

**PART 3 - EXECUTION**

3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. General: Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with SDI A250.11.
  1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
    - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
    - b. Install frames with removable stops located on secure side of opening.
  2. Fire-Rated Openings: Install frames according to NFPA 80.

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3. Floor Anchors: Secure with postinstalled expansion anchors.
  4. Solidly pack mineral-fiber insulation inside frames.
  5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
  6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors.
  7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
    - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
1. Non-Fire-Rated Steel Doors: Comply with SDI A250.8.
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
  3. Smoke-Control Doors: Install doors according to NFPA 105.
- D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.
- 3.3 CLEANING AND TOUCHUP
- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
  - B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
  - C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

**END OF SECTION 081113**

**SECTION 081416 - FLUSH WOOD DOORS**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Solid-core doors with wood-veneer faces.
2. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:

1. Section 081113 "Hollow Metal Doors and Frames"
2. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction, louvers, and trim for openings.

B. Sustainable Design Submittals:

1. Product Certificates: For materials manufactured within 100 miles of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
2. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
3. Chain-of-Custody Qualification Data: For manufacturer and vendor.
4. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.
4. Undercuts.
5. Requirements for veneer matching.
6. Doors to be factory finished and finish requirements.
7. Fire-protection ratings for fire-rated doors.

D. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.

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2. Louver blade and frame sections, 6 inches long, for each material and finish specified.
3. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.
- B. Quality Standard Compliance Certificates: WI Certified Compliance Program certificates.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions and WDMA I.S. 1A.
  1. Store doors flat and palletized on a level surface in a dry, well-ventilated space.
  2. Keep doors at least 4-inches off the floor with protective coverings under the bottom and over the top of stack. Covering shall protect doors from dirt, water and abuse but allow air circulation under and around the stack.
  3. Do not walk on or stack other materials on top of stacked doors.
  4. Do not allow doors to come in contact with water.
  5. Avoid exposure of interior doors to direct sunlight or extremes of heat or humidity.
  6. Always handle doors with clean dry hands or gloves.
  7. Always lift and carry doors. Do not drag doors.
  8. If cardboard containers become wet, remove and dry contents immediately.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

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## 1.7 WARRANTY

- A. A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
    - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
  2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  3. Warranty Period for Solid-Core Interior Doors: Life of installation.

**PART 2 - PRODUCTS**

## 2.1 MANUFACTURERS

- A. Wood Door Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Algoma Hardwoods, Inc.
  2. Graham Wood Doors; ASSA ABLOY Group company.
  3. Marshfield DoorSystems, Inc.
  4. Or equal.
- B. Sound Control Wood Door Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Overly Wood Doors.
  2. Kreiger Specialty Products.
  3. Jeld-Wen Windows & Doors
  4. Or equal.

## 2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."
1. Provide WI Certified Compliance Labels indicating that doors comply with requirements of grades specified.
- B. Regional Materials: Wood doors shall be manufactured within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.

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- C. Certified Wood: Wood doors shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
  - D. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
  - E. Composite Wood Products: Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.
  - F. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.
  - G. Sound Control Doors
    - 1. Components: Assemblies to be complete with metal frame, wood door(s), sealing system, and Cam-Lift hinges.
    - 2. Performance: Sound Retardant Wood Swinging Door System with STC rating of (49) when tested as an operable system in accordance with ASTM E90 and ASTM E413.
- 2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH
- A. Interior Solid-Core Doors:
    - 1. Grade: Premium, with Grade A faces.
    - 2. Species: Select white maple.
    - 3. Cut: Rotary cut.
    - 4. Match between Veneer Leaves: Slip match.
    - 5. Assembly of Veneer Leaves on Door Faces: Running match.
    - 6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
    - 7. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
    - 8. Exposed Vertical and Top Edges: Same species as faces - edge Type A.
    - 9. Core: Glued wood stave.
    - 10. Construction: Five or seven plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.

## 2.4 LIGHT FRAMES AND LOUVERS

- A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.
  - 1. Wood Species: Same species as door faces.
  - 2. Profile: Flush rectangular beads.
  - 3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.
- B. Metal Louvers:

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1. See Section 089119 "Fixed Louvers"
2. Blade Type: Vision-proof, inverted V.
3. Metal and Finish: Extruded aluminum with Class II, clear anodic finish, AA-M12C22A31.

2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
  1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- C. Openings: Factory cut and trim openings through doors.
  1. Light Openings: Trim openings with moldings of material and profile indicated.
  2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
  3. Louvers: Factory install louvers in prepared openings.

2.7 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
  1. Grade: Premium.
  2. Finish: AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" System 5, conversion varnish.
  3. Staining: None required.
  4. Sheen: Satin.
  5. Match Architect's Sample.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
  - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
  - 1. Install fire-rated doors according to NFPA 80.
  - 2. Install smoke- and draft-control doors according to NFPA 105.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

**END OF SECTION 081416**

**SECTION 083113 - ACCESS DOORS AND FRAMES**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section includes access doors and frames for walls and ceilings.
- B. Fire-rated access doors and frames for walls and ceilings

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples: For each type of access door and frame and for each finish specified, complete assembly minimum 6 by 6 inches in size.
- C. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

**PART 2 - PRODUCTS**

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection and temperature-rise limit ratings indicated, according to NFPA 252 or UL 10B.

2.2 ACCESS DOORS AND FRAMES

- A. Flush Access Doors with Exposed Flanges:
  - 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. Elmdor/Stoneman Manufacturing Company; a division of Acorn Engineering Company.
    - b. Milcor; Commercial Products Group of Hart & Cooley, Inc.
    - c. Nystrom, Inc.
    - d. Or equal.

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2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
3. Locations: Wall and ceiling.
4. Door Size: 24"x24" in ceilings, 12"x12" in walls, unless otherwise indicated..
5. Stainless-Steel Sheet for Door: Nominal 0.062 inch, 16 gage, No. 4 finish.
6. Frame Material: Same material, thickness, and finish as door.
7. Latch and Lock: Cam latch, key operated.

2.3 FIRE-RATED ACCESS DOORS AND FRAMES

A. Fire-Rated, Flush Access Doors with Exposed Flanges:

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. Elmdor/Stoneman Manufacturing Company; a division of Acorn Engineering Company.
  - b. Milcor; Commercial Products Group of Hart & Cooley, Inc.
  - c. Nystrom, Inc.
  - d. Or equal.
2. Description: Door face flush with frame, uninsulated; with exposed flange, self-closing door, and concealed hinge.
3. Locations: Wall and ceiling.
4. Door Size: 24"x24" in ceilings, 12"x12" in walls, unless otherwise indicated.
5. Fire-Resistance Rating: Not less than that of adjacent construction.
6. Stainless-Steel Sheet for Door: Nominal 0.038 inch, 20 gage, No. 4 finish.
7. Frame Material: Same material, thickness, and finish as door.
8. Latch and Lock: Self-latching door hardware, operated by key.

2.4 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.
- C. Frame Anchors: Same material as door face.
- D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.5 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

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- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
- D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling. Provide access sleeves for each latch operator and install in holes cut through finish.
  - 1. For recessed doors with plaster infill, provide self-furring expanded-metal lath attached to door panel.
- E. Latch and Lock Hardware:
  - 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
  - 2. Keys: Furnish two keys per lock and key all locks alike.

## 2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Stainless-Steel Finishes:
  - 1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
  - 2. Polished Finish: No. 4 finish. Grind and polish surfaces to produce uniform finish, free of cross scratches.
    - a. Run grain of directional finishes with long dimension of each piece.
    - b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
  - 3. Bright, Cold-Rolled, Unpolished Finish: No. 2B.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

**END OF SECTION 083113**

**SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Exterior and interior storefront framing.
2. Storefront framing for ribbon walls.
3. Storefront framing for punched openings.
4. Exterior manual-swing entrance doors and door-frame units.

B. Related Requirements:

1. Section 085113 "Aluminum Windows.
2. Section 07 92 00 "Joint Sealants".
3. Section 08 80 00 "Glazing"

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Sustainable Design Submittals:

1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
  - a. Joinery, including concealed welds.
  - b. Anchorage.
  - c. Expansion provisions.
  - d. Glazing.
  - e. Flashing and drainage.
3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

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- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
  - E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:
    - 1. Joinery, including concealed welds.
    - 2. Anchorage.
    - 3. Expansion provisions.
    - 4. Glazing.
    - 5. Flashing and drainage.
  - F. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.
- 1.3. INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
  - B. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.
    - 1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.
  - C. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by a qualified testing agency.
  - D. Source quality-control reports.
  - E. Sample Warranties: For special warranties.
- 1.4. CLOSEOUT SUBMITTALS
- A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.
- 1.5. QUALITY ASSURANCE
- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
  - B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

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1. Do not change intended aesthetic effects, as judged solely by Resident Engineer, except with Resident Engineer approval. If changes are proposed, submit comprehensive explanatory data to Resident Engineer for review.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Structural failures including, but not limited to, excessive deflection.
    - b. Noise or vibration created by wind and thermal and structural movements.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - d. Water penetration through fixed glazing and framing areas.
    - e. Failure of operating components.
  2. Warranty Period: Two years from date of Substantial Completion.

**PART 2 - PRODUCTS**

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
  1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
  2. Failure also includes the following:
    - a. Thermal stresses transferring to building structure.
    - b. Glass breakage.
    - c. Noise or vibration created by wind and thermal and structural movements.
    - d. Loosening or weakening of fasteners, attachments, and other components.
    - e. Failure of operating units.
- B. Structural Loads:
  1. Wind Loads: As indicated on Drawings.
  2. Other Design Loads: As indicated on Drawings.
- C. Deflection of Framing Members: At design wind pressure, as follows:

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1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
  2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.
    - a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
- D. Structural: Test according to ASTM E 330 as follows:
1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
  2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
  3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- E. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
1. Fixed Framing and Glass Area:
    - a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
  2. Entrance Doors:
    - a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
    - b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
- F. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..
- G. Seismic Performance: Aluminum-framed entrances and storefronts shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- H. Energy Performance: Certify and label energy performance according to NFRC as follows:
1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.47 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
  2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.25 as determined according to NFRC 200.
- I. Noise Reduction: Test according to ASTM E 90, with ratings determined by ASTM E 1332, as follows.

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1. Outdoor-Indoor Transmission Class: Minimum 30.
- J. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
  1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
  2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
    - a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.
    - b. Low Exterior Ambient-Air Temperature: 0 deg F.
    - c. Interior Ambient-Air Temperature: 75 deg F.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. EFCO Corporation.
  2. Kawneer North America; an Alcoa company.
  3. TRACO.
  4. Or equal.
- B. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing venting windows and accessories, from single manufacturer.

2.3 FRAMING

- A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
  1. Construction: Nonthermal.
  2. Glazing System: Retained mechanically with gaskets on four sides.
  3. Glazing Plane: Front or Center as indicated on drawings.
  4. Finish: Color anodic finish per architect.
  5. Fabrication Method: Field-fabricated stick system.
- B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Materials:

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1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
  - a. Sheet and Plate: ASTM B 209.
  - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
  - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
  - d. Structural Profiles: ASTM B 308/B 308M.

2.4 VENTING WINDOWS

- A. Aluminum Windows: As specified in Section 085113 "Aluminum Windows."
- B. Glazing: As specified in Section 088000 "Glazing."

2.5 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
  1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
  2. Door Design: Medium stile; 3-1/2-inch nominal width.
  3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.

2.6 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."
- B. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule for each entrance door to comply with requirements in this Section.
  - a. Egress Doors: Not more than 5 lbf to fully open door.
  - b. Accessible Interior Doors: Not more than 5 lbf to fully open door.
- C. Weather Stripping: Manufacturer's standard replaceable components.
  1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
  2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

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## 2.7 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: Comply with Section 088000 "Glazing."
  - 1. Sealant shall have a VOC content of 250 g/L or less.
  - 2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

## 2.8 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
  - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  - 2. Reinforce members as required to receive fastener threads.
  - 3. Do not use exposed fasteners, except for hardware application. For hardware application, use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
  - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- C. Concealed Flashing: Dead-soft, 0.018-inch-thick stainless steel, ASTM A 240/A 240M of type recommended by manufacturer.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

## 2.9 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.

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2. Accurately fitted joints with ends coped or mitered.
  3. Physical and thermal isolation of glazing from framing members.
  4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  5. Provisions for field replacement of glazing from exterior.
  6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Storefront Framing: Provide subframes and reinforcing of types indicated or, as required for a complete system. Factory assemble components to greatest extent possible. Disassemble components only as necessary for shipment and installation.
- F. Entrance Door Frames: Fabricate door framing in profiles indicated. Reinforce as required to support loads imposed by door operation and for installing entrance door hardware. Cut, drill, and tap for factory-installed hardware before finishing components.
1. At exterior doors, provide compression weather stripping at fixed stops.
  2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.
- G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
  2. At exterior doors, provide weather sweeps applied to door bottoms.
- H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.
- 2.10 ALUMINUM FINISHES
- A. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.
1. Color: Dark Bronze. Verify with architect.

**PART 3 - EXECUTION**

## 3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

## A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

## B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

- C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

- D. Install components plumb and true in alignment with established lines and grades.

- E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weatherstripping contact and hardware movement to produce proper operation.

- F. Install glazing as specified in Section 088000 "Glazing."

- G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

## 3.3 ERECTION TOLERANCES

- A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:
  - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
  - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.

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- c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
- 4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.4 ADJUSTING AND CLEANING

- A. Adjust doors and hardware to provide tight fit at contact points and weather stripping, smooth operation, and weathertight closure.
- B. Remove excess sealant and glazing compounds and dirt from surfaces.

3.5 PROTECTION

- A. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensure entrance and storefront systems are without damage or deterioration at the time of Substantial Completion.

3.6 MAINTENANCE SERVICE

- A. Entrance Door Hardware:
  - 1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.

**END OF SECTION 084113**

**SECTION 08 45 23 - FIBERGLASS-SANDWICH-PANEL ASSEMBLIES**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes aluminum-framed assemblies incorporating fiberglass-sandwich panels as follows:
  - 1. Window assemblies.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum components of panel assemblies.
- B. Shop Drawings: For panel assemblies.
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Include details of provisions for assembly expansion and contraction and for draining moisture within the assembly to the exterior.
- C. Samples: In sizes indicated.
  - 1. For each type of fiberglass-sandwich panel. 12-inch x 12-inch.
  - 2. For each type of exposed finish for framing members. 12-inch lengths.

1.3 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each fiberglass-sandwich-panel assembly, for tests performed by a qualified testing agency.
- B. Evaluation Reports: For fiberglass-sandwich-panel assemblies from ICC-ES.
- C. Field quality-control reports.
- D. Sample Warranties: For special warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For panel assemblies to include in maintenance manuals.

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1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: For fiberglass-sandwich panels, a qualified manufacturer whose facilities, processes, and products are monitored by an independent, accredited quality-control agency for compliance with applicable requirements in ICC-ES AC04 or ICC-ES AC177.
- B. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of panel assemblies that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including, but not limited to, excessive deflection.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - c. Water leakage.
  - 2. Warranty Period: Five years from date of Substantial Completion.
- B. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace fiberglass-sandwich panels that exhibit defects in materials or workmanship within specified warranty period.
  - 1. Defects include, but are not limited to, the following:
    - a. Fiberbloom.
    - b. Delamination of coating, if any, from exterior face sheet.
    - c. Color change exceeding requirements.
    - d. Delamination of panel face sheets from panel cores.
  - 2. Warranty Period: 10 years from date of Substantial Completion.
- C. Special Aluminum-Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.
  - 1. Failures include, but are not limited to, checking, crazing, peeling, chalking, and fading of finishes.
  - 2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Loads: As indicated on Drawings.
- B. Deflection Limits:
  - 1. Vertical Panel Assemblies: Limited to 1/120 of clear span for each assembly component.
  - 2. Overhead Panel Assemblies: Limited to 1/120 of clear span for each assembly component.
- C. Structural-Test Performance: Provide panel assemblies tested according to ASTM E 330, as follows:
  - 1. When tested at positive and negative wind-load design pressures, assemblies do not show evidence of deflection exceeding specified limits.
  - 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not show evidence of material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
  - 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- D. Windborne-Debris-Impact-Resistance Performance: Provide panel assemblies that pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and the testing information in ASTM E 1996 for Wind Zone 1.
  - 1. Large-Missile Test: For glazed openings located within 30 feet of grade.
  - 2. Small-Missile Test: For glazed openings located more than 30 feet above grade.
- E. Water Penetration under Static Pressure: Provide panel assemblies that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
  - 1. Maximum Water Leakage: According to AAMA 501.1 No uncontrolled water penetrating aluminum-framed systems or water appearing on systems' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water that is controlled by flashing and gutters and drained to the exterior, or water that cannot damage adjacent materials or finishes.
- F. Thermal Movements: Allow for thermal movements from ambient- and surface-temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 100 deg F, ambient; 180 deg F, material surfaces.

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- G. Energy Performance: Provide panel assemblies with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below and certified and labeled according to NFRC:
1. Thermal Transmittance (U-Factor): Fixed glazing and framing areas shall have U-factor of not more than 0.3 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
  2. Solar Heat Gain Coefficient (SHGC): Fixed glazing and framing areas shall have a SHGC of no greater than 0.3 as determined according to NFRC 200.
  3. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 0.01 cfm/sq. ft. of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft.

2.2 FIBERGLASS-SANDWICH-PANEL ASSEMBLIES

- A. Fiberglass-Sandwich-Panel Assemblies: Translucent assemblies that are supported by aluminum framing and glazed with fiberglass-sandwich panels.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CPI Daylighting, Inc.
    - b. Kalwall Corporation.
    - c. Major Industries, Inc.
    - d. Or Equal.

2.3 FIBERGLASS-SANDWICH PANELS

- A. Fiberglass-Sandwich Panels: Uniformly colored, translucent, thermoset, fiberglass-reinforced-polymer face sheets bonded to both sides of a grid core.
- B. Panel Thickness: 4 inches.
- C. Grid Core: Mechanically interlocked, extruded-aluminum I-beams, with a minimum flange width of 7/16 inch.
1. Extruded Aluminum: ASTM B 221, in alloy and temper recommended in writing by manufacturer.
  2. I-Beam Construction: One piece, extruded aluminum.
  3. Grid Pattern: Square, nominal 12 inches.
- D. Exterior Face Sheet:
1. Thickness: 0.40 inch.
  2. Color: As selected by Architect from manufacturer's full range.
  3. Protective Weathering Surface: Manufacturer's standard.
- E. Interior Face Sheet:

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1. Thickness: 0.40 inch.
  2. Color: As selected by Architect from manufacturer's full range.
- F. Fiberglass-Sandwich-Panel Adhesive: Manufacturer's standard for permanent adhesion of facings to cores.
- G. Panel Strength:
1. Maximum Panel Deflection: 3-1/2 inches when a 4-by-12-foot panel is tested according to ASTM E 72 at 34 lbf/sq. ft., with a maximum 0.090-inch set deflection after five minutes.
  2. Panel Support Strength: Capable of supporting, without failure, a 300-lbf concentrated load when applied to a 3-inch-diameter disk according to ASTM E 661.
- H. Panel Performance:
1. Self-Ignition Temperature: 650 deg F or more according to ASTM D 1929.
  2. Smoke-Developed Index: 450 or less according to ASTM E 84, or 75 or less according to ASTM D 2843.
  3. Combustibility Classification: Class CC1 based on testing according to ASTM D 635.
  4. Roof-Covering Classification: Class A according to ASTM E 108 or UL 790.
  5. Interior Finish Classification: Class A, based on testing according to ASTM E 84.
  6. Color Change: Not more than 3.0 units Delta E, when measured according to ASTM D 2244, after outdoor weathering compliant with procedures in ASTM D 1435.
  7. Impact Resistance: No fracture or tear at impact of 60 ft. x lbf freefalling ball according to UL 972 test procedure.
  8. Haze Factor: Greater than 90 percent when tested according to ASTM D 1003.

2.4 ALUMINUM FRAMING SYSTEMS

- A. Components: Manufacturer's standard extruded-aluminum members of thickness required and reinforced as required to support imposed loads.
1. Construction: One piece, extruded aluminum.
- B. Aluminum: Alloy and temper recommended in writing by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209.
  2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
  3. Extruded Structural Pipe and Tubes: ASTM B 429.
  4. Structural Profiles: ASTM B 308.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning skylight components.
- D. Fasteners and Accessories: Manufacturer's standard, corrosion-resistant, nonstaining, and nonbleeding fasteners and accessories; compatible with adjacent materials.

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1. At closures, retaining caps, or battens, use ASTM A 193, 300 series stainless-steel screws.
  2. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  3. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended in writing by manufacturer.
- E. Concealed Flashing: Corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- F. Exposed Flashing and Closures: Aluminum sheet not less than 0.040 inch thick, finished to match framing.
- G. Framing Gaskets: Manufacturer's standard.
- H. Frame-System Sealants: As recommended in writing by manufacturer.
- I. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## 2.5 FABRICATION

- A. Frame System Fabrication:
1. Fabricate components that, when assembled, have the following characteristics:
    - a. Profiles that are sharp, straight, and free of defects or deformations.
    - b. Accurately fitted joints with ends coped or mitered.
    - c. Internal guttering systems or other means to drain water passing through joints, and moisture migrating within assembly to exterior.
  2. Fabricate sill closures with weep holes and for installation as continuous component.
  3. Reinforce components as required to receive fastener threads.
- B. Panel Fabrication: Factory assemble and seal panels.
1. Laminate face sheets to grid core under a controlled process using heat and pressure to produce straight adhesive bonding lines that cover width of core members and that have sharp edges.
    - a. White spots indicating lack of bond at intersections of grid-core members are limited in number to four for every 40 sq. ft. of panel and limited in diameter to 3/64 inch.
  2. Fabricate with grid pattern that is symmetrical about centerlines of each panel.
  3. Fabricate panel to allow condensation within panel to escape.
  4. Reinforce panel corners.

## FIBERGLASS-SANDWICH-PANEL ASSEMBLIES

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2.6 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions.
  - 1. Do not install damaged components.
  - 2. Fit joints between aluminum components to produce hairline joints free of burrs and distortion.
  - 3. Rigidly secure non-movement joints.
  - 4. Install anchors with separators and isolators to prevent metal corrosion, electrolytic deterioration, and immobilization of moving joints.
  - 5. Seal joints watertight unless otherwise indicated.
- B. Metal Protection: Where aluminum components will contact dissimilar materials, protect against galvanic action by painting contact surfaces with corrosion-resistant coating or by installing nonconductive spacers as recommended in writing by manufacturer for this purpose.
- C. Install components plumb and true in alignment with established lines and elevations.
- D. Skylight Assemblies: Install continuous aluminum sill closures with weatherproof expansion joints and locked and sealed corners. Locate weep holes at rafters. Install components to drain water passing through joints and moisture migrating within assembly to exterior.
- E. Erection Tolerances: Install panel assemblies to comply with the following maximum tolerances:
  - 1. Alignment: Limit offset from true alignment to 1/32 inch where surfaces abut in line, edge to edge, at corners, or where a reveal or protruding element separates aligned surfaces by less than 3 inches; otherwise, limit offset to 1/8 inch.
  - 2. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet, but no greater than 1/2 inch over total length.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

FIBERGLASS-SANDWICH-PANEL ASSEMBLIES

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1. Water-Spray Test: Before installation of interior finishes has begun, panel assemblies shall be tested according to AAMA 501.2 and shall not show evidence of water penetration.
- B. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

**END OF SECTION 08 45 23**

**SECTION 085113 - ALUMINUM WINDOWS**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section includes aluminum windows for exterior locations.
- B. Related Requirements:
  - 1. Section 084113 "Aluminum-Framed Entrances and Storefronts".
  - 2. Section 07 92 00 "Joint Sealants".
  - 3. Section 08 80 00 "Glazing".

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for aluminum windows.
- B. Shop Drawings: For aluminum windows.
  - 1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
- C. Samples: For each exposed product and for each color specified, 2 by 4 inches in size.
- D. Samples for Initial Selection: For units with factory-applied finishes.
  - 1. Include Samples of hardware and accessories involving color selection.
- E. Samples for Verification: For aluminum windows and components required, showing full range of color variations for finishes, and prepared on Samples of size indicated below:
  - 1. Exposed Finishes: 2 by 4 inches.
  - 2. Exposed Hardware: Full-size units.
- F. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Product Test Reports: For each type of aluminum window, for tests performed by a qualified testing agency.
- C. Sample Warranties: For manufacturer's warranties.

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1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.
- B. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.

1.5 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure to meet performance requirements.
    - b. Structural failures including excessive deflection, water leakage, condensation, and air infiltration.
    - c. Faulty operation of movable sash and hardware.
    - d. Deterioration of materials and finishes beyond normal weathering.
    - e. Failure of insulating glass.
  - 2. Warranty Period:
    - a. Window: 2 years from date of Substantial Completion.
    - b. Glazing Units: 10 years from date of Substantial Completion.
    - c. Aluminum Finish: 3 years from date of Substantial Completion.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. Source Limitations: Obtain aluminum windows from single source from single manufacturer.
- B. 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:
  - 1. Arcadia, Inc.
  - 2. Kawneer North America; an Alcoa company.
  - 3. Winco Manufacturing Co.
  - 4. Or Equal.

2.2 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

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1. Window Certification: AAMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
  1. Minimum Performance Class: HC.
  2. Minimum Performance Grade: 40.
- C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.60 Btu/sq. ft. x h x deg F.
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.24.
- E. Thermal Movements: Provide aluminum windows, including anchorage, 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 joint sealants, 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: 120 deg F ambient; 180 deg F material surfaces.
- F. Sound Transmission Class (STC): Rated for not less than 30 STC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 413.
- G. Outside-Inside Transmission Class (OITC): Rated for not less than 30 OITC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 1332.

### 2.3 ALUMINUM WINDOWS

- A. Operating Types: Provide the following operating types in locations indicated on Drawings:
  1. Awning: Project out - Kawneer GLASSvent or equal.
- B. Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.

### 2.4 GLAZING

- A. Glazing: Comply with Section 08 80 00 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers, fabricated from an elastomer of type and in hardness recommended by system and gasket manufacturer to comply with system performance requirements.
- C. Glazing Sealants: Comply with Section 08 80 00 "Glazing."

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2.5 HARDWARE

- A. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.
  - 1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- B. Projected Window Hardware:
  - 1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested according to ASTM E 405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.
    - a. Type and Style: As selected by Architect from manufacturer's full range of types and styles.
  - 2. Hinges: Stainless Steel 4 Bar Hinges.
  - 3. Lock: Lever handle and cam-action lock with keeper.
  - 4. Pole Operators: Tubular-shaped anodized aluminum; with rubber-capped lower end and standard push-pull hook at top to match hardware design; of sufficient length to operate window without reaching more than 60 inches above floor; one pole operator and pole hanger per room that has operable windows more than 72 inches above floor.
- C. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.
- D. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
  - 1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.6 ACCESSORIES

- A. Subsills: Nonthermal, extruded-aluminum subsills in configurations indicated on Drawings.
- B. Column Covers: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- C. Interior Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- D. Panning Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- E. Receptor System: Two-piece, snap-together, thermally broken, extruded-aluminum receptor system that anchors windows in place.

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2.7 INSECT SCREENS

- A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
  - 1. Type and Location: Full, inside for project-out sashes.
- B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
  - 1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
- C. Aluminum Wire Fabric: 18-by-16 mesh of 0.011-inch-diameter, coated aluminum wire.
  - 1. Wire-Fabric Finish: Charcoal gray.

2.8 FABRICATION

- A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
- B. Glaze aluminum windows in the factory.
- C. Weather strip each operable sash to provide weathertight installation.
- D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- E. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.
- F. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.
- G. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

2.9 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

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2.10 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; 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.
  - 1. Color: Black.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.
- C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

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- B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
  - 1. Keep protective films and coverings in place until final cleaning.
- C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

**END OF SECTION 085113**

**SECTION 085123.13 - HOT-ROLLED STEEL WINDOWS**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section includes steel windows from hot-rolled members.
- B. Related Requirements:
  - 1. Section 088000 "Glazing" for requirements for glass and glazing.
  - 2. Section 099123 "Interior Painting" and Section 099113 "Exterior Painting" for on-site painting of factory prime-coated windows.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review requirements for hot-rolled steel windows, including, but not limited to, the following:
    - a. Coordinating finishing of hot-rolled steel windows with other work where color and finish matching is indicated.
    - b. Coordinating hot-rolled steel windows with other exterior wall components, including anchorage, glazing, flashing, weeping, air barriers, sealants, and protection of finishes.
    - c. Sequencing work to construct a watertight and weathertight exterior building enclosure.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions.
- B. Sustainable Design Submittals:
  - 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
- C. Shop Drawings:
  - 1. Include plans, elevations, sections, and details.
  - 2. Detail attachments to other work, and between units, if any.
  - 3. Include hardware and required clearances.
  - 4. Mullion details, including reinforcement and stiffeners.

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5. Flashing details.
6. Glazing details.
7. Accessories.

D. Samples for Initial Selection: For units with factory-applied color finishes.

1. Include similar Samples of hardware and accessories involving color selection.

E. Product Schedule: For hot-rolled steel windows. Use same designations indicated on Drawings.

#### 1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For hot-rolled steel windows, for tests performed by a qualified testing agency.

C. Sample Warranties: For special warranty.

#### 1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For hot-rolled steel windows to include in maintenance manuals.

#### 1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating hot-rolled steel windows that meet performance requirements indicated and of documenting performance by labels, test reports, and calculations.

B. Installer Qualifications: An installer acceptable to window manufacturer for installation of units required for this Project.

#### 1.7 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace components of hot-rolled steel windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Failure to meet performance requirements.
- b. Structural failures, including excessive deflection.
- c. Excessive water leakage or air infiltration.
- d. Faulty operation of operable sash and hardware.
- e. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Period:

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- a. Window: Two years from date of Substantial Completion.
- b. Finish: Five years from date of Substantial Completion.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Arcadia, Inc.
  - 2. Hope's Windows, Inc.
  - 3. Optimum Window Mfg Corp.
  - 4. Torrance Steel Window Co., Inc.

2.2 PERFORMANCE REQUIREMENTS

- A. SWI Standards: Comply with applicable requirements in SWI's "The Architect's Guide to Steel Windows and Doors" and "Specifications: Hot-Rolled," except where more stringent requirements are indicated.
- B. Deflection Limits: Design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch, whichever is less, at design pressures.
- C. Structural: Test according to ASTM E 330 as follows:
  - 1. When tested at positive and negative wind-load design pressures, hot-rolled steel windows do not evidence deflection exceeding specified limits.
  - 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
  - 3. Test Durations: As required by design wind velocity, but not less than 10seconds.
- D. Air Infiltration for Weather-Stripped Sash: Not more than 0.37 cfm/ft. of sash crack length at an inward test pressure of 6.24 lbf/sq. ft. when tested according to ASTM E 283.
- E. Water Penetration: No leakage for 15 minutes when window is subjected to a rate of flow of 5 gal./h/sq. ft. with a differential pressure across the window of 6 lbf/sq. ft. when tested according to ASTM E 331.
- F. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.32 Btu/sq. ft. x h x deg F.
- G. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.27.
- H. Condensation Resistance: Provide hot-rolled steel windows with a CR determined according to NFRC 500 of 36 minimum.

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- I. Thermal Movements: Provide hot-rolled steel windows, including anchorage, 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 joint sealants, 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: 120 deg F, ambient; 180 deg F material surfaces.
- J. Crack Tolerances: Test each type and size of required window unit, with sash closed and locked, for compliance with tolerances indicated in SWI's "The Architect's Guide to Steel Windows and Doors" and "Specifications: Hot-Rolled."

2.3 HOT-ROLLED STEEL WINDOWS

- A. Operating Types: Provide the following operating types in locations indicated on Drawings:
  - 1. Awning: Project out.
  - 2. Fixed.
- B. Hot-Rolled Steel Windows: Provide frame and sash members formed from hot-rolled, new billet steel sections. Provide combined weight of frame and sash members and depth of frame or sash members according to the SWI specifications category for Heavy Intermediate hot-rolled steel windows.
  - 1. Thermally Improved Design: Provide frame and sash members designed to isolate interior and exterior surfaces for improved thermal performance.
- C. Window Finish: Galvanized and factory primed.
- D. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- E. Mullions: Formed of hot-rolled steel matching window units; with anchors for support to structure and for installation of window units and having sufficient strength to withstand design pressure indicated. Provide mullions of profile indicated and with cover plates. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections.
- F. Glazing Stops: Provide manufacturer's standard screw-applied or snap-on glazing stops fabricated from formed steel or stainless steel; coordinate with Section 088000 "Glazing" for glazing system indicated. Finish glazing stops with same finish as window units if fabricated of steel; otherwise, provide manufacturer's standard finish. Match color to window units.
- G. Glazing Clips: Where face glazing (without glazing stops) is indicated at existing windows to be repaired, furnish glazing clips for concealment in glazing compound.
- H. Weather Stripping: Manufacturer's standard compressible weather stripping, complying with AAMA 701/702, ASTM C 509, or ASTM C 864 and designed for permanently resilient sealing under compression and for complete concealment when sash is closed.

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2.4 GLAZING

- A. Glass and Glazing System: See Section 088000 "Glazing" for glass units and glazing requirements for hot-rolled steel windows.

2.5 HARDWARE

- A. General: Provide manufacturer's standard nonremovable, solid-bronze hardware, with operating components of stainless steel, carbon steel complying with AAMA 907, brass, bronze, or other corrosion-resistant material designed to smoothly operate, tightly close, and securely lock hot-rolled steel window sash; and sized to accommodate sash weight and dimensions.
- B. Projected Window Hardware:
  - 1. Operating Device: Gear-type rotary complying with AAMA 901 when tested according to ASTM E 405, Method A sash operator located at sill.
  - 2. Hinges: Concealed, four-bar friction hinges with adjustable slide shoes complying with AAMA 904; two per sash.
  - 3. Lock: Cam-action, sweep lock handle with surface-mounted strike.
  - 4. Pole Operators: Tubular-shaped, anodized aluminum; with rubber-capped lower end and standard push-pull hook at top to match hardware design; of sufficient length to operate window without reaching more than 60 inches above floor; one pole operator and pole hanger per room that has operable windows more than 72 inches above floor.
  - 5. Limit Device: Adjustable, concealed friction adjustor/stay-bar with release key or tool limit devices designed to restrict sash opening.

2.6 INSECT SCREENS

- A. Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, fully integrated with window. Locate screens on inside of window and provide for each operable exterior sash. Comply with SMA 1201.
- B. Aluminum Screen Frames: Manufacturer's standard extruded-aluminum or formed-tubular-aluminum members; with mitered, coped joints, or corner extrusions; concealed fasteners; and removable PVC or PE spline/anchor concealing edge of mesh.
  - 1. Frame Wall Thickness: 0.03-inch minimum.
  - 2. Finish: Anodized aluminum in manufacturer's standard color.
  - 3. Finish: Baked-enamel or powder-coat finish in color selected by the Architect from manufacturer's full range.
- C. Aluminum Wire Fabric: 18-by-16 count per sq. in. mesh of 0.011-inch-diameter, coated aluminum wire.
  - 1. Wire-Fabric Finish: color selected by the Architect from manufacturer's full range.
- D. Wickets: Provide sliding or hinged wickets, framed and trimmed for a tight fit and durability during handling.

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2.7 ACCESSORIES

- A. Fasteners: Provide fasteners of bronze, brass, stainless steel, or other metal that are warranted by manufacturer to be noncorrosive and compatible with trim, hardware, anchors, and other components of hot-rolled steel windows.
  - 1. Exposed Fasteners: Do not use exposed fasteners to the greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.
- B. Anchors, Clips, and Window Accessories: Provide units of stainless steel, hot-dip zinc-coated steel, bronze, brass, or iron complying with ASTM A 123/A 123M. Provide units with sufficient strength to withstand design pressure indicated.
  - 1. Windborne-Debris-Impact Resistance: Provide anchors and clips of same design used to pass windborne-debris-impact-resistance testing.
- C. Sealant: For sealants required within fabricated windows, provide manufacturer's standard, permanently elastic, nonshrinking, and nonmigrating type recommended by sealant manufacturer for joint size and movement.

2.8 FABRICATION

- A. General: Fabricate hot-rolled steel windows of type and in sizes indicated to comply with SWI standards. Include a complete system for assembly of components and anchorage of window units.
- B. Provide units that are reglazable without dismantling framing.
- C. Prepare windows for site glazing.
- D. Subframes and Operable Sash: Formed of hot-rolled steel of profile indicated. Miter or cope corners, and weld and dress joints smooth.
- E. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.
- F. Provide weep holes and internal water passages to conduct infiltrating water to the exterior.

2.9 STEEL FINISHES

- A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning".
- B. Galvanized Finish: Hot-dip galvanize according to ASTM A 123/A 123M.
- C. Factory Prime Finish: After surface preparation and pretreatment, apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer.

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- D. Baked Enamel or Powder Coat Finish: After cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of 2 mils.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Verify rough-opening dimensions, levelness of sill plate, and clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. SWI Publication: Comply with applicable requirements in SWI's "General Guidelines on the Installation of Steel Windows," except where more stringent requirements are indicated.
- B. Comply with manufacturer's written instructions for installing windows, hardware, operators, accessories, and other components.
- C. Install windows level, plumb, square, true to line, without distortion or impediment to thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- D. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.
- E. Install windows and components to drain condensation, water-penetrating joints, and moisture migrating within windows to the exterior.
- F. Separate corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials according to ASTM E 2112.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
  - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Field Quality-Control Testing:

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1. Testing Methodology: Test windows for air-penetration resistance and water resistance according to AAMA 502, Test Method A, by applying same test pressures required for performance.
  2. Testing Extent: Three windows as selected by Resident Engineer and a qualified independent testing and inspecting agency. Test windows immediately after installation.
- C. Prepare test reports according to AAMA 502.
- D. Window will be considered defective if it does not pass tests and inspections.

3.4 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- B. Clean factory-finished steel surfaces immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Avoid damaging protective coatings and finishes.
- C. Protect window surfaces from contact with contaminating substances resulting from construction operations. Remove contaminants immediately according to manufacturer's written recommendations.
- D. Refinish or replace windows with damaged finish.

**END OF SECTION 085123.13**

**SECTION 086200 - UNIT SKYLIGHTS**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Unit skylights mounted on site-erected curbs.

B. Related Requirements:

1. Section 084523 "Fiberglass-Sandwich-Panel Assemblies" for metal-framed skylights glazed with fiberglass-sandwich panels.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of unit skylight.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for unit skylights.

B. Shop Drawings: For unit skylight work.

1. Include plans, elevations, sections, details, and connections to supporting structure and other adjoining work.

C. Aluminum Finish Samples: For each type of exposed finish required, in a representative section of each unit skylight in manufacturer's standard size.

D. Glazing Samples:

E. Product Schedule: For unit skylights. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer and manufacturer.

B. Product Test Reports: For each type and size of unit skylight, for tests performed within the last four years by a qualified testing agency. Test results based on testing of smaller unit skylights than specified will not be accepted.

C. Sample Warranty: For special warranty.

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1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For unit skylights to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating unit skylights that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.
- B. Installer Qualifications: An installer acceptable to unit skylight manufacturer for installation of units required for this Project.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of unit skylights that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Uncontrolled water leakage.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 2. Warranty Period: Five years from date of Substantial Completion.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- 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:
  - 1. Kalwall Corporation.
  - 2. Major Industries.
  - 3. Or equal.

2.2 PERFORMANCE REQUIREMENTS

- A. Unit Skylight Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
  - 1. Performance Class and Grade: Class AW-PG 40.
  - 2. Certification: AAMA-, WDMA-, or CSA-certified unit skylights with label attached to each.

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- B. Thermal Transmittance: NFRC 100 maximum U-factor of 0.65 Btu/sq. ft. x h x deg F.
- C. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum SHGC of 0.6.
- D. Outside-Inside Transmission Class (OITC): Rated for not less than 30 OITC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 1332.
- E. Windborne-Debris-Impact Resistance: Provide unit skylights that pass basic-protection testing requirements in ASTM E 1996 for Wind Zone 1 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than unit skylights indicated for use on Project and shall be installed in same manner as unit skylights indicated for use on Project.
  - 1. Large-Missile Test: For unit skylights located within 30 feet of grade.
  - 2. Small-Missile Test: For unit skylights located more than 30 feet above grade.

2.3 UNIT SKYLIGHTS

- A. General: Provide factory-assembled unit skylights that include glazing, extruded-aluminum glazing retainers, gaskets, and inner frames and that are capable of withstanding performance requirements indicated.
- B. Unit Shape and Size: Rectangular, 120-by-36-inch outside curb.

2.4 FIBERGLASS-SANDWICH PANELS

- A. Fiberglass-Sandwich Panels: Uniformly colored, translucent, thermoset, fiberglass-reinforced-polymer face sheets bonded to both sides of a grid core.
- B. Panel Thickness: 2-3/4 inches.
- C. Grid Core: Mechanically interlocked, extruded-aluminum I-beams, with a minimum flange width of 7/16 inch.
  - 1. Extruded Aluminum: ASTM B 221, in alloy and temper recommended in writing by manufacturer.
  - 2. I-Beam Construction: One piece, extruded aluminum.
  - 3. Grid Pattern: Square, nominal 12 inches.
- D. Exterior Face Sheet:
  - 1. Thickness: 0.070 inch.
  - 2. Color: As selected by Architect from manufacturer's full range.
  - 3. Protective Weathering Surface: Manufacturer's standard.
- E. Interior Face Sheet:
  - 1. Thickness: 0.045 inch.
  - 2. Color: As selected by Architect from manufacturer's full range.

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- F. Fiberglass-Sandwich-Panel Adhesive: Manufacturer's standard for permanent adhesion of facings to cores.
- G. Panel Strength:
  - 1. Maximum Panel Deflection: 3-1/2 inches when a 4-by-12-foot panel is tested according to ASTM E 72 at 34 lbf/sq. ft., with a maximum 0.090-inch set deflection after five minutes.
  - 2. Panel Support Strength: Capable of supporting, without failure, a 300-lbf concentrated load when applied to a 3-inch-diameter disk according to ASTM E 661.
- H. Panel Performance:
  - 1. Self-Ignition Temperature: 650 deg F or more according to ASTM D 1929.
  - 2. Smoke-Developed Index: 450 or less according to ASTM E 84, or 75 or less according to ASTM D 2843.
  - 3. Combustibility Classification: Class CC1 based on testing according to ASTM D 635.
  - 4. Roof-Covering Classification: Class A according to ASTM E 108 or UL 790.
  - 5. Interior Finish Classification: Class A, based on testing according to ASTM E 84.
  - 6. Color Change: Not more than 3.0 units Delta E, when measured according to ASTM D 2244, after outdoor weathering compliant with procedures in ASTM D 1435.
  - 7. Impact Resistance: No fracture or tear at impact of 60 ft. x lbf freefalling ball according to UL 972 test procedure.
  - 8. Haze Factor: Greater than 90 percent when tested according to ASTM D 1003

## 2.5 ALUMINUM FRAMING SYSTEMS

- A. Components: Manufacturer's standard extruded-aluminum members of thickness required and reinforced as required to support imposed loads.
  - 1. Construction: One piece, extruded aluminum.
- B. Aluminum: Alloy and temper recommended in writing by manufacturer for type of use and finish indicated.
  - 1. Sheet and Plate: ASTM B 209.
  - 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
  - 3. Extruded Structural Pipe and Tubes: ASTM B 429.
  - 4. Structural Profiles: ASTM B 308.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning skylight components.
- D. Fasteners and Accessories: Manufacturer's standard, corrosion-resistant, nonstaining, and nonbleeding fasteners and accessories; compatible with adjacent materials.
  - 1. At closures, retaining caps, or battens, use ASTM A 193, 300 series stainless-steel screws.
  - 2. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.

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3. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended in writing by manufacturer.
  - E. Concealed Flashing: Corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
  - F. Exposed Flashing and Closures: Aluminum sheet not less than 0.040 inch thick, finished to match framing.
  - G. Framing Gaskets: Manufacturer's standard.
  - H. Frame-System Sealants: As recommended in writing by manufacturer.
  - I. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
  - J. Glazing Gaskets: EPDM, neoprene, partially vulcanized butyl tape, or liquid-applied elastomeric sealant.
  - K. Condensation Control: Fabricate unit skylights with integral internal gutters and nonclogging weeps to collect and drain condensation to the exterior.
  - L. Thermal Break: Fabricate unit skylights with thermal barrier separating exterior and interior metal framing.
- 2.6 ALUMINUM FINISHES
- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

**PART 3 - EXECUTION**

## 3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. Coordinate installation of unit skylight with installation of substrates, vapor retarders, roof insulation, roofing membrane, and flashing as required to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight.

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- B. Comply with recommendations in AAMA 1607 and with manufacturer's written instructions for installing unit skylights.
- C. Install unit skylights level, plumb, and true to line, without distortion.
- D. Anchor unit skylights securely to supporting substrates.
- E. Where aluminum surfaces of unit skylights will contact another metal or corrosive substrates, such as preservative-treated wood, apply bituminous coating on concealed metal surfaces or provide other approved permanent separation recommended in writing by unit skylight manufacturer.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. After completion of installation and nominal curing of sealant and glazing compounds but before installation of interior finishes, test for water leaks according to AAMA 501.2.
- C. Perform test for total area of each unit skylight.
- D. Work will be considered defective if it does not pass tests and inspections.
- E. Additional testing and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- F. Prepare test and inspection reports.

3.4 CLEANING

- A. Clean exposed unit skylight surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes.
- B. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Remove and replace glazing that has been broken, chipped, cracked, abraded, or damaged during construction period.
- D. Protect unit skylight surfaces from contact with contaminating substances resulting from construction operations.

**END OF SECTION 086200**

**SECTION 086223 - TUBULAR SKYLIGHTS**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section includes tubular daylighting system, consisting of roof dome, reflective tube, accessories, and diffuser assembly; configuration as indicated.

1.2 REFERENCES

- A. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials; 2011b.
- B. ASTM A463 – Standard Specification for Steel Sheet, Aluminum Coated, by the Hot-Dip Process; 2010.
- C. ASTM A653 – Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannelaed) by the Hot Dip Process; 2011.
- D. ASTM E283 – Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004.
- E. ASTM E308 – Standard Practice for Computing the Colors of Objects by Using the CIE System; 2008.
- F. ASTM E330 - 02 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2010.
- G. ASTM E331 - 00 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain walls by Static Air Pressure Difference; 2009.
- H. ASTM D635 – Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2010.
- I. ASTM D1929 – Standards Test Method for Determining Ignition Temperature of Plastics; 2013.
- J. UL 181 – Standard for Factory-Made Air Ducts and Air Connectors; 2008.
- K. UL 790 – Standard Test Methods for Fire Tests of Roof Covering; 1997.
- L. ICC ES AC16 - Acceptance Criteria for Plastic Glazed Skylights; 2011.

1.3 PERFORMANCE REQUIREMENTS

- A. Completed tubular daylighting system assemblies shall be capable of meeting the following performance requirements:

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1. Air Infiltration Test: Air infiltration will not exceed .30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E283.
2. Water Resistance Test: No uncontrolled water leakage at 16.5 psf pressure differential with water rate of 5 gallons/hours/sf when tested in accordance with ASTM E331.
3. Uniform Load Test:
  - a. No breakage, permanent damage to fasteners, hardware parts, or damage to make tubular skylight inoperable or cause permanent deflection of any section in excess of 1 percent of its span at a Positive or Negative Load of 35 psf (1.68 kPa).
  - b. All units shall be tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E330.
4. Fire Testing:
  - a. When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the 2013 California Building Code.
  - b. Self-Ignition Temperature - Greater than 650 degrees F per ASTM D1929.
  - c. Smoke Density - Rating no greater than 450 per ASTM Standard E84 in way intended for use. Classification C.
  - d. Rate of Burn and/or Extent - Maximum Burning Rate: 2.5 inches/min (62 mm/min) Classification CC-2 per ASTM D635.
  - e. Rate of Burn and/or Extent - Maximum Burn Extent: 1 inch (25 mm) Classification CC-1 per ASTM D635.

1.4 SUBMITTALS

- A. Product Data: For each type of tubular skylight.
  1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for tubular skylights.
  2. Motors: Show nameplate data, power requirements, ratings, characteristics, and mounting arrangements.
- B. Shop Drawings: For tubular skylight work.
  1. Include plans, elevations, sections, details, and connections to supporting structure and other adjoining work.
- C. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.
- D. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For tubular skylights and tubular skylight operating system to include in maintenance manuals.

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1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating tubular skylights that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.
- B. Installer Qualifications: An installer acceptable to tubular skylight manufacturer for installation of units required for this Project.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 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.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of tubular skylights that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Uncontrolled water leakage.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - c. Yellowing glazing.
    - d. Breakage glazing.
  - 2. Warranty Period:
    - a. Tubular Daylighting System: Manufacturer's standard warranty for 10 years from date of Notice of Completion.

**PART 2 - PRODUCTS**

## 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products manufactured by Solatube International, Inc., 2210 Oak Ridge Way; Vista, CA 92081; (888) 765-2882 or comparable approved product.
- B. Requests for substitutions will be considered in accordance with provisions of Section 4-1.6 of the City of San Diego "Whitebook".

## 2.2 TUBULAR DAYLIGHTING SYSTEM

- A. Tubular Daylighting System General: Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC ES AC-16.
- B. Brighten Up Series: Solatube Model 290 DS-C Closed Ceiling, 14 inch (350 mm) Daylighting System:
  - 1. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
    - a. Outer Dome Glazing: Type DA, 0.125 inch (3.2 mm) minimum thickness injection molded acrylic classified as CC2 material; UV inhibiting (100 percent UV C, 100 percent UV B and 98.5 percent UV A), impact modified acrylic blend.
    - b. Raybender 3000: Variable prism optic molded into outer dome to capture low angle sunlight and limit high angle sunlight.
  - 2. Roof Flashing Base:
    - a. One Piece: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube. Sheet steel, corrosion resistant conforming to ASTM A 653/A 653M or ASTM A 463/A 463M, 0.028 inch (0.7 mm) thick. Base style as indicated.
  - 3. Dome Edge Protection Band: Type PB, for fire rated roofs with turret height less than 8 inches (203 mm). Galvanized steel. Nominal thickness of 0.039 inch (1 mm).
  - 4. Roof Flashing Turret Extensions: Provide manufacturer's standard extensions for applications as indicated.
  - 5. Tube Ring: Attached to top of base section; 0.090 inch (2.3 mm) nominal thickness injection molded high impact PVC; to prevent thermal bridging between base flashing and tubing and channel condensed moisture out of tubing.
  - 6. Tube Ring Seal: Attached to the base of the dome ring; butyl glazing rope 0.24 inch (6 mm) diameter; to minimize air infiltration.
  - 7. Dome Seal: Adhesive backed weatherstrip, 0.63 inch (16 mm) tall by 0.28 inch (7 mm) wide.
  - 8. Reflective Tubes: Aluminum sheet, thickness 0.018 inch (0.5 mm).

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- a. General:
    - 1) Interior Finish: Spectralight Infinity high reflectance specular finish on exposed reflective surface. Specular reflectance for visible spectrum (400 nm to 760 nm) greater than 99 percent. Total solar spectrum reflectance (400 nm to 2500 nm) less than 80.2 percent.
    - 2) Color: a\* and b\* (defined by CIE L\*a\*b\* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
  - b. Extension Tube.
    - 1) Reflective extension tube, in lengths required for diffuser attachment with 90 degree extension at end.
  - c. Diffuser Assembly:
    - 1) Suitable for mounting in gypsum board.
    - 2) Square JustFrost Diffuser
9. Accessories:
- a. Wire Suspension Kit: Type E, Use the wire suspension kit when additional bracing to the structure is required.
  - b. Security Kit: Type SK Dome Security Kit, rivets with nylon spacers to replace dome screws.

2.3 ACCESSORIES

- A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.
- B. Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.
- C. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.

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- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Installer shall be factory trained and certified by the manufacturer prior to commencement of installation..
- B. Coordinate installation of tubular skylight with installation of substrates, vapor retarders, roof insulation, roofing membrane, and flashing as required to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight.
- C. Comply with manufacturer's written instructions for installing tubular skylights.
- D. Install tubular skylights level, plumb, and true to line, without distortion.
- E. Anchor tubular skylights securely to supporting substrates.
- F. Where aluminum surfaces of tubular skylights will contact another metal or corrosive substrates, such as preservative-treated wood, apply bituminous coating on concealed metal surfaces or provide other approved permanent separation recommended in writing by tubular skylight manufacturer.

3.4 CLEANING

- A. Clean exposed tubular skylight surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes.
- B. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Remove and replace glazing that has been broken, chipped, cracked, abraded, or damaged during construction period.
- D. Protect tubular skylight surfaces from contact with contaminating substances resulting from construction operations.
- E. Tubular Skylight Operating System: Clean and lubricate joints and hardware. Adjust for proper operation.

3.5 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain tubular skylight operating system.

**END OF SECTION 086223**

**SECTION 08 71 00 - DOOR HARDWARE**

**PART 1 - GENERAL**

1.1 SUMMARY:

A. Section Includes: Finish Hardware for door openings, except as otherwise specified herein.

1. Door hardware for steel (hollow metal) doors.
2. Door hardware for aluminum doors.
3. Door hardware for wood doors.
4. Door hardware for other doors indicated.
5. Keyed cylinders as indicated.

B. Related Sections:

1. Division 6: Rough Carpentry.
2. Division 8: Aluminum Doors and Frames
3. Division 8: Hollow Metal Doors and Frames.
4. Division 8: Wood Doors.
5. Division 26 Electrical
6. Division 28: Electronic Security

C. References: Comply with applicable requirements of the following standards. Where these standards conflict with other specific requirements, the most restrictive shall govern.

1. Builders Hardware Manufacturing Association (BHMA)
2. NFPA 101 Life Safety Code
3. NFPA 80 -Fire Doors and Windows
4. ANSI-A156.xx- Various Performance Standards for Finish Hardware
5. UL10C – Positive Pressure Fire Test of Door Assemblies
6. ANSI-A117.1 – Accessible and Usable Buildings and Facilities
7. DHI /ANSI A115.IG – Installation Guide for Doors and Hardware
8. ICC – International Building Code

D. Intent of Hardware Groups

1. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
2. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to be submitted to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.

1.2 SUBSTITUTIONS:

A. Comply with City of San Diego "Whitebook".

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## 1.3 SUBMITTALS:

- A. Special Submittal Requirements: Combine submittals of this Section with Sections listed below to ensure the "design intent" of the system/assembly is understood and can be reviewed together.
- B. Product Data: Manufacturer's specifications and technical data including the following:
1. Detailed specification of construction and fabrication.
  2. Manufacturer's installation instructions.
  3. Wiring diagrams for each electric product specified. Coordinate voltage with electrical before submitting.
  4. Submit 6 copies of catalog cuts with hardware schedule.
  5. Provide 9001-Quality Management and 14001-Environmental Management for products listed in Materials Section 2.2
- C. Shop Drawings - Hardware Schedule: Submit 6 complete reproducible copy of detailed hardware schedule in a vertical format.
1. List groups and suffixes in proper sequence.
  2. Completely describe door and list architectural door number.
  3. Manufacturer, product name, and catalog number.
  4. Function, type, and style.
  5. Size and finish of each item.
  6. Mounting heights.
  7. Explanation of abbreviations and symbols used within schedule.
  8. Detailed wiring diagrams, specially developed for each opening, indicating all electric hardware, security equipment and access control equipment, and door and frame rough-ins required for specific opening.
- D. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.
1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.
- E. Samples: (If requested by the Resident Engineer)
1. 1 sample of Lever and Rose/Escutcheon design, (pair).
  2. 3 samples of metal finishes
- F. Contract Closeout Submittals: Provide the Following.
1. Operating and maintenance manuals: Submit 3 sets containing the following.
    - a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
    - b. Catalog pages for each product.
    - c. Name, address, and phone number of local representative for each manufacturer.
    - d. Parts list for each product.
  2. Copy of final hardware schedule, edited to reflect, "As installed".

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3. Copy of final keying schedule
4. As installed "Wiring Diagrams" for each piece of hardware connected to power, both low voltage and 110 volts.
5. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

1.4 QUALITY ASSURANCE

A. Provide the Following.

1. Statement of qualification for distributor and installers.
2. Statement of compliance with regulatory requirements and single source responsibility.
3. Distributor's Qualifications:
  - a. Distributor to employ full time Architectural Hardware Consultants (AHC) for the purpose of scheduling and coordinating hardware and establishing keying schedule.
  - b. Hardware Schedule shall be prepared and signed by an AHC.
4. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.
  - a. Provide UL listed hardware for labeled and 20 minute openings in conformance with requirements for class of opening scheduled.
  - b. Underwriters Laboratories requirements have precedence over this specification where conflict exists.
5. Single Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.

B. Review Project for extent of finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Resident Engineer in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Resident Engineer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Comply the Following.

1. Deliver products in original unopened packaging with legible manufacturer's identification.
2. Package hardware to prevent damage during transit and storage.
3. Mark hardware to correspond with "reviewed hardware schedule".
4. Deliver hardware to door and frame manufacturer upon request.

B. Storage and Protection: Comply with manufacturer's recommendations.

1.6 PROJECT CONDITIONS:

- A. 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 the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.

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- B. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.7 WARRANTY:

- A. Refer to Conditions of the Contract

- B. Manufacturer’s Warranty:

1. Closers: Ten years
2. Exit Devices: Five Years
3. Mortise Locks: Lifetime
4. Locksets & Cylinders: Ten years
5. All other Hardware: Two years.

1.8 OWNER’S INSTRUCTION:

- A. Instruct Owner’s personnel in operation and maintenance of hardware units.

1.9 MAINTENANCE:

- A. Extra Service Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Provide the following.

1. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
2. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.
3. Delivery, Storage and Protection: Comply with Owner’s requirements for delivery, storage and protection of extra service materials.

- B. Maintenance Service: Submit for Owner’s consideration maintenance service agreement for electronic products installed.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS:

- A. The following manufacturers are approved subject to compliance with requirements of the Contract Documents. Approval of manufacturers other than those listed shall be in accordance with Division 1.

<u>Item:</u>	<u>Manufacturer:</u>	<u>Approved:</u>
Hinges	Stanley	McKinney
Continuous Hinges	Stanley	Pemko, Markar
Locksets	Best	No Substitution
Cylinders	Best	No Substitution
Exit Devices	Precision	No Substitution

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Closers	LCN	No Substitution
Automatic Operators	Stanley D-4990	LCN 4640, Norton
Push/Pull Plates	Trimco	Rockwood
Push/Pull Bars	Trimco	Rockwood
Protection Plates	Trimco	Rockwood
Overhead Stops	G+J	Sargent
Door Stops	Trimco	Rockwood
Flush Bolts	Trimco	Rockwood
Coordinator & Brackets	Trimco	Rockwood
Threshold & Gasketing	Pemko	Reese

2.2 MATERIALS:

A. Hinges: Shall be Five Knuckle Ball bearing hinges

1. Template screw hole locations
2. Bearings are to be fully hardened.
3. Bearing shell is to be consistent shape with barrel.
4. Minimum of 2 permanently lubricated non-detachable bearings on standard weight hinge and 4 permanently lubricated bearing on heavy weight hinges.
5. Equip with easily seated, non-rising pins.
6. Non Removable Pin screws shall be slotted stainless steel screws.
7. Hinges shall be full polished, front, back and barrel.
8. Hinge pin is to be fully plated.
9. Bearing assembly is to be installed after plating.
10. Sufficient size to allow 180-degree swing of door
11. Furnish five knuckles with flush ball bearings
12. Provide hinge type as listed in schedule.
13. Furnish 3 hinges per leaf to 7 foot 6 inch height. Add one for each additional 30 inches in height or fraction thereof.
14. Tested and approved by BHMA for all applicable ANSI Standards for type, size, function and finish
15. UL10C listed for Fire rated doors.

B. Geared Continuous Hinges:

1. Tested and approved by BHMA for ANSI A156.26-1996 Grade 1
2. Anti-spinning through fastener
3. UL10C listed for 3 hour Fire rating
4. Non-handed
5. Lifetime warranty
6. Provide Fire Pins for 3-hour fire ratings
7. Sufficient size to permit door to swing 180 degrees

C. Mortise Type Locks and Latches:

1. Tested and approved by BHMA for ANSI A156.13, Series 1000, Operational Grade 1, Extra-Heavy Duty, Security Grade 2 and be UL10C.

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2. Furnish UL or recognized independent laboratory certified mechanical operational testing to 4 million cycles minimum.
3. Provide 9001-Quality Management and 14001-Environmental Management.
4. Fit ANSI A115.1 door preparation
5. Functions and design as indicated in the hardware groups
6. Solid, one-piece, 3/4-inch (19mm) throw, anti-friction latchbolt made of self-lubricating stainless steel
7. Deadbolt functions shall have 1 inch (25mm) throw bolt made of hardened stainless steel
8. Latchbolt and Deadbolt are to extend into the case a minimum of 3/8 inch (9.5mm) when fully extended
9. Auxiliary deadlatch to be made of one piece stainless steel, permanently lubricated
10. Provide sufficient curved strike lip to protect door trim
11. Lever handles must be of forged or cast brass, bronze or stainless steel construction and conform to ANSI A117.1. Levers that contain a hollow cavity are not acceptable
12. Lock shall have self-aligning, thru-bolted trim
13. Levers to operate a roller bearing spindle hub mechanism
14. Mortise cylinders of lock shall have a concealed internal setscrew for securing the cylinder to the lockset. The internal setscrew will be accessible only by removing the core, with the control key, from the cylinder body.
15. Spindle to be designed to prevent forced entry from attacking of lever
16. Provide locksets with 7-pin removable and interchangeable core cylinders
17. Each lever to have independent spring mechanism controlling it
18. Core face must be the same finish as the lockset.

## D. Cylindrical Type Locks and Latchsets:

1. Tested and approved by BHMA for ANSI A156.2, Series 4000, Operational Grade 1, Extra-Heavy Duty, and be UL10C listed.
2. Provide 9001-Quality Management and 14001-Environmental Management.
3. Fit modified ANSI A115.2 door preparation.
4. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty
5. Locksets to have anti-rotational studs that are thru-bolted
6. Keyed lever shall not have exposed "keeper" hole
7. Each lever to have independent spring mechanism controlling it
8. 2-3/4 inch (70 mm) backset
9. 9/16 inch (14 mm) throw latchbolt
10. Provide sufficient curved strike lip to protect door trim
11. Outside lever sleeve to be seamless, of one-piece construction made of a hardened steel alloy
12. Keyed lever to be removable only after core is removed, by authorized control key
13. Provide locksets with 7-pin removable and interchangeable core cylinders
14. Hub, side plate, shrouded rose, locking pin to be a one-piece casting with a shrouded locking lug.
15. Locksets outside locked lever must withstand minimum 1400 inch pounds of torque. In excess of that, a replaceable part will shear. Key from outside and inside lever will still operate lockset.
16. Core face must be the same finish as the lockset.
17. Functions and design as indicated in the hardware groups.

## E. Cylindrical Deadbolt:

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1. Tested and approved by ANSI A156.36, Operational Grade 1,
2. Fit modified ANSI A115.3 door preparation
3. Provide 9001-Quality Management and 14001-Environmental Management.
4. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty
5. 2-3/4 inch (70mm) backset, or 2 3/8 inch backset as needed
6. 1 inch throw deadbolt
7. Provide locksets with 7-pin core.

F. Mortise Deadbolt:

1. Tested and approved by ANSI A156.36, Operational Grade 1.
2. Provide 9001-Quality Management and 14001-Environmental Management.
3. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty
4. 2-3/4 inch (70mm) backset
5. 1 inch throw deadbolt
6. Provide locksets with 7-pin core.

G. Exit Devices:

1. Exit devices to meet or exceed BHMA for ANSI 156.3, Grade 1.
2. Exit devices to be tested and certified by UL or by a recognized independent laboratory for mechanical operational testing to 10 million cycles minimum with inspection confirming Grade 1 Loaded Forces have been maintained.
3. Exit devices chassis to be investment cast steel, zinc dichromate.
4. Exit devices to have stainless steel deadlocking 3/4" through latch bolt.
5. Exit devices to be equipped with sound dampening on touchbar.
6. Non-fire rated exit devices to have cylinder dogging.
7. Non-fire rated exit devices to have 1/4" minimum turn hex key dogging.
8. Touchpad to be "T" style constructed of architectural metal with matching metal end caps.
9. Touchbar assembly on wide style exit devices to have a 1/4" clearance to allow for vision frames.
10. All exposed exit device components to be of architectural metals and "true" architectural finishes.
11. Provide strikes as required by application.
12. Fire exit hardware to conform to UL10C and UBC 7-2. UL tested for Accident Hazard.
13. The strike is to be powder coated finish.
14. Exit devices to have field reversible handing.
15. Provide heavy duty vandal resistant lever trim with heavy duty investment cast stainless steel components and extra strength shock absorbing overload springs. Lever shall not require resetting. Lever design to match locksets and latchsets.
16. Provide 9001-Quality Management and 14001-Environmental Management.
17. Vertical Latch Assemblies to have gravity operation, no springs.
18. Approved Manufacturers
  - a. The following manufacturers will be approved contingent on meeting or exceeding the above performance criteria:
    - 1) Precision Manufactured by Stanley Security Solutions

H. Cylinders:

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1. Provide the necessary cylinder housings, collars, rings & springs as recommended by the manufacturer for proper installation.
2. Provide the proper cylinder cams or tail piece as required to operate all locksets and other keyed hardware items listed in the hardware sets.
3. Coordinate and provide as required for related sections.

I. Door Closers shall:

1. Tested and approved by BHMA for ANSI 156.4, Grade 1
2. UL10C certified
3. Provide 9001-Quality Management and 14001-Environmental Management.
4. Closer shall have extra-duty arms and knuckles
5. Conform to ANSI 117.1
6. Maximum 2 7/16 inch case projection with non-ferrous cover
7. Separate adjusting valves for closing and latching speed, and backcheck
8. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions
9. Full rack and pinion type closer with 1½" minimum bore
10. Mount closers on non-public side of door, unless otherwise noted in specification
11. Closers shall be non-handed, non-sized and multi-sized.

J. Low Energy Operators shall:

1. Conform to ANSI/BHMA A156.19 as a low energy power opening device.
2. Be listed under UL228, UL325, UL10B, UL10C, UBC 7.2 and FCC listed.
3. Shall be non-handed.
4. Be rated for door panels weighing up to 350 lbs (160 kg).
5. The manual door closer within the Low Energy Operator shall be adjusted to meet Americans with Disabilities Act (ADA) 5 lbs opening force [Push-Side applications only]
6. Operator shall be isolated from mounting plate with rubber mounts to mitigate the transmission of forces between the door and the operator.
7. Shall have a position encoder to communicate with microprocessor.
8. Incorporate a resettable powered operation counter that tracks both powered and non-powered cycling of the Operator.
9. Incorporate the following adjustable settings:
  - i. Hold Open Timer, to 28 seconds
  - ii. Open Speed
  - iii. Backcheck Speed
  - iv. Vestibule Sequence Timer
10. Include DIP switch controls for:
  - i. On board diagnostics
  - ii. Power close
  - iii. Push and Go operation
  - iv. Time delay logic for electrified hardware components
11. Include terminals for auxiliary controls including:
  - i. Activation devices; provide two discrete inputs
  - ii. Vestibule sequencing
12. Control switches including:

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- i. Day/Night open (illuminated)
  - ii. Power On-Off
- 13. Includes adhesive Low Energy Operator mounting templates.
- 14. R-14 Aluminum Allow Materials
- 15. For non-powered operation, the unit shall function as a standard door closer with adjustable spring force size 1 thru 6.
  
- K. Door Stops: Provide a wall stop for every opening as listed in the hardware sets.
  - 1. Wall stop shall be wrought bronze, brass or satin nickel.
  - 2. Provide fastener suitable for wall construction.
  - 3. Coordinate reinforcement of walls where wall stop is specified.
  - 4. Provide post focal floor stop where indicated
  
- L. Over Head Stops: Provide a Surface mounted or concealed overhead when a floor or wall stop cannot be used or when listed in the hardware set.
  - 1. Concealed overhead stops shall be heavy duty bronze or satin nickel.
  - 2. Surface overhead stops shall be heavy duty bronze or satin nickel.
  
- M. Push Plates: Provide with four beveled edges ANSI J301, .050 thickness, size as indicated in hardware set. Furnish oval-head countersunk screws to match finish.
  
- N. Pulls with plates: Provide with four beveled edges ANSI J301, .050 thickness Plate s with ANSI J401 Pull as listed in hardware set. Provide proper fasteners for door construction.
  
- O. Push Pull Bars: Provide ANSI J504, .1” Dia. Pull and push bar model and series as listed in hardware set. Provide proper fasteners for door construction.
  
- P. Kickplates: Provide with four beveled edges ANSI J102, 10 inches high by width less 2 inches on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
  
- Q. Mop plates: Provide with four beveled edges ANSI J103, 4 inches high by width less 1 inch on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
  
- R. Door Bolts: Flush bolts for wood or metal doors.
  - 1. Provide a set of Automatic bolts, Certified ANSI/BHMA 156.3 Type 25 for hollow metal label doors.
  - 2. Provide a set of Automatic bolts, Certified ANSI/BHMA 156.3 Type 27 at wood label doors.
  - 3. Manual flush bolts, Certified ANSI/BHMA 156.16 at openings where allowed local authority.
  - 4. Provide Dust Proof Strike, Certified ANSI/BHMA 156.16 at doors with flush bolts without thresholds.
  
- S. Coordinator and Brackets: Provide a surface mounted coordinator when automatic bolts are used in the hardware set.
  - 1. Coordinator, Certified ANSI/BHMA A1156.3 Type 21A for full width of the opening.

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2. Provide mounting brackets for soffit applied hardware.
  3. Provide hardware preparation (cutouts) for latches as necessary.
- T. Power Supply: Provide power supply for (ELR) Electric Latch Retraction exit devices
1. Motherboard will accept up to four plug-in Control Modules. Provide the appropriate necessary control module to operate the number of ELR exit devices used at each opening. The Control Module shall include a Time delay Feature, variable (0-4 minutes) latch retraction period in response to a momentary input.
  2. UL Listed for class II output
  3. Include circuit breakers for protection of motherboard
  4. 115 or 230 Volt user selectable switch, with AC input= 115 Volt at 1 Amp
  5. Control module shall include Fire alarm terminal and Auxiliary contacts for remote signaling.
  6. Optional card for Battery Backup (BT) power tap module to operate a Card reader or when ELR devices require battery backup (Lead Acid Batteries are not included and is to be furnished by others)
  7. Precision ELR150 Series with the required modules.
- U. Power Supply: PS160 Use with Delayed Egress Devices and a variety of applications including Electric Locking and Exit Alarm The power supply uses 120 VAC at 0.8 amp input. A 230 VAC at 0.3 ampere is available. The power shall be able to control up to (4) Delayed Egress Exit devices. The filtered and regulated output power is field selectable for 12 or 24 VDC at 2 amps.
1. Fire Alarm release that accepts normally closed contact
  2. AC input is protected via a manually reset circuit breaker
  3. DC output is protected via an auto-reset fuse (PTC)
  4. Box shall include a key lock.
- V. Quick Connect Power Transfer: Power transfer device shall be a steel housing and flexible tube. Secure and inconspicuous channel is to bring power from the frame to the door.
1. Precision EPT-12C
  2. Tube shall contain 12 Wire bundle with Stanley Quick Connect Connectors one 4 wire connector consisting of two 18AWG wires and 2 24AWG wires and one 8 wire connector with 8 24AWG wires.
  3. 120 Volt AC input at 1 Amp
  4. Control module shall include Fire alarm terminal contacts.
- W. Quick Connect plug-in connectors: Stanley quick connect plug-in must be used with a combination of the following components to work as a complete plug and play system.
1. Best locks series 45HW, 45HM, 8KW, 9KW, 9KM
  2. To include Quick connectors to Best lock products Suffix "C" Example (45HW-7DEL14H DS C)
  3. Precision Exit Devices 2000 Series, DE, DS, TS, TDS, LDS, ELR
  4. To include Quick connectors to Precision Electric Exit device products Prefix "C" Example (C ELR 2108 x V4908A TS)
  5. Precision 12 Conductor Electric Power Transfer EPT-12C
  6. Stanley 12 Hinges Conductor Hinge CECB179-12C

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- X. Quick Connect Wire Harnesses: The Quick Connect wire harness shall have of one four wire connector and one eight wire connector. The four wire connector has two 18AWG and two 24AWG wires. The eight wire connector has eight 24AWG wires Stanley quick connect wire harnesses are available in various length's, 3" (76mm), 6" (152mm), 12" (304mm), 26" (660mm) 32" (812mm) 38" (965mm), 44" (1117mm), 50" (1270mm) and 192" (4876mm).
1. Wire Harness that is terminated at both ends is specified as WH-size (Example WH-3).
  2. Wire Harness that is terminated at one end with exposed pin head at the other is specified as WH-size P (Example WH-3P).
  3. Wire Harness 6" (152mm) terminated at one end with bray leads on the other is specified as WH-6E.

Notes The Wire harnesses with suffix "E" has brae wire ends, is used to connect the quick connect harness to a hardwired connection.

Wire harnesses of different lengths may be combined to form a desired length

The maximum size hole needed to pass through the quick connect plug is 1" (25MM).

- Y. Magnetic Door Holders: Provide magnetic door holders with Tri-Voltage that can be wired 12VDC, 24V AC/DC or 120V AC
1. Wall magnetic door holders shall be Surface or Flush mounted.
  2. Armature shall be thru-bolted and can be provided with any projection required.
  3. Models will be available in US28, sprayed finishes and US32D.
  4. Floor mounted shall be provided for a single door or double door hold open application.
- Z. Seals: All seals shall be finished to match adjacent frame color. Seals shall be furnished as listed in schedule. Material shall be UL listed for labeled openings.
- AA. Weatherstripping: Provide at head and jambs only those units where resilient or flexible seal strip is easily replaceable. Where bar-type weatherstrip is used with parallel arm mounted closers install weatherstrip first.
1. Weatherstrip shall be resilient seal of (Neoprene, Polyurethane, Vinyl, Pile, Nylon Brush, Silicone)
  2. UL10C Positive Pressure rated seal set when required.
- BB. Door Bottoms/Sweeps: Surface mounted or concealed door bottom where listed in the hardware sets.
1. Door seal shall be resilient seal of (Neoprene, Polyurethane, Nylon Brush, Silicone)
  2. UL10C Positive Pressure rated seal set when required.
- CC. Thresholds: Thresholds shall be aluminum beveled type with maximum height of ½" for conformance with ADA requirements. Furnish as specified and per details. Provide fasteners and screws suitable for floor conditions.

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2.3 FINISH:

- A. Designations used in Schedule of Finish Hardware - 3.05, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products
- B. Powder coat door closers to match other hardware, unless otherwise noted.
- C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

2.4 KEYS AND KEYING:

- A. Provide keyed brass construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished in the same keyway (or key section) as the Owner's permanent keying system. Permanent cores and keys (prepared according to the accepted keying schedule) will be furnished to the Owner.
- B. Cylinders, removable and interchangeable core system: Best CORMAX™ Patented 7-pin.
- C. Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."
- D. Transmit Grand Masterkeys, Masterkeys and other Security keys to Owner by Registered Mail, return receipt requested.
- E. Furnish keys in the following quantities:
  - 1. 1 each Grand Masterkeys
  - 2. 4 each Masterkeys
  - 3. 2 each Change keys each keyed core
  - 4. 15 each Construction masterkeys
  - 5. 1 each Control keys
- F. The Owner, or the Owner's agent, will install permanent cores and return the construction cores to the Hardware Supplier. Construction cores and keys remain the property of the Hardware Supplier.
- G. Keying Schedule: Arrange for a keying meeting, and programming meeting with Architect Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish 3 typed copies of keying and programming schedule to Architect.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.

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1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 HARDWARE LOCATIONS:

- A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.
  1. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
  2. Recommended locations for Architectural Hardware for flush wood doors (DHI).
  3. WDMA Industry Standard I.S.-1A-04, Industry Standard for Architectural wood flush doors.

3.3 INSTALLATION:

- A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- B. Conform to local governing agency security ordinance.
- C. Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.
  1. Adjust door closer sweep periods so that from the 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.
- D. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

3.4 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

- A. Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.
  1. Check and adjust closers to ensure proper operation.
  2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.
    - a. Verify levers are free from binding.
    - b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.
  3. Report findings, in writing, to architect indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.

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3.5 SCHEDULE OF FINISH HARDWARE:

**Manufacturer List**

<u>Code</u>	<u>Name</u>
AB	ABH Manufacturing Inc.
BE	Best Access Systems
BY	By Others
NA	National Guard
PR	Precision
SD	Stanley Door Closers
ST	Stanley
TR	Trimco

**Finish List**

<u>Code</u>	<u>Description</u>
AL	Aluminum
600	Primed for Painting
626	Satin Chromium Plated
628	Satin Aluminum, Clear Anodized
630	Satin Stainless Steel
689	Aluminum Painted
US28	Aluminum - Clear Anodized
626AM	Satin Chrome - Antimicrobial Coating
630AM	Satin Stainless - Antimicrobial Coating
BLACK	Black
US26D	Chromium Plated, Dull
US32D	Stainless Steel, Dull

**Option List**

<u>Code</u>	<u>Description</u>
C	Quick Connect Wiring Option
CD	Cylinder Dogging
DE	Delayed Egress
TS	Touchbar Monitoring Switch
ALK	Alarm
B4E	Beveled 4 Edges
CSK	Countersunk Screw Holes
ELR	Electric Latch Retraction
MCS	Mullion Cap Spacer
SCH	School Option

## COMMUNITY CENTER AND GYM IMPROVEMENTS

**Hardware Sets****SET #1**

Doors: 002-1, 003-2

6	Hinges	FBB191 4 1/2 X 4 1/2 NRP	US32D	ST
1	Set Auto Flush Bolts	3810 X 3810	626	TR
1	Lockset	45H-7D14R PATD	626AM	BE
1	Coordinator	3094B4	BLACK	TR
2	Door Closer	CLD-4551 CS	689	SD
2	Kick Plate	KO050 10" x 1" LDW B4E CSK	630	TR
2	Mounting Bracket	3095	BLACK	TR
1	Astragal	158NA	NA	
1	Weatherstrip	160SA Head & Jambs	NA	
2	Door Sweep	200NA	NA	
1	Handicap Threshold	513A	AL	NA

**SET #2**

Doors: 003-1, 006-1

3	Hinges	FBB191 4 1/2 X 4 1/2 NRP	US32D	ST
1	Lockset	45H-7D14R PATD	626AM	BE
1	Door Closer	CLD-4551 STD W/PA BRKT	689	SD
1	Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1	Wall Bumper	1270CVSV	626	TR
1	Gasketing	5050B Head & Jambs	NA	

**SET #3**

Doors: 004-1, 206-1, 206-2

3	Hinges	FBB191 4 1/2 X 4 1/2 NRP	US32D	ST
1	Exit Device	2308 X M4908A CD	630AM	PR
2	Mortise Cylinder	1E-74 PATD	626	BE
1	Door Closer	CLD-4551 STD W/PA BRKT	689	SD
1	Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1	Wall Bumper	1270CVSV	626	TR
1	Gasketing	5050B Head & Jambs	NA	

**SET #3.1**

Doors: 133-1

3	Hinges	FBB191 4 1/2 X 4 1/2 NRP	US32D	ST
1	Exit Device	2308 X M4908A CD	630AM	PR
2	Mortise Cylinder	1E-74 PATD	626	BE
1	Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1	Overhead Stop	4420 Series	US32D	AB

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1 Gasketing 5050B Head & Jambs NA

**SET #4**

Doors: 141-2

3 Hinges	FBB199 5 X 4 1/2 NRP	US32D	ST
1 Exit Device	2308 X M4908A CD	630AM	PR
2 Mortise Cylinder	1E-74 PATD	626	BE
1 Door Closer	CLD-4551 STD W/PA BRKT	689	SD
1 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1 Wall Bumper	1270CVSV	626	TR
1 Sound Gasketing	by Sound Door Mfg.	BY	

NOTE: Sound door gasketing may interfere with typical door closers. Special mounting may be required to clear gaskets. Exit device backsets also may be required to be adjusted to avoid interference with sound gasketing.

**SET #5**

Doors: 010-1

3 Hinges	FBB191 4 1/2 X 4 1/2 NRP	US32D	ST
1 Exit Device	2303 X M4903A CD	630AM	PR
2 Mortise Cylinder	1E-74 PATD	626	BE
1 Door Closer	CLD-4551 CS	689	SD
1 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1 Weatherstrip	160SA Head & Jambs	NA	
1 Door Sweep	200NA	NA	
1 Handicap Threshold	513A	AL	NA

**SET #6**

Doors: 147-1

3 Hinges	FBB191 4 1/2 X 4 1/2 NRP	US32D	ST
1 Exit Device	C ELR TS 2303 X M4903A	630AM	PR
1 Mortise Cylinder	1E-74 PATD	626	BE
1 Low Energy Operator	D-4990	628	SD
1 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1 Power Transfer	EPT-12C	PR	
2 Actuator	CL4163	630	SD
1 Power Supply	ELR151	PR	
1 Wire Harness	WH-26P	ST	
1 Weatherstrip	160SA Head & Jambs	NA	
1 Door Sweep	200NA	NA	
1 Handicap Threshold	513A	AL	NA

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NOTE: Pressing either activating plate retracts the exit device latch allowing access. "Day" mode will engage operator for normal powered operation with activation by push plates during day time operating hours. "Night" mode disables the operator from normal powered operation. The operator can be configured to receive activation signals from a secure exterior activation device or the interior push plate.

**SET #7**

Doors: 004-2, 120-1, 301, 302

6 Hinges	FBB191 4 1/2 X 4 1/2 NRP	US32D	ST
1 Removable Mullion	KR822 MCS	600	PR
2 Exit Device	2303 X M4903A CD	630AM	PR
4 Mortise Cylinder	1E-74 PATD	626	BE
1 Rim Cylinder	12E-72 PATD	626	BE
2 Door Closer	CLD-4551 CS	689	SD
2 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
2 Weatherstrip	160SA Head & Jambs	NA	
1 Mullion Seal	5100N	NA	
2 Door Sweep	200NA	NA	
2 Handicap Threshold	513A	AL	NA

**SET #8**

Doors: 112-1

3 Hinges	FBB191 4 1/2 X 4 1/2 NRP	US32D	ST
1 Exit Device	2303 X M4903A ALK	630AM	PR
2 Mortise Cylinder	1E-74 PATD	626	BE
1 Door Closer	CLD-4551 CS	689	SD
1 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1 Weatherstrip	160SA Head & Jambs	NA	
1 Door Sweep	200NA	NA	
1 Handicap Threshold	513A	AL	NA

**SET #9**

Doors: 145A-1, 145B-1

2 Continuous Hinge	661HD UL SCH	AL	ST
1 Removable Mullion	KR822 MCS	600	PR
2 Exit Device	2303 X M4903A CD	630AM	PR
4 Mortise Cylinder	1E-74 PATD	626	BE
1 Rim Cylinder	12E-72 PATD	626	BE
2 Door Closer	CLD-4551 CS	689	SD
2 Spacer Block	P45HD-110	689	SD
1 Mullion Seal	5100N	NA	
1 Integral Seals	by Frame Mfg.	BY	

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2 Handicap Threshold	513A	AL	NA
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**SET #10**

Doors: 141-3

3 Hinges	FBB191 4 1/2 X 4 1/2 NRP	US32D	ST
1 Delayed Egress Exit Device	C DE 2303 X M4903A	630AM	PR
1 Mortise Cylinder	1E-74 PATD	626	BE
1 Door Closer	CLD-4551 CS	689	SD
1 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1 Power Transfer	EPT-12C	PR	
1 Wire Harness	WH-26P	ST	
1 Power Supply	PS161-6	PR	
1 Weatherstrip	160SA Head & Jambs	NA	
1 Door Sweep	200NA	NA	
1 Handicap Threshold	513A	AL	NA

NOTE: The delayed egress exit device provides a controlled egress. When armed the device will deny egress to unauthorized personnel for 15 or 30 seconds, while simultaneously sounding a local audible alarm. The device secures the door in the locked mode with the Red LED indicating locked status. A 30 second delay is available. A written approval from the authority having jurisdiction is required.

**SET #11**

Doors: 139-1, 139-2

3 Hinges	FBB199WT 4-1/2 x 6	US32D	ST
1 Exit Device	2303 X M4903A CD	630AM	PR
1 Lockset	45H-7R14R PATD	626AM	BE
1 Door Closer	CLD-4551 CS	689	SD
1 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1 Gasketing	5050B Head & Jambs	NA	

**SET #12**

Doors: 139-3

3 Hinges	FBB191 4 1/2 X 4 1/2 NRP	US32D	ST
1 Exit Device	2303 X M4903A CD	630AM	PR
2 Mortise Cylinder	1E-74 PATD	626	BE
1 Door Closer	CLD-4551 CS	689	SD
1 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1 Weatherstrip	160SA Head & Jambs	NA	
1 Door Sweep	200NA	NA	
1 Handicap Threshold	513A	AL	NA

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**SET #13**

Doors: 145A-2, 145B-2

6 Hinges	FBB191 4 1/2 X 4 1/2 NRP	US32D	ST
1 Removable Mullion	KR822 MCS	600	PR
2 Exit Device	2308 X M4908A CD	630AM	PR
4 Mortise Cylinder	1E-74 PATD	626	BE
1 Rim Cylinder	12E-72 PATD	626	BE
2 Magnetic Holder	2300	US28	AB
2 Door Closer	CLD-4551 STD W/PA BRKT	689	SD
2 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
2 Gasketing	5050B Head & Jambs	NA	

NOTE: Magnetic holders hold doors in the open position until door is released.

**SET #14**

Doors: 112-2

6 Hinges	FBB191 4 1/2 X 4 1/2 NRP	US32D	ST
1 Removable Mullion	KR822 MCS	600	PR
2 Exit Device	2308 X M4908A CD	630AM	PR
4 Mortise Cylinder	1E-74 PATD	626	BE
1 Rim Cylinder	12E-72 PATD	626	BE
2 Magnetic Holder	2300	US28	AB
2 Door Closer	CLD-4551 STD W/PA BRKT	689	SD
4 Edge Guard	KE33-2 34"	630	TR
2 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
2 Gasketing	5050B Head & Jambs	NA	

NOTE: Magnetic holders hold doors in the open position until door is released.

**SET #15**

Doors: 116-1, 129-1, 144-1, 153-1, 133-1

3 Hinges	FBB191 4 1/2 X 4 1/2 NRP	US32D	ST
1 Exit Device	2308 X M4908A CD	630AM	PR
2 Mortise Cylinder	1E-74 PATD	626	BE
1 Door Closer	CLD-4551 H	689	SD
1 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1 Wall Bumper	1270CVSV	626	TR
1 Gasketing	5050B Head & Jambs	NA	

**SET #16**

Doors: 104-1, 105-1, 106-1, 107-1, 108-2, 124-1, 130-1, 134-1

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3 Hinges	FBB191 4 1/2 X 4 1/2 NRP	US32D	ST
1 Keypad Lockset	45HZ-7DV14R PATD	626AM	BE
1 Wall Bumper	1270CVSV	626	TR
1 Gasketing	5050B Head & Jambs	NA	

**SET #17**

Doors: 140-1, 141-1

3 Hinges	FBB199 5 X 4 1/2 NRP	US32D	ST
1 Lockset	9K4-7AB14K PATD	626AM	BE
1 Wall Bumper	1270CVSV	626	TR
1 Sound Gasketing	by Sound Door Mfg.	BY	

**SET #18**

Doors: 124-2

3 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Lockset	9K3-7AB14K PATD	626AM	BE
1 Floor Stop	Post Focal	626	TR
1 Gasketing	5050B Head & Jambs	NA	

**SET #19**

Doors: 008-1, 109-1, 142-1, 150-1, 152-1, 201-1, 204-1, 210-1

3 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Lockset	9K3-7D14K PATD	626AM	BE
1 Overhead Stop	4420 Series	US32D	AB
1 Gasketing	5050B Head & Jambs	NA	

**SET #20**

Doors: 006-2, 007-1, 007-2, 012-1, 119-5, 136-1, 137-1, 138-1, 203-1, 207-1, 208-1

3 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Lockset	9K3-7D14K PATD	626AM	BE
1 Wall Bumper	1270CVSV	626	TR
1 Gasketing	5050B Head & Jambs	NA	

**SET #21**

Doors: 004-3, 009-4, 148-1

3 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Lockset	45H-7R14R PATD	626AM	BE
1 Door Closer	CLD-4551 H	689	SD
1 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1 Wall Bumper	1270CVSV	626	TR
1 Gasketing	5050B Head & Jambs	NA	

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1 Floor Stop @148-1	Post Focal	626	TR
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**SET #21.1**

Doors: 009-1

3 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Deadlock	48H-7R PATD	626AM	BE
1 Pull Plate	1017-3B	630	TR
1 Push Plate	1001-9	630	TR
1 Door Closer	CLD-4551 H	689	SD
1 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1 Wall Bumper	1270CVSV	626	TR
1 Gasketing	5050B Head & Jambs	NA	

**SET #21.2**

Doors: 132-1

3 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Keypad Lockset	45HZ-7DV14R PATD	626AM	BE
1 Door Closer	CLD-4551 H	689	SD
1 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1 Wall Bumper	1270CVSV	626	TR
1 Gasketing	5050B Head & Jambs	NA	

**SET #21.3**

Doors: 132-2

3 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Keypad Lockset	45HZ-7DV14R PATD	626AM	BE
1 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1 Magnetic Holder	2300	US28	AB
1 Gasketing	5050B Head & Jambs	NA	

NOTE: Magnetic holders hold doors in the open position until door is released.

**SET #22**

Doors: 148-2, 151-1

3 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Lockset	45H-7R14R PATD	626AM	BE
1 Door Closer	CLD-4551 CS	689	SD
1 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1 Gasketing	5050B Head & Jambs	NA	

**SET #23**

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Doors: 146-1

3 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Lockset	45H-7R14R PATD	626AM	BE
1 Door Closer	CLD-4551 STD W/PA BRKT	689	SD
1 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1 Wall Bumper	1270CVSV	626	TR
1 Gasketing	5050B Head & Jambs	NA	

**SET #24**

Doors: 008-2, 008-3, 119-1, 119-2, 119-3, 119-4, 135-1, 209-1

3 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Privacy Set	9K3-0L14K	626AM	BE
1 Wall Bumper	1270CVSV	626	TR
1 Gasketing	5050B Head & Jambs	NA	

**SET #25**

Doors: 149A-1, 149B-1, 205-1,

3 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Deadlock	48H-7R PATD	626AM	BE
1 Pull Plate	1017-3B	630TG	TR
1 Push Plate	1001-9	630TG	TR
1 Door Closer	CLD-4551 STD W/PA BRKT	689	SD
1 Kick Plate	KO050 10" x 2" LDW B4E CSK	630	TR
1 Wall Bumper	1270CVSV	626	TR
1 Gasketing	5050B Head & Jambs	NA	

**SET #26**

Doors: 009-2

3 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Passage Set	9K4-0N14K	626AM	BE
1 Wall Bumper	1270CVSV	626	TR
1 Sound Gasketing	5050B Head & Jambs	NA	

**SET #27**

Doors: 009-3, 145C-1, 146-2, 151-2

6 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Flush Bolt	3917-12 Top Bolt Only	626	TR
1 Lockset	9K3-7D14K PATD	626AM	BE
2 Overhead Stop	4420 Series	US32D	AB
1 Astragal	158NA	NA	
1 Gasketing	5050B Head & Jambs	NA	

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**SET #28**

Doors: 108-1

3 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Passage Set	9K4-0N14K	626AM	BE
1 Overhead Stop	4420 Series	US32D	AB
1 Gasketing	5050B Head & Jambs	NA	

**SET #29**

Doors: 145A-3

6 Hinges	FBB191 4 1/2 X 4 1/2	US32D	ST
1 Flush Bolt	3917-12 Top Bolt Only	626	TR
1 Passage Set	9K4-0N14K	626AM	BE
2 Overhead Stop	4420 Series	US32D	AB
1 Astragal	158NA	NA	
1 Gasketing	5050B Head & Jambs	NA	

**SET #30**

Doors: Gate

1 Exit Device	2103 X 4903A CD	630AM	PR
1 Mortise Cylinder	1E-74 PATD	626	BE
1 Rim Cylinder	12E-72 PATD	626	BE

Balance of hardware by Gate Mfg.

**END OF SECTION 087100**

**SECTION 088000 - GLAZING**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section includes:

1. Glass for windows, doors, interior borrowed lites, storefront framing, skylights.
2. Glazing sealants and accessories.

B. Related Requirements:

1. Section 084113 "Aluminum Framed Entrances and Storefronts."
2. Section 085113 "Aluminum Windows."
3. Section 085123.13 "Hot-Rolled Steel Windows"

1.2 DEFINITIONS

- A. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- B. CBC: California Building Code.
- C. Interspace: Space between lites of an insulating-glass unit.

1.3 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

C. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.

1. Insulating glass.

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- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturers of insulating-glass units with sputter-coated, low-E coatings.
- B. Product Certificates: For glass.
- C. Product Test Reports: For insulating glass and glazing sealants, for tests performed by a qualified testing agency.
  - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Preconstruction adhesion and compatibility test report.
- E. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
  - 1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
  - 2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
  - 3. Test no fewer than nine Samples of each type and finish of glass-framing members and each type, class, kind, condition, and form of glass (monolithic, laminated, and insulating

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units) as well as one sample of each glazing accessory (gaskets, tape sealants, spacers, setting blocks, shims, sealant backings, secondary seals, and miscellaneous materials).

4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

## 1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
  1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

## 1.10 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
  1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
  1. Warranty Period: Five years from date of Substantial Completion.
- C. Manufacturer's Special Warranty for 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.

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

1. Warranty Period: 10 years from date of Substantial Completion.

**PART 2 - PRODUCTS**

## 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Glasswerks LA, Inc.
  2. Oldcastle BuildingEnvelope™.
  3. PPG Flat Glass; PPG Industries, Inc.
  4. Viracon
  5. Or Equal
- B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

## 2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the CBC and ASTM E 1300.
1. Design Wind Pressures: As indicated on Drawings.
  2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
- C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites of thickness indicated.
  2. For laminated-glass lites, properties are based on products of construction indicated.

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3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
4. U-Factors: Center-of-glazing values, according to NFRC 100, expressed as Btu/sq. ft. x h x deg F.
5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200.
6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

## 2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
  2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum.
  1. Minimum Glass Thickness for Exterior Lites: 6 mm.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass. Where fully tempered float glass is indicated, provide fully tempered float glass.

## 2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
  1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- C. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

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1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

## 2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
  1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
  2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
  3. Interlayer Color: Clear unless otherwise indicated.

## 2.6 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
  1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
  2. Perimeter Spacer: Manufacturer's standard spacer material and construction complying with the following requirements:
    - a. Aluminum with mill or clear anodic finish.
  3. Desiccant: Molecular sieve or silica gel, or a blend of both.
- B. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated in the Insulating-Glass Schedule at the end of Part 3 are nominal. The overall thickness of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.

## 2.7 GLAZING SEALANTS

- A. General:
  1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing.
  2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  3. Sealant shall have a VOC content of 250 g/L or less.
  4. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
  5. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

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- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Dow Corning Corporation.
    - b. Pecora Corporation.
    - c. Tremco Incorporated.
    - d. Or equal.

## 2.8 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

## 2.9 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Glazing Compound: For installing glazing in existing windows needing repair. Use Asrco Dual Glaze Elastic Glazing Compound or equal.
- E. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- F. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

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## 2.10 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit 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.
  - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
    - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

**PART 3 - EXECUTION**

## 3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Presence and functioning of weep systems.
  - 3. Minimum required face and edge clearances.
  - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

## 3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage

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- or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
  - D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
  - E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
  - F. Provide spacers for glass lites where length plus width is larger than 50 inches.
    - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
    - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
  - G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
  - H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
  - I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
  - J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
  - K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

## 3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

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- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

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## 3.7 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
  - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

## 3.8 MONOLITHIC GLASS SCHEDULE

- A. Glass Type GL-#1: Clear annealed float glass.
  - 1. Minimum Thickness: 6 mm.
- B. Glass Type GL-#2: Clear fully tempered float glass.
  - 1. Minimum Thickness: 6 mm.
  - 2. Where Fire Resistive or Safety glazing is required.

## 3.9 INSULATING GLASS SCHEDULE

- A. Glass Type GL-#3: Low-E-coated, clear insulating glass.
  - 1. Basis-of-Design Product: < Solarban z75 on Optiblue + Clear Insulating Glass or equal.
  - 2. Overall Unit Thickness: 1 inch.
  - 3. Minimum Thickness of Each Glass Lite: 6 mm.
  - 4. Outdoor Lite: Annealed float glass.
  - 5. Interspace Content: Air.
  - 6. Indoor Lite: Annealed float glass.
  - 7. Low-E Coating: Pyrolytic or sputtered on second or third surface.
  - 8. Winter Nighttime U-Factor: 0.28 maximum.
  - 9. Visible Light Transmittance: 48 percent minimum.
  - 10. Solar Heat Gain Coefficient: 0.24 maximum.
- B. Glass Type GL-#4: Low-E-coated, clear insulating glass heat strengthened.
  - 1. Basis-of-Design Product: < Solarban z75 on Optiblue + Clear Insulating Glass or equal.

## COMMUNITY CENTER AND GYM IMPROVEMENTS

2. Overall Unit Thickness: 1 inch.
3. Minimum Thickness of Each Glass Lite: 6 mm.
4. Outdoor Lite: Heat strengthened float glass.
5. Interspace Content: Air.
6. Indoor Lite: Heat strengthened float glass.
7. Low-E Coating: Pyrolytic or sputtered on second or third surface.
8. Winter Nighttime U-Factor: 0.28 maximum.
9. Visible Light Transmittance: 48 percent minimum.
10. Solar Heat Gain Coefficient: 0.24 maximum.

## 3.10 LAMINATED GLASS SCHEDULE (At Existing Frames)

- A. Glass Type **GL-5**: Tinted laminated glass with two plies of clear heat strengthened float glass and tinted interlayer.

1. Basis-of-Design Product: Viracon 7/16" VE1-42 Laminated Glass HS/HS.
2. Minimum Thickness of Each Glass Ply: 5 mm.
3. Outer pane Clear HS w/ VE-42 #2.
4. Interlayer Thickness: 0.060 inch (1.52 mm).
5. Interlayer Color: Frosted.
6. Inner pane Clear HS
7. Winter Nighttime U-Factor: .96 maximum.
8. Summer Daytime U-Factor: .87 maximum.
9. Visible Light Transmittance: 41 percent minimum.
10. Solar Heat Gain Coefficient: .5 maximum.
11. Safety glazing required.

- B. Glass Type **GL-6**: Tinted laminated glass with two plies of clear heat strengthened float glass and tinted interlayer.

1. Basis-of-Design Product: Viracon 7/16" VE1-42 Laminated Glass HS/HS.
2. Minimum Thickness of Each Glass Ply: 5 mm.
3. Outer pane Clear HS w/ VE-42 #2.
4. Interlayer Thickness: 0.060 inch (1.52 mm).
5. Interlayer Color: Clear PVB.
6. Inner pane Clear HS
7. Winter Nighttime U-Factor: .96 maximum.
8. Summer Daytime U-Factor: .87 maximum.
9. Visible Light Transmittance: 41 percent minimum.
10. Solar Heat Gain Coefficient: .5 maximum.
11. Safety glazing required.

**END OF SECTION 088000**

**SECTION 089119 - FIXED LOUVERS**

**PART 4 - GENERAL**

**4.1 SUMMARY**

**A. Section Includes:**

1. Fixed, extruded-aluminum louvers.

**B. Related Requirements:**

1. Section 081113 "Hollow Metal Doors and Frames" for louvers in hollow-metal doors.
2. Section 081416 "Flush Wood Doors" for louvers in flush wood doors.

**4.2 DEFINITIONS**

- A. Louver Terminology:** Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

- B. Horizontal Louver:** Louver with horizontal blades (i.e., the axes of the blades are horizontal).

**4.3 ACTION SUBMITTALS**

**A. Product Data:** For each type of product.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

- B. Shop Drawings:** For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
2. Show mullion profiles and locations.

- C. Samples:** For each type of metal finish required.

**4.4 FIELD CONDITIONS**

- A. Field Measurements:** Verify actual dimensions of openings by field measurements before fabrication.

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**PART 5 - PRODUCTS**

## 5.1 MANUFACTURERS

- A. Source Limitations: Obtain louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

## 5.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.
1. Wind Loads: Determine loads based on a uniform pressure of 20 lbf/sq. ft., acting inward or outward.
- B. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- C. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- D. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

## 5.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal, Nondrainable-Blade Louver:
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. Airolite Company, LLC (The).
    - b. Cesco Products; a division of MESTEK, Inc.
    - c. Greenheck Fan Corporation.
    - d. Or Equal.
  2. Louver Depth: 2 inches at doors and 4 inches at walls.
  3. Blade Profile: Plain blade without center baffle.
  4. Frame and Blade Nominal Thickness: Not less than 0.080 inch.
  5. Mullion Type: Exposed.
  6. Louver Performance Ratings:

## FIXED LOUVERS

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- a. Free Area: Not less than 8.0 sq. ft. for 48-inch-wide by 48-inch-high louver.
- b. Point of Beginning Water Penetration: Not less than 1000 fpm.
- c. Air Performance: Not more than 0.10-inch wg static pressure drop at 850-fpm free-area velocity.

## 5.4 LOUVER SCREENS

- A. General: Provide screen at each exterior louver unless otherwise noted.
  1. Screen Location for Fixed Louvers: Interior face.
  2. Screening Type: Bird screening except where insect screening is indicated.
- B. Secure screen frames to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches from each corner and at 12 inches o.c.
- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
  1. Metal: Same type and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
  2. Finish: Same finish as louver frames to which louver screens are attached.
  3. Type: Rewirable frames with a driven spline or insert.
- D. Louver Screening for Aluminum Louvers:
  1. Bird Screening: Aluminum, 1/2-inch-square mesh, 0.063-inch wire.
  2. Insect Screening: Aluminum, 18-by-16 mesh, 0.012-inch wire.

## 5.5 MATERIALS

- A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.
- B. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Fasteners: Use types and sizes to suit unit installation conditions.
  1. Use tamper-resistant screws for exposed fasteners unless otherwise indicated.
  2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
- D. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed for masonry, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

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## 5.6 FABRICATION

- A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.
- C. Maintain equal louver blade spacing to produce uniform appearance.
- D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
  - 1. Frame Type: Channel unless otherwise indicated.
- E. Include supports, anchorages, and accessories required for complete assembly.
- F. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72 inches o.c., whichever is less.
  - 1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.
- G. Provide subsills made of same material as louvers or extended sills for recessed louvers.
- H. Join frame members to each other and to fixed louver blades with fillet welds concealed from view unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

## 5.7 ALUMINUM FINISHES

- A. Finish louvers after assembly.
  - A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
    - 1. Color: Dark bronze.

**PART 6 - EXECUTION**

## 6.1 EXAMINATION

- A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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- B. Proceed with installation only after unsatisfactory conditions have been corrected.

6.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

6.3 INSTALLATION

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Protect unpainted galvanized and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.
- F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 079200 "Joint Sealants" for sealants applied during louver installation.

6.4 ADJUSTING AND CLEANING

- A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

**END OF SECTION 089119**

**SECTION 092216 - NON-STRUCTURAL METAL FRAMING**

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.

B. Related Requirements:

1. Section 095113 "Acoustical Panel Ceilings" for ceiling suspension systems.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of code-compliance certification for studs and tracks.

B. Evaluation Reports: For post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association, the Steel Framing Industry Association, or the Steel Stud Manufacturers Association.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

## COMMUNITY CENTER AND GYM IMPROVEMENTS

- B. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
  2. Protective Coating: ASTM A 653/A 653M, G40 or coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.
- C. Studs and Tracks: ASTM C 645.
1. Steel Studs and Tracks:
    - 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:
      - 1) CEMCO; California Expanded Metal Products Co.
      - 2) MRI Steel Framing, LLC.
      - 3) SCAFCO Steel Stud Company.
    - b. Minimum Base-Metal Thickness: As indicated on Drawings.
    - c. Depth: As indicated on Drawings.
- D. Slip-Type Head Joints: Where indicated, provide[ **one of**] the following:
1. Deflection Track: Steel sheet top track 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. 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:
      - 1) CEMCO; California Expanded Metal Products Co.
      - 2) ClarkDietrich Building Systems.
      - 3) SCAFCO Steel Stud Company.
      - 4) Or equal.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width 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. ClarkDietrich Building Systems.
    - b. MRI Steel Framing, LLC.
    - c. SCAFCO Steel Stud Company.
    - d. Or equal.
  2. Minimum Base-Metal Thickness: As indicated on Drawings.

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- F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
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. ClarkDietrich Building Systems.
    - b. MRI Steel Framing, LLC.
    - c. SCAFCO Steel Stud Company.
    - d. Or equal.
  2. Depth: As indicated on Drawings.
  3. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
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. ClarkDietrich Building Systems.
    - b. MRI Steel Framing, LLC.
    - c. SCAFCO Steel Stud Company.
    - d. Or equal.
  2. Minimum Base-Metal Thickness: As indicated on Drawings.
  3. Depth: As indicated on Drawings.

2.3 SUSPENSION SYSTEMS

- A. See Section 095113 “Acoustical Panel Ceilings” for suspension systems.

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
1. Fasteners for Steel 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/D 226M, 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 thick, in width to suit steel stud size.

## PART 3 - EXECUTION

## 3.1 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.

## 3.2 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 framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

## 3.3 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 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 that penetrate 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 track section (for cripple studs) at head and secure to jamb studs.
    - a. Install two studs at each jamb unless otherwise indicated.

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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.
  4. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- 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 o.c.
- F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.
- 3.4 INSTALLING CEILING SUSPENSION SYSTEMS
- A. See Section 095113 "Acoustical Panel Ceilings" for installation of suspension systems.

**END OF SECTION 092216**

**SECTION 092400 - CEMENT PLASTERING**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior vertical plasterwork (stucco).
2. Exterior horizontal and nonvertical plasterwork (stucco).

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.
- C. Samples: For each type of factory-prepared finish coat and for each color and texture specified.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover, and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.4 FIELD CONDITIONS

- A. Comply with ASTM C 926 requirements.
- B. Exterior Plasterwork:
  1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
  2. Apply plaster when ambient temperature is greater than 40 deg F.
  3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.
- C. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

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## PART 2 - PRODUCTS

## 2.1 METAL LATH

- A. Expanded-Metal Lath: ASTM C 847, cold-rolled carbon-steel sheet with ASTM A 653/A 653M, G60, hot-dip galvanized-zinc coating.
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. CEMCO; California Expanded Metal Products Co.
    - b. ClarkDietrich Building Systems.
    - c. Phillips Manufacturing Co.
    - d. Or equal.
  2. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
  3. Diamond-Mesh Lath: Self-furring, 3.4 lb/sq. yd..

## 2.2 ACCESSORIES

- A. General: Comply with ASTM C 1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
- B. Metal Accessories:
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. CEMCO; California Expanded Metal Products Co.
    - b. ClarkDietrich Building Systems.
    - c. Phillips Manufacturing Co.
    - d. Or equal.
  2. Foundation Weep Screed: Fabricated from hot-dip galvanized-steel sheet, ASTM A 653/A 653M, G60 zinc coating.
  3. Cornerite: Fabricated from metal lath with ASTM A 653/A 653M, G60, hot-dip galvanized-zinc coating.
  4. External- (Outside-) Corner Reinforcement: Fabricated from metal lath with ASTM A 653/A 653M, G60, hot-dip galvanized-zinc coating.
  5. Cornerbeads: Fabricated from zinc or zinc-coated (galvanized) steel.
    - a. Smallnose cornerbead with expanded flanges; use unless otherwise indicated.
  6. Casing Beads: Fabricated from zinc or zinc-coated (galvanized) steel; square-edged style; with expanded flanges.

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7. Control Joints: Fabricated from zinc or zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
8. Expansion Joints: Fabricated from zinc or zinc-coated (galvanized) steel; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.

## 2.3 MISCELLANEOUS MATERIALS

- A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch long, free of contaminants, manufactured for use in cement plaster.
- C. Fasteners for Attaching Metal Lath to Substrates: ASTM C 1063.
- D. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch diameter unless otherwise indicated.
- E. 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.

## 2.4 PLASTER MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type I.
  1. Color for Finish Coats: White.
- B. Colorants for Job-Mixed Finish Coats: Colorfast mineral pigments that produce finish plaster color selected from manufacturers full range of color.
- C. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.
- D. Sand Aggregate: ASTM C 897.
  1. Color for Job-Mixed Finish Coats: As selected from manufacturers full range of colors.

## 2.5 PLASTER MIXES

- A. General: Comply with ASTM C 926 for applications indicated.
  1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. of cementitious materials.
- B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:

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1. Portland Cement Mixes:
  - a. Scratch Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
  - b. Brown Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.
- C. Job-Mixed Finish-Coat Mixes:
  1. Portland Cement Mix: For cementitious materials, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 1-1/2 to 3 parts aggregate per part of cementitious material.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.
- B. Prepare smooth, solid substrates for plaster according to ASTM C 926.

3.3 INSTALLATION, GENERAL

- A. Sound-Attenuation Blankets: Where required, install blankets before installing lath unless blankets are readily installed after lath has been installed on one side.

3.4 INSTALLING METAL LATH

- A. Metal Lath: Install according to ASTM C 1063.
  1. Partition Framing and Vertical Furring: Install self-furring-diamond-mesh lath.
  2. Flat-Ceiling and Horizontal Framing: Install flat-diamond-mesh lath.
  3. On Solid Surfaces, Not Otherwise Furred: Install self-furring, diamond-mesh lath.

3.5 INSTALLING ACCESSORIES

- A. Install according to ASTM C 1063 and at locations indicated on Drawings.

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- B. Reinforcement for External (Outside) Corners:
  - 1. Install lath-type, external-corner reinforcement at exterior locations.
- C. Control Joints: Locate as approved by Architect for visual effect and as follows:
  - 1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
    - a. Vertical Surfaces: 144 sq. ft..
    - b. Horizontal and Other Nonvertical Surfaces: 100 sq. ft..
  - 2. At distances between control joints of not greater than 18 feet o.c.
  - 3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
  - 4. Where control joints occur in surface of construction directly behind plaster.
  - 5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

## 3.6 PLASTER APPLICATION

- A. General: Comply with ASTM C 926.
  - 1. Do not deviate more than plus or minus 1/4 inch in 10 feet from a true plane in finished plaster surfaces when measured by a 10-foot straightedge placed on surface.
  - 2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
- B. Walls; Base-Coat Mixes for Use over Metal Lath: For scratch and brown coats, for three-coat plasterwork with 3/4-inch total thickness, as follows:
  - 1. Portland cement mixes.
- C. Walls; Base-Coat Mix: For base (scratch) coat, for two-coat plasterwork and having 3/8-inch thickness on masonry, as follows:
  - 1. Portland cement mix.
- D. Plaster Finish Coats: Apply to provide float finish to match Architect's sample.
- E. Concealed Exterior Plasterwork: Where plaster application is used as a base for adhered finishes, omit finish coat.

## 3.7 PLASTER REPAIRS

- A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.8 CLEANING AND PROTECTION

- A. Remove temporary protection and enclosure of other work after plastering is complete. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

**END OF SECTION 092400**

**SECTION 092900 - GYPSUM BOARD**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.2 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Perforated acoustic gypsum board for interior ceilings.
3. Tile backing panels.
4. Texture finishes.

B. Related Requirements:

1. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
2. Section 093013 "Ceramic Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Certificates: For materials manufactured within 100 miles of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
2. Product Data: For adhesives and sealants, indicating VOC content.
3. Laboratory Test Reports: For adhesives and sealants, indicating compliance with requirements for low-emitting materials.
4. Laboratory Test Reports: For ceiling and wall materials, indicating compliance with requirements for low-emitting materials.

C. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.
2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

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1.4 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.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install 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.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- B. Ceiling and wall materials shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 GYPSUM BOARD, GENERAL

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50% percent.
- B. Regional Materials: Products shall be manufactured within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.
- C. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

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## 2.3 INTERIOR GYPSUM BOARD

## A. Gypsum Wallboard and Ceiling Board: ASTM C 1396/C 1396M.

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. CertainTeed Corporation.
  - b. PABCO Gypsum.
  - c. United States Gypsum Company.
  - d. Or equal.
2. Thickness: 5/8 inch. or as indicated.
3. Long Edges: Tapered.

## B. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

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. CertainTeed Corporation.
  - b. PABCO Gypsum.
  - c. United States Gypsum Company.
  - d. Or equal.
2. Core: 5/8 inch or as indicated.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

## C. Perforated Gypsum, Sound Absorptive Ceiling Board:

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. CertainTeed Corporation.
  - b. GypSorb.
  - c. Pyrok, Inc.
  - d. Or equal.
2. Edges: Tapered.
3. Thickness: 1/2-inch
4. Size: 4'-0" x 8'-0"
5. Pattern: 1/2" square holes.

## GYPSUM BOARD

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## 2.4 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
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. Custom Building Products.
    - b. FinPan, Inc.
    - c. United States Gypsum Company.
    - d. Or equal.
  2. Thickness: 5/8 inch or As indicated.
  3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

## 2.5 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
  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.

## 2.6 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
1. Interior Gypsum Board: Paper.
  2. 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 and damaged surface areas, use setting-type taping compound.
  2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
  3. Fill Coat: For second coat, use drying-type, all-purpose compound.

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4. Finish Coat: For third coat, use drying-type, all-purpose compound.
  5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.
- D. Joint Compound for Tile Backing Panels:
1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.7 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
1. Adhesives shall have a VOC content of 50 g/L or less.
  2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using 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. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 30 percent.
- E. Acoustical 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. See Section 079219 "Acoustical Joint Sealants"
  2. Sealant shall have a VOC content of 250 g/L or less.
  3. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.8 TEXTURE FINISHES

- A. Primer: As recommended by textured finish manufacturer.

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- B. Non-Aggregate Finish: Premixed, vinyl texture finish for spray application.
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. CertainTeed Corporation.
    - b. National Gypsum Company.
    - c. United States Gypsum Company.
    - d. Or equal.
  2. Texture: Troweled Smooth.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- 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.

## 3.2 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.

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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. 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. 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 instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

## 3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
1. Wallboard Type: As indicated on Drawings.
  2. Ceiling Type: As indicated on Drawings.
  3. Mold-Resistant Type: As indicated on Drawings.
- 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 vertically (parallel 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-shaped 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.

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## 3.4 APPLYING TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces as required to produce a uniform plane across panel surfaces.

## 3.5 INSTALLING 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 at locations indicated on Drawings or 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 unless otherwise indicated.
  - 2. Bullnose Bead: Use where indicated.
  - 3. LC-Bead: Use at exposed panel edges.
  - 4. L-Bead: Use where indicated.
  - 5. U-Bead: Use where indicated.
  - 6. Curved-Edge Cornerbead: Use at curved openings.

## 3.6 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 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 4: At panel surfaces that will be exposed to view unless otherwise indicated.
    - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
- E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

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3.7 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 instructions.

3.8 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 092900**

**SECTION 093013 - CERAMIC TILING**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Porcelain tile.
2. Glazed wall tile.
3. Crack isolation membrane.
4. Metal edge strips.
5. Setting Materials
6. Grout Materials

B. Related Requirements:

1. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Section 092900 "Gypsum Board" for cementitious backer units.

1.2 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
3. Laboratory Test Reports: For sealers, indicating compliance with requirements for low-emitting materials.

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- C. Samples for Initial Selection: For tile, grout, and accessories involving color selection.
- D. Samples for Verification:
  - 1. Full-size units of each type and composition of tile and for each color and finish required.
  - 2. Full-size units of each type of trim and accessory for each color and finish required.
  - 3. Metal edge strips in 6-inch lengths.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of product.
- C. Product Test Reports: For tile-setting and -grouting products.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:
  - 1. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockup of each type of floor tile installation.
  - 2. Build mockup of each type of wall tile installation.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.
  - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
  - 1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
  - 2. Obtain crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
  - 1. Provide tile complying with Standard grade requirements.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

2.3 TILE PRODUCTS

- A. Ceramic Tile Type **PT-1**: Unglazed porcelain tile.
  - 1. Basis-of-Design Product: Subject to compliance with requirements provide Daltile Keystones or a comparable product by one of the following:
    - a. American Olean
    - b. Crossville
    - c. Interceramic
  - 2. Face Size: 2 by 2 inches.
  - 3. Thickness: 1/4 inch.
  - 4. Face: Plain with square or cushion edges.

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5. Dynamic Coefficient of Friction: Not less than 0.42.
6. Tile Color, Glaze, and Pattern: As selected by Architect from manufacturer's full range.  
NOTE: Color selections will be made from Price Groups 3 and 4.
7. Grout Color: As selected by Architect from manufacturer's full range.
8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
  - a. Cove Base: 6 inches high, surface bullnose at gyp board/plaster, module size same as adjoining flat tile.
  - b. External Corners: Surface bullnose, module size same as adjoining flat tile.
  - c. Internal Corners: Field-buttet square corners.

**B. Ceramic Tile Type PT-2: Glazed porcelain tile.**

1. Basis-of-Design Product: Subject to compliance with requirements provide American Olean Rapport or a comparable product by one of the following:
  - a. Daltile
  - b. Crossville
  - c. Bedrosians
2. Face Size: 12 by 24 inches.
3. Thickness: 3/8 inch.
4. Face: Plain with square or cushion edges.
5. Dynamic Coefficient of Friction: Not less than 0.42.
6. Tile Color, Glaze, and Pattern: As selected by Architect from manufacturer's full range.
7. Grout Color: As selected by Architect from manufacturer's full range.
8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
  - a. Cove Base: Surface bullnose, module size 6 by 12 inches.
  - b. External Corners: Surface bullnose, module size 6 by 1 inches.

**C. Ceramic Tile Type PT-3 Unglazed porcelain tile.**

1. Basis-of-Design Product: Subject to compliance with requirements provide Daltile Keystones or a comparable product by one of the following:
  - a. American Olean
  - b. Crossville
  - c. Interceramic
2. Face Size: Hexagonal 2 by 2 inches.
3. Thickness: 1/4 inch.
4. Face: Plain with square or cushion edges.
5. Tile Color, Glaze, and Pattern: As selected by Architect from manufacturer's full range.  
NOTE: Color selections will be made from Price Groups 3 and 4.
6. Grout Color: As selected by Architect from manufacturer's full range.
7. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

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- a. Internal Corners: Field-buttet square corners. Complete hexagonal tile between walls.
  - b. Edges with no termination. Complete hexagonal tile only, provide sealant per TCNA standards.
- D. Ceramic Tile Type **CT-1**: Glazed wall tile.
- 1. Basis-of-Design Product: Subject to compliance with requirements provide Daltile Semi-Gloss/Matte Wall Tile or a comparable product by one of the following:
    - a. American Olean
    - b. Crossville
  - 2. Module Size: 3 by 6 inches.
  - 3. Thickness: 5/16 inch.
  - 4. Face: Plain with modified square edges or cushion edges.
  - 5. Finish: Bright, opaque and Mat, opaque glaze.
  - 6. Tile Color and Pattern: As selected by Architect from manufacturer's full range.
  - 7. Grout Color: As selected by Architect from manufacturer's full range.
  - 8. Mounting: Factory, back mounted.
  - 9. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
    - a. Internal Corners: Field butted square corners.
    - b. Wainscot Cap for Thinset Mortar Installations: Surface bullnose, module size 2 by 6 inches.
    - c. External Corners for Thinset Mortar Installations: Surface bullnose, same size as adjoining flat tile.

2.4 CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.
  - 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. Bostik, Inc.
    - b. Custom Building Products.
    - c. LATICRETE SUPERCAP, LLC.
    - d. MAPEI Corporation.

2.5 SETTING MATERIALS

- A. Standard Dry-Set Mortar (Thinset): ANSI A118.1.

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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. Bostik, Inc.
    - b. Custom Building Products.
    - c. LATICRETE SUPERCAP, LLC.
    - d. MAPEI Corporation.
  2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.1.
- B. Water-Cleanable, Tile-Setting Epoxy: ANSI A118.3.
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. Bostik, Inc.
    - b. Custom Building Products.
    - c. LATICRETE SUPERCAP, LLC.
    - d. MAPEI Corporation.
  2. Adhesives shall have a VOC content of 65 g/L or less.
  3. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
  4. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.

2.6 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.
  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. Bostik, Inc.
    - b. Custom Building Products.
    - c. LATICRETE SUPERCAP, LLC.
    - d. MAPEI Corporation.
  2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.

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- C. Grout for PregROUTed Tile Sheets: Same product used in factory to pregrout tile sheets.

2.7 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; nickel silver exposed-edge material.
  - 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. Blanke Corporation.
    - b. Ceramic Tool Company, Inc.
    - c. Schluter Systems L.P.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- D. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.
  - 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. Bonsal American, an Oldcastle company.
    - b. Custom Building Products.
  - 2. Products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.8 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
  2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
    - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
  3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
  4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

## 3.3 CERAMIC TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

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1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
  - a. Tile floors consisting of tiles 8 by 8 inches or larger.
  - b. Tile floors consisting of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
  1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
  2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
  3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
  1. Glazed Wall Tile: 1/16 inch.
  2. Porcelain Tile: 1/8 inch.
- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
  1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- J. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.
- K. Floor Sealer: Apply floor sealer to cementitious grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

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3.4 CRACK ISOLATION MEMBRANE INSTALLATION

- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
- B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.5 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  - 1. Remove grout residue from tile as soon as possible.
  - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.6 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.7 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

- A. Interior Floor Installations, Concrete Subfloor:
  - 1. Ceramic Tile Installation: TCNA F125-Full; thinset mortar on crack isolation membrane.
    - a. Ceramic Tile Type: Porcelain tile.
    - b. Thinset Mortar: Standard dry-set mortar.
    - c. Grout: Sand-portland cement grout.
- B. Interior Floor Installations, Wood Subfloor:
  - 1. Ceramic Tile Installation: TCNA F143; water-cleanable, tile-setting epoxy; epoxy grout.

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- a. Ceramic Tile Type: Porcelain tile
  - b. Grout: Water-cleanable epoxy grout.
- C. Interior Wall Installations, Masonry or Concrete:
- 1. Ceramic Tile Installation: TCNA W202; thinset mortar.
    - a. Ceramic Tile Type: Glazed wall tile.
    - b. Thinset Mortar: Standard dry-set mortar.
    - c. Grout: Sand-portland cement grout.
- D. Interior Wall Installations, Wood or Metal Studs or Furring:
- 1. Ceramic Tile Installation: TCNA W244C or TCNA W244F; thinset mortar on cementitious backer units or fiber-cement backer board.
    - a. Ceramic Tile Type: Glazed wall tile, or Porcelain 2" hexagon.
    - b. Thinset Mortar: Standard dry-set mortar.
    - c. Grout: Sand-portland cement grout.

**END OF SECTION 093013**

**SECTION 095113 - ACOUSTICAL PANEL CEILINGS**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.
- B. Related Requirements:
  - 1. Section 095123 "Acoustical Tile Ceilings" for ceilings consisting of mineral-base acoustical tiles used with fully concealed suspension systems, stapling, or adhesive bonding.
  - 2. Section 079219 "Acoustical Joint Sealants."

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
  - 1. Laboratory Test Reports: For ceiling products, indicating compliance with requirements for low-emitting materials.
- C. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Product Test Reports: For each acoustical panel ceiling, for tests performed by a qualified testing agency.
- C. Evaluation Reports: For each acoustical panel ceiling suspension system, from ICC-ES.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.5 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. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.

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1.6 QUALITY ASSURANCE

- A. Comply with the California Building Code (CBC). This includes, but is not limited to:
  - 1. Wires.
  - 2. Closure angles.
  - 3. Grid members.
  - 4. Compression struts.
  - 5. Anchors.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
  - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Ceiling products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

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- C. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: Class A according to ASTM E 1264.
  2. Smoke-Developed Index: 50 or less.

## 2.3 ACOUSTICAL PANELS

- A. Basis-of-Design Product: Subject to compliance with requirements provide Armstrong Optima or a comparable product by one of the following:
1. CertainTeed Corporation.
  2. United States Gypsum Company.
  3. Or equal.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.
- D. Classification: Provide panels as follows:
1. Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted; with vinyl overlay on face.
  2. Pattern: E (lightly textured).
- E. Color: White.
- F. Light Reflectance (LR): Not less than 0.85.
- G. Ceiling Attenuation Class (CAC): Not less than 35.
- H. Noise Reduction Coefficient (NRC): Not less than 0.85.
- I. Articulation Class (AC): Not less than 180.
- J. Edge/Joint Detail: Shadowlined Taper.
- K. Thickness: 7/8 inch.
- L. Modular Size: 24 by 24 inches and 24 by 48 inches as indicated on drawings.
- M. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.

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## 2.4 METAL SUSPENSION SYSTEM

- 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:
1. Armstrong World Industries, Inc.
  2. CertainTeed Corporation.
  3. United States Gypsum Company.
  4. Or Equal.
- B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.
- C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.
1. Structural Classification: Heavy-duty system.
  2. End Condition of Cross Runners: Override (stepped) type.
  3. Face Design: Flat, flush.
  4. Cap Material: Cold-rolled steel.
  5. Cap Finish: Painted to match color of acoustical unit.

## 2.5 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488/E 488M or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
    - a. Type: Post-installed expansion anchors.
    - b. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B 633, Class SC 1 (mild) service condition.
  2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch-diameter wire.

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- C. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.
- D. Hold-Down Clips: Manufacturer's standard hold-down.
- E. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical panels in place during a seismic event.
- F. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.

## 2.6 METAL EDGE MOLDINGS AND TRIM

- 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:
  - 1. Armstrong World Industries, Inc.
  - 2. CertainTeed Corporation.
  - 3. United States Gypsum Company.
  - 4. Or equal.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
  - 1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
  - 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

## 2.7 ACOUSTICAL SEALANT

- A. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

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- C. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

## 3.3 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C 636/C 636M, seismic design requirements, and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  - 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  - 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  - 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  - 7. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
  - 8. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
  - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

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2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
  3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
  2. Install hold-down and seismic clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.
    - a. Hold-Down Clips: Space 24 inches o.c. on all cross runners.

3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
1. Periodic inspection during the installation of suspended ceiling grids according to ASCE/SEI 7.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- C. Acoustical panel ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

**END OF SECTION 095113**

**SECTION 096400 - WOOD FLOORING**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Factory-finished wood flooring.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
2. Chain-of-Custody Qualification Data: For manufacturer and vendor.
3. Product Data: For adhesives, indicating VOC content.
4. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
5. Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials.
6. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For each type of floor assembly and accessory. Include plans, sections, and attachment details. Include expansion provisions and trim details.

D. Samples: For each exposed product and for each color and texture specified, approximately 12 inches long and of same thickness and material indicated for the Work and showing the full range of normal color and texture variations expected.

E. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors and finishes available for wood flooring.

1. Include Samples of accessories involving color and finish selection.

F. Samples for Verification: For each type of wood flooring and accessory, with stain color and finish required, approximately 12 inches long and of same thickness and material indicated for the Work and showing the full range of normal color and texture variations expected.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

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- B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver wood flooring materials in unopened cartons or bundles.
- B. Protect wood flooring from exposure to moisture. Do not deliver wood flooring until after concrete, masonry, plaster, ceramic tile, and similar wet-work is complete and dry.
- C. Store wood flooring materials in a dry, warm, ventilated, weathertight location.

1.5 FIELD CONDITIONS

- A. Install factory-finished wood flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Certified Wood: Wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
- C. Composite Wood Products: Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.

2.2 FACTORY-FINISHED WOOD FLOORING

- A. Engineered-Wood Flooring: HPVA EF, complying with requirements for composite wood products.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- a. Anderson Hardwood Floors.
  - b. Armstrong World Industries, Inc.
  - c. Bruce Hardwood; Armstrong.
  - d. Johnsonite; a Tarkett company.
  - e. Mannington Mills, Inc.

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2. Species: White oak.
  3. Thickness: 1/2 inch.
  4. Construction: Five ply.
  5. Face Width: 5 inches.
  6. Length: Manufacturer's standard.
  7. Edge Style: Beveled (eased).
  8. Finish: UV urethane.
- a. Color: As selected by Architect in manufacturer's full range.

### 2.3 ACCESSORY MATERIALS

- A. Vapor Retarder: ASTM D 4397, polyethylene sheet not less than 6.0 mils thick.
- B. Asphalt-Saturated Felt: ASTM D 4869/D 4869M, Type II.
- C. Wood Flooring Adhesive: Mastic recommended by flooring and adhesive manufacturers for application indicated.
  1. Adhesive shall have a VOC content of 100 g/L or less.
  2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based formulation approved by wood flooring manufacturer.
- E. Fasteners: As recommended by manufacturer, but not less than that recommended in NWFAs "Installation Guidelines."
- F. Thresholds and Saddles: To match wood flooring. Tapered on each side.
- G. Reducer Strips: To match wood flooring. 2 inches wide, tapered, and in thickness required to match height of flooring.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of wood flooring.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Concrete Slabs: Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.

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1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
  - a. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
  - b. Perform additional moisture tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

### 3.2 PREPARATION

#### A. Concrete Slabs:

1. Grind high spots and fill low spots to produce a maximum 1/8-inch deviation in any direction when checked with a 10-foot straight edge.
2. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

- #### B. Broom or vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.3 INSTALLATION

- #### A. Comply with flooring manufacturer's written installation instructions, but not less than applicable recommendations in NWFA's "Installation Guidelines."

- #### B. Provide expansion space at walls and other obstructions and terminations of flooring of not less than 1/2 inch.

- #### C. Vapor Retarder: Comply with the following for vapor retarder installation:

1. Wood Flooring Installed Directly on Concrete: Install a layer of polyethylene sheet according to flooring manufacturer's written instructions.

- #### D. Engineered-Wood Flooring: Set in adhesive.

### 3.4 PROTECTION

- #### A. Protect installed wood flooring during remainder of construction period with covering of heavy kraft paper or other suitable material. Do not use plastic sheet or film that might cause condensation.

1. Do not move heavy and sharp objects directly over kraft-paper-covered wood flooring. Protect flooring with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.

**END OF SECTION 096400**

**SECTION 096513 - RESILIENT BASE AND ACCESSORIES**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Thermoplastic-rubber base.
2. Rubber stair accessories.
3. Rubber molding accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
3. Product Data: For sealants, indicating VOC content.
4. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
5. Laboratory Test Reports: For resilient base and stair products and accessories, indicating compliance with requirements for low-emitting materials.
6. Environmental Product Declaration: For each product.
7. Health Product Declaration: For each product.
8. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.

C. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.

D. Samples for Initial Selection: For each type of product indicated.

E. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

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## 1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  - 1. Coordinate mockups in this Section with mockups specified in other Sections.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

## 1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

## PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. Products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

## 2.2 THERMOPLASTIC-RUBBER BASE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Burke Mercer Flooring Products; a division of Burke Industries Inc.

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2. Johnsonite; a Tarkett company.
  3. Roppe Corporation, USA.
  4. VPI Corporation.
- B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).
1. Group: I (solid, homogeneous).
  2. Style and Location:
    - a. Style A, Straight: Provide in areas with carpet.
    - b. Style B, Cove: Provide in areas with resilient floor coverings.
- C. Thickness: 0.125 inch.
- D. Height: 4 inches.
- E. Lengths: Cut lengths 48 inches long or coils in manufacturer's standard length.
- F. Outside Corners: Job formed.
- G. Inside Corners: Job formed.
- H. Colors: As indicated by manufacturer's designations.

2.3 RUBBER STAIR ACCESSORIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Burke Mercer Flooring Products; a division of Burke Industries Inc.
  2. Johnsonite; a Tarkett company.
  3. Roppe Corporation, USA.
  4. VPI Corporation.
- B. Stair Treads: ASTM F 2169.
1. Type: TP (rubber, thermoplastic).
  2. Class: 1 (smooth, flat).
  3. Group: 2 (with contrasting color for the visually impaired).
  4. Nosing Style: Square.
  5. Nosing Height: 1-1/2 inches.
  6. Thickness: 1/4 inch and tapered to back edge.
  7. Size: Lengths and depths to fit each stair tread in one piece.
- C. Separate Risers: Smooth, flat; in height that fully covers substrate; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.
1. Style: Toeless, by length matching treads.
  2. Thickness: Manufacturer's standard.

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- D. Stringers: Height and length after cutting to fit risers and treads and to cover stair stringers, produced by same manufacturer as treads, and recommended by manufacturer for installation with treads.
  - 1. Thickness: Manufacturer's standard.
- E. Colors and Patterns: As indicated by manufacturer's designations.

2.4 RUBBER MOLDING ACCESSORY

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Roppe Corporation, USA.
  - 2. VPI Corporation.
- B. Description: Rubber carpet bar for tackless installations, carpet edge for glue-down applications, reducer strip for resilient floor covering, joiner for tile and carpet, transition strips.
- C. Profile and Dimensions: As indicated.
- D. Locations: Provide rubber molding accessories in areas indicated.
- E. Colors and Patterns: As indicated by manufacturer's designations.

2.5 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
  - 1. Adhesives shall have a VOC content of 50 g/L or less and 60 g/L or less for rubber stair treads.
- C. Stair-Tread Nose Filler: Two-part epoxy compound recommended by resilient stair-tread manufacturer to fill nosing substrates that do not conform to tread contours.
- D. Metal Edge Strips: Extruded aluminum with mill finish, nominal 2 inches wide, of height required to protect exposed edges of flooring, and in maximum available lengths to minimize running joints.
- E. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread manufacturer.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

## 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
  - 4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until materials are the same temperature as space where they are to be installed.
  - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

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3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Job-Formed Corners:
  - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
    - a. Form without producing discoloration (whitening) at bends.
  - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
    - a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Stair Accessories:
  - 1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
  - 2. Tightly adhere to substrates throughout length of each piece.
- C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:

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1. Remove adhesive and other blemishes from surfaces.
  2. Sweep and vacuum horizontal surfaces thoroughly.
  3. Damp-mop horizontal 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.
- D. Floor Polish: Remove soil, adhesive, and blemishes from resilient stair treads before applying liquid floor polish.
1. Apply two coat(s).
- E. Cover resilient products subject to wear and foot traffic until Substantial Completion.

**END OF SECTION 096513**

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Solid vinyl floor tile.
  2. Rubber Athletic floor tile.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
1. Product Data: For adhesives, indicating VOC content.
  2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
  3. Product Data: For chemical-bonding compounds, indicating VOC content.
  4. Laboratory Test Reports: For chemical-bonding compounds, indicating compliance with requirements for low-emitting materials.
  5. Product Data: For sealants, indicating VOC content.
  6. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
  7. Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials.
  8. Environmental Product Declaration: For each product.
  9. Health Product Declaration: For each product.
  10. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.
- C. Samples: Full-size units of each color, texture, and pattern of floor tile required.
- D. Product Schedule: For floor tile. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

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1.5 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. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
  - 1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  - 1. Coordinate mockups in this Section with mockups specified in other Sections.
    - a. Size: Minimum 100 sq. ft. for each type, color, and pattern in locations directed by Resident Engineer.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.8 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

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- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 SOLID VINYL FLOOR TILE - LVT

- A. Basis-of-Design Product: Subject to compliance with requirements provide Altor Lavencia LVT or a comparable product by one of the following:
  - 1. Armstrong World Industries, Inc.
  - 2. Congoleum Corporation.
  - 3. Gerfloor .
  - 4. Johnsonite; a Tarkett company.
- B. Tile Standard: ASTM F 1700.
  - 1. Class: As indicated by product designations.
  - 2. Type: B, Embossed Surface.
- C. Thickness: 0.120 inch.
- D. Size: 10 by 60 inches.
- E. Colors and Patterns: As indicated by manufacturer's designations. To be selected by Architect from manufacturer's full range.

2.3 RUBBER ATHLETIC FLOOR TILE - RAF

- A. Basis-of-Design Product: Subject to compliance with requirements provide NEXT STEP by Dinoflex, Walk Soft Evo 60 or a comparable product by one of the following:
  - 1. Ecore Athletic
  - 2. Johnsonite
  - 3. Mondo.
- B. Thickness: 0.3125 inch.
- C. Size: 38 by 38 inches.

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- D. Colors and Patterns: As indicated by manufacturer's designations. To be selected by Architect from manufacturer's full range.
- E. Installation Method: Direct Glue Down.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
  - 1. Adhesives shall have a VOC content of 60 g/L or less.
  - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.

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4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
  - a. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 65 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
  1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

## 3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
  1. Lay tiles square with room axis.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
  1. Lay tiles with grain running in one direction.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
  - 1. Remove adhesive and other blemishes from surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover floor tile until Substantial Completion.

**END OF SECTION 096519**

**SECTION 09 65 43 - LINOLEUM FLOORING**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section includes linoleum floor tile.
- B. Related Requirements:
  - 1. Section 02 41 19 "Selective Demolition" for removing existing floor coverings.
  - 2. Section 09 65 13 "Resilient Base and Accessories" and Section 09 65 19 "Resilient Tile Flooring".

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency.
- B. Samples: For each exposed product and for each color and pattern specified in manufacturer's standard size, but not less than 6-by-9-inch sections.
- C. Product Schedule: For linoleum flooring.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of linoleum flooring to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for flooring installation.
  - 1. Engage an installer who employs workers for this Project who are trained or certified by flooring manufacturer for installation techniques required.

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1.6 WARRANTY

- A. Manufacturer's Warranty: Submit manufacturer's standard warranty document.
  - 1. Warranty Period: Ten (10) year standard manufacturer's warranty commencing on Date of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 65 deg F or more than 90 deg F.
  - 1. Floor Tile: Store on flat surfaces.
  - 2. Sheet Flooring: Store rolls upright.

1.8 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive flooring during the following time periods:
  - 1. 72 hours before installation.
  - 2. During installation.
  - 3. 72 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during flooring installation.
- D. Close spaces to traffic for 72 hours after flooring installation.
- E. Install flooring after other finishing operations, including painting, have been completed.

**PART 2 - PRODUCTS**

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and CBC Section 11B-302.1.

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2.2 LINOLEUM FLOOR TILE

- A. Basis-of-Design Product: Subject to compliance with requirements provide Forbo Marmoleum Modular or a comparable product by one of the following:
  - 1. Greenfloors Flooring.
  - 2. Or Equal.
- B. Linoleum Floor Tile: ASTM F 2195, Type II, linoleum floor tile with special backing.
  - 1. Nominal Floor Tile Size: 10 x 20 inches.
- C. Thickness: 0.10 inch .
- D. Colors and Patterns: As selected by Architect from full range of industry colors.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic-cement-based formulation provided or approved by linoleum flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit products and substrate conditions indicated.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by linoleum flooring manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of flooring.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to linoleum flooring manufacturer's written instructions to ensure adhesion of flooring.

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- B. Concrete Moisture Testing: Conduct moisture tests on all concrete floors regardless of the age, grade level or the presence of existing flooring. Conduct calcium chloride tests in accordance with the latest version of ASTM F 1869. Measure the internal relative humidity of the concrete slab in accordance with the latest version of ASTM F 2170. One test of each type should be conducted for every 1,000 square feet of flooring (minimum of 3). The tests should be conducted around the perimeter of the room, at columns, and anywhere moisture may be evident. Concrete moisture vapor emissions must not exceed 8.0 lbs. per 1,000 square feet in 24 hours when using Forbo V 885 adhesive. Concrete internal relative humidity must not exceed 85% when using Forbo V 885 adhesive. A diagram of the area showing the location and results of each test should be submitted to the Architect, General Contractor or End User. If the test results exceed these limitations, the installation must not proceed until the problem has been corrected.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install flooring until it is the same temperature as space where it is to be installed.
  - 1. At least 72 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by flooring.

### 3.3 INSTALLATION, GENERAL

- A. Comply with manufacturer's written instructions for installing flooring.
- B. Scribe and cut flooring to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.
- C. Extend flooring into toe spaces, accessible cabinets open to the floor, door reveals, closets, and similar openings.
- D. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on flooring as marked on substrates. Use chalk or other nonpermanent marking device.
- E. Adhere flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

### 3.4 LINOLEUM FLOOR TILE INSTALLATION

- A. Lay out linoleum floor tiles from center marks established with principal walls, discounting minor offsets, so floor tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

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1. Lay floor tiles square with room axis.
- B. Match linoleum floor tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed floor tiles.
  1. Lay floor tiles with grain running in one direction.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting linoleum flooring.
- B. Perform the following operations immediately after completing linoleum flooring 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 linoleum flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. After allowing drying room film (yellow film caused by linseed oil oxidation) to disappear, cover linoleum flooring until Substantial Completion.

**END OF SECTION 09 65 43**

**SECTION 096813 - TILE CARPETING**

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Modular Carpet Tile
2. Modular Walk Off Mat.

B. Related Requirements:

1. Section 024119 "Selective Demolition" for removing existing floor coverings.
2. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include manufacturer's written installation recommendations for each type of substrate.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
3. Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.
3. Include Samples of exposed edge, transition, and other accessory stripping involving color or finish selection.

D. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.

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- 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.
  - E. Product Schedule: For carpet tile. Use same designations indicated on Drawings.
  - F. Sustainable Product Certification: Provide ANSI/NSF 140 certification for carpet products.
- 1.3 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
  - B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
  - C. Sample Warranty: For special warranty.
- 1.4 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
    - 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
    - 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.
- 1.5 MAINTENANCE MATERIAL SUBMITTALS
- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
    - 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd..
- 1.6 QUALITY ASSURANCE
- A. Installer Qualifications: An installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
  - B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
    - 1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Comply with CRI's "CRI Carpet Installation Standard."

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1.8 FIELD CONDITIONS

- A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.9 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
  - 2. Failures include, but are not limited to, the following:
    - a. More than 10 percent edge raveling, snags, and runs.
    - b. Dimensional instability.
    - c. Excess static discharge.
    - d. Loss of tuft-bind strength.
    - e. Loss of face fiber.
    - f. Delamination.
  - 3. Warranty Period: 15 years (non-prorated) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE - **CPT-1**

- A. Basis-of-Design Product: Subject to compliance with requirements provide Interface, Shiver Me Timbers or a comparable product by one of the following:
  - 1. J&J Invision; J&J Industries, Inc.
  - 2. Shaw Contract Group; a Berkshire Hathaway company.
  - 3. Tandus; a Tarkett company.
- B. Color: Match Architect's samples.
- C. Pattern: Match Architect's samples.

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- D. Fiber Content: 100 percent nylon 6.
- E. Fiber Type: Aquafil.
- F. Pile Characteristic: Tufted Sheared pile.
- G. Density: 5,962 oz./cu. yd..
- H. Pile Thickness: 0.157 in. for finished carpet tile.
- I. Pile Height: 0.2 inch.
- J. Stitches: 10/inch.
- K. Gage: 1/10 inch.
- L. Tufted Yarn Weight: 26 oz./sq. yd..
- M. Primary Backing/Backcoating: Manufacturer's standard composite materials.
- N. Backing System: Glas-Bac Tile.
- O. Size: 25 cm x 1 m.
- P. Applied Treatments:
  - 1. Soil-Resistance Treatment: Manufacturer's standard treatment.
- Q. Sustainable Design Requirements:
  - 1. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- R. Performance Characteristics:
  - 1. Appearance Retention Rating: Heavy traffic, 3.0 minimum according to ASTM D 7330.

2.2 CARPET TILE **CPT-2**

- A. Basis-of-Design Product: Subject to compliance with requirements provide Interface Monochrome or a comparable product by one of the following:
  - 1. J&J Invision; J&J Industries, Inc.
  - 2. Shaw Contract Group; a Berkshire Hathaway company.
  - 3. Tandus; a Tarkett company.
- B. Color: Match Architect's samples.
- C. Pattern: Match Architect's samples.

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- D. Fiber Content: 100 percent nylon 6.
- E. Fiber Type: Aquafil.
- F. Pile Characteristic: Tufted Textured Loop.
- G. Density: 7,261 oz./cu. yd..
- H. Pile Thickness: 0.119in. for finished carpet tile.
- I. Pile Height: 0.18 inch.
- J. Stitches: 10.3/inch.
- K. Gage: 1/12 inch.
- L. Tufted Yarn Weight: 24 oz./sq. yd..
- M. Primary Backing/Backcoating: Manufacturer's standard composite materials.
- N. Backing System: Glas-Bac Tile.
- O. Size: 50 cm x 50 cm.
- P. Applied Treatments:
  - 1. Soil-Resistance Treatment: Manufacturer's standard treatment.
- Q. Sustainable Design Requirements:
  - 1. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- R. Performance Characteristics:
  - 1. Appearance Retention Rating: Heavy traffic, 3.0 minimum according to ASTM D 7330.

2.3 WALK OFF MAT

- A. Basis-of-Design Product: Subject to compliance with requirements provide Interface Superflor or a comparable product by one of the following:
  - 1. J&J Invision; J&J Industries, Inc.
  - 2. Shaw Contract Group; a Berkshire Hathaway company.
  - 3. Tandus; a Tarkett company.
- B. Color: Match Architect's samples.
- C. Pattern: Match Architect's samples.

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- D. Fiber Content: 82.5% Nylon, 17.5% Polyester.
- E. Fiber Type: Hair Tile.
- F. Density: 8,9457 oz./cu. yd..
- G. Pile Thickness: 0.165in. for finished carpet tile.
- H. Total Thickness: 0.32 inches.
- I. Pile Height: 0.16 inch.
- J. Primary Backing/Backcoating: Manufacturer's standard composite materials.
- K. Backing System: GRAPHLAR.
- L. Size: 50cm x 50 cm.
- M. Applied Treatments:
  - 1. Soil-Resistance Treatment: Manufacturer's standard treatment.
- N. Sustainable Design Requirements:
  - 1. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- O. Performance Characteristics:
  - 1. Appearance Retention Rating: Heavy traffic, 3.0 minimum according to ASTM D 7330.

2.4 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
  - 1. Adhesives shall have a VOC content of 50 g/L or less.
  - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
  - 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 80 percent relative humidity level measurement.
    - b. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- D. Wood Subfloors: Verify the following:
  - 1. Underlayment over subfloor complies with requirements specified in Section 061600 "Sheathing."
  - 2. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. General: Comply with CRI's "Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- C. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

## 3.3 INSTALLATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.

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- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns indicated on Drawings.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
  - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
  - 2. Remove yarns that protrude from carpet tile surface.
  - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

**END OF SECTION 096813**

**SECTION 097700 - WALL SURFACE PADDING SYSTEM**

**PART I GENERAL**

**1.1 SECTION INCLUDES**

- A. Surface padding system for walls for sensory room.
- B. System shall consist of field-applied MF-SILTEC, covered with bullet resistant Kevlar by DuPont and a protective top coat of high-build liquid vinyl.

**1.2 PERFORMANCE AND DESIGN REQUIREMENTS**

- A. Provide wall surface padding system which isolates hard surfaces from within the scheduled area.
  - 1. Padded surface system shall resist chipping and peeling.
  - 2. Padded surface system shall be easy to clean.
  - 3. Padded surface system shall be water-repellent, impervious to oil, urine and salt.

**1.3 QUALITY ASSURANCE**

- A. Comply with governing codes and regulations.
- B. Applicator Qualifications: Application shall be performed by an applicator acceptable to the manufacturer.
- C. Deliver, handle and store materials in accordance with manufacturer's instructions.
- D. Surface burning characteristics of surface system when tested in accordance with UL Standard 723 ( ASTM E84 ) must be equal to or less than:
 

1.	Flame Spread Index	10
2.	Fuel Contributed	10
3.	Smoke Developed	160
- E. Compression Deflection ( ASTM D 1056 ) 4 psi @ 25 % deflection.
- F. Acute Oral Toxicity Test ..... Non Toxic
- G. Fungus Resistance(ASTM G-21-90) ..... 0 ( Completely resistance )

**1.5 SUBMITTALS**

WALL PADDING

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- A. Product Data: Submit manufacturer's product data and installation instructions. Include methods of installation of surface padding system for each type of substrate to receive padding.
- B. Shop Drawings: Submit shop drawings showing typical method of padding application.
- C. Maintenance Information: Submit, for Owner's use, information regarding the proper care and maintenance of surface padding system.

1.6 WARRANTY

- A. New Installations: A padded surface guaranteed to be impenetrable by organic human body parts for a period of three years from date of substantial completion.
- B. Conditions: This guarantee does not apply to damage caused by non-organic human body parts, nor damage resulting from use prior to completion of final curing.

PART 2 PRODUCTS

2.1 MANUFACTURERS: Subject to compliance with requirements, provide products by one of the following:

- 1. B&E.
- 2. Gold Medal.
- 3. Or Equal.

2.2 MATERIALS

A.Foam Sheets:

- 1. Features
  - a. Nonflammable, nontoxic, and inherently durable
  - b. A nonconductive foam polymer with excellent cushioning, fire blocking, thermal insulating and acoustic/vibration dampening properties.
  - c. Structurally resilient with low compression set and 100% memory.
  - d. Continuous operating temperature range: -70 to +500 degrees F.
- 3. Compression Set, % ASTM D-1056 22 hours @ 100 C...5 %
- 4. Compression Deflection, psi @ 25 % ..... 4 psi.
- 5. Tensile Strength, psi ..... 25 psi minimum

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- 6. Elongation, % .....60 % minimum
- 7. Water Absorption, % .....10 % maximum
- 8. Thermal Conductivity k Factor ..... 0.30 ( BTU in/hr/ft./F )

- B. Reinforcing Mesh: Kevlar bullet resistant material
- C. Encapsulate: High-build liquid vinyl of consistency to permit spray or field application.
- D. Color: Provide manufacturer's full range of color for selection.
- E. Adhesive: Type compatible with the materials to be adhered.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which detention surface padding system is to be applied. Verify that substrate is in proper condition for installation of system. Do not proceed with installation until satisfactory conditions have been corrected.

3.2 PREPARATION

- A. Verify that ambient temperatures will be within range required by manufacturer for successful installation and curing of system.
- B. Verify that work of other trades are complete and will not adversely affect curing and protection of detention surface padding system.

3.3 INSTALLATION ON WALLS

- A. Cover specified areas with Kev-Koat padded material system.
- B. Apply protective top coat to encapsulate entire padded surface. Color as selected by Architect.
- C. Temperature must be 60 degrees Fahrenheit at time of installation and maintained for the duration of the construction period and 30 day cure time.
- D. At penetrations of padding system for plumbing fixtures, air diffusers, lighting fixtures and security devises, coordinate with requirements of the respective trades for correct mounting.
- E. A 30-day cure time is required before rooms with detention surface padding can be utilized. Use prior to the 30-day cure time will void the 3 year warranty.

3.4 DOOR PADDING PANEL FABRICATION

WALL PADDING

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- D. Fabricate components to comply with performance and design requirements specified and in accordance with approved shop drawings.
- E. Door padding panels shall be composed of Kev-Koat padded material system adhered to a 3/4" thick fire resistant plywood backing board.
- F. Provide openings for glazed observation openings and food slots.

3.5 CLEANING AND PROTECTION

- A. Touch up damage.
- B. Clean work area of debris associated with installation.
- C. Surface can be cleaned with a mild, non-abrasive liquid detergent.

**END OF SECTION 097700**

**SECTION 098430 - SOUND-ABSORBING WALL AND CEILING UNITS**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes shop-fabricated, acoustical panel units tested for acoustical performance, including the following:
  - 1. Sound-absorbing ceiling panels.
  - 2. Sound-diffusing ceiling panels.
  - 3. Sound-absorbing wall panels.

1.2 DEFINITIONS

- A. NRC: Noise Reduction Coefficient.
- B. SAA: Sound Absorption Average.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include panel edge, core material, and mounting indicated.
- B. Sustainable Design Submittals:
  - 1. Product Certificates: For materials manufactured within 100 miles of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
  - 2. Laboratory Test Reports: For ceiling products, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: For unit assembly and installation.
  - 1. Include reflected ceiling plans, elevations, sections, and mounting devices and details.
  - 2. Include details at joints and corners; and details at ceiling intersections and intersections with walls. Indicate panel edge profile and core materials.
- D. Samples for Verification: For the following products:
  - 1. Panel Edge: 12-inch-long Sample(s) showing each edge profile, corner, and finish.

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2. Core Material: 12-inch-square Sample at corner.
3. Mounting Devices: Full-size Samples.
4. Assembled Panels: Approximately 36 by 36 inches, including joints and mounting methods.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of unit.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of unit to include in maintenance manuals. Include fabric manufacturer's written cleaning and stain-removal instructions.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not install units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Lighting: Do not install units until a permanent level of lighting is provided on surfaces to receive the units.
- C. Air-Quality Limitations: Protect units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.
- D. Field Measurements: Verify unit locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace units and components that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Acoustical performance.

- b. Warping of core.
- 2. Warranty Period: One year from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain wall and ceiling units specified in this Section from single source from single manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Ceiling and wall products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
  - 1. Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 450 or less.
  - 2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 286.

### 2.3 SOUND-ABSORBING CEILING UNITS

- A. Sound-Absorbing and Diffusing Ceiling Panel: Manufacturer's standard panel construction consisting of solid core material.
  - 1. Basis-of-Design Product: Subject to compliance with requirements provide Kirei EchoStar or a comparable product by one of the following:
    - a. 3Form
    - b. Or equal
  - 2. Panel Shape: As indicated on Drawings.
  - 3. Mounting: Back mounted with manufacturer's standard suspension system, secured to substrate.
  - 4. Material: Solid, PET plastic.
  - 5. Acoustical Performance: Sound absorption NRC of 0.36 according to ASTM C .
  - 6. Nominal Overall Panel Thickness: 12mm.

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7. Panel Size: 36" x 31" x 5 ½".

## 2.4 SOUND-ABSORBING WALL UNITS

- A. Sound-Absorbing Wall Panel: Manufacturer's standard panel construction consisting of solid core material.
  1. Basis-of-Design Product: Subject to compliance with requirements provide Kirei EchoPanel Geometry Tiles or a comparable product by one of the following:
    - a. 3Form
    - b. Or equal
  2. Panel Shape: Hex.
  3. Mounting: Back mounted with manufacturer's standard adhesive, secured to substrate.
  4. Material: Solid, PET plastic.
  5. Acoustical Performance: Sound absorption NRC of 0.36 according to ASTM C 423 for Type A mounting according to ASTM E 795.
  6. Nominal Overall Panel Thickness: 12mm.
  7. Panel Width: 200 mm.
  8. Panel Height: 200 mm.

## 2.5 MATERIALS

- A. Sustainable Design Requirements:
  1. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 60 percent.
  2. Regional Materials: Products shall be fabricated within 100 miles of Project site from materials that have been extracted, harvested, or recovered within 100 miles of Project site.
- B. Mounting Devices: Suspended from top edge of unit (ceiling unit), recommended by manufacturer to support weight of unit.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. Install units in locations indicated. Unless otherwise indicated, install units with edges in alignment with walls and other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.

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- B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.
- C. Align fabric pattern and grain with adjacent units.

3.3 INSTALLATION TOLERANCES

- A. Variation from Alignment with Surfaces: Plus or minus 1/16 inch in 48 inches, noncumulative.
- B. Variation from Level or Slope: Plus or minus 1/16 inch.
- C. Variation of Joint Width: Not more than 1/16 inch wide from hairline in 48 inches, noncumulative.

3.4 CLEANING

- A. Clip loose threads; remove pills and extraneous materials.
- B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

**END OF SECTION 098436**

**SECTION 099113 - EXTERIOR PAINTING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
  - 1. Concrete masonry units (CMUs).
  - 2. Steel and iron.
  - 3. Galvanized metal.
  - 4. Wood.
  - 5. Portland cement plaster (stucco).
  
- B. Related Requirements:
  - 1. Section 057000 "Decorative Metal" for shop priming metal fabrications.

**1.2 DEFINITIONS**

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523, a matte flat finish.
- B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, an eggshell finish.
- C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523, a satin-like finish.
- D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523, a semi-gloss finish.
- E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523, a gloss finish.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Indicate VOC content.
  
- B. Sustainable Design Submittals:
  - 1. Product Data: For paints and coatings, indicating VOC content.
  
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

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1. Submit Samples on rigid backing, 8 inches square.
  2. Apply coats on Samples in steps to show each coat required for system.
  3. Label each coat of each Sample.
  4. Label each Sample for location and application area.
- D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
1. Maintain containers in clean condition, free of foreign materials and residue.
  2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Sherwin-Williams Company (The).
  2. Dunn-Edwards Corporation.
  3. Vista Paint Corporation.
  4. Or equal.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Exterior Painting Schedule for the paint category indicated.

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2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
  - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing.
  - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: As selected by Architect from manufacturer's full range if not indicated in a color schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.
  - 2. Masonry (Clay and CMUs): 12 percent.
  - 3. Wood: 15 percent.
  - 4. Portland Cement Plaster: 12 percent.
  - 5. Gypsum Board: 12 percent.
- C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.
- D. Exterior Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- E. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- F. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

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- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer:
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Wood Substrates:
  - 1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
  - 2. Sand surfaces that will be exposed to view, and dust off.
  - 3. Prime edges, ends, faces, undersides, and backsides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.

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3. Paint both sides and edges of exterior hollow metal doors and entire exposed surface of exterior hollow metal door frames.
  4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. 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.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed to view:
    - a. Equipment, including panelboards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
1. Contractor shall touch up and restore painted surfaces damaged by testing.
  2. 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.

3.5 CLEANING AND PROTECTION

- 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.

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- 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 Resident 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.

3.6 EXTERIOR PAINTING SCHEDULE

- A. Concrete and Portland Cement Plaster (Stucco), Nontraffic Surfaces as indicated on drawings:
  - 1. Latex System:
    - a. Prime Coat: Primer sealer, latex, exterior: S-W Loxon Concrete & Masonry Primer Sealer, A24W8300, at 8.0 mils wet, 3.2 mils dry.
    - b. Intermediate Coat: Latex, exterior, matching topcoat.
    - c. Topcoat: Latex, exterior, satin: S-W A-100 Exterior Latex Satin, A82 Series, at 4.0 mils wet, 1.5 mils dry, per coat.
- B. CMU Substrates as indicated on drawings:
  - 1. Latex System:
    - a. Block Filler: Block filler, latex, interior/exterior: S-W PrepRite Block Filler, B25W25, at 75 to 125 sq. ft. per gal.
    - b. Intermediate Coat: Latex, exterior, matching topcoat.
    - c. Topcoat: Latex, exterior, satin: S-W A-100 Exterior Latex Satin, A82 Series, at 4.0 mils wet, 1.5 mils dry, per coat.
- C. Ferrous Metal Substrates:
  - 1. Water-Based Light Industrial Coating System:
    - a. Prime Coat: Primer, water-based, anti-corrosive for metal: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, 5.0 to 10.0 mils wet, 2.0 to 4.0 mils dry.
    - b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
    - c. Topcoat: Light industrial coating, exterior, water based, semi-gloss: S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.5 to 4.0 mils dry, per coat.
- D. Wood Substrates: Including exposed wood items not indicated to receive shop-applied finish.
  - 1. Latex System:
    - a. Prime Coat: Primer, latex for exterior wood.
    - a. Intermediate Coat: Latex, exterior, matching topcoat.
    - b. Topcoat: Latex, exterior, satin: S-W A-100 Exterior Latex Satin, A82 Series, at 4.0 mils wet, 1.5 mils dry, per coat.

**END OF SECTION 099113**

**SECTION 099123 - INTERIOR PAINTING**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
  - 1. Concrete.
  - 2. Concrete masonry units (CMUs).
  - 3. Steel and iron.
  - 4. Galvanized metal.
  - 5. Gypsum board.
  - 6. Plaster.
  - 7. Acoustic panels and tiles.

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523, a matte flat finish.
- B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, an eggshell finish.
- C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523, a satin-like finish.
- D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523, a semi-gloss finish.
- E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523, a gloss finish.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Indicate VOC content.
- B. Sustainable Design Submittals:
  - 1. Product Data: For paints and coatings, indicating VOC content.
  - 2. Laboratory Test Reports: For paints and coatings, indicating compliance with requirements for low-emitting materials.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

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1. Submit Samples on rigid backing, 8 inches square.
  2. Apply coats on Samples in steps to show each coat required for system.
  3. Label each coat of each Sample.
  4. Label each Sample for location and application area.
- D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
1. Maintain containers in clean condition, free of foreign materials and residue.
  2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Dunn-Edwards Corporation.
  2. Sherwin-Williams Company (The).
  3. Vista Paint Corporation.
  4. Or equal.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Interior Painting Schedule for the paint category indicated.

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## 2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
  - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing.
  - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
  - 1. Flat Paints and Coatings: 50 g/L.
  - 2. Nonflat Paints and Coatings: 50 g/L.
  - 3. Dry-Fog Coatings: 150 g/L.
  - 4. Primers, Sealers, and Undercoaters: 100 g/L.
  - 5. Rust-Preventive Coatings: 100 g/L.
  - 6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
  - 7. Pretreatment Wash Primers: 420 g/L.
  - 8. Shellacs, Clear: 730 g/L.
  - 9. Shellacs, Pigmented: 550 g/L.
- D. Low-Emitting Materials: For field applications that are inside the weatherproofing system, 90 percent of paints and coatings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- E. Colors: As selected by Architect from manufacturer's full range and as indicated in a color schedule.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.
  - 2. Fiber-Cement Board: 12 percent.
  - 3. Masonry (Clay and CMUs): 12 percent.
  - 4. Wood: 15 percent.

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5. Gypsum Board: 12 percent.
  6. Plaster: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Plaster Substrates: Verify that plaster is fully cured.
- E. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- F. Proceed with coating application only after unsatisfactory conditions have been corrected.
1. Application of coating indicates acceptance of surfaces and conditions.

## 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.

## 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
1. Use applicators and techniques suited for paint and substrate indicated.

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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.
  4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. 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.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. 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.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed in occupied spaces:
    - a. Equipment, including panelboards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
    - h. Other items as directed by Architect.

## 3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
1. Contractor shall touch up and restore painted surfaces damaged by testing.
  2. 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.

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3.5 CLEANING AND PROTECTION

- 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 Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
  - 1. Latex System:
    - a. Prime Coat: Primer sealer, latex, interior: S-W Loxon Concrete & Masonry Primer Sealer, A24W8300, at 8.0 mils wet, 3.2 mils dry.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior, eg-shel: S-W ProMar 200 Zero VOC Latex Low Gloss Eg-shel, B41-2600 Series, at 4.0 mils wet, 1.6 mils dry, per coat.
- B. CMU Substrates:
  - 1. Latex System:
    - a. Block Filler: Block filler, latex, interior/exterior: S-W PrepRite Block Filler, B25W25, at 100 to 200 sq. ft. per gal.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior, eg-shel: S-W ProMar 200 Zero VOC Latex Low Gloss Eg-shel, B41-2600 Series, at 4.0 mils wet, 1.6 mils dry, per coat.
- C. Metal Substrates (Aluminum, Steel, Galvanized Steel):
  - 1. Latex Light Industrial Coating System:
    - a. Prime Coat: Primer, rust-inhibitive, water based: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.
    - b. Intermediate Coat: Water-based acrylic, interior, matching topcoat.
    - c. Topcoat: Water-based acrylic, semi-gloss: S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.5 to 4.0 mils dry, per coat.
- D. Gypsum Board and Plaster Substrates:
  - 1. Latex System:

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- a. Prime Coat: Primer, latex, interior: S-W ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils wet, 1.5 mils dry.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior, eg-shel: S-W ProMar 200 Zero VOC Latex Low Gloss Eg-shel, B41-2600 Series, at 4.0 mils wet, 1.6 mils dry, per coat.

**END OF SECTION 099123**

**SECTION 101200 - DISPLAY CASES**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Bulletin boards.
  - 2. Display cases.
- B. Related Requirements:

1.2 DEFINITIONS

- A. Bulletin Board: Glazed cabinet with tackboard panel, without shelves, typically of shallow depth for display of paper documents.
- B. Display Case: Glazed cabinet with tackboard panel back surface and adjustable shelves.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for display cases and bulletin boards. Include furnished specialties and accessories.
- B. Sustainable Design Submittals:
  - 1. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
  - 2. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: For display cases and bulletin boards.
  - 1. Include plans, elevations, sections, and attachment details.
  - 2. Show location of seams and joints in tackboard panels.
  - 3. Include sections of typical trim members.
- D. Samples: For each exposed product and for each color and texture specified; not less than 8-1/2 by 11 inches for tackboard panels and 6 inches long for trim with factory finish.
- E. Samples for Initial Selection: For each type of exposed finish.

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1. Include Samples of tackboard panels and factory-finished trim involving color finish selection.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For tackboard panels, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For display cases and bulletin boards to include in maintenance manuals.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install display cases and bulletin boards for indoor installations until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings 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.
- B. Field Measurements: Verify actual dimensions of openings for display cases and bulletin boards by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain display cases and bulletin boards from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  1. Flame-Spread Index: 25 or less.
  2. Smoke-Developed Index: 50 or less.

2.3 BULLETIN BOARD

- 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:
  1. A-1 Visual Systems.
  2. AJW Architectural Products.

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3. Architectural School Products Ltd.
  4. Aywon.
  5. Claridge Products and Equipment, Inc.
  6. Platinum Visual Systems.
- B. General: Factory-fabricated unit consisting of manufacturer's standard wall-mounted cabinet with tackboard panel on back inside surface and operable glazed doors at front.
1. Frame and Cabinet Profile: Square frame section with square cabinet corners.
  2. Mounting: Surface mounted.
  3. Size: As indicated on Drawings.
  4. Size: 36 inches wide by 48 inches high by 3 inches deep.
- C. Aluminum-Framed Cabinet: Extruded aluminum; with clear anodic finish.
1. Color: As selected by Architect from manufacturer's full range.
- D. Glazed Hinged Doors: Tempered glass; set in frame matching cabinet material and finish. Equip each door with full-height continuous hinge and cylinder lock with two keys.
1. Number of Doors: One.
- E. Back Panel: Manufacturer's standard vinyl-fabric-faced tackboard panel.
1. Color: As selected by Architect from full range of industry colors.
- 2.4 DISPLAY CASE
- 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:
1. A-1 Visual Systems.
  2. AJW Architectural Products.
  3. Architectural School Products Ltd.
  4. Aywon.
  5. Claridge Products and Equipment, Inc.
  6. Platinum Visual Systems.
- B. Recessed Display Case: Factory-fabricated display case; with finished interior, operable glazed doors at front, and trim on face to cover edge of recessed opening.
1. Display Case Cabinet: Hardwood veneer plywood.
    - a. Veneer Species: Manufacturer's standard species with stained finish.
  2. Face Frame: Aluminum.
  3. Aluminum Finish: Clear anodic.
- C. Glazed Sliding Doors: Tempered glass; unframed; with extruded-aluminum top and bottom track; supported on nylon or ball-bearing rollers; with plastic top guide and rubber bumpers. Equip each door with ground finger pull and adjustable cylinder lock with two keys.

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1. Number of Doors: Two.
- D. Shelves: 6-mm-thick tempered glass; supported on adjustable shelf standards and supports.
  1. Shelf Depth: 10 inches.
  2. Number of Shelves: Three.
- E. Adjustable Shelf Standards and Supports: BHMA A156.9, B04102; with shelf brackets, B04112; recess mounted in rear surface. Provide standards extending full height of display case.
- F. Back Panel: Vinyl-fabric-faced tackboard panel .
  1. Color: As selected by Architect from manufacturer's full range.
- G. Size: 60 inches wide, by 40 inches high, by 10 inches deep.

2.5 FABRICATION

- A. Fabricate bulletin boards and display cases to requirements indicated for dimensions, design, and thickness and finish of materials.
- B. Use metals and shapes of thickness and reinforcing required to produce flat surfaces, and to impart strength for size, design, and application indicated.
- C. Fabricate cabinets and door frames with reinforced corners, mitered to a hairline fit, with no exposed fasteners.
- D. Fabricate shelf standards plumb and at heights to align shelf brackets for level shelves.

2.6 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.
- B. Examine walls and partitions for proper backing for bulletin boards and display cases.
- C. Examine walls and partitions for suitable framing depth if recessed units will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare recesses for display cases as required by type and size of unit.

3.3 INSTALLATION

- A. General: Install units in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
- B. Bulletin Boards: Attach units to wall surfaces with concealed clips, hangers, or grounds.
- C. Recessed Display Cases: Attach units to wall framing with fasteners at not more than 16 inches o.c. Attach aluminum trim over edges of recessed display cases and conceal grounds and clips. Attach trim with fasteners at not more than 24 inches o.c.
- D. Install display case shelving level and straight.

3.4 ADJUSTING AND CLEANING

- A. Adjust doors to operate smoothly without warp or bind and so contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.
- B. Touch up factory-applied finishes to restore damaged areas.

**END OF SECTION 101200**

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**SECTION 101419 - DIMENSIONAL LETTER SIGNAGE**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast dimensional characters.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements, and layout for each sign at least half size.

D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

1. Dimensional Characters: Full-size Sample of each type of dimensional character.
2. Exposed Accessories: Full-size Sample of each accessory type.

E. Product Schedule: For dimensional letter signs. Use same designations indicated on Drawings or specified.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

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1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Deterioration of finishes beyond normal weathering.
  - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Signs and supporting elements shall withstand the effects of gravity and other loads within limits and under conditions indicated.
  - 1. Uniform Wind Load: As indicated on Drawings.
  - 2. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 DIMENSIONAL CHARACTERS

- A. Cast Characters : Characters with uniform faces, sharp corners, and precisely formed lines and profiles, and as follows:
  - 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. ACE Sign Systems, Inc.
    - b. ASI Sign Systems, Inc.
    - c. Gemini Incorporated.
    - d. Or equal.
  - 2. Character Material: Cast aluminum.
  - 3. Character Height: 8" (Overhead) and 3" (Wall Mount).
  - 4. Thickness: 1" (Overhead) and ½" (Wall Mount).
  - 5. Finishes:
    - a. Integral Aluminum Finish: Brushed (satin).
    - b. Overcoat: Clear organic coating.
  - 6. Mounting: As indicated on Drawings.
  - 7. Typeface: Helvetica.

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## 2.3 DIMENSIONAL CHARACTER MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M, alloy and temper recommended by sign manufacturer for casting process used and for type of use and finish indicated.

## 2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:
1. Use concealed fasteners and anchors unless indicated to be exposed.
  2. For exterior exposure, furnish stainless-steel devices unless otherwise indicated.
  3. Exposed Metal-Fastener Components, General:
    - a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
  4. Sign Mounting Fasteners:
    - a. Projecting Studs: Threaded studs with sleeve spacer, welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.

## 2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
  2. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
  3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
  4. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
  5. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.
- B. Brackets: Fabricate brackets, fittings, and hardware for bracket-mounted signs to suit sign construction and mounting conditions indicated. Modify manufacturer's standard brackets as required.
1. Aluminum Brackets: Factory finish brackets with baked-enamel or powder-coat finish to match sign-background color unless otherwise indicated.

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## 2.6 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.
- D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
  - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
  - 2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
  - 3. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- B. Mounting Methods:
  - 1. Projecting Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
    - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place spacers on studs, place sign in position, and push until spacers are pinched between sign and substrate, embedding the stud ends in holes. Temporarily support sign in position until adhesive fully sets.

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- b. Thin or Hollow Surfaces: Place spacers on studs, place sign in position with spacers pinched between sign and substrate, and install washers and nuts on stud ends projecting through opposite side of surface, and tighten.
- 2. Back Bar and Brackets: Remove loose debris from substrate surface and install backbar or bracket supports in position, so that signage is correctly located and aligned.

3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed characters and signs that do not comply with specified requirements. Replace characters with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

**END OF SECTION 101419**

**SECTION 10 14 23 - PANEL SIGNAGE**

**PART 1 - GENERAL**

**1.1 SUMMARY**

**A. Section Includes:**

1. Panel signs.
2. Room-identification signs.

**B. Related Requirements:**

1. Section 14 24 00 "Hydraulic Elevators" for code-required conveying equipment signage.
2. Section 22 05 53 "Identification for Plumbing Piping and Equipment" for labels, tags, and nameplates for plumbing systems and equipment.
3. Section 23 05 53 "Identification for HVAC Piping and Equipment" for labels, tags, and nameplates for HVAC systems and equipment.
4. Section 26 05 53 "Identification for Electrical Systems" for labels, tags, and nameplates for electrical equipment.
5. Section 26 52 19 "Emergency and Exit Lighting" for illuminated, self-luminous, and photoluminescent exit sign units.

**1.2 DEFINITIONS**

- A. Accessible:** In accordance with the accessibility standard.

**1.3 ACTION SUBMITTALS**

- A. Product Data:** For each type of product.

- B. Shop Drawings:** For panel signs.

1. Include fabrication and installation details and attachments to other work.
2. Include plans, elevations, and large-scale sections of typical members and other components.
3. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
4. Show typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

- C. Samples for Initial Selection:** For each type of sign assembly, exposed component, and exposed color, pattern and surface finish.

1. Include representative Samples of available typestyles and graphic symbols.

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D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

1. Panel Signs: Full-size Sample.
2. Room-Identification Signs: Full-size Sample.
3. Exposed Accessories: Full-size Sample of each accessory type.
4. Cast Acrylic Sheet: Manufacturer's color charts of actual sections of material including the full range of colors available for each material required.

E. Sign Schedule: Use same designations specified or indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Single Source Responsibility: For each separate sign type required, obtain signs from one source of a single manufacturer.

1.7 WARRANTY

A. Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
  - a. Deterioration of finishes beyond normal weathering.
  - b. Deterioration of embedded graphic image.
  - c. Separation or delamination of sheet materials and components.
2. Warranty Period: one year from date of shipping.

**PART 2 - PRODUCTS**

2.1 PANEL SIGNS, GENERAL

- A. Panel Signs: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
  - 1. Produce smooth, even, level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16-inch measured diagonally.
- B. Unframed Panel Signs: Fabricate signs with edges mechanically and smoothly finished to conform with the following requirements:
  - 1. Edge Condition: Beveled.
  - 2. Corner Condition: Corners rounded to a 3/8-inch radius.
- C. Framed Panel Signs: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
  - 1. Produce smooth, even, level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally
- D. Graphic Content and Style: Provide sign copy that complies with the requirements indicated for size, style, spacing, content, position, material, finishes, and colors of letters, numbers, and other graphic devices.
- E. Raised Copy: Machine-cut copy characters from matte-finished opaque acrylic sheet and chemically weld onto the acrylic sheet forming sign panel face. Produce precisely formed characters with square cut edges free from burrs and cut marks. Character height, spacing, proportions, braille, etc. per CBC 11B-703.

2.2 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and CBC for signs.

2.3 PANEL SIGNS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

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1. ASI Sign Systems, Inc.
  2. Best Sign Systems, Inc.
  3. Vomar Products, Inc.
  4. Or equal.
- B. Panel Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
1. Solid-Sheet Sign: Acrylic sheet with finish specified in "Surface Finish and Applied Graphics" Subparagraph below and as follows:
    - a. Thickness: 0.080 inch.
    - b. Surface-Applied Graphics: Applied vinyl film.
  2. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated to acrylic backing sheet to produce composite sheet.
    - a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
    - b. Surface-Applied Graphics: Applied vinyl film.
  3. Sign-Panel Perimeter: Finish edges smooth.
    - a. Edge Condition: Beveled.
    - b. Corner Condition in Elevation: Rounded to radius indicated.
  4. Mounting: As indicated with concealed anchors.
  5. Surface Finish and Applied Graphics:
    - a. Integral Acrylic Sheet Color: As selected by Architect from full range of industry colors.
    - b. Overcoat: Manufacturer's standard baked-on clear coating.
  6. Text and Typeface: Accessible raised characters and Braille typeface as selected by Architect from manufacturer's full range.
  7. Flatness Tolerance: Sign panel shall remain flat or uniformly curved under installed conditions as indicated and within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner.
- C. Room-Identification Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
1. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated over subsurface graphics to acrylic backing sheet to produce composite sheet.
    - a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
    - b. Surface-Applied Graphics: Applied vinyl film.
    - c. Color(s): As selected by Architect from manufacturer's full range.
  2. Sign-Panel Perimeter: Finish edges smooth.
    - a. Edge Condition: Beveled.

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- b. Corner Condition in Elevation: Rounded to radius indicated.
- 3. Mounting: Surface mounted to wall with concealed anchors.
- 4. Text and Typeface: Accessible raised characters and Braille.

2.4 PANEL-SIGN MATERIALS

- A. Cast Acrylic Sheet: Provide cast (not extruded or continuous cast) methyl methacrylate monomer plastic sheet per ASTM D 4802 Type UVF (UV filtering), in sizes and thicknesses indicated, with a minimum flexural strength of 16,000 psi when tested according to ASTM D 790, with a minimum allowable continuous service temperature of 176 deg. F (80 deg. C), and of the following general types:
  - 1. Opaque Sheet: Provide colored opaque acrylic sheet in colors and finishes as selected from the manufacturer's standards.
- B. Colored Coatings for Acrylic Plastic Sheet: Use colored coatings, including inks and paints for copy and background colors that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are nonfading for the application intended.
- C. Polycarbonate Sheet: ASTM C 1349, Appendix X1, Type II (coated, mar-resistant, UV-stabilized polycarbonate), with coating on both sides.
- D. Vinyl Film: Opaque, non-reflective UV-resistant vinyl film 0.0035-inch minimum thickness, with pressure-sensitive, permanent adhesive on back; die cut to form characters or images as indicated and suitable for exterior applications.

2.5 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:
  - 1. Use concealed fasteners and anchors unless indicated to be exposed.
  - 2. For exterior exposure, furnish nonferrous-metal, or hot-dip galvanized devices unless otherwise indicated.
  - 3. Exposed Metal-Fastener Components, General:
    - a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
    - b. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish insets, as required, to be set into concrete or masonry work.
  - 4. Sign Mounting Fasteners:
    - a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material or screwed into back of sign assembly, unless otherwise indicated.
    - b. Projecting Studs: Threaded studs with sleeve spacer, welded or brazed to back of sign material or screwed into back of sign assembly, unless otherwise indicated.

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- c. Through Fasteners: Exposed metal fasteners matching sign finish, with type of head indicated, installed in predrilled holes.
- 5. Inserts: Furnish inserts to be set by other trades into concrete or masonry work.
- B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

## 2.6 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
  - 1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
  - 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
  - 3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
  - 4. Internally brace signs for stability and for securing fasteners.
  - 5. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

## 2.7 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes'.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches as selected by the Architect from manufacturer's full range.
- E. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

**PART 3 - EXECUTION**

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Verify that anchor inserts are correctly sized and located to accommodate signs.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
  - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
  - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
  - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
  - 4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- B. Room-Identification Signs and Other Accessible Signage: Install in locations on walls as indicated on Drawings and according to accessibility standard.
- C. Mounting Methods:
  - 1. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.

## 3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Resident Engineer.

**END OF SECTION 10 14 23**

PANEL SIGNAGE

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**SECTION 102113.19 - PLASTIC TOILET COMPARTMENTS**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-plastic toilet compartments configured as toilet enclosures and urinal screens.

B. Related Requirements:

1. Section 102800 "Toilet, Bath, and Laundry Accessories" for toilet tissue dispensers, grab bars, purse shelves, and similar accessories mounted on toilet compartments.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

B. Shop Drawings: For toilet compartments.

1. Include plans, elevations, sections, details, and attachment details.
2. Show locations of cutouts for compartment-mounted toilet accessories.
3. Show locations of centerlines of toilet fixtures.
4. Show locations of floor drains.

C. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:

1. Each type of material, color, and finish required for toilet compartments, prepared on 6-inch-square Samples of same thickness and material indicated for Work.
2. Each type of hardware and accessory.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

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PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 75 or less.
  - 2. Smoke-Developed Index: 450 or less.
- B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.
- C. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and CBC Title 24 for toilet compartments designated as accessible.

2.2 SOLID-PLASTIC TOILET COMPARTMENTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Bradley Corporation.
  - 2. Global Partitions; ASI Group.
  - 3. Scranton Products.
  - 4. Or equal.
- B. Toilet-Enclosure Style: Overhead braced and floor anchored..
- C. Urinal-Screen Style: Wall hung.
- D. Door, Panel, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.
  - 1. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum or stainless-steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
  - 2. Color and Pattern: One color and pattern in each room per finish schedule or as selected by Architect from manufacturer's full range.
- E. Pilaster Shoes and Sleeves (Caps): Manufacturer's standard design; stainless steel.
- F. Brackets (Fittings):
  - 1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

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## 2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's heavy-duty operating hardware and accessories.
  - 1. Hinges: Manufacturer's minimum 0.062-inch-thick stainless-steel continuous, cam type that swings to a closed or partially open position, allowing emergency access by lifting door. Mount with through-bolts.
  - 2. Latch and Keeper: Manufacturer's heavy-duty surface-mounted cast-stainless-steel latch unit designed to resist damage due to slamming, with combination rubber-faced door strike and keeper, and with provision for emergency access. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible. Mount with through-bolts.
  - 3. Coat Hook: Manufacturer's heavy-duty combination cast-stainless-steel hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories. Mount with through-bolts.
  - 4. Door Bumper: Manufacturer's heavy-duty rubber-tipped cast-stainless-steel bumper at out-swinging doors. Mount with through-bolts.
  - 5. Door Pull: Manufacturer's heavy-duty cast-stainless-steel pull at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible. Mount with through-bolts.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

## 2.4 MATERIALS

- A. Aluminum Extrusions: ASTM B 221.
- B. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- C. Stainless-Steel Castings: ASTM A 743/A 743M.

## 2.5 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
- B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

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- C. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- D. Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide, out-swinging doors for standard toilet compartments and 36-inch-wide, in-swinging doors with a minimum 32-inch-wide, clear opening for compartments designated as accessible.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
  - 1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
  - 1. Maximum Clearances:
    - a. Pilasters and Panels: 1/2 inch.
    - b. Panels and Walls: 1 inch.
  - 2. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
    - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
    - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Floor-Anchored Units: Set pilasters with anchors penetrating not less than 2 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position.

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- D. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

**END OF SECTION 102113.19**

**SECTION 102600 - WALL AND DOOR PROTECTION**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Corner guards.

B. Related Requirements:

1. Section 087100 "Door Hardware" for metal protective trim units, according to BHMA A156.6, used for armor, kick, mop, and push plates.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For each type of wall and door protection showing locations and extent.

C. Samples for Verification: For each type of exposed finish on the following products, prepared on Samples of size indicated below:

1. Corner Guards: 12 inches long. Include example top caps.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.

1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

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## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Source Limitations: Obtain wall- and door-protection products from single source from single manufacturer.

## 2.2 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: 25 or less.
  2. Smoke-Developed Index: 450 or less.

## 2.3 CORNER GUARDS

- A. Surface-Mounted, Metal Corner Guard: Fabricated as one piece from formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.
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. Koroguard Wall Protection Systems.
    - b. Nystrom, Inc.
    - c. Wallguard.com.
    - d. Or equal.
  2. Material: Stainless-steel sheet, Type 304.
    - a. Thickness: Minimum 0.0625 inch.
    - b. Finish: Directional satin, No. 4.
  3. Wing Size: Nominal 1-1/2 by 1-1/2 inches.
  4. Height: 96 inches
  5. Corner Radius: 1/8 inch.
  6. Mounting: Flat-head, countersunk screws through factory-drilled mounting holes.

## 2.4 MATERIAL

- A. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.

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## 2.5 FABRICATION

- A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.
- B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
- C. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

## 2.6 FINISHES

- A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine walls to which wall and door protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing wall and door protection.
- B. Before installation, clean substrate to remove dust, debris, and loose particles.

## 3.3 INSTALLATION

- A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

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- B. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
  - 1. Provide anchoring devices and suitable locations to withstand imposed loads.
- C. Abuse-Resistant Wall Covering: Install top and edge moldings, corners, and divider bars as required for a complete installation.

3.4 CLEANING

- A. Immediately after completion of installation, clean covers and accessories.

**END OF SECTION 102600**

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**SECTION 10 28 00 - TOILET, BATH, AND LAUNDRY ACCESSORIES**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Warm-air dryers.
3. Under-lavatory guards.
4. Custodial accessories.

B. Related Requirements:

1. Section 09 30 13 "Ceramic Tiling".
2. Section 10 21 13.19 "Plastic Toilet compartment".

1.2 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.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Include electrical characteristics.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

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1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Install toilet and bath accessories per ADA-ABA and CBC Title 24 access requirements.
  - 1. Accessible toilet accessories shall be mounted at heights and at horizontal locations according to CBC Title 24.

1.7 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, visible silver spoilage defects.
  - 2. Warranty Period: 15 years from date of Substantial Completion.

**PART 2 - PRODUCTS**

2.1 PERFORMANCE REQUIREMENTS

- 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.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

- A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.
  - 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. American Specialties, Inc.
    - b. Bobrick Washroom Equipment, Inc.
    - c. Bradley Corporation.

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d. Or equal.

B. Toilet Tissue (Roll) Dispenser (4G/G-004):

1. Basis of Design: Bobrick B-3888
2. Description: Roll-in-reserve dispenser with hinged front secured with tumbler lockset.
3. Mounting: Recessed.
4. Operation: Non-control delivery with theft-resistant spindle.
5. Capacity: Designed for 4-1/2- or 5-inch-diameter tissue rolls.
6. Material and Finish: Stainless steel, No. 4 finish (satin).

C. Toilet Tissue (Roll) Dispenser (4I/G-004):

1. Basis of Design: Bobrick B-386
2. Description: Roll-in-reserve dispenser with hinged front secured with tumbler lockset.
3. Mounting: Partition mounted, serving two adjacent toilet compartments.
4. Operation: Non-control delivery with theft-resistant spindle.
5. Capacity: Designed for 4-1/2- or 5-inch-diameter tissue rolls.
6. Material and Finish: Stainless steel, No. 4 finish (satin).

D. Toilet Tissue (Roll) Dispenser (4H/G-004):

1. Basis of Design: Bobrick B-685
2. Description: Single Roll.
3. Mounting: Surface.
4. Operation: Non-control delivery with theft-resistant spindle.
5. Capacity: Designed for 4-1/2- or 5-inch-diameter tissue rolls.
6. Material and Finish: Stainless steel, No. 4 finish (satin).

E. Paper Towel (Folded) Dispenser (4D/G-004):

1. Basis of Design: Bobrick B-262
2. Mounting: Surface mounted.
3. Minimum Capacity: 400 C-fold or 525 multifold towels.
4. Material and Finish: Stainless steel, No. 4 finish (satin).
5. Lockset: Tumbler type.
6. Refill Indicator: Pierced slots at sides or front.

F. Combination Towel (Folded) Dispenser/Warm Air Dryer/Waste Receptacle (4N/G-004):

1. Basis of Design: Bobrick B-38030 230V
2. Description: Combination unit for dispensing C-fold or multifold towels, automatic hand dryer, and removable waste receptacle.
3. Mounting: Recessed.

a. Designed for nominal 4-inch wall depth.

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4. Minimum Towel-Dispenser Capacity: 450 C-fold or 600 multifold paper towels.
  5. Minimum Waste-Receptacle Capacity: 3.6 gal.
  6. Material and Finish: Stainless steel, No. 4 finish (satin).
  7. Liner: Reusable, plastic waste-receptacle liner.
  8. Lockset: Tumbler type for towel-dispenser compartment and waste receptacle.
  9. Operation: Electronic-sensor activated, shut-off with removal of hands.
  10. Electrical Requirements: 208-240 V, 3-4 A, 750-900 W.
- G. Combination Towel (Folded) Dispenser/Waste Receptacle (4O/G-004):
1. Basis of Design: Bobrick B-3944
  2. Description: Combination unit for dispensing C-fold or multifold towels, with removable waste receptacle.
  3. Mounting: Recessed with projecting receptacle.
    - a. Designed for nominal 4-inch wall depth.
  4. Minimum Towel-Dispenser Capacity: 600 C-fold or 800 multifold paper towels.
  5. Minimum Waste-Receptacle Capacity: 12 gal.
  6. Material and Finish: Stainless steel, No. 4 finish (satin).
  7. Liner: Reusable, vinyl waste-receptacle liner.
  8. Lockset: Tumbler type for towel-dispenser compartment and waste receptacle.
- H. Liquid-Soap Dispenser (4B/G-004):
1. Basis of Design: Bobrick B-2111 (wall mount)
  2. Description: Designed for dispensing soap in liquid or lotion form.
  3. Mounting: Vertically oriented, surface mounted.
  4. Capacity: 40 fl. oz..
  5. Materials: Stainless Steel, No. 4 Finish (satin).
  6. Lockset: Tumbler type.
  7. Refill Indicator: Window type.
- I. Liquid-Soap Dispenser (4B/G-004):
1. Basis of Design: Bobrick B-42 (mirror mount)
  2. Description: Designed for dispensing soap in liquid or lotion form.
  3. Mounting: Vertically oriented, surface mounted.
  4. Capacity: 40 fl. oz..
  5. Materials: Black, Translucent ABS.
  6. Lockset: Tumbler type.
  7. Refill Indicator: Translucent container.
- J. Grab Bar:
1. Basis of Design: Bobrick B-6806.
  2. Mounting: Flanges with concealed fasteners.

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3. Material: Stainless steel, 0.05 inch thick.
    - a. Finish: Smooth, No. 4 finish (satin).
  4. Outside Diameter: 1-1/2 inches.
  5. Configuration and Length: As indicated on Drawings.
- K. Vendor (4E/G-004):
1. Basis of Design: Bobrick B-3706
  2. Type: Sanitary napkin and tampon.
  3. Mounting: Semirecessed.
  4. Capacity: 20 sanitary napkins and 30 tampons.
  5. Operation: Single coin (25 cents).
  6. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).
  7. Lockset: Tumbler type with separate lock and key for coin box.
- L. Sanitary-Napkin Disposal Unit (4J/G-004):
1. Basis of Design: Bobrick B-353
  2. Mounting: Recessed.
  3. Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.
  4. Receptacle: Removable.
  5. Material and Finish: Stainless steel, No. 4 finish (satin).
- M. Sanitary-Napkin Disposal Unit (4L/G-004):
1. Basis of Design: Bobrick B-354
  2. Mounting: Partition mounted, dual access.
  3. Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.
  4. Receptacle: Removable.
  5. Material and Finish: Stainless steel, No. 4 finish (satin).
- N. Sanitary-Napkin Disposal Unit (4K/G-004):
1. Basis of Design: Bobrick B-254
  2. Mounting: Surface.
  3. Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.
  4. Receptacle: Removable.
  5. Material and Finish: Stainless steel, No. 4 finish (satin).
- O. Seat-Cover Dispenser (4M/G004):

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1. Basis of Design: Bobrick B-221
2. Mounting: Surface mounted.
3. Minimum Capacity: 250 seat covers.
4. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).
5. Lockset: Tumbler type.

P. Mirror Unit (4A/G-004):

1. Basis of Design: Bobrick B-1658
2. Frame: Stainless-steel channel.
  - a. Corners: Mitered and mechanically interlocked.
3. Size: 18-inches wide x 36-inches high.
4. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
  - a. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.

Q. Coat Hook (4Q/G-004):

1. Basis of Design: Bobrick B-212
2. Description: Single-prong unit with hard rubber bumper.
3. Material and Finish: Solid cast aluminum, matte finish.

2.3 WARM-AIR DRYERS

A. Source Limitations: Obtain warm-air dryers from single source from single manufacturer.

B. Warm-Air Dryer (4C/G-004):

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. World Dryer Corporation.
  - b. Fastaire.
  - c. Bobrick Washroom Equipment, Inc.
  - d. Or equal.
2. Basis of Design: World Dryer VERDEdri
3. Description: High-speed, warm-air hand dryer.
4. Mounting: Surface mounted, with low-profile design, 4" max.
5. Operation: Sensor activated with timed power cut-off switch.
  - a. Operation Time: 30 seconds.

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6. Cover Material and Finish: Stainless steel, No. 4 finish (satin).
7. Electrical Requirements: 115 V, 8.3 A, 950 W.

2.4 CHILDCARE ACCESSORIES

- A. Source Limitations: Obtain childcare accessories from single source from single manufacturer.
- B. Diaper-Changing Station (4P/G004):
  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. American Specialties, Inc.
    - b. GAMCO Specialty Accessories; a division of Bobrick.
    - c. Koala Kare Products.
  2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
    - a. Engineered to support minimum of 250-lb static load when opened.
  3. Mounting: Surface mounted, with unit projecting not more than 4 inches from wall when closed.
  4. Operation: By pneumatic shock-absorbing mechanism.
  5. Material and Finish: Stainless steel, No. 4 finish (satin), exterior shell with rounded plastic corners; HDPE interior in manufacturer's standard color.
  6. Liner Dispenser: Built in.

2.5 UNDER-LAVATORY GUARDS

- A. Under-lavatory Guard:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Plumberex Specialty Products, Inc.
    - b. Truebro by IPS Corporation.
    - c. Or equal.
  2. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
  3. Material and Finish: Antimicrobial, molded plastic, white.

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2.6 CUSTODIAL ACCESSORIES

- A. Source Limitations: Obtain custodial accessories from single source from single manufacturer.
- B. Mop and Broom Holder (4F/G-004):
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Specialties, Inc.
    - b. Bobrick Washroom Equipment, Inc.
    - c. Bradley Corporation.
    - d. Or equal.
  - 2. Basis of Design: Bobrick B-224
  - 3. Description: Unit with shelf, hooks, and holders..
  - 4. Length: 36 inches.
  - 5. Hooks: Three.
  - 6. Mop/Broom Holders: Four, spring-loaded, rubber hat, cam type.
  - 7. Material and Finish: Stainless steel, No. 4 finish (satin).
    - a. Shelf: Not less than nominal 0.05-inch-thick stainless steel.
    - b. Rod: Approximately 1/4-inch-diameter stainless steel.

2.7 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.
- B. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- C. 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.
- D. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.8 FABRICATION

- 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 Resident Engineer.

TOILET, BATH, AND LAUNDRY ACCESSORIES

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**PART 3 - EXECUTION**

3.1 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. Provide backing where basic substrate is not sufficient to support accessory without additional material.
- C. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

3.2 ADJUSTING 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 instructions.

**END OF SECTION 10 28 00**

**SECTION 10 44 13 - FIRE PROTECTION CABINETS**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for the following:
  - a. Portable fire extinguishers.

B. Related Requirements:

1. Section 10 44 16 "Fire Extinguishers."

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed, semirecessed, or surface-mounting method and relationships of box and trim to surrounding construction.
- B. Shop Drawings: For fire-protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- C. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semirecessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.4 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 FIRE-PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- a. JL Industries, Inc.; a division of the Activar Construction Products Group.
  - b. Larsens Manufacturing Company.
  - c. Potter Roemer LLC.
  - d. Or Equal.
- B. Cabinet Construction: Nonrated.
- C. Cabinet Material: Cold-rolled steel sheet.
- D. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
1. Rolled-Edge Trim: 2-1/2-inch backbend depth.
- E. Cabinet Trim Material: Steel sheet.
- F. Door Material: Steel sheet.
- G. Door Style: Fully glazed panel with frame.
- H. Door Glazing: Tempered float glass (clear).
- I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
- 1. Provide projecting door pull and friction latch operable with 5 lbs. maximum force.
  - 2. Provide continuous hinge of same material and finish as trim, permitting door to open 180 degrees.
- J. Accessories:
- 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
  - 2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.
    - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
      - 1) Location: Applied to cabinet door.

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- 2) Application Process: Pressure-sensitive vinyl letters.
- 3) Lettering Color: Red.
- 4) Orientation: Vertical.

K. Materials:

1. Cold-Rolled Steel: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
  - a. Finish: Baked enamel or powder coat.
  - b. Color: Gloss white.
2. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.2 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
  1. Weld joints and grind smooth.
  2. Provide factory-drilled mounting holes.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
  1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.3 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

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## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine roughing-in for cabinets to verify actual locations before cabinet installation.
- B. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

## 3.3 INSTALLATION

- A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights indicated below:
  - 1. Mount Fire Protection Cabinets to provide a handle height for both the Fire-Protection Cabinet and Fire Extinguisher at a maximum 48" above finished floor. The bottom of surface-mounted Fire Extinguisher Cabinets shall not exceed 27" above finished floor.
- B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
  - 1. Unless otherwise indicated, provide semi-recessed fire-protection cabinets. If wall thickness is inadequate for semi-recessed cabinets, provide surface-mounted fire-protection cabinets.
  - 2. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.
- C. Identification: Apply vinyl lettering at locations indicated.

## 3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire-protection cabinet doors to operate easily without binding.
- C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

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- E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

**END OF SECTION 10 44 13**

**SECTION 10 44 16 - FIRE EXTINGUISHERS**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Requirements:
  - 1. Section 10 44 13 "Fire Protection Cabinets."

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure of hydrostatic test according to NFPA 10.
    - b. Faulty operation of valves or release levers.

FIRE EXTINGUISHERS

10 44 16 - 1

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

**PART 2 - PRODUCTS**

2.1 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Amerex Corporation.
    - b. Ansul Incorporated; Tyco International.
    - c. Potter Roemer LLC.
    - d. Or Equal.
  2. Valves: Manufacturer's standard.
  3. Handles and Levers: Manufacturer's standard.
  4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.
- B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 2-A:10-B:C, 5-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
  1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

FIRE EXTINGUISHERS

10 44 16 - 2

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3.2 INSTALLATION

- A. General: Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.
  - 1. Mount Fire Extinguishers to provide handle height at a maximum of 48” above finish floor, and the bottom of the fire extinguisher is at a maximum of 27” above finish floor.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

**END OF SECTION 10 44 16**

**SECTION 113100 - RESIDENTIAL APPLIANCES**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Refrigeration appliances.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include installation details, material descriptions, dimensions of individual components, and finishes for each appliance.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

B. Sustainable Design Submittals:

1. Product Data: For indicated products, indicating compliance with requirements for ENERGY STAR product labeling.

1.3 INFORMATIONAL SUBMITTALS

A. Sample Warranties: For manufacturers' special warranties.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each residential appliance to include in operation and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Maintains, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

1.6 WARRANTY

A. Special Warranties: Manufacturer agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.

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1. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain residential appliances from single source.

2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Appliances: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with applicable provisions in the DOJ's 2010 ADA Standards for Accessible Design the ABA standards of the Federal agency having jurisdiction and ICC A117.1.

2.3 REFRIGERATOR/FREEZERS

- A. Refrigerator/Freezer: French door refrigerator/freezer complying with AHAM HRF-1.
  1. Basis-of-Design Product: Subject to compliance with requirements provide GE Model #GNE21FSKSS or a comparable product by one of the following:
    - a. Whirlpool
    - b. Maytag
    - c. Or equal
  2. Type: Freestanding.
  3. Dimensions:
    - a. Width: 30 inches.
    - b. Depth: 36 inches.
    - c. Height: 70 inches.
  4. Storage Capacity:
    - a. Refrigeration Compartment Volume: 20.8 cu. ft..
    - b. Refrigeration Compartment Volume: 6 cu. ft..
  5. Refrigerator Features:
    - a. Interior light in refrigeration compartment.
  6. Freezer Features: One freezer compartment configured as pull-out drawer.
    - a. Automatic defrost.
    - b. Interior light in freezer compartment.

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- c. Automatic icemaker and storage bin.
- 7. ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product-labeling program.
- 8. Appliance Color/Finish: Stainless steel.

2.4 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of residential appliances.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before appliance installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install appliances according to manufacturer's written instructions.
- B. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
  - 1. Perform visual, mechanical, and electrical inspection and testing for each appliance according to manufacturers' written recommendations. Certify compliance with each manufacturer's appliance-performance parameters.

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2. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
  3. Operational Test: After installation, start units to confirm proper operation.
  4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.
- B. An appliance will be considered defective if it does not pass tests and inspections.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain residential appliances.

**END OF SECTION 113100**

**SECTION 12 21 13 - HORIZONTAL LOUVER BLINDS**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Horizontal louver blinds with polymer slats.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry for wood blocking and grounds for mounting horizontal louver blinds and accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For horizontal louver blinds, include fabrication and installation details.

C. Samples: For each exposed product and for each color and texture specified, 12 inches long.

D. Product Schedule: For horizontal louver blinds. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For horizontal louver blinds with polymer slats that have been tested for compliance with NFPA 701, for tests performed by a qualified testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For horizontal louver blinds to include in maintenance manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver horizontal louver blinds in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet-work and finish work in spaces, including painting, is complete and dry and ambient

HORIZONTAL LOUVER BLINDS

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temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

- B. Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Construction Manager of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. Source Limitations: Obtain horizontal louver blinds from single source from single manufacturer.

2.2 HORIZONTAL LOUVER BLINDS, ALUMINUM SLATS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Hunter Douglas Contract.
  - 2. Levolor Contract; a Newell Rubbermaid company.
  - 3. Springs Window Fashions; SWFcontract.
  - 4. Or Equal.
- B. Flame-Resistance Rating: Comply with NFPA 701; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- C. Slats: Aluminum; alloy and temper recommended by producer for type of use and finish indicated; with crowned profile and radius corners.
  - 1. Width: 1 inch.
  - 2. Thickness: Not less than 0.008 inch.
  - 3. Spacing: Manufacturer's standard.
  - 4. Finish: Ionized antistatic, dust-repellent, baked polyester finish.
  - 5. Features:
    - a. Lift-Cord Rout Holes: Minimum size required for lift cord and located near back (outside) edge of slat to maximize slat overlap and minimize light gaps between slats.
- D. Headrail: Formed steel or extruded aluminum; long edges returned or rolled. Headrail fully encloses operating mechanisms on three sides and ends.
  - 1. Capacity: One blind(s) per headrail unless otherwise indicated.
  - 2. Manual Lift Mechanism:

HORIZONTAL LOUVER BLINDS

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- a. Lift-Cord Lock: Variable; stops lift cord at user-selected position within full operating range.
  - b. Operator: Extension of lift cord(s) through lift-cord lock mechanism to form cord pull.
3. Manual Tilt Mechanism: Enclosed worm-gear mechanism and linkage rod that adjusts ladders.
- a. Tilt: Full.
  - b. Operator: Clear-plastic wand.
  - c. Over-Rotation Protection: Manufacturer's detachable operator or slip clutch to prevent over rotation of gear.
- E. Bottom Rail: Secures and protects ends of ladders and lift cords.
- 1. Type: Manufacturer's standard formed-steel or extruded-aluminum tube, with plastic or metal capped ends.
- F. Lift Cord: Manufacturer's standard braided cord.
- G. Ladders: Evenly spaced across headrail at spacing that prevents long-term slat sag.
- 1. Type: Cloth tape, manufacturer's standard width.
- H. Valance: Manufacturer's standard.
- I. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated.
- 1. Type: Wall unless indicated otherwise.
  - 2. Intermediate Support: Provide intermediate support brackets to produce support spacing recommended by blind manufacturer for weight and size of blind.
- J. Colors, Textures, Patterns, and Gloss:
- 1. Slats: As selected by Architect from manufacturer's full range.
  - 2. Components: Provide rails, cords, ladders, and materials exposed to view matching or coordinating with slat color unless otherwise indicated.

2.3 HORIZONTAL LOUVER BLIND FABRICATION

- A. Product Safety Standard: Fabricate horizontal louver blinds to comply with WCMA A 100.1 including requirements for corded, flexible, looped devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
  - 1. Outside of Jamb Installation: Width and length as indicated, with terminations between blinds of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

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- C. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.
  - 1. Lift-and-Tilt Mechanisms: With permanently lubricated moving parts.
- D. Mounting and Intermediate Brackets: Designed for removal and reinstallation of blind without damaging blind and adjacent surfaces, for supporting blind components, and for bracket positions and blind placement indicated.
- E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to brackets and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.
- F. Color-Coated Finish:
  - 1. Metal: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install horizontal louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.
  - 1. Install mounting and intermediate brackets to prevent deflection of headrails.
  - 2. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.

3.3 ADJUSTING

- A. Adjust horizontal louver blinds to operate free of binding or malfunction through full operating ranges.

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3.4 CLEANING AND PROTECTION

- A. Clean horizontal louver blind surfaces after installation according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensures that horizontal louver blinds are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged horizontal louver blinds that cannot be repaired in a manner approved by the Resident Engineer before time of Substantial Completion.

**END OF SECTION 12 21 13**

**SECTION 123661.16 - SOLID SURFACING COUNTERTOPS**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid surface material countertops.
2. Solid surface material backsplashes.
3. Solid surface material end splashes.
4. Solid surface material apron fronts.
5. Solid surface material sinks.

B. Related Requirements:

1. Section 224216.16 "Commercial Sinks" for non-integral sinks and plumbing fittings.

1.2 ACTION SUBMITTALS

A. Product Data: For countertop materials.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
3. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

1. Show locations and details of joints.
2. Show direction of directional pattern, if any.

D. Samples for Verification: For the following products:

1. One full-size solid surface material countertop, with front edge and backsplash, 8 by 10 inches, of construction and in configuration specified.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

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1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of countertops.

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.7 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Avonite Surfaces.
    - b. Corian
    - c. Formica Corporation.
    - d. Wilsonart.
  - 2. Type: Provide Standard type unless Special Purpose type is indicated.
  - 3. Colors and Patterns: As selected by Architect from manufacturer's full range.
- B. Composite Wood Products: Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.

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- C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

## 2.2 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions.
  - 1. Grade: Custom.
- B. Configuration:
  - 1. Front: 2 inch eased edge.
  - 2. Backsplash: Radius edge with 3/8-inch radius.
  - 3. End Splash: Matching backsplash.
- C. Countertops: 1/2-inch-thick, solid surface material with front edge built up with same material.
- D. Backsplashes: 1/2-inch-thick, solid surface material.
- E. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
  - 1. Fabricate with loose backsplashes for field assembly.
- F. Joints: Fabricate countertops in sections for joining in field.
  - 1. Joint Locations: Not within 18 inches of a sink or cooktop and not where a countertop section less than 36 inches long would result, unless unavoidable.
  - 2. Splined Joints: Accurately cut kerfs in edges at joints for insertion of metal splines to maintain alignment of surfaces at joints. Make width of cuts slightly more than thickness of splines to provide snug fit. Provide at least three splines in each joint.
- G. Cutouts and Holes:
  - 1. Counter-Mounted Plumbing Fixtures: Prepare countertops for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
  - 2. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.
  - 3. Counter-Mounted Cooktops: Prepare countertops in shop for field cutting openings for cooktops. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

## 2.3 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.
  - 1. Adhesives shall have a VOC content of 70 g/L or less.
  - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

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- B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.
- B. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- C. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- D. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
  - 1. Install metal splines in kerfs in countertop edges at joints. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
  - 2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- E. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- F. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Pre-drill holes for screws as recommended by manufacturer.
- G. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
  - 1. Seal edges of cutouts in particleboard subtops by saturating with varnish.

H. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

**END OF SECTION 123661.16**

**SECTION 14 24 00 - MODULAR HYDRAULIC ELEVATOR - ADDITIVE ALTERNATE B**

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Section Includes:

1. Modular Hydraulic Passenger Elevator
2. Passenger cab with doors and frames; hoistway entrance doors and frames.
3. Motor and pump, controllers, hoistway, equipment, and accessories.

B. Related sections:

1. 033053 Miscellaneous Cast-In-Place Concrete
2. 071700 Bentonite Waterproofing

1.2 REFERENCES

- A. CAS/CAR – California Accessibility Statutes And California Accessibility Regulations, 2013 California Building Code.
- B. ASME A17.1 – 2004 – Safety Code For Elevators And Escalators.
- C. ASME A17.1 – 2005 Handbook – Handbook Safety Code For Elevators And Escalators.
- D. AWD D1.1 – Structural Welding Code, Steel. 2010
- E. CEC – California Electrical Code.
- F. NFPA 80 – Fire Doors and Windows.
- G. UL 10B – Fire Tests of Door Assemblies.
- H. APA – American Plywood Association.
- I. ASTM A36 – Structural Steel.
- J. ASTM A1008/A1008M – Steel, Sheet, Cold-Rolled, Carbon, Structural, High Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- K. ASTM A139 – Electric-Fusion (ARC)-Welded Steel Pipe (NPS 4-in. and Over).
- L. ASTM A167 – Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- M. ASTM B221 – Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- N. NEMA LD3 – High Pressure Decorative Laminates.
- O. NEMA MG1 – Motors and Generators.
- P. Steel Structures Painting Council (SSPC) – Steel Structures Painting Manual.
- Q. IR 16.1.13 – Design and Construction Requirements for Relocatable Buildings.
- R. ASTM D1785, PVC Plastic Pipe, Schedules 40, 80, and 120.
- S. Chapters 11B, 16A and Chapter 30, California Building Code. CBC 11B-407 and 3001.1.1 with exception, and 3001.3
- T. California Building Code, Section 1117B.5 for Signage.

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- U. ASTM A500 Grade B (Fy=46ksi) – HSS Structural Steel Tube.
- V. A307 – Carbon Steel and Galvanized Steel Machine Bolts.
- W. FA36 – Hardened Steel Washers.
- X. AISC 360-OS- Structural Steel Design Manual.
- Y. California Code of Regulations, Title 8.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate the following information:
  - 1. Dimensioned plan of hoistway and machine room and full height section through hoistway.
  - 2. Motor and hydraulic pump, valve, controller, selector, governor and other component locations.
  - 3. Car, guide rails, buffers, and other components in hoistway.
  - 4. Rail bracket spacing; maximum loads imposed on guide rails.
  - 5. Clearances and over travel of car.
  - 6. Location of components in machine room.
  - 7. Location in hoistway and machine room of connections for car light and telephone.
  - 8. Location and sizes of access doors, doors, and frames.
  - 9. Electrical characteristics and connection requirements.
  - 10. Show suggested arrangement of equipment in machine room so moving elements and other equipment can be removed for repairs and replaced without disturbing other components. Arrange equipment for clear passage through access door.
  - 11. Signal and operating fixtures, operating panels, indicators.
- B. Product Data:
  - 1. Cab design, dimensions, layout, and components.
  - 2. Cab and hoistway door and frame details.
  - 3. Electrical characteristics and connection requirements.
- C. Samples shall be provided, illustrating cab interior finishes, car and hoistway door and frame finishes.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Seismic Qualification Certificates: For elevator equipment, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

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- C. Manufacturer Certificates: Signed by elevator manufacturer, certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.

1.5 OPERATION AND MAINTENANCE DATA

- A. Include a parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
- B. Provide technical information for servicing operating equipment.
- C. Include legible schematic of hydraulic piping and wiring diagrams of installed electrical equipment, and changes made in the Work. List symbols corresponding to identify or markings on machine room and hoistway apparatus.
- D. Provide one copy of master electric and hydraulic schematic.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with ASME A17.1, AWS D1.1, CEC, AISC, and as supplemented in this section.
- B. Fabricate and install door and frame assemblies in accordance with NFPA 80 and UL 10B
- C. Maintain one copy of each document on site.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified.
- B. Installer: Elevator Company specializing in performing the work of this section, approved by modular elevator system manufacturer.

1.8 WARRANTY

- A. Provide one year manufacturer's warranty
- B. Warranty: Include coverage for elevator operating equipment and devices.

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1.9 MAINTENANCE SERVICE

- A. Warranty: Provide special project warranty, signed by the Contractor, Installer and Manufacturer, agreeing to replace/repair/restore defective materials and workmanship of elevator work during warranty period. “defective” is hereby defined to include, but not by way of limitation, operation or control system failures, performances below required minimums, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration, and similar unusual, unexpected and unsatisfactory conditions.
  - 1. The warranty period is for 12 months starting on date of acceptance by the State of Elevator inspector or 13 months from delivery of modular elevator unit, whichever is the least.
  
- B. Maintenance Service: Include maintenance by skilled competent employees of Elevator Installer for a period of 12 months following date of acceptance by DOSH and District Inspectors. Include monthly preventative maintenance, performed during normal working hours. Include repair/replacement of worn or defective parts or components and lubrication, cleaning and adjusting as required for proper elevator operation in conformance with specified service. Exclude only repair/replacement due to misuse, abuse, accidents for neglect cause by persons other than Installer’s personnel.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products of the following manufacturers from the basis of design and quality intended.
  - 1. Modular Elevator Manufacturing, Inc.
  - 2. Phoenix Modular Elevator
  - 3. Or equal

2.2 PERFORMANCE REQUIREMENTS

- A. Hydraulic Elevator System; in-ground, with motor and pump adjacent. System includes jacks, as per drawings, car, wiring, pump unit, oil storage tank, controller, guide rails, entrances, and modular equipment room (if applicable). Pre-manufactured hoistway structure with 5/8” Type “X” brown board exterior, plywood roof with removable lifting eyes. Modular equipment, where applicable, wired and ready for electrical hook-up. Interior will be unfinished. Equipment room shall be installed in

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the field (by elevator contractor). Aluminum transition threshold shall be installed after modular elevator has been set, plumbed, anchored, and grouted to provide a smooth transition from landing floors to elevator sills at applicable entrances.

B. Characteristics:

1. Rated Net Capacity: 3500 lbs.
2. Rated Speed: 125 feet per minute
3. Operating System: Single Automatic.
4. Clear Car Inside: 6'-8" wide X 5'-3" front to back
5. Platform Size: 6'-10 1/2" wide X 6'-0" front to back
6. Cab Height: 8'-0"
7. Door Type: Single-Speed, Side Slide.
8. Door Size: 3'-6" wide X 7'-0" high
9. Door Operation: Automatic, direct current powered.
10. No. of Stops: Three (3) In Line; Travel: 20'-0"
11. Other Features: Battery Lowering; Sound Isolation Couplings –One In Pit, One In Machine Room. Non-Proprietary Components.
12. Hoistway and Roof Exterior Finish Furnished and Installed By Others.

C. Door Control Features:

1. Program door control to open doors automatically when car arrives at floor.
2. Render "Door Close" button inoperative when car is standing at dispatching terminal with doors open.
3. If doors are prevented from closing for approximately twenty seconds because of an obstruction, automatically disconnect door reopening devices, close doors more slowly until obstruction is cleared, Section 11B-407.3.3 Sound buzzer.
4. Door Safety Devices: Equip with photo-electric light rays or object proximity detector device capable of sensing an object or person in the path of a closing door without requiring contact for activation at minimum 5 inches and 29 inches above the floor, Section 11B-407.3.3.1.

D. Interconnect elevator control system with building fire alarm.

E. Seismic Design: In accordance with Section 1613A, 1614A, California Building Code and California Elevator Safety Regulations Code, Part 7, Title 24, CCR.

2.3 SINGLE AUTOMATIC OPERATION – SINGLE CAR

- A. Set system operation so that upon momentary pressure of a hall button from another landing dispatches car to that landing.
- B. Allow call registered by momentary pressure of hall button at any time to remain registered until car stops in response to that call at that landing.

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- C. If hoistway door is not opened within a short interval after car has stopped at registered landing, allow car to respond to any call from the other landing.

2.4 FIREFIGHTER'S SERVICE

- A. Provide "Firefighter's Operation" in accordance with ASME A17.1. 2004
- B. Designated Landing: Main floor.
- C. Alternate Landing: Lower Floor.

2.5 INDEPENDENT SERVICE

- A. Provide key operated "Independent Service" in car operating panel, or in service cabinets, if provided. Key activation will remove that car from normal operation and cancel all pre-registered car and hall calls. Operation shall be from car buttons only.
- B. Car will respond to selected floor. Car will not respond to any calls from hall call buttons. Car will only respond to calls placed on the car operating panel. Doors will remain open at last landing requested. Doors will close with a constant pressure on "DOOR CLOSE" button.
- C. Key cannot be removed during independent service operation. Key activation to normal operation will return car to normal operation.

2.6 LIMITED ACCESS SERVICE

- A. Keyed Hall Call Control Switch: Incorporate in each floor key call switch feature to register a hall call. Keyed to Adams typical AE102 key. When activated, calls the elevator to that designated floor.

2.7 MATERIALS

- A. Rolled Steel Sections, Shapes, Rods: ASTM A36
- B. Casing: ASTM A139, Grade A Steel or ASTM D1785 Schedule 80 PVC Pipe.
- C. Sheet Steel: ASTM A1008 with commercial bright finish.
- D. Stainless Steel: ASTM A167, Type 304, No. 4 finish
- E. Aluminum: ASTM B221, extruded.

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- F. Particle Board: ANSI 208.1, 47 lbs/cu.ft
- G. Plastic Laminate: NEMA LD3, 0.050 inch thick; color/pattern and surface finish as selected.

2.8 FINISH MATERIALS

- A. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.
- B. Primer for Wood Surfaces; Alkyd primer sealer.
- C. Finish Paint (for Metal Surfaces); Alkyd enamel, semi-gloss color as selected.
- D. Finish Paint (for Wood Surfaces); Alkyd enamel, semi-gloss color as selected.

2.9 EQUIPMENT

- A. Motor, Pumps, Valves, Regulators, Fluid Tank, Hydraulic Fluid, Controller, Controls, Buttons, Wiring and Devices, Indicators: Required by CEC.
- B. Guide Rails, Cables, Spring Buffers, Attachment Brackets and Anchors: Purpose designed, sized according to code with safety factors.

2.10 ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Electrical Characteristics
  1. 208 volts or 480 volts, 3 phase, 60 hertz
  2. Lighting 120 volts, 1ph, 60 hertz, 20 amps.
  3. Refer to Electrical Division Sections for electrical service for elevators to and including disconnect switch, transfer switch, and connection from auxiliary contacts in transfer switch to controller.
- B. Motor: NEMA MG1.
- C. Disconnect Switch: Factory mount disconnect switch on control panel.

2.11 ELECTRICAL COMPONENTS

- A. Boxes, Conduit, Wiring, and Devices: Required by CEC.
- B. Fittings: Steel compression type for electrical metallic tubing. Fittings with set screws are acceptable only when a separate grounding conductor is also installed across the joint.
- C. Spare Conductors: Include 10 percent extra conductors and two pairs of shielded audio cables in traveling cables. Do not parallel conductors to increase electric current capacity unless individually fused.
- D. Do not use armored flexible metal conduit as a grounding conductor.
- E. Include wiring and connection to elevator devices remote from hoistway and between elevator machine rooms. Provide additional components and wiring to suit machine

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room layout.

- F. Battery-Powered Lowering: If power fails, cars that are at a floor remain at that floor, cycle their doors, and shut down with the doors closed. Cars that are between floors are lowered to a field programmable floor, cycle their doors, and shut down with the doors closed. Cars that are below the field programmable floor are lowered to the next lower floor, cycle their doors, and shut down with the doors closed. System includes rechargeable battery and automatic recharging system.

2.12 LUBRICATION

- A. Grease Fittings: For lubricating bearings requiring periodic lubrication.
- B. Grease Cups: Automatic feed type.
- C. Lubrication Points: Visible and easily accessible.

2.13 CAR FABRICATION

- A. Frame: Structural steel members
- B. Platform: Steel frame, with fireproofed plywood sub flooring assembly, ready to receive underlayment and floor finish.

2.14 CAB FABRICATION

- A. Flooring: Resilient tile flooring (5/8" recess), of type specified in Section 09651 (furnished and installed by others)
- B. Roof: 12 gauge galvaneal painted white panels.
- C. Side & Rear Walls: Steel Shell With Plastic Laminate Flush Walls (std. colors)
- D. Front Return Panel: #4 Stainless Steel 3-Piece Swing
- E. Car Interior Door: #4 Stainless Steel
- F. Suspended Ceiling: Translucent Panels mounted in #4 Stainless Steel Frame
- G. Light Fixtures: Standard Fluorescent Lighting
- H. Hand Rail At Rear: Stainless steel, 2" X 1/4" Bar, spaced from wall 1 1/2 inches at rear wall, 32 inches above finish floor.
- I. Ventilation: Heavy Duty One Speed Fan above ceiling;

2.15 FIXTURES

- A. Control Panel and Face Plate: #4 Stainless steel with illuminating call buttons.
- B. Indicator Panel: Above control panel with illuminating position indicators.

2.16 CAB INTERIOR DOOR (DOOR INSIDE CAB)

- A. Cab Interior Door: #4 Stainless Steel; 16 gauge thick metal, of insulated

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- sandwich panel construction, flush design, rolled profiles, rigid construction.
- B. Cab Interior Door Frame: #4 Stainless Steel; 16 gauge thick metal.
- C. Thresholds: Extruded aluminum type.

2.17 HOISTWAY ENTRANCE DOORS (IN HALLWAYS)

- A. Hoistway Door (Main Floor): Primer Steel-Finish Paint By Others; 16 gauge thick metal, of insulated sandwich panel construction, flush design, rolled profiles, rigid construction. Single Slide Side.
- B. Hoistway Door Frames (Main Floor): Primer Steel-Finish Paint By Others-; 16 gauge thick metal, of rolled profiles, bolted with smooth invisible joints. Single side UL "B" labeled.
- C. Hoistway Door (Other Floor): Primer Steel- Finish Paint By Others-; 16 gauge thick metal, of hollow sandwich panel construction, flush design, rolled profiles, rigid construction. Single slide side.
- D. Hoistway Door Frames (Other Floor): Primer Steel-Finish Paint By Others; 16 inch thick metal, or rolled profiles, bolted with smooth invisible joints.
- E. Door and Frame Construction: UL 1½ hour fire rating; insulated sandwich panel door construction 1¼ inch thick, minimum.
- F. Sills: Extruded Aluminum.

2.18 FINISHES

- A. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; and painted.
- B. Machine Room Components: Clean and degrease; paint prime one coat.
- C. Galvanized Surfaces: Clean with neutralizing solvent.
- D. Aluminum: Clear anodized.
- E. Stainless Steel: No. 4 Brushed, Type 302.

2.19 MACHINE ROOM INTERFACING MONITOR PROVISIONS

- A. Fabricate one multiple terminal block in controller relay panel or selector, in location indicated, for connection of monitoring devices for:
  1. Hall and car registration circuits.
  2. Load weighing circuits.
  3. Up and down peak programming circuits.
  4. Independent service switches (Optional).

2.20 CAR OPERATING PANEL

- A. Provide one flush mounted operating panel per car with applied faceplate; containing illuminated call buttons, minimum ¾ inches and raised 1/8 inch above surrounding surface corresponding to floors served, in-car alarm button, and DOOR OPEN DOOR

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CLOSE buttons.

- B. Position alarm button and emergency stop where it is unlikely to be accidentally actuated; not more than 54 inches above cab floor and must be 35 inches above finish floor, located minimum 24 inches clear from center line of panel from cab corner.
- C. Include service cabinet or fire cabinet, with hinged door and lock in each car (optional).
- D. Certificate Frame and Glazing: Metal frame, clear plastic attached with tamper proof screws.
- E. Standard Car Position Indicator: 2" High, 16 Segmented.
- F. Standard Car Direction Lantern Mounted in Car Door Frame.
- G. Emergency Light.
- H. Telephone Speaker: Hands-free telephone speaker no higher than 4 feet above floor.
- I. Vandal Resistant per City of San Diego standards.

2.21 LANDING CONTROLS

- A. Landing Keyed Call Controls: Illuminating type, one for originating UP and one for originating DOWN calls, one button only at terminating landings; marked with arrows, including indications required by CAS/CAR and CBC 11B-408.2
- B. Landing Position Indicators: None.

2.22 PROVISION FOR DISABLED

- A. Comply with CAS/CAR.
- B. Provide indicators near controls in conformance with CAS/CAR.
- C. Landing Keyed Call Controls: Illuminating type, one for originating UP and one for originating DOWN calls, one button only at terminating landings; marked with arrows, including indications required by CAS/CAR and CBC 11B-408.2.
- D. Locate highest button in elevator cab control panel and the center of the telephone handset, not more than 40 inches above floor level.
- E. Sound audible tone signal in car when car is stopping at a floor, once at first floor twice at second floor.
- F. Include with illuminated landing indicators, audible tone signals; once for UP stops and twice for DOWN stops.
- G. In each cab provide Arabic numerals 2 inches height raised 1/32 inch and Contracted Grade 2 Braille symbols immediately to left of floor buttons to identify each floor. Dots shall be 1/10 inch (2.54 mm) on centers in each cell with 2/10 inch (0.635 mm) above the background. Minimum separation of 5/8 inch between rows of buttons.
- H. At each floor landing provide 2 inch in height floor landing Arabic numerals raised 1/32 inch and Contracted Grade 2 Braille symbols immediately to the left of the numeral per CBC Section 3003.4.16a and 11B-407.2.3.1. Install 60 inches above finish floor. The raised characters shall be on a contrasting background.

2.23 HYDRAULIC SUSPENSION MEANS:

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- A. Manufacturers standard twin jacks, or in-ground direct plunger systems.

2.24 HYDRAULIC DRIVING MEANS:

- A. Fully integrated pump unit, including motor, pump, valve and overload protection.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that pit, and equipment room slab are ready for work of this section.
- B. Verify that electrical power is available and of the correct characteristics.
- C. Verify that low voltage service including, as applicable, telephone, smoke detectors, and heat sensors are available and of correct characteristics.

3.2 INSTALLATION

- A. Install in accordance with ASME A17.1
- B. Install modular elevator structure plumb and aligned with landings within  $\frac{1}{2}$ ". Secure in place, grout, install hydraulic piping between elevator and pump unit, connect all elevator electrical.
- C. Provide conduit, boxes, wiring, and accessories.
- D. Mount motor and pump unit on vibration and acoustic isolators, on bed plate and concrete pad. Place unit on structural supports and bearing plates. Securely fasten to building supports. Prevent lateral displacement.
- E. Accommodate equipment in space indicated or modular equipment room.
- F. Install guide rails using threaded bolts.
- G. Accurately machine and align guide rails. Form smooth joints with machined splice plates.
- H. Weld brackets directly to structural steel hoistway framing.
- I. Field Welds: Chip and clean away oxidation and residue, wire brush; spot prime with two coats.
- J. Install hoistway door sills, frames, and headers in hoistway modular walls. Set entrances in vertical alignment with car openings and aligned.
- K. Adjust equipment for smooth and quiet operation.

3.3 TOLERANCES

- A. Guide Rail Alignment: Plumb and parallel to each other within 1/8 inch in accordance with ASME A17.1 and ASME A17.2
- B. Cab Movement on Aligned Guide Rails: Smooth movement, with no objectionable

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lateral or oscillating movement or vibration.

3.4 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division 1, General Requirements.
- B. Perform tests required by ASME A17.2
- C. Supply instruments and execute specific tests.
- D. Perform the following test in the presence of the Owner and Architect.
  - 1. Test elevator system by transporting at least 5 persons provided by owner up from main floor during a five minute period.

3.5 TESTS BY REGULATORY AGENCIES

- A. Testing by regulatory agencies will be performed at their discretion.

**END OF SECTION 142400**

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**SECTION 211300 – FIRE SUPPRESSION SYSTEM – ADDITIVE ALTERNATE ‘A’**

PART 1 - GENERAL

1.1 GENERAL AND SPECIAL CONDITIONS

- A. General and special conditions apply to the work in this section.
- B. The Contractor shall furnish all equipment, materials, tools, labor, engineering, drawings, etc. necessary for a complete fire protection system, with said systems being made ready for operation in accordance with the requirements of the Authorities Having Jurisdiction. The purpose of the permit drawings and specifications is to convey to the Contractor the scope of work required, all of which the Contractor is responsible to furnish, install, adjust, and make operable. The omission by the Owner of any necessary system component as required by the Authorities Having Jurisdiction, in the specifications shall not relieve the Contractor of the responsibility for providing such necessity, without additional cost to the Owner. The Contractor shall visit the site before submitting his bid and shall examine all existing physical conditions that may be material to the performance of his work. No extra payments will be allowed to the Contractor as a result of extra work made necessary by his failure to do so. Any case of error, omission, discrepancy or lack of clarity shall be promptly identified to the Owner, Architect, and Engineer for clarification prior to the bid due date.
- C. The Contractor shall provide all devices and equipment required by these specifications. Under no circumstances will the Contractor delete any equipment or devices without the written directive of the Owner.

1.2 SYSTEM ABBREVIATIONS AND DEFINITIONS

- A. AHJ – Authority Having Jurisdiction.
- B. ANSI – American National Standards Institute.
- C. Approved – Unless otherwise stated, materials, equipment or submittals approved by the Engineer.
- D. Architect – Platt/Whitelaw Architects, Inc.
- E. ASTM – American Society for Testing and Materials.
- F. AWS – American Welding Society.
- G. AWWA – American Water Works Association.
- H. Concealed – Where used in connection with installation of piping or conduit and accessories, shall mean, “Hidden from sight” as in shafts, furred spaces, in soffits or above suspended ceilings.
- I. Contractor – The Company awarded the prime contract for this work and any of its subcontractors, vendors, suppliers, or fabricators.

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- J. Engineer – Jensen Hughes.
- K. Exposed – Where used in connection with installation of piping or conduit and accessories, shall mean “visible” or “not concealed.”
- L. FM – FM Global.
- M. FM Approved – Materials or equipment approved by Factory Mutual and included in the most recent edition of the FM Approval Guide.
- N. Furnish – Supply materials.
- O. GPM – Gallons per minute.
- P. Install – Install materials, mount, and connect equipment or assemblies.
- Q. IRI – Industrial Risk Insurers.
- R. ISO – Insurance Services Office.
- S. NFPA – National Fire Protection Association.
- T. PIV – Post indicating valve.
- U. Provide – Furnish, install, and connect.
- V. PSI – pounds per square inch.
- W. QR – Quick Response Sprinkler
- X. Remove – Remove material and equipment and restore surface.
- Y. UL – Underwriters Laboratories, Inc.
- Z. UL Listed – Materials or equipment by Underwriters Laboratories and included in the most recent edition of the UL Fire Protection Equipment Directory.

1.3 SCOPE OF WORK

- A. Provide complete fire protection system for the Recreation Center outlined in the project specifications, including all labor, materials, permits, shop drawings and hydraulic calculations needed to furnish and install a complete and functional automatic sprinkler system, and all of the following:
  - 1. Wet pipe automatic sprinkler system throughout, complete with supervised control valve (omit riser control valve when Post Indicator Valve is installed on the underground fire lateral), inspector’s test and main drain assemblies, vane type water flow switch, and pressure gauges.
  - 2. Connect to underground furnished in phase 1. Connect to underground stub and elbow into Room 152 and build riser inside room.
  - 3. Earthquake bracing and flexible couplings.

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4. Furnish, install, and adjust all waterflow and valve supervisory switches.
5. Coordinate all work with other trades.
6. Install pipe offsets as required to coordinate around other trades.
7. Coordination and interface of alarm initiating and supervisory devices with the fire alarm system.
8. Demo and replace ceiling for sway bracing and hanger installation.
9. Control valve for sprinklers in the elevator shafts and elevator machine rooms.
10. Shop drawings.
11. Two (2) sets of operating instructions and valve diagrams.
12. As-built drawings. The Contractor will be required to provide as-built drawings on disk/CD in AutoCAD format, in addition to required reproducible and blue-line drawings.
13. On-site project supervision.
14. Required signs in English at all control valves, main drains, auxiliary drains and inspector's test connections, etc., including hydraulic placards, in accordance with NFPA 13 requirements.
15. All required system testing in accordance with NFPA 13, 24, and 25.
16. Warranty on all materials and labor.
17. All permits, taxes, and fees, including AHJ inspection and testing fees necessary to complete the specified work.

1.4 RELATED WORK

A. Materials and methods specified in other sections, included but not limited to:

1. Cutting and patching.
2. Fire extinguishers, cabinets, and accessories.
3. Painting of finished surfaces at pipe penetrations by other than Contractor.
4. Grading.

B. Materials furnished and installed in this section but wired by others:

1. Valve supervisory devices shall be furnished and installed by the Contractor but wired by the alarm contractor.
2. Waterflow switches shall be furnished and installed by the Contractor but wired by the alarm contractor.

1.5 DESIGN CRITERIA

A. Sprinkler System

1. Office, basement area below framed floor, dance studio, break areas, restrooms, and associated support spaces: Wet system with a K-Factor of 5.6, spaced to a maximum of 130 square feet to 225 square feet per sprinkler in accordance with construction. The system shall be designed to provide 0.10 gpm per square foot for the most remote 1,500 square foot area with a hose demand of 100 gpm (Light Hazard).

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2. Multi-purpose room, boiler room, electrical, mechanical, and small storage rooms: Wet system with a K-Factor of 5.6, spaced to a maximum of 130 square feet per sprinkler. The system shall be designed to provide 0.15 gpm per square foot for the most remote 1,500 square foot area with a hose demand of 250 gpm (Ordinary Hazard).

B. Water Supply

1. Pipe sizing will be determined by hydraulic calculations in accordance with NFPA 13 requirements and will be based upon the flow test results from City OF San Diego Water Department.

1.6 APPLICABLE STANDARDS

- A. National Fire Protection Association 13 (NFPA 13) – “Standard for the Installation of Sprinkler Systems,” 2013 Edition.
- B. National Fire Protection Association 24 (NFPA 24) – “Standard for the Installation of Private Fire Service Mains,” 2013 Edition.
- C. National Fire Protection Association 25 (NFPA 25) – “Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems,” 2014 Edition as amended by the State of California.
- D. California Building Code (CBC), 2013 Edition.
- E. California Fire Code (CFC), 2013 Edition.
- F. Local Policies.
- G. American National Standards Institute, Inc. (ANSI) Standards, current editions:
  1. A21.10 a – Gray-Iron and Ductile-Iron Fittings, 2 inch through 48 inch for Water and Other Liquids.
  2. A21.11 – Rubber-Gasket Joints for Cast-Iron and Ductile-Iron Pressure Pipe and Fittings.
  3. B16.1 – Cast-Iron Pipe Flanges and Flanged Fittings, 24, 125, 250, and 800 pounds.
  4. B16.3 – Malleable-Iron Threaded Fitting, Class 150 and 300.
  5. B16.4 – Cast-Iron Threaded Fitting, Class 125 and 250.
  6. B18.2.1 – Square and Hex Bolts and Screws.
  7. B18.2.2 – Square and Hex Nuts.
  8. B36.10 – Welded and Seamless Wrought Steel Pipe.
  9. B112.1 – Hose Valves for Fire Protection Services.
- H. American Society for Testing and Materials (ASTM) Standards, current edition:
  1. A 53 – Specifications for Welded and Seamless Steel Pipe.
  2. A 307 – Carbon Steel Externally and Internally Threaded Standard Fasteners.
- I. Federal Specifications (Fed. Spec.):
  1. GG-G76D – Gages, Pressure and Vacuum, Dial Indicating, (for Air, Steam, Oil, Water, Ammonia, and Chloro-Floro Hydrocarbon Gases).

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2. WW-P-421c – Pipe, Cast Gray and Ductile Iron, Pressure (for Water and Other Liquids).
  3. WW-P-521f – Pipe Fittings, Flange Fittings and Flanges, Steel and Malleable Iron (Threaded and Butt-Welding) 150 Pound.
  4. WW-V-51E – Valve, Angle, Check and Globe, Bronze (125, & Int. AM-2 150 and 200 Pound, Threaded End, Flange Ends, (GSA-FFS) – Solder Ends and Brazed End, for Land Use).
  5. WW-V-58B – Valves, Gate, Cast Iron; Threaded and Flanged (for Land Use).
- J. FM Publication:
1. Approval Guide.
- K. Underwriters Laboratories, Inc. (UL) Publication:
1. Fire Protection Equipment List (Annually with Quarterly Supplements).
- L. American Water Works Association (AWWA) Standards, current editions:
1. C200-75 – Steel Water Pipe 6 Inches and Larger.
  2. C207-55 – Steel Pipe Flanges.
  3. C500-71 – Gate Valves – 3 through 48 inch – for Water and Other Liquids.
  4. C105 – Polyethylene Encasement.
- M. American Welding Society (AWS) Standards, current edition:
1. D10.9 – Qualification of Welding Procedures and Welders for Piping and Tubing, Level AR-3.
  2. B2.1 – Specifications for Qualification of Welding Procedures and Welder for Piping and Tubing.
- N. American Standard Mechanical Engineers (ASME) Standards, current edition:
1. B1.20.1 – Pipe Threads, General Purpose.

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1.7 APPROVALS

- A. Sprinkler Contractor shall prepare permit drawings and submit to the Fire Authority for approval and obtain permit. The Contractor shall submit the shop drawings to Jensen Hughes for approval prior to system installation.

1.8 SUBMITTALS

A. Shop Drawings

1. Submit three sets of complete shop drawings, three sets of manufacturer's data and three sets of hydraulic calculations to Architect and Engineer for all necessary reviews prior to fabrication of materials.
2. Contractor shall submit complete system packages. Partial system submittals will be rejected.
3. Hydraulic calculations shall include a water supply graph and hydraulic cover sheet. The cover sheet shall include the name and location of the calculated area, ceiling height, occupancy, design criteria, sprinkler spacing, system type, sprinkler make, model, K-factor and temperature rating, flow requirements, C-factor used, water supply data and source of information.
4. Prepare shop drawings with a minimum scale of 1/8 inch = 1 foot-0 inch for plans, and 1/4 inch = 1 foot-0 inch for details. Show all piping, sprinklers, hangers, type of pipe, tube connections, outlets, type of roof construction, and occupancy of each area, including ceiling and roof heights as required by NFPA 13. When welding is planned, shop drawings shall indicate the sections to be shop welded and the type of welded fittings to be used. All drawings shall be prepared using AutoCAD.
5. Design shall be based on these specifications and the appropriate NFPA standards.
6. Shop drawings shall include details of earthquake sway bracing, including the appropriate calculations.
7. Shop drawings shall include details of underground thrust blocking/restraints.

B. Changes

1. Make no changes in installation from layout as shown on the approved drawings unless change is specifically approved by the Engineer and AHJ. This does not include minor revisions for the purpose of coordination.
2. Any pipe fabricated and/or installed before all approvals are obtained at the Contractor's own expense and responsibility. Any changes made to the approved drawings other than as stated above are at the Contractor's own expense and responsibility.

C. Manufacturer's Data

1. Provide data from manufacturer on the following devices, including installation, maintenance, and testing procedures, dimensions, wiring diagrams, etc. Where any devices that are provided or furnished involve work by someone other than the Contractor, submit additional data copies directly to the Contractor. At a minimum, the following data sheets shall be provided:

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- a. Sprinklers and escutcheons.
- b. Pipe, fittings, and hangers.
- c. Control valves.
- d. Fire department connection.
- e. Check valves.
- f. Waterflow devices.
- g. Valve supervisory devices.
- h. Bell.
- i. Fire stopping materials (including installation detail).

D. As-Built Drawings

1. Maintain at the site an up-to-date marked set of as-built drawings, which shall be corrected and delivered to the Owner upon completion of work.

E. Samples

1. Provide one sample of each type of sprinkler and escutcheon.

F. Final Inspection and Test

1. The Contractor shall make arrangements with the Owner, Architect, and Engineer for final inspection and witnessing of the final acceptance tests. The Owner, Architect, and the Engineer will witness the final inspection.
2. Perform all tests and inspections required by the referenced codes and standards, the AHJ, and the Owner.
3. When the Engineer visits the job site for final inspection and tests after being advised by the Contractor that the work is complete and ready for test, if the work has not been completed or the final acceptance tests are unsatisfactory, the Contractor shall be responsible for the Engineer's extra time and expenses for reinspection and witnessing the retesting of the work. Such extra fees shall be deducted from payments by the Owner to the Contractor.
4. Upon completion of final inspections and tests, as required by appropriate NFPA Standards, submit copies of Standard Contractor's Material and Test Certificate.

G. Operating Instructions

1. At the completion of the work, provide a small scale plan of building indicating the locations of all control valves, low point drains, and inspector's test valves. The plans shall be neatly drawn and color-coded to indicate the portion of the building protected by each system, framed under glass and permanently mounted on the wall at the sprinkler room.
2. Furnish one copy of NFPA 25 and bound set of printed operating and maintenance instructions to the Owner, and adequately instruct the Owner's maintenance personnel in proper operation and test procedures of all fire protection components provided, furnished, or installed.

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1.9 SPARE PARTS

- A. Provide and install one spare sprinkler cabinet, complete with 12 sprinklers of all types and temperature ratings used throughout the installation. The cabinet shall be equipped with sprinklers and special sprinkler wrenches required for each type of sprinkler installed.
- B. Confer with the Owner's representative for exact location of cabinet.

1.10 GUARANTEE

- A. The Contractor shall guarantee all materials and workmanship for a period of one year beginning with the date of final acceptance by the Owner. The Contractor shall be responsible during the design, installation, testing and guarantee periods for any damage caused by his (or his subcontractors') work, materials, or equipment.

1.11 PRODUCT DELIVERY

- A. Delivery of Materials: Delivery of all materials and equipment to the job site shall be scheduled to assure compliance with the predetermined construction schedules.
- B. Storage of Materials, Equipment, and Fixtures: Contractor shall be responsible for storage of materials on job site, including furnishing of any storage facilities or structures required.
- C. Handling Materials and Equipment: Contractor shall be responsible for on-site handling of materials and equipment.

1.12 QUALITY ASSURANCE

- A. Testing Agency: All materials shall be UL listed or FM approved for their intended use.
- B. Regulatory Agencies: State and local building codes and ordinances, and fire department requirements shall apply.
- C. The Contractor shall be licensed in all aspects of the fire protections systems herein specified.
- D. Similar materials shall be from a single manufacturer.

1.13 JOB CONDITIONS

- A. Damage: Protect all unfinished work to prevent damage and furnish protection of all surrounding areas where necessary.
- B. Leak Damage: The Contractor shall be responsible during the installation and testing periods of the sprinkler system for any damage to the work of others, to the building or its contents caused by leaks in any equipment, by unplugged or disconnected pipes or fittings, or by overflow, and shall pay for the necessary replacements or repairs to work of others damaged by such leakage.

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1.14 EMERGENCY SERVICE

- A. The Contractor shall provide emergency repair service for the sprinkler system within four hours of a request for such service by the Owner during the warranty period. This service shall be available on a 24-hour per day, seven-day per week basis.

1.15 TRAINING

- A. The Contractor shall conduct two training sessions of four hours each to familiarize the facility personnel with the features, operation, and maintenance of the sprinkler systems. Training sessions shall be scheduled by the Owner at a mutually agreeable time to the Contractor and the Owner.

1.16 PERMITS AND FEES

- A. Pay for all permit fees, and charges required for this work.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All components shall be used in accordance with the manufacturer's recommendations and its UL listing and/or FM approval.
- B. The naming of manufacturers in the specifications shall not be construed as eliminating the materials, products or services of other manufacturers and suppliers providing approved equivalent items.
- C. The substitutions of materials or products other than those named in the specifications are subject to proper approval of the Owner granted in writing.

2.2 ABOVEGROUND PIPE

- A. Feed Mains and Branchline Piping
  - 1. Pipe shall be new, rated for 175-psi working pressure, conforming to ASTM specifications, and have the manufacturer's name and brand along with the applicable ASTM standard marked on each length of pipe.
    - a. Pipe used shall be black steel and must comply with the specifications of the American Society for Testing and Materials, ASTM A 53 for welded and seamless steel pipe.
    - b. Schedule 40 piping is required for sizes 2 inches and less. Pipe ends shall be threaded or roll grooved in accordance with NFPA 13.
    - c. Schedule 10 pipe is acceptable in sizes 2-½ inches and larger. Pipe ends shall be welded or roll grooved in accordance with NFPA 13.
    - d. Hot-dipped galvanized pipe shall be used when exposed to the outside.

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- e. Hot-dipped galvanized pipe shall be used for drain pipe.
- f. A seismic separation assembly shall be installed where sprinkler piping crosses a buildings seismic separation joints.

2.3 UNDERGROUND PIPE

- A. Connect to flange above grade at exterior of building in accordance with manufacturer's data sheets and NFPA 24.

2.4 FITTINGS AND JOINTS

A. Steel Pipe

- 1. Screwed fittings shall be cast iron, 175-pound class, black, and in accordance with ANSI B 16.4 or malleable iron, 175-pound class, black and in accordance with ANSI B 16.3. Bushings shall not be used.
- 2. Weld fittings shall be steel, standard weights, black, and in accordance with ASME B 16.9, ASME B 16.25, ASME B 16.5, ASME B 16.11 and ASTM A 234.
- 3. Grooved fittings and couplings shall be produced by the same manufacturer.
- 4. Grooved couplings shall be dimensionally compatible with pipe.

2.5 SPRINKLERS

- A. Listed lead-coated or corrosion-proof sprinklers shall be installed in all areas exposed to outside atmosphere or to corrosive conditions.
- B. Sprinklers in light hazard and ordinary hazard occupancies shall be upright or pendent, quick response type, K-factor of 5.6, and ordinary temperature rating.
- C. Sprinklers in unfinished areas shall be rough brass finish. Sprinklers in finished areas shall have special finishes, factory painted as selected at time of final design by the Architect.
- D. Pendent sprinklers installed in areas where ceilings are located shall be recessed white. Sprinklers shall be installed in quarter point or center of tile.

2.6 VALVES

- A. Control valves shall be listed/approved indicating type.
  - 1. OS & Y valves shall be resilient seat type.
  - 2. Butterfly valves shall be gear operated.
  - 3. Ball valves shall be gear operated with full port.
- B. Drain, trim, and test valves shall be approved.
- C. Check Valves

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1. Check valves for water supply, fire department connections and risers shall have removable covers for maintenance without removing the valve from the system.
2. Check valves in the trim shall be approved.

2.7 SLEEVES FOR WALL/FLOOR PENETRATIONS

- A. Sleeves through walls and floors shall be of a type that can be made watertight and fire stopped.
  1. Sleeve sizes shall be as required by NFPA 13 for Earthquake Protection.

2.8 WATER FLOW ALARM AND SUPERVISORY DEVICES

- A. Devices shall be listed/approved for the intended application and compatible with the alarm system.
  1. Supervisory (Tamper) switches provided with butterfly/ball valves by the valve manufacturer shall be listed/approved as an assembly.
- B. Water Flow Switches.
  1. Vane type flow switches shall be compatible with the alarm system and provided by the valve manufacturer.

2.9 SIGNS

- A. Provide standard metal signs in English in accordance with NFPA 13.
- B. Provide hydraulic calculation information signs at risers in accordance with NFPA 13.

2.10 HANGERS

- A. All hanger components shall be of an approved and listed type.
  1. Earthquake bracing steel shapes listed in NFPA 13 shall be limited to maximum length indicated. The slenderness ratio shall not exceed 200 in accordance with NFPA.
  2. The Contractor shall submit calculations with shop drawings indicating least radius of gyration and maximum permissible length for each shape.

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PART 3 - EXECUTION

3.1 GENERAL

A. Product Delivery

1. Delivery of Materials: Delivery of all materials and equipment to the job site shall be scheduled to assure compliance with the predetermined construction schedules.
2. Storage of Materials, Equipment, and Fixtures: Contractor shall be responsible for storage of materials on job site, including furnishing of any storage facilities or structures required.
3. Handling Materials and Equipment: Contractor shall be responsible for on-site handling of materials and equipment.

B. Clean-up

1. Maintain the premises free from accumulation of waste materials or rubbish caused by this work.
2. At the completion of the work, removed all surplus materials, tools, etc., and leave the premises clean.

C. Leak Protection

1. Damage: Protect all unfinished work to prevent damage and furnish protection of all surrounding areas where necessary.
2. Leak Damage: The Contractor shall be responsible during the installation and testing periods of the fire protection system for any damage to the work of others, to the building or its contents caused by leaks in any equipment, by unplugged or disconnected pipes or fittings, or by overflow, and shall pay for the necessary replacements or repairs to work of others damaged by such leakage.

D. Safety

1. All work shall be performed in compliance with the Occupational Safety and Health Act of 1970 and the Construction Safety Act Standards.
2. Contractor shall attend all job safety meetings.

3.2 FABRICATION

A. Pipe Ends

1. Ream and remove burrs after cutting pipe. Standard wall pipe ends shall be welded, threaded, cut grooved, or plain end.
2. Thin wall pipe ends shall be plain end, welded or roll grooved in accordance with the fitting manufactures' recommendation.
3. Threads shall be in accordance with ASME B1.20.1. Each thread on light wall pipe shall be gauged before the fitting is made-up.

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B. Grooved Ends

1. Pipe minimum thickness, squareness, and out-of roundness shall be in accordance with the coupling manufacturers specifications.
2. Pipe surface shall be free of indentations, projections, or roll marks from the end of the pipe to the groove.

C. Welding

1. No field welding of sprinkler piping shall be permitted.
2. Headers risers, feed mains, cross mains and branch lines may be shop welded using acceptable welding fittings. Welding methods shall comply with all the requirements of AWS B2.1.
3. Certified records shall be maintained upon the completion of each weld, welder shall stamp an imprint of their identification into the side of the pipe adjacent to the weld.

3.3 INSTALLATION

A. General

1. A clean set of prints or shop drawings shall be maintained at the site and marked up to show any changes.
2. Piping shall be installed below existing ceilings except where attic areas permit piping installation. Demo and replace ceiling to install sway bracing and hangers. Install piping in exposed areas as high as possible using necessary fittings and auxiliary drains to maintain maximum clear headroom.

3.4 SPRINKLERS

A. General

1. Sprinklers below ceilings of exposed piping shall be listed and approved regular bronze upright type, in upright position. Listed and approved regular bronze pendent type may be used where necessary due to clear height requirements, duct interference, etc.
2. Sprig-ups shall be provided wherever necessary to provide proper deflector distances in accordance with NFPA 13 requirements.

B. Sprinkler Guards and Water Shields

1. Provide guards on sprinklers within 7 feet of finished floor or wherever sprinklers may be subject to mechanical damage.

C. Drains

1. Provide main drain valves at system control valves, sized in accordance with NFPA 13 and AHJ requirements that extend piping to exterior.
2. Provide all auxiliary drains where necessary.
3. Pipe all drains and auxiliary drains to locations where water drained will not damage stock, equipment, vehicles, planted areas, etc., or injure personnel.

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4. Plugs used for auxiliary drains shall be brass.
5. All piping and fittings downstream of drain valve shall be hot-dipped galvanized.
6. The contractor shall comply with all water discharge restrictions.

3.5 VALVES

A. General

1. Valves shall be installed with sufficient clearance for operation, testing, and maintenance.
2. Where wafer bodied valves are used, they shall be installed so that the discs do not interfere with other components.

B. Control valves shall be installed so that valve position indicator is visible.

C. Drain, test, and trim valves.

1. Valves shall be installed no more than 7 feet 0 inches above the finished floor and shall be accessible.

D. Pressure Relief Valves.

1. Pressure relief valves for sprinkler system risers shall be listed/approved, not less than ½-inch in size, set to open at not more than 175 psi.

3.6 FIRE DEPARTMENT CONNECTION

A. Refer to Civil drawings.

3.7 PRESSURE GAUGES

A. Gauges shall be installed vertically, with three-way valve with ¼-inch plugged outlet, and as follows:

1. Above and below wet system riser check valves.
2. At each water supply and inlet of floor control valve.

3.8 Hangers, Supports, and Earthquake Bracing

A. General

1. All piping must be substantially supported from building structure and only approved types of hangers shall be used. Piping lines under ducts shall not be supported from duct work, but shall be supported from building structure with trapeze hangers where necessary or from steel angles supporting duct work in accordance with NFPA 13.
2. All thread rods shall not be bent.
3. Hanger components shall be ferrous.
4. Powder driven studs shall be specifically listed for use in the required seismic zone.

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B. Feed and Cross Mains

1. Install at least one hanger per length of pipe joined by grooved couplings.

C. Risers

1. Risers shall be supported at lowest level and alternate levels above using riser clamp.
2. Install flexible couplings in risers.

D. System Headers

1. Install pipe saddle supports complete with flange bolted to floor.

E. Earthquake Protection

1. Install flexible joints and sub bracing as provided in NFPA 13 section 9.3.2.

3.9 Sleeveings, Wall & Floor Penetrations

- A. Set Schedule 40 sleeves in place for all pipes passing through openings in fire resistance rated construction when required by UL listing for fire stopping method utilized.
- B. Provide clearance between the sprinkler piping and sleeves in accordance with NFPA and/or FM. The space between sleeve and pipe shall be filled with noncombustible, UL listed fire-stopping materials. Provide chrome wall plates at each side of wall.
- C. Sleeves through floors shall be watertight. Penetrations through fire rated construction shall be adequately fire stopped to maintain the fire resistance rating required.
- D. Where sleeves are not installed, provide clearance around piping penetrations in accordance with NFPA 13. The space between the wall/floor and pipe shall be filled with noncombustible, UL listed fire-stopping materials. Provide chrome wall plates at each side of wall.

3.10 SIGNS

A. Valves

1. Secure to each valve with corrosion resistant wire or chain, sign stating, "control valve."

B. Hydraulic Design Information

1. Secure to each system riser with corrosion resistant fasteners.

3.11 Water flow alarms & supervisory devices

A. Alarm Bells

1. Electric bells and wiring diagrams shall be delivered to the alarm contractor for installation and wiring.

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B. Alarm and Supervisory Switches

1. Deliver wiring diagrams to alarm contractor.
2. Install alarm water flow switches in accordance with switch and valve manufacturer's instructions.
3. Install and adjust valve supervisory switches in accordance with switch manufacturer's instructions.

3.12 INSPECTOR'S TEST

- A. Provide inspector's test connections, as specified in NFPA 13, at required points for testing each waterflow alarm device. Special discharge nozzle shall have same size orifice as smallest orifice sprinklers installed.
- B. Provide 1-inch sight glass if inspector's test discharge cannot be readily observed while operating valve.
- C. Pipe all inspector's test connections discharging to atmosphere to location where water drained will not damage stock, equipment, vehicles, planted areas, etc., or injure personnel.
- D. Splash blocks shall be provided where inspector's test discharge could produce damage to surroundings.
- E. All pipe and fittings downstream of inspector's test valve shall be galvanized.

3.13 SYSTEM ACCEPTANCE

A. Tests

1. General system test shall be coordinated with the owner's representatives for training and witnessed by the AHJ. Problems noted during testing such as air or water leaks, difficulty in operating valves, alarm failures, etc. shall be corrected before the Contractor leaves the job.
2. Hydrostatically test all piping, including fire department connections between the check valve and connection, at 200 psi for 2 hours. If the highest static pressure at the lowest point in the system exceeds 150 psi, the system shall be tested at 50 psi more than the highest static pressure.
3. Flow Tests
  - a. Main drain shall be opened wide until pressure stabilizes then slowly closed, noting and recording flowing (residual) and static (non-flow) pressure.

B. Valve Operation

1. Operate each valve through its entire range. Adjust valve packing glands.
  - a. Hose valves shall be capped during the test.
2. Threads for hose valve/wall hydrant outlets and fire department inlets shall be verified to conform to those used by the AHJ.

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C. Water Flow and Supervisory Devices

1. Coordinate testing of electric components with the alarm contractor.
2. Each water flow device shall be tested in accordance with NFPA 72 by opening the inspectors test or alarm test valve.
3. Each valve supervisory device shall be tested by operating the valve wheel/crank.
4. Verify all signals have been noted by the fire alarm control panel and each audible alarm device operates.

D. Contractor's material and test certificates shall be completed for each system/floor and signed by the Contractor and witnessed by the owner's representative/AHJ. Provide the NFPA certificate(s) to the Resident Engineer.

E. Training

1. General – In addition to the tests required in Parts A through C and witnessed by the owner's representative(s), conduct one/two-hour training sessions to familiarize the representatives with all operating features of the system, including control valve, drain and test valve locations and operations.
2. Provide owner's representatives with:
  - a. A small-scale plan of the system/building showing locations of control, drain, and test valves.
  - b. Component manufacturer's inspection and testing manuals.
  - c. Two copies of NFPA 25.
3. Spare Parts
  - a. Provide 12 spare sprinklers of all types and ratings that are installed, in a steel cabinet complete with special sprinkler wrenches. Install cabinet as directed by Resident Engineer.

3.14 ADJUSTMENT AND CLEANING

- A. Cleaning: Flush all piping in accordance with NFPA Standards for test procedures.

**END OF SECTION 211300**

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**21 13 00.01 - FIRE SPRINKLER BASIS OF DESIGN – ADDITIVE ALTERNATE ‘A’**

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**A. REFERENCE CRITERIA**

The fire sprinkler system requirements for the Recreation Area Building and the Gymnasium Building will be based upon the following codes and standards:

1. California Building Code (CBC), 2013 Edition.
2. California Fire Code (CFC), 2013 Edition.
3. California Electrical Code (CEC), 2013 Edition.
4. NFPA 13 (Installation of Sprinkler Systems), 2013 Edition.
5. NFPA 24 (Installation of Private Fire Service Mains), 2013 Edition.
6. NFPA 72 (National Fire Alarm Code), 2013 Edition.
7. Local requirements.

**B. SITE DESCRIPTION**

The Park De La Cruz will be remodeling the Recreation Center Building and the Gymnasium Building.

**C. NEW FIRE SPRINKLER SYSTEM**

**Fire Sprinkler System**

The Existing Gymnasium will require a sprinkler hydraulic calculation to confirm the water supply can meet the sprinkler demand with the new underground changes in phase I.

The Recreation Center building will be protected with wet-pipe automatic fire sprinkler systems designed in accordance with the requirements of the California Building Code (CBC), California Fire Code (CFC), and the 2013 Edition of NFPA 13.

1. For sprinklers, the design discharge densities shall be in accordance with NFPA 13.
  - a) Offices, Exercise, Sensory Room, Area Below Pool, Dance Studio, Corridors, Break Areas, and Restrooms shall be hydraulically calculated as a Light Hazard Occupancy in

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accordance with NFPA 13 with a sprinkler density of 0.10 gpm/sq. ft. over the most remote 1,500 sq. ft., plus 100 gpm hose stream allowance.

- b) Multi-Purpose Room, Boiler Room, Mechanical Rooms, Janitor's Closets, and Storage Rooms shall be hydraulically calculated in accordance with NFPA 13 as Ordinary Hazard Group 1 Occupancies with a sprinkler density of 0.15 gpm/sq. ft. over the most remote 1,500 sq. ft. or the entire area (whichever is less), plus 250 gpm hose stream allowance.
  - c) Basement Area Below Framed Main Floor shall be hydraulically calculated as a Light Hazard Occupancy in accordance with NFPA 13 with sprinkler density of 0.10 gpm/sq. ft. over the most remote 1,500 sq. ft., plus 100 gpm hose stream allowance.
2. Quick-response sprinklers shall be provided throughout all light and ordinary hazard occupancy areas, and their adjoining corridors. Exterior sprinklers shall be corrosion resistant.
  3. Piping shall be installed exposed below existing ceiling. Ceiling shall be removed to install sway bracing and hanger. Ceiling shall be replaced to match existing.
  4. Quick-response brass upright or white pendent sprinklers shall be utilized throughout common areas exposed to structure.
  5. The Recreation Area Building will incorporate a sprinkler riser assembly inside Room 152 consisting of a flow switch, test connection, and main drain. Connect sprinkler riser into flange located approximately 12" above grade, located on the exterior adjacent to Room 152. Install 90 degree elbow to penetrate piping into Room 152.
  6. All drains shall be piped to the outside and discharge into an approved drain.
  7. Provide inspector's test connection with discharge piping connected to the main drain.
  8. A weatherproof exterior electric bell water flow alarm shall be provided and connected to the building fire alarm system.
  9. All control valves shall be supervised with valve tamper switches.
  10. All valve tamper and sprinkler water flow switches shall be connected to the building fire alarm system.
  11. Sprinkler piping shall be exposed where attic does not occur. Coordinate hangers and bracing locations. Remove and patch ceiling as necessary. Coordinate sprinkler piping locations with Resident Engineer for loads on structure.
  12. Demo partial existing sprinkler system fed from the domestic water supply. Provide demo drawing of sprinkler and piping to be removed. Coordinate with Resident Engineer for capping of plumbing pipe.

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END SECTION 21 13 00.01

SECTION 220517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Sleeves.
  - 2. Sleeve-seal systems.
  - 3. Grout.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.

2.2 SLEEVE-SEAL SYSTEMS

- A. Manufacturers:
  - 1. Advance Products & Systems, Inc.
  - 2. CALPICO, Inc.
  - 3. Metraflex Company (The).
  - 4. Pipeline Seal and Insulator, Inc.
  - 5. Proco Products, Inc.
- B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

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1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Stainless steel.
3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

### 2.3 GROUT

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

## PART 3 - EXECUTION

### 3.1 SLEEVE INSTALLATION

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
  1. Sleeves are not required for core-drilled holes.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
  1. Cut sleeves to length for mounting flush with both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
  2. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
  1. Cut sleeves to length for mounting flush with both surfaces.
  2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.

3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Division 07 Section "Joint Sealants."

### 3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

### 3.3 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
  1. Exterior Concrete Walls above Grade:
    - a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves.
    - b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves.
  2. Exterior Concrete Walls below Grade:
    - a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves with sleeve-seal system.
      - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
    - b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves with sleeve-seal system.
      - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
  3. Concrete Slabs-on-Grade:
    - a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves with sleeve-seal system.
      - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
    - b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves with sleeve-seal system.
      - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

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4. Concrete Slabs above Grade:
  - a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves.
  - b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves.
  
5. Interior Partitions, including Plumbing Shaft Walls:
  - a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves.
  - b. Piping NPS 6 and Larger: Galvanized-steel-sheet sleeves.

**END OF SECTION 220517**

**SECTION 220518 - ESCUTCHEONS FOR PLUMBING PIPING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Escutcheons.
  - 2. Floor plates.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

- A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.
- C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

2.2 FLOOR PLATES

- A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.
- B. Split-Casting Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.
  - 1. Escutcheons for New Piping:
    - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
    - b. Insulated Piping: One-piece, stamped-steel type.
    - c. Bare Piping: One-piece, cast-brass type with polished, chrome-plated finish.
- C. Install floor plates for piping penetrations of equipment-room floors.
- D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
  - 1. New Piping: One-piece, floor-plate type.
  - 2. Existing Piping: Split-casting, floor-plate type.

3.2 FIELD QUALITY CONTROL

- A. Replace broken and damaged escutcheons and floor plates using new materials.

**END OF SECTION 220518**

**SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Bronze angle valves.
2. Bronze ball valves.
3. Iron, single-flange butterfly valves.
4. Iron, grooved-end butterfly valves.
5. Bronze globe valves.

B. Related Sections:

1. Division 22 plumbing piping Sections for specialty valves applicable to those Sections only.
2. Division 22 Section "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.

1.4 SUBMITTALS

- A. Product Data: For each type of valve indicated.

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1.5 QUALITY ASSURANCE

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
  - 1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
  - 2. ASME B31.1 for power piping valves.
  - 3. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
  - 1. Protect internal parts against rust and corrosion.
  - 2. Protect threads, flange faces, grooves, and weld ends.
  - 3. Set angle, gate, and globe valves closed to prevent rattling.
  - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
  - 5. Set butterfly valves closed or slightly open.
  - 6. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
  - 1. Maintain valve end protection.
  - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to valve schedule articles for applications of valves.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve Actuator Types:

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1. Gear Actuator: For quarter-turn valves NPS 8 and larger.
  2. Handwheel: For valves other than quarter-turn types.
  3. Handlever: For quarter-turn valves NPS 6 and smaller.
- E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
1. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
  2. Butterfly Valves: With extended neck.
- F. Valve-End Connections:
1. Flanged: With flanges according to ASME B16.1 for iron valves.
  2. Grooved: With grooves according to AWWA C606.
  3. Solder Joint: With sockets according to ASME B16.18.
  4. Threaded: With threads according to ASME B1.20.1.
- G. Valve Bypass and Drain Connections: MSS SP-45.

## 2.2 BRONZE ANGLE VALVES

- A. Class 125, Bronze Angle Valves with Bronze Disc:
1. Manufacturers:
    - a. Hammond Valve.
    - b. Milwaukee Valve Company.
  2. Description:
    - a. Standard: MSS SP-80, Type 1.
    - b. CWP Rating: 200 psig.
    - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
    - d. Ends: Threaded.
    - e. Stem and Disc: Bronze.
    - f. Packing: Asbestos free.
    - g. Handwheel: Malleable iron, bronze, or aluminum.

## 2.3 BRONZE BALL VALVES

- A. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:
1. Manufacturer:
    - a. American Valve, Inc.

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- b. Conbraco Industries, Inc.; Apollo Valves.
- c. Crane Co.; Crane Valve Group; Crane Valves.
- d. Hammond Valve.
- e. Lance Valves; a division of Advanced Thermal Systems, Inc.
- f. Legend Valve.
- g. Milwaukee Valve Company.
- h. NIBCO INC.
- i. Red-White Valve Corporation.
- j. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Two piece.
- e. Body Material: Bronze.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Bronze.
- i. Ball: Chrome-plated brass.
- j. Port: Full.

2.4 IRON, SINGLE-FLANGE BUTTERFLY VALVES

A. 200 CWP, Iron, Single-Flange Butterfly Valves with EPDM Seat and Stainless-Steel Disc:

1. Manufacturers:

- a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
- b. American Valve, Inc.
- c. Conbraco Industries, Inc.; Apollo Valves.
- d. Cooper Cameron Valves; a division of Cooper Cameron Corporation.
- e. Crane Co.; Crane Valve Group; Jenkins Valves.
- f. Crane Co.; Crane Valve Group; Stockham Division.
- g. DeZurik Water Controls.
- h. Flo Fab Inc.
- i. Hammond Valve.
- j. Kitz Corporation.
- k. Legend Valve.
- l. Milwaukee Valve Company.
- m. Mueller Steam Specialty; a division of SPX Corporation.
- n. NIBCO INC.
- o. Norriseal; a Dover Corporation company.
- p. Red-White Valve Corporation.
- q. Spence Strainers International; a division of CIRCOR International, Inc.
- r. Sure Flow Equipment Inc.

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- s. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig.
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: EPDM.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Stainless steel.

2.5 IRON, GROOVED-END BUTTERFLY VALVES

A. 175 CWP, Iron, Grooved-End Butterfly Valves:

1. Manufacturers:

- a. Kennedy Valve; a division of McWane, Inc.
- b. Shurjoint Piping Products.
- c. Tyco Fire Products LP; Grinnell Mechanical Products.
- d. Victaulic Company.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 175 psig.
- c. Body Material: Coated, ductile iron.
- d. Stem: Two-piece stainless steel.
- e. Disc: Coated, ductile iron.
- f. Seal: EPDM.

2.6 BRONZE GLOBE VALVES

A. Class 125, Bronze Globe Valves with Bronze Disc:

1. Manufacturers:

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Stockham Division.
- c. Hammond Valve.
- d. Kitz Corporation.
- e. Milwaukee Valve Company.
- f. NIBCO INC.
- g. Powell Valves.

- h. Red-White Valve Corporation.
  - i. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - j. Zy-Tech Global Industries, Inc.
2. Description:
- a. Standard: MSS SP-80, Type 1.
  - b. CWP Rating: 200 psig.
  - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
  - d. Ends: Threaded or solder joint.
  - e. Stem and Disc: Bronze.
  - f. Packing: Asbestos free.
  - g. Handwheel: Malleable iron, bronze, or aluminum.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

#### 3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.

### 3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

### 3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
  - 1. Shutoff Service: Ball, butterfly valves.
  - 2. Butterfly Valve Dead-End Service: Single-flange (lug) type.
  - 3. Throttling Service: Globe valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
  - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
  - 2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
  - 3. For Copper Tubing, NPS 5 and Larger: Flanged ends.
  - 4. For Grooved-End Copper Tubing and Steel Piping: Valve ends may be grooved.

### 3.5 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

- A. Provide valves on hot and cold water piping at each piece of equipment to allow maintenance service at the fixture level.
- B. Pipe NPS 2 and Smaller:
  - 1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
  - 2. Bronze Angle Valves: Class 125, bronze disc.
  - 3. Bronze Ball Valves: Two piece, full port, bronze with bronze trim.
  - 4. Bronze Globe Valves: Class 125 bronze disc.

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C. Pipe NPS 2-1/2 and Larger:

1. Iron, Single-Flange Butterfly Valves: 200 CWP, EPDM seat, stainless-steel disc.
2. Iron, Grooved-End Butterfly Valves: 175 CWP.
3. Bronze Globe Valves: Class 125.

**END OF SECTION 220523**

**SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section..

1.2 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Thermal-hanger shield inserts.
4. Fastener systems.
5. Pipe positioning systems.
6. Equipment supports.

B. Related Sections:

1. Division 05 Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
2. Division 21 fire-suppression piping Sections for pipe hangers for fire-suppression piping.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
  1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
  2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
  3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

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1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following; include Product Data for components:
  - 1. Trapeze pipe hangers.
  - 2. Equipment supports.
- C. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
  - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
  - 2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
  - 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
  - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
  - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
- B. Copper Pipe Hangers:
  - 1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
  - 2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

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## 2.2 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

## 2.3 THERMAL-HANGER SHIELD INSERTS

## A. Manufacturers:

1. Carpenter & Paterson, Inc.
2. Clement Support Services.
3. ERICO International Corporation.
4. National Pipe Hanger Corporation.
5. PHS Industries, Inc.
6. Pipe Shields, Inc.; a subsidiary of Piping Technology & Products, Inc.
7. Piping Technology & Products, Inc.
8. Rilco Manufacturing Co., Inc.
9. Value Engineered Products, Inc.

- B. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psi minimum compressive strength.

- C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

- E. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

## 2.4 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

- B. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

## 2.5 PIPE POSITIONING SYSTEMS

- A. Description: IAPMO PS 42, positioning system of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.6 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.7 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
  - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
  - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
  - 2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.
- D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Fastener System Installation:
  - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
  - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

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- F. Pipe Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. See Division 22 plumbing fixture Sections for requirements for pipe positioning systems for plumbing fixtures.
- G. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- H. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- I. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- J. Install lateral bracing with pipe hangers and supports to prevent swaying.
- K. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- L. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- N. Insulated Piping:
  - 1. Attach clamps and spacers to piping:
    - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
  - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
  - 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:
  - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
  - b. NPS 4: 12 inches long and 0.06 inch thick.
  - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
  - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
  - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

### 3.2 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

### 3.3 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and 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. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

### 3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

### 3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

### 3.6 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports and attachments for general service applications.
- F. Use copper-plated pipe hangers and steel attachments for copper piping and tubing.
- G. Use padded hangers for piping that is subject to scratching.
- H. Use thermal-hanger shield inserts for insulated piping and tubing.
- I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
  - 2. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.

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3. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
- J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
- K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
  2. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
- L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction, to attach to top flange of structural shape.
  2. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
  3. C-Clamps (MSS Type 23): For structural shapes.
  4. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
  5. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
  6. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    - a. Light (MSS Type 31): 750 lb.
    - b. Medium (MSS Type 32): 1500 lb.
    - c. Heavy (MSS Type 33): 3000 lb.
  7. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
  8. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
  2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
  3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

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- N. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- O. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
- P. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.
- Q. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

**END OF SECTION 220529**

**SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Equipment labels.
  - 2. Warning signs and labels.
  - 3. Pipe labels.
  - 4. Stencils.
  - 5. Valve tags.
  - 6. Warning tags.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

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## PART 2 - PRODUCTS

### 2.1 EQUIPMENT LABELS

#### A. Metal Labels for Equipment:

1. Material and Thickness: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

#### B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

#### C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

### 2.2 WARNING SIGNS AND LABELS

#### A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.

#### B. Letter Color: Yellow.

#### C. Background Color: Black.

#### D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

#### E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

#### F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

#### G. Fasteners: Stainless-steel rivets or self-tapping screws.

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- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
  - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
  - 2. Lettering Size: At least 1-1/2 inches high.

2.4 STENCILS

- A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; and minimum letter height of 3/4 inch for access panel and door labels, equipment labels, and similar operational instructions.
  - 1. Stencil Material: Brass.
  - 2. Stencil Paint: Exterior, gloss, alkyd enamel black unless otherwise indicated. Paint may be in pressurized spray-can form.
  - 3. Identification Paint: Exterior, alkyd enamel in colors according to ASME A13.1 unless otherwise indicated.

2.5 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
  - 1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
  - 2. Fasteners: Brass wire-link or beaded chain.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or

space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

## 2.6 WARNING TAGS

- A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.
  1. Size: 3 by 5-1/4 inches minimum.
  2. Fasteners: Brass grommet and wire.
  3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
  4. Color: Yellow background with black lettering.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

### 3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

### 3.3 PIPE LABEL INSTALLATION

- A. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels on each piping system.
  1. Identification Paint: Use for contrasting background.
  2. Stencil Paint: Use for pipe marking.
- B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
  1. Near each valve and control device.

2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

C. Pipe Label Color Schedule:

1. Domestic Water Piping:
  - a. Background Color: Green.
  - b. Letter Color: White.
2. Sanitary Waste Piping:
  - a. Background Color: Black.
  - b. Letter Color: White.

3.4 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
  1. Valve-Tag Size and Shape:
    - a. Cold Water: 1-1/2 inches, round.
    - b. Hot Water: 1-1/2 inches round.
  2. Valve-Tag Color:
    - a. Cold Water: Natural.
    - b. Hot Water: Natural.
  3. Letter Color:
    - a. Cold Water: Black.
    - b. Hot Water: Black.

3.5 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

**END OF SECTION 220553**

**SECTION 220700 - PLUMBING INSULATION**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section..

**1.2 SUMMARY**

**A. Section Includes:**

- 1. Insulation Materials:
  - a. Flexible elastomeric.
- 2. Field-applied jackets.

**B. Related Sections include the following:**

- 1. Division 21 Section "Fire-Suppression Systems Insulation."
- 2. Division 23 Section "HVAC Insulation."

**1.3 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).

**B. LEED Submittal:**

- 1. Product Data for Credit EQ 4.1: For adhesives and sealants, including printed statement of VOC content.

**C. Shop Drawings:**

- 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
- 2. Detail insulation application at pipe expansion joints for each type of insulation.
- 3. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
- 4. Detail removable insulation at piping specialties, equipment connections, and access panels.
- 5. Detail application of field-applied jackets.
- 6. Detail application at linkages of control devices.

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- 7. Detail field application for each equipment type.
- D. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:
  - 1. Sample Sizes:
    - a. Preformed Pipe Insulation Materials: 12 inches long by NPS 2.
    - b. Sheet Form Insulation Materials: 12 inches square.
    - c. Jacket Materials for Pipe: 12 inches long by NPS 2.
    - d. Sheet Jacket Materials: 12 inches square.
    - e. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.
- E. Qualification Data: For qualified Installer.
- F. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- G. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.
  - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
  - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application and equipment Installer for equipment insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.7 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
  - 1. Products:
    - a. Aeroflex USA Inc.; Aerocel.
    - b. Armacell LLC; AP Armaflex.
    - c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.

2.2 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. Metal Jacket:
  - 1. Products:
    - a. Childers Products, Division of ITW; Metal Jacketing Systems.
    - b. PABCO Metals Corporation; Surefit.
    - c. RPR Products, Inc.; Insul-Mate.
  - 2. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105 or 5005, Temper H-14.
    - a. Finish and thickness are indicated in field-applied jacket schedules.
    - b. Moisture Barrier for Indoor Applications: 1-mil-thick, heat-bonded polyethylene and kraft paper.
    - c. Factory-Fabricated Fitting Covers:
      - 1) Same material, finish, and thickness as jacket.
      - 2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
      - 3) Tee covers.
      - 4) Flange and union covers.
      - 5) End caps.
      - 6) Beveled collars.
      - 7) Valve covers.
      - 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
  - 1. Verify that systems and equipment to be insulated have been tested and are free of defects.
  - 2. Verify that surfaces to be insulated are clean and dry.
  - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

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- B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
  - 1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
  - 2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

### 3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
  - 1. Install insulation continuously through hangers and around anchor attachments.

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- 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
  - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
  - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- O. For above ambient services, do not install insulation to the following:
- 1. Vibration-control devices.
  - 2. Testing agency labels and stamps.
  - 3. Nameplates and data plates.
  - 4. Manholes.
  - 5. Handholes.
  - 6. Cleanouts.

3.4 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
- 1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
  - 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.

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3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
  4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
  5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
  6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
  7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
  8. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
  2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
  3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
  4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.

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5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

### 3.5 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
  1. Install pipe insulation to outer diameter of pipe flange.
  2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
  3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
  4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
  1. Install mitered sections of pipe insulation.
  2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Insulation Installation on Valves and Pipe Specialties:
  1. Install preformed valve covers manufactured of same material as pipe insulation when available.
  2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
  3. Install insulation to flanges as specified for flange insulation application.
  4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

### 3.6 FIELD-APPLIED JACKET INSTALLATION

- A. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.7 FINISHES

- A. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- C. Do not field paint aluminum or stainless-steel jackets.

3.8 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
  - 1. Drainage piping located in crawl spaces.
  - 2. Underground piping.
  - 3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.9 INDOOR PIPING INSULATION SCHEDULE

- A. Domestic Hot Water:
  - 1. All Pipe Sizes: Insulation shall be the following:
    - a. Flexible Elastomeric: 1-1/2 inch thick.
- B. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:
  - 1. All Pipe Sizes: Insulation shall be the following:
    - a. Flexible Elastomeric: 1-1/2 inch thick.

3.10 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Exposed:

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1. Aluminum: 0.016 inch thick.

**END OF SECTION 220700**

**SECTION 221116 - DOMESTIC WATER PIPING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Under-building slab and aboveground domestic water pipes, tubes, fittings, and specialties inside the building.
- 2. Encasement for piping.
- 3. Specialty valves.
- 4. Flexible connectors.

1.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Domestic water piping and support and installation shall withstand effects of earthquake motions determined according to ASCE/SEI 7.

1.4 SUBMITTALS

- A. Product Data: For the following products:

- 1. Specialty valves.
- 2. Transition fittings.
- 3. Dielectric fittings.
- 4. Flexible connectors.

1.5 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14 for plastic, potable domestic water piping and components.
- C. Comply with NSF 61 for potable domestic water piping and components.

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## PART 2 - PRODUCTS

### 2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

### 2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
  - 1. Cast-Copper Solder-Joint Fittings: ASME B16.18, pressure fittings.
  - 2. Wrought-Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
  - 3. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
  - 4. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
- B. Soft Copper Tube: ASTM B 88, Type L water tube, annealed temper.
  - 1. Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.

### 2.3 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free, unless otherwise indicated; full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

### 2.4 ENCASEMENT FOR PIPING

- A. Standard: ASTM A 674 or AWWA C105.
- B. Form: Sheet or Tube.
- C. Material: LLDPE film of 0.008-inch minimum thickness.

## 2.5 TRANSITION FITTINGS

### A. General Requirements:

1. Same size as pipes to be joined.
2. Pressure rating at least equal to pipes to be joined.
3. End connections compatible with pipes to be joined.

### B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

### C. Plastic-to-Metal Transition Fittings:

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. Charlotte Pipe and Foundry Company.
  - b. Harvel Plastics, Inc.
  - c. Spears Manufacturing Company.
2. Description: PVC] one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert and one solvent-cement-socket end.

### D. Plastic-to-Metal Transition Unions:

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. Colonial Engineering, Inc.
  - b. NIBCO INC.
  - c. Spears Manufacturing Company.

## 2.6 DIELECTRIC FITTINGS

### A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.

### B. Dielectric Flanges:

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. Capitol Manufacturing Company.

- b. Central Plastics Company.
- c. EPCO Sales, Inc.
- d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Factory-fabricated, bolted, companion-flange assembly.
- b. Pressure Rating: 150 psig minimum.
- c. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

C. Dielectric-Flange Kits:

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. Advance Products & Systems, Inc.
- b. Calpico, Inc.
- c. Central Plastics Company.
- d. Pipeline Seal and Insulator, Inc.

2. Description:

- a. Nonconducting materials for field assembly of companion flanges.
- b. Pressure Rating: 150 psig.
- c. Gasket: Neoprene or phenolic.
- d. Bolt Sleeves: Phenolic or polyethylene.
- e. Washers: Phenolic with steel backing washers.

D. Dielectric Couplings:

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. Calpico, Inc.
- b. Lochinvar Corporation.

2. Description:

- a. Galvanized-steel coupling.
- b. Pressure Rating: 300 psig at 225 deg F.
- c. End Connections: Female threaded.
- d. Lining: Inert and noncorrosive, thermoplastic.

## 2.7 FLEXIBLE CONNECTORS

- 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:
  - 1. Flex-Hose Co., Inc.
  - 2. Flexicraft Industries.
  - 3. Flex Pression, Ltd.
  - 4. Flex-Weld, Inc.
  - 5. Hyspan Precision Products, Inc.
- B. Bronze-Hose Flexible Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.
  - 1. Working-Pressure Rating: Minimum 200 psig.
  - 2. End Connections NPS 2 and Smaller: Threaded copper pipe or plain-end copper tube.
  - 3. End Connections NPS 2-1/2 and Larger: Flanged copper alloy.
- C. Stainless-Steel-Hose Flexible Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.
  - 1. Working-Pressure Rating: Minimum 200 psig.
  - 2. End Connections NPS 2 and Smaller: Threaded steel-pipe nipple.
  - 3. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

## PART 3 - EXECUTION

### 3.1 EARTHWORK

- A. Comply with requirements in Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

### 3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- C. Install underground copper tube in PE encasement according to ASTM A 674 or AWWA C105 and backfill with clean sand at least 2 inches thick surrounding the tubing.

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- D. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside the building at each domestic water service entrance. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for pressure gages and Division 22 Section "Domestic Water Piping Specialties" for drain valves and strainers.
- E. Install shutoff valve immediately upstream of each dielectric fitting.
- F. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for pressure-reducing valves.
- G. Install domestic water piping level and plumb.
- H. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- I. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- J. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- K. Install piping adjacent to equipment and specialties to allow service and maintenance.
- L. Install piping to permit valve servicing.
- M. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.
- N. Install piping free of sags and bends.
- O. Install fittings for changes in direction and branch connections.
- P. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- Q. Install thermometers on outlet piping from each water heater. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for thermometers.
- R. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- S. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."

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- T. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 22 Section "Escutcheons for Plumbing Piping."

### 3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Braze Joints" Chapter.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- E. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.
- F. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- G. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

### 3.4 VALVE INSTALLATION

- A. General-Duty Valves: Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for valve installations.
- B. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball or gate valves for piping NPS 2 and smaller. Use butterfly or gate valves for piping NPS 2-1/2 and larger.
- C. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping. Drain valves are specified in Division 22 Section "Domestic Water Piping Specialties."
  - 1. Hose-End Drain Valves: At low points in water mains, risers, and branches.
  - 2. Stop-and-Waste Drain Valves: Instead of hose-end drain valves where indicated.

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- D. Install balancing valve in each hot-water circulation return branch and discharge side of each pump and circulator. Set balancing valves partly open to restrict but not stop flow. Use ball valves for piping NPS 2 and smaller and butterfly valves for piping NPS 2-1/2 and larger. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves.
- E. Install calibrated balancing valves in each hot-water circulation return branch and discharge side of each pump and circulator. Set calibrated balancing valves partly open to restrict but not stop flow. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for calibrated balancing valves.

### 3.5 TRANSITION FITTING INSTALLATION

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
  - 1. NPS 1-1/2 and Smaller: Fitting-type coupling.
  - 2. NPS 2 and Larger: Sleeve-type coupling.
- C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings.

### 3.6 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings.
- C. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.

### 3.7 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment" for seismic-restraint devices.
- B. Comply with requirements in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support products and installation.
  - 1. Vertical Piping: MSS Type 8 or 42, clamps.
  - 2. Individual, Straight, Horizontal Piping Runs:
    - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    - c. Longer Than 100 Feet If Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
  4. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
  2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
  3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
  4. NPS 2-1/2: 108 inches with 1/2-inch rod.
  5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
  6. NPS 6: 10 feet with 5/8-inch rod.
  7. NPS 8: 10 feet with 3/4-inch rod.
- F. Install supports for vertical copper tubing every 10 feet.
- G. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.
- 3.8 CONNECTIONS
- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment and machines to allow service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
1. Domestic Water Booster Pumps: Cold-water suction and discharge piping.
  2. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
  3. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Comply with requirements in Division 22 plumbing fixture Sections for connection sizes.
  4. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.9 IDENTIFICATION

- A. Identify system components. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment" for identification materials and installation.
- B. Label pressure piping with system operating pressure.

3.10 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Piping Inspections:
  - 1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
  - 2. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
    - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
    - b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
  - 3. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
  - 4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- C. Piping Tests:
  - 1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
  - 2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
  - 3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
  - 4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
  - 5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
  - 6. Prepare reports for tests and for corrective action required.
- D. Domestic water piping will be considered defective if it does not pass tests and inspections.

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- E. Prepare test and inspection reports.

### 3.11 ADJUSTING

- A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
  - a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide flow of hot water in each branch.
  - b. Adjust calibrated balancing valves to flows indicated.
5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

### 3.12 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
  - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
  - b. Fill and isolate system according to either of the following:
    - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
    - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
  - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
  - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

- B. Clean non-potable domestic water piping as follows:
  - 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
  - 2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:
    - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    - b. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- C. Prepare and submit reports of purging and disinfecting activities.
- D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

### 3.13 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.
- D. Under-building-slab, domestic water, building service piping, NPS 3 and smaller, shall be the following:
  - 1. Soft copper tube, ASTM B 88, Type L; wrought-copper solder-joint fittings; and brazed joints.
- E. Aboveground domestic water piping, NPS 2 and smaller, shall be one of the following:
  - 1. Hard copper tube, ASTM B 88, Type L; wrought-copper solder-joint fittings; and soldered joints.
- F. Aboveground domestic water piping, NPS 2-1/2 to NPS 4, shall be one of the following:
  - 1. Hard copper tube, ASTM B 88, Type L; wrought-copper solder-joint fittings; and soldered joints.

### 3.14 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

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1. Shutoff Duty: Use ball or gate valves for piping NPS 2 and smaller. Use butterfly, ball, or gate valves with flanged ends for piping NPS 2-1/2 and larger.
  2. Throttling Duty: Use ball or globe valves for piping NPS 2 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 and larger.
  3. Drain Duty: Hose-end drain valves.
- B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

**END OF SECTION 221116**

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. This Section includes the following domestic water piping specialties:

1. Vacuum breakers.
2. Water pressure-reducing valves.
3. Balancing valves.
4. Temperature-actuated water mixing valves.
5. Strainers.
6. Wall hydrants.
7. Drain valves.
8. Water hammer arresters.
9. Air vents.
10. Trap-seal primer valves.

1.3 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig, unless otherwise indicated.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

1.5 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. NSF Compliance:
  - 1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components.
  - 2. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."

PART 2 - PRODUCTS

2.1 VACUUM BREAKERS

- A. Hose-Connection Vacuum Breakers:
  - 1. 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:
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Arrowhead Brass Products, Inc.
    - b. Cash Acme.
    - c. Conbraco Industries, Inc.
    - d. Legend Valve.
    - e. MIFAB, Inc.
    - f. Prier Products, Inc.
    - g. Watts Industries, Inc.; Water Products Div.
    - h. Woodford Manufacturing Company.
    - i. Zurn Plumbing Products Group; Light Commercial Operation.
    - j. Zurn Plumbing Products Group; Wilkins Div.
  - 3. Standard: ASSE 1011.
  - 4. Body: Bronze, nonremovable, with manual drain.
  - 5. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.

2.2 WATER PRESSURE-REDUCING VALVES

- A. Water Regulators:

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1. 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:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Cash Acme.
  - b. Conbraco Industries, Inc.
  - c. Honeywell Water Controls.
  - d. Watts Industries, Inc.; Water Products Div.
  - e. Zurn Plumbing Products Group; Wilkins Div.
3. Standard: ASSE 1003.
4. Pressure Rating: Initial working pressure of 150 psig.
5. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and NPS 3.

2.3 BALANCING VALVES

A. Copper-Alloy Calibrated Balancing Valves:

1. 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:
  - a. Armstrong International, Inc.
  - b. Flo Fab Inc.
  - c. ITT Industries; Bell & Gossett Div.
  - d. NIBCO INC.
  - e. TAC Americas.
  - f. Taco, Inc.
  - g. Watts Industries, Inc.; Water Products Div.
2. Type: Ball valve with two readout ports and memory setting indicator.
3. Body: Bronze.
4. Size: Same as connected piping, but not larger than NPS 2.
5. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

2.4 TEMPERATURE-ACTUATED WATER MIXING VALVES

A. Primary, Thermostatic, Water Mixing Valves:

1. 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:
  - a. Armstrong International, Inc.

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- b. Lawler Manufacturing Company, Inc.
  - c. Leonard Valve Company.
  - d. Powers; a Watts Industries Co.
  - e. Symmons Industries, Inc.
2. Standard: ASSE 1017.
  3. Pressure Rating: 125 psig.
  4. Type: Exposed-mounting, thermostatically controlled water mixing valve.
  5. Material: Bronze body with corrosion-resistant interior components.
  6. Connections: Threaded[ union] inlets and outlet.
  7. Accessories: Manual temperature control, check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
  8. Valve Pressure Rating: 125 psig minimum, unless otherwise indicated.

2.5 STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers:

1. Pressure Rating: 125 psig minimum, unless otherwise indicated.
2. Body: Bronze for NPS 2 and smaller; cast iron for NPS 2-1/2 and larger.
3. End Connections: Threaded for NPS 2 and smaller;flanged for NPS 2-1/2 and larger.
4. Screen: Stainless steel with round perforations, unless otherwise indicated.
5. Drain: Pipe plug.

2.6 WALL HYDRANTS

A. Wall Hydrants:

1. 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:
  - a. Josam Company.
  - b. MIFAB, Inc.
  - c. Prier Products, Inc.
  - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - e. Tyler Pipe; Wade Div.
  - f. Watts Drainage Products Inc.
  - g. Woodford Manufacturing Company.
  - h. Zurn Plumbing Products Group; Light Commercial Operation.
  - i. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.21.3M for concealed-outlet, self-draining wall hydrants.
3. Pressure Rating: 125 psig.
4. Operation: Loose key.
5. Inlet: NPS 3/4 or NPS 1.

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6. Outlet: Concealed, with integral vacuum breaker or nonremovable hose-connection; and garden-hose thread complying with ASME B1.20.7.
7. Box: Deep, flush mounting with cover.
8. Operating Keys(s): One with each wall hydrant.

## 2.7 DRAIN VALVES

### A. Ball-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 3/4.
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

## 2.8 WATER HAMMER ARRESTERS

### A. Water Hammer Arresters:

1. 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:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. AMTROL, Inc.
  - b. Josam Company.
  - c. MIFAB, Inc.
  - d. PPP Inc.
  - e. Sioux Chief Manufacturing Company, Inc.
  - f. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - g. Tyler Pipe; Wade Div.
  - h. Watts Drainage Products Inc.
  - i. Zurn Plumbing Products Group; Specification Drainage Operation.
3. Standard: PDI-WH 201.
4. Size: PDI-WH 201, Sizes A through F.

2.9 AIR VENTS

A. Welded-Construction Automatic Air Vents:

1. Body: Stainless steel.
2. Pressure Rating: 150-psig minimum pressure rating.
3. Float: Replaceable, corrosion-resistant metal.
4. Mechanism and Seat: Stainless steel.
5. Size: NPS 3/8 minimum inlet.
6. Inlet and Vent Outlet End Connections: Threaded.

2.10 TRAP-SEAL PRIMER VALVES

A. Supply-Type, Trap-Seal Primer Valves:

1. 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:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. MIFAB, Inc.
  - b. PPP Inc.
  - c. Sioux Chief Manufacturing Company, Inc.
  - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - e. Watts Industries, Inc.; Water Products Div.
3. Standard: ASSE 1018.
4. Pressure Rating: 125 psig minimum.
5. Body: Bronze.
6. Inlet and Outlet Connections: NPS 1/2 threaded, union, or solder joint.
7. Gravity Drain Outlet Connection: NPS 1/2 threaded or solder joint.
8. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install water regulators with inlet and outlet shutoff valves. Install pressure gages on inlet and outlet.
- B. Install water control valves with inlet and outlet shutoff valves. Install pressure gages on inlet and outlet.

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- C. Install temperature-actuated water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet.
  - 1. Install thermometers and water regulators if specified.
- D. Install Y-pattern strainers for water on supply side of each control valve and water pressure-reducing valve.
- E. Install water hammer arresters in water piping according to PDI-WH 201.
- F. Install air vents at high points of water piping.
- G. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping and specialties.
- B. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- C. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
  - 1. Pressure vacuum breakers.
  - 2. Water pressure-reducing valves.
  - 3. Primary, thermostatic, water mixing valves.
  - 4. Primary water tempering valves.
  - 5. Supply-type, trap-seal primer valves.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and prepare test reports:
  - 1. Test each pressure vacuum breaker according to authorities having jurisdiction and the device's reference standard.
- B. Remove and replace malfunctioning domestic water piping specialties and retest as specified above.

3.5 ADJUSTING

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow set points of balancing valves.
- C. Set field-adjustable temperature set points of temperature-actuated water mixing valves.

**END OF SECTION 221119**

**SECTION 221316 - SANITARY WASTE AND VENT PIPING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Pipe, tube, and fittings.
  - 2. Specialty pipe fittings.
  - 3. Encasement for underground metal piping.

1.3 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:
  - 1. Soil, Waste, and Vent Piping: 10-foot head of water.
- B. Seismic Performance: Soil, waste, and vent piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Seismic Qualification Certificates: For waste and vent piping, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  - 2. Detailed description of piping anchorage devices on which the certification is based and their installation requirements.
- C. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 74, Extra Heavy class.
- B. Gaskets: ASTM C 564, rubber.
- C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

2.3 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.
- B. Sovent Stack Fittings: ASME B16.45 or ASSE 1043, hubless, cast-iron aerator and deaerator drainage fittings.
- C. Hubless-Piping Couplings:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ANACO-Husky.
    - b. Dallas Specialty & Mfg. Co.
    - c. Fernco Inc.
    - d. Matco-Norca, Inc.
    - e. MIFAB, Inc.
    - f. Mission Rubber Company; a division of MCP Industries, Inc.
    - g. Stant.
    - h. Tyler Pipe.
  - 2. Standards: ASTM C 1277 and CISPI 310.

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3. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

#### 2.4 ABS PIPE AND FITTINGS

- A. Solid-Wall ABS Pipe: ASTM D 2661, Schedule 40.
- B. ABS Socket Fittings: ASTM D 2661, made to ASTM D 3311, drain, waste, and vent patterns.
- C. Solvent Cement: ASTM D 2235.
  1. Use ABS solvent cement that has a VOC content of 325 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

#### 2.5 SPECIALTY PIPE FITTINGS

- A. Transition Couplings:
  1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.
  2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
  3. Shielded, Nonpressure Transition Couplings:
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Cascade Waterworks Mfg. Co.
      - 2) Mission Rubber Company; a division of MCP Industries, Inc.
    - b. Standard: ASTM C 1460.
    - c. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

#### 2.6 ENCASEMENT FOR UNDERGROUND METAL PIPING

- A. Standard: ASTM A 674 or AWWA C105/A 21.5.
- B. Material: Linear low-density polyethylene film of 0.008-inch minimum thickness.
- C. Form: Sheet or tube.

PART 3 - EXECUTION

3.1 EARTH MOVING

- A. Comply with requirements for excavating, trenching, and backfilling specified in Division 31 Section "Earth Moving."

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- K. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

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- L. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- M. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:
1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 2 percent downward in direction of flow for piping NPS 4 and larger.
  2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
  3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- N. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
1. Install encasement on underground piping according to ASTM A 674 or AWWA C105/A 21.5.
- O. Install steel piping according to applicable plumbing code.
- P. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."
- Q. Install underground ABS piping according to ASTM D 2321.
- R. Plumbing Specialties:
1. Install backwater valves in sanitary waste gravity-flow piping. Comply with requirements for backwater valves specified in Division 22 Section "Sanitary Waste Piping Specialties."
  2. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping. Install cleanout fitting with closure plug inside the building in sanitary drainage force-main piping. Comply with requirements for cleanouts specified in Division 22 Section "Sanitary Waste Piping Specialties."
  3. Install drains in sanitary drainage gravity-flow piping. Comply with requirements for drains specified in Division 22 Section "Sanitary Waste Piping Specialties."
- S. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- T. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- U. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."

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- V. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 22 Section "Escutcheons for Plumbing Piping."

### 3.3 JOINT CONSTRUCTION

- A. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- B. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Join copper tube and fittings with soldered joints according to ASTM B 828. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.
- E. Grooved Joints: Cut groove ends of pipe according to AWWA C606. Lubricate and install gasket over ends of pipes or pipe and fitting. Install coupling housing sections, over gasket, with keys seated in piping grooves. Install and tighten housing bolts.
- F. Flanged Joints: Align bolt holes. Select appropriate gasket material, size, type, and thickness. Install gasket concentrically positioned. Use suitable lubricants on bolt threads. Torque bolts in cross pattern.

### 3.4 SPECIALTY PIPE FITTING INSTALLATION

- A. Transition Couplings:
  - 1. Install transition couplings at joints of piping with small differences in OD's.
  - 2. In Drainage Piping: Shielded, nonpressure transition couplings.
- B. Dielectric Fittings:
  - 1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
  - 2. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
  - 3. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.

### 3.5 VALVE INSTALLATION

- A. General valve installation requirements are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."
- B. Shutoff Valves:
  - 1. Install shutoff valve on each sewage pump discharge.
  - 2. Install gate or full-port ball valve for piping NPS 2 and smaller.
  - 3. Install gate valve for piping NPS 2-1/2 and larger.
- C. Check Valves: Install swing check valve, between pump and shutoff valve, on each sewage pump discharge.
- D. Backwater Valves: Install backwater valves in piping subject to backflow.
  - 1. Horizontal Piping: Horizontal backwater valves.
  - 2. Floor Drains: Drain outlet backwater valves unless drain has integral backwater valve.
  - 3. Install backwater valves in accessible locations.
  - 4. Comply with requirements for backwater valve specified in Division 22 Section "Sanitary Waste Piping Specialties."

### 3.6 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for seismic-restraint devices specified in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- B. Comply with requirements for pipe hanger and support devices and installation specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."
  - 1. Install stainless-steel pipe hangers for horizontal piping in corrosive environments.
  - 2. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
  - 3. Vertical Piping: MSS Type 8 or Type 42, clamps.
  - 4. Install individual, straight, horizontal piping runs:
    - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
  - 5. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
  - 6. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Support horizontal piping and tubing within 12 inches of each fitting and coupling.
- D. Support vertical piping and tubing at base and at each floor.

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- E. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.
- F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
  - 2. NPS 3: 60 inches with 1/2-inch rod.
  - 3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
- G. Install supports for vertical cast-iron soil piping every 15 feet.
- H. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1-1/4: 84 inches with 3/8-inch rod.
  - 2. NPS 1-1/2: 108 inches with 3/8-inch rod.
  - 3. NPS 2: 10 feet with 3/8-inch rod.
  - 4. NPS 2-1/2: 11 feet with 1/2-inch rod.
  - 5. NPS 3: 12 feet with 1/2-inch rod.
  - 6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
- I. Install supports for vertical steel piping every 15 feet.
- J. Install hangers for ABS piping with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
  - 2. NPS 2-1/2: 48 inches with 1/2-inch rod.
  - 3. NPS 3 and NPS 5: 48 inches with 5/8-inch rod.
- K. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect drainage and vent piping to the following:
  - 1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
  - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.

3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
  4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
  5. Equipment: Connect drainage piping as indicated. Provide shutoff valve if indicated and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.
- D. Connect force-main piping to the following:
1. Sanitary Sewer: To exterior force main.
  2. Sewage Pump: To sewage pump discharge.
- E. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- F. Make connections according to the following unless otherwise indicated:
1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
  2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

### 3.8 IDENTIFICATION

- A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

### 3.9 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
  1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
  2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

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1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
  2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
  3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
  4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
  5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
  6. Prepare reports for tests and required corrective action.
- E. Test force-main piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
1. Leave uncovered and unconcealed new, altered, extended, or replaced force-main piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
  2. Cap and subject piping to static-water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
  3. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
  4. Prepare reports for tests and required corrective action.

## 3.10 CLEANING AND PROTECTION

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.
- D. Exposed ABS and PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

3.11 PIPING SCHEDULE

- A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.
- B. Aboveground, soil and waste piping shall be the following:
  - 1. Hubless, cast-iron soil pipe and fittings, hubless-piping couplings; and coupled joints.
- C. Aboveground, vent piping shall be the following:
  - 1. Hubless, cast-iron soil pipe and fittings; hubless-piping couplings; and coupled joints.
- D. Underground, soil, waste, and vent piping shall be the following:
  - 1. Solid wall ABS pipe, ABS socket fittings, and solvent-cemented joints.

**END OF SECTION 221316**

**SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section..

**1.2 SUMMARY**

- A. This Section includes the following sanitary drainage piping specialties:
  - 1. Cleanouts.
  - 2. Floor drains.
  - 3. Miscellaneous sanitary drainage piping specialties.

**1.3 DEFINITIONS**

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. FRP: Fiberglass-reinforced plastic.
- C. HDPE: High-density polyethylene plastic.
- D. PE: Polyethylene plastic.
- E. PP: Polypropylene plastic.
- F. PVC: Polyvinyl chloride plastic.

**1.4 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and accessories.
- B. Field quality-control test reports.
- C. Operation and Maintenance Data: For drainage piping specialties to include in emergency, operation, and maintenance manuals.

SANITARY WASTE PIPING SPECIALTIES

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1.5 QUALITY ASSURANCE

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.
- B. 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.
- C. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.

1.6 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Coordinate size and location of roof penetrations.

PART 2 - PRODUCTS

2.1 CLEANOUTS

- A. Exposed Metal Cleanouts:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Josam Company; Josam Div.
    - b. MIFAB, Inc.
    - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    - d. Tyler Pipe; Wade Div.
    - e. Watts Drainage Products Inc.
    - f. Zurn Plumbing Products Group; Specification Drainage Operation.
  - 2. Standard: ASME A112.36.2M.
- B. Metal Floor Cleanouts:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Josam Company; Josam Div.
    - b. Oatey.
    - c. Sioux Chief Manufacturing Company, Inc.
    - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.

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- e. Tyler Pipe; Wade Div.
- f. Watts Drainage Products Inc.
- g. Zurn Plumbing Products Group; Light Commercial Operation.
- h. Zurn Plumbing Products Group; Specification Drainage Operation.

2. Standard: ASME A112.36.

C. Cast-Iron Wall Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Josam Company; Josam Div.
- b. MIFAB, Inc.
- c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
- d. Tyler Pipe; Wade Div.
- e. Watts Drainage Products Inc.
- f. Zurn Plumbing Products Group; Specification Drainage Operation.

2. Standard: ASME A112.36.2M. Include wall access.

2.2 FLOOR DRAINS

A. Cast-Iron Floor Drains:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Commercial Enameling Co.
- b. Josam Company; Josam Div.
- c. MIFAB, Inc.
- d. Prier Products, Inc.
- e. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
- f. Tyler Pipe; Wade Div.
- g. Watts Drainage Products Inc.
- h. Zurn Plumbing Products Group; Light Commercial Operation.
- i. Zurn Plumbing Products Group; Specification Drainage Operation.

2. Standard: ASME A112.6.3.

2.3 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Floor-Drain, Trap-Seal Primer Fittings:

1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.

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2. Size: Same as floor drain outlet with NPS 1/2 side inlet.
- B. Air-Gap Fittings:
1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
  2. Body: Bronze or cast iron.
  3. Inlet: Opening in top of body.
  4. Outlet: Larger than inlet.
  5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.
- C. Vent Caps:
1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
  2. Size: Same as connected stack vent or vent stack.
- D. Expansion Joints:
1. Standard: ASME A112.21.2M.
  2. Body: Cast iron with bronze sleeve, packing, and gland.
  3. End Connections: Matching connected piping.
  4. Size: Same as connected soil, waste, or vent piping.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
  2. Locate at each change in direction of piping greater than 45 degrees.
  3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
  4. Locate at base of each vertical soil and waste stack.
- B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

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- D. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
  - 1. Position floor drains for easy access and maintenance.
  - 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
    - a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
    - b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
    - c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.
  - 3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
  - 4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- E. Install trench drains at low points of surface areas to be drained. Set grates of drains flush with finished surface, unless otherwise indicated.
- F. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.
- G. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.
  - 1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
  - 2. Size: Same as floor drain inlet.
- H. Install vent caps on each vent pipe passing through roof.
- I. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.

3.3 LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each plumbing equipment.

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- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

3.4 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

**END OF SECTION 221319**

**SECTION 224000 - PLUMBING FIXTURES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. This Section includes the following conventional plumbing fixtures and related components:
  - 1. Protective shielding guards.
  - 2. Fixture supports.
  - 3. Water closets.
  - 4. Urinals.
  - 5. Lavatories.
  - 6. Commercial sinks.
  - 7. Service sinks.
  - 8. Drinking fountains.

1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.
- C. Cast Polymer: Cast-filled-polymer-plastic material. This material includes cultured-marble and solid-surface materials.
- D. Cultured Marble: Cast-filled-polymer-plastic material with surface coating.
- E. Fitting: Device that controls the flow of water into or out of the plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spouts, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.
- F. FRP: Fiberglass-reinforced plastic.
- G. PMMA: Polymethyl methacrylate (acrylic) plastic.

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- H. PVC: Polyvinyl chloride plastic.
- I. Solid Surface: Nonporous, homogeneous, cast-polymer-plastic material with heat-, impact-, scratch-, and stain-resistance qualities.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of plumbing fixture indicated. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.
- B. Operation and Maintenance Data: For plumbing fixtures to include in emergency, operation, and maintenance manuals.
- C. Warranty: Special warranty specified in this Section.

#### 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.
  - 1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.
- B. 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.
- C. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.
- D. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- E. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.

#### 1.6 WARRANTY

- A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace components of whirlpools that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:

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- a. Structural failures of unit shell.
  - b. Faulty operation of controls, blowers, pumps, heaters, and timers.
  - c. Deterioration of metals, metal finishes, and other materials beyond normal use.
2. Warranty Period for Commercial Applications: One year from date of Substantial Completion.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.
  2. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.
  3. Flushometer Valve, Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than 12 of each type.
  4. Provide hinged-top wood or metal box, or individual metal boxes, with separate compartments for each type and size of extra materials listed above.
  5. Toilet Seats: Equal to 5 percent of amount of each type installed.

PART 2 - PRODUCTS

2.1 PROTECTIVE SHIELDING GUARDS

- A. Protective Shielding Piping Enclosures:
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. TRUEBRO, Inc.
  2. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

2.2 FIXTURE SUPPORTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Josam Company.
  2. MIFAB Manufacturing Inc.
  3. Smith, Jay R. Mfg. Co.

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4. Tyler Pipe; Wade Div.
5. Watts Drainage Products Inc.; a div. of Watts Industries, Inc.
6. Zurn Plumbing Products Group; Specification Drainage Operation.

B. Water-Closet Supports:

1. Description: Combination carrier designed for wall-mounting, water-closet-type fixture. Include single or double, vertical or horizontal, hub-and-spigot or hubless waste fitting as required for piping arrangement; faceplates; couplings with gaskets; feet; and fixture bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space.

2.3 WATER CLOSETS

A. Water Closets:

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
  - a. Acorn Engineering Company
  - b. American Standard Companies, Inc.
  - c. Briggs Plumbing Products, Inc.
  - d. Capizzi.
  - e. Crane Plumbing, L.L.C./Fiat Products.
  - f. Eljer.
  - g. Kohler Co.
  - h. St. Thomas Creations.
  - i. TOTO USA, Inc.
2. Description Wall-mounting, back-outlet, vitreous china fixture designed for flushometer valve operation. See Plumbing Schedule on P-003.

2.4 URINALS

A. Urinals:

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
  - a. Acorn Engineering Company
  - b. Commercial Enameling Company
  - c. Eljer.
  - d. Kohler Co.

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2. Description: Wall-mounting, vitreous china. See Plumbing Schedule on P-003.

## 2.5 LAVATORIES

### A. Lavatories:

1. Basis-of-Design Product: Subject to compliance with requirements, provide or a comparable product by one of the following:
  - a. Acorn Engineering Company
  - b. American Standard Companies, Inc.
  - c. Briggs Plumbing Products, Inc.
  - d. Crane Plumbing, L.L.C./Fiat Products.
  - e. Eljer.
  - f. Kohler Co.
  - g. Mansfield Plumbing Products, Inc.
  - h. Peerless Pottery, Inc.
  - i. St. Thomas Creations.
2. Description: Accessible, countertop. See Plumbing Schedule on P-003.

## 2.6 COMMERCIAL SINKS

### A. Commercial Sinks:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Advance Tabco.
  - b. Eagle Group.
  - c. Amtekco Industries, Inc.
  - d. Elkay Manufacturing Co.
  - e. Just Manufacturing Company.
  - f. Marlo Manufacturing.
  - g. Metal Masters Foodservice Equipment Co., Inc.
2. Description: Two-compartment, stainless-steel commercial sink. See Plumbing Schedule on P-003.

## 2.7 SERVICE SINKS

### A. Service Sinks:

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1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Zurn Plumbing Products Group
  - b. Acorn Engineering Company
  - c. American Standard Companies, Inc.
  - d. Commercial Enameling Company.
  - e. Eljer.
  - f. Kohler Co
2. Mop service basin. See Plumbing Schedule on P-003.

## 2.8 DRINKING FOUNTAINS

### A. Drinking Fountains:

1. Stainless-Steel Drinking Fountains ADA compliant, Stainless steel, refrigerated wall mounted units.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Elkay Manufacturing Co.
  - b. Halsey Taylor
  - c. Haws Corporation
3. Description: See Plumbing Schedule on P-003.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.
- B. Examine cabinets, counters, floors, and walls for suitable conditions where fixtures will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.

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- B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.
  - 1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
  - 2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
  - 3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.
- C. Install back-outlet, wall-mounting fixtures onto waste fitting seals and attach to supports.
- D. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.
- E. Install wall-mounting fixtures with tubular waste piping attached to supports.
- F. Install floor-mounting, back-outlet water closets attached to building floor substrate and wall bracket and onto waste fitting seals.
- G. Install fixtures level and plumb according to roughing-in drawings.
- H. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
  - 1. Exception: Use ball, gate, or globe valves if supply stops are not specified with fixture. Valves are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."
- I. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.
- J. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
- K. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.
- L. Install toilet seats on water closets.
- M. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- N. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.
- O. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- P. Install shower flow-control fittings with specified maximum flow rates in shower arms.

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- Q. Install traps on fixture outlets.
  - 1. Exception: Omit trap on fixtures with integral traps.
  - 2. Exception: Omit trap on indirect wastes, unless otherwise indicated.
- R. Install disposer in outlet of each sink indicated to have disposer. Install switch where indicated or in wall adjacent to sink if location is not indicated.
- S. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in Division 22 Section "Escutcheons for Plumbing Piping."
- T. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 07 Section "Joint Sealants."

### 3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### 3.4 FIELD QUALITY CONTROL

- A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.
- B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.
- C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.
- D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.
- E. Install fresh batteries in sensor-operated mechanisms.

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3.5 ADJUSTING

- A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
- B. Adjust water pressure at faucets and flushometer valves to produce proper flow and stream.
- C. Replace washers and seals of leaking and dripping faucets and stops.

3.6 CLEANING

- A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:
  - 1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
  - 2. Remove sediment and debris from drains.
- B. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

3.7 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

**END OF SECTION 224000**

**SECTION 230130.52 - EXISTING HVAC AIR DISTRIBUTION SYSTEM CLEANING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section includes cleaning existing HVAC air-distribution equipment, ducts, plenums, and system components.
- B. Related Requirements:
  - 1. Section 233113.00 "Metal Ducts" for cleaning newly installed metal ducts.
  - 2. Section 230593.00 "Testing, Adjusting, Balancing for HVAC" for system flow documentation before cleaning and balancing and following cleaning and restoration.
  - 3. Section 233300.00 "Air Duct Accessories" for restoration of opened ducts and plenums with access doors.

1.3 DEFINITIONS

- A. ACAC: American Council for Accredited Certification.
- B. AIHA-LAP: American Industrial Hygiene Association Lab Accreditation Program
- C. ASCS: Air systems cleaning specialist.
- D. CESB: Council of Engineering and Scientific Specialty Boards.
- E. CMI: Certified Microbial Investigator.
- F. CMC: Certified Microbial Consultant.
- G. CMR: Certified Microbial Remediator.
- H. CMRS: Certified Microbial Remediation Supervisor.
- I. EMLAP: Environmental Microbiology Laboratory Accreditation Program.
- J. IEP: Indoor Environmental Professional.

K. IICRC: Institute of Inspection, Cleaning, and Restoration Certification.

L. NADCA: National Air Duct Cleaners Association.

#### 1.4 ACTION SUBMITTALS

A. Product Data:

1. Cleaning agents
2. Antimicrobial surface treatments ("sealant" for sustainable design submittal purposes).

B. Sustainable Design Submittals:

1. Product Data: For adhesives and sealants, indicating VOC content.
2. Laboratory Test Reports: For adhesives and sealants, indicating compliance with requirements for low-emitting materials.

#### 1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. For an ASCS.
2. For an IEP.
3. For a CMR and a CMRS.

B. Field Quality-Control Reports:

1. Project's existing conditions.
2. Evaluations and recommendations, including cleanliness verification.
3. Strategies and procedures plan.

#### 1.6 CLOSEOUT SUBMITTALS

A. Post-Project report.

#### 1.7 QUALITY ASSURANCE

A. ASCS Qualifications: A certified member of NADCA.

1. Certification: Employ an ASCS certified by NADCA on a full-time basis.
2. Supervisor Qualifications: Certified as an ASCS by NADCA.

B. IEP Qualifications: CMI who is certified by ACAC and accredited by CESB.

C. CMR Qualifications: Certified by ACAC and accredited by CESB.

- D. CMRS Qualifications: Certified by ACAC and accredited by CESB.
- E. UL Compliance: Comply with UL 181 and UL 181A for fibrous-glass ducts.

## PART 2 - PRODUCTS

### 2.1 HVAC CLEANING AGENTS

- 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:
  - 1. Apex Engineering Products Corporation.
  - 2. BBJ Environmental Solutions.
  - 3. Goodway Technologies Corporation.
  - 4. Nu-Calgon.
  - 5. QuestVapco Corporation.
- B. Description:
  - 1. Formulated for each specific soiled coil condition that needs remedy.
  - 2. Will not corrode or tarnish aluminum, copper, or other metals.

### 2.2 ANTIMICROBIAL SURFACE TREATMENT

- 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:
  - 1. Bio-Cide International, Inc.
  - 2. Contec, Inc.
  - 3. Ecolab, Inc.
- B. Description: Specific product selected shall be as recommended by the IEP based on the specific antimicrobial needs of the specific Project conditions.
  - 1. Formulated to kill and inhibit growth of microorganisms.
  - 2. EPA-registered for use in HVAC systems and for the specific application in which it will be used.
  - 3. Have no residual action after drying, with zero VOC off-gassing.
  - 4. OSHA compliant.
  - 5. Treatment shall dry clear to allow continued visual observation of the treated surface.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Inspect HVAC air-distribution equipment, ducts, plenums, and system components to determine appropriate methods, tools, and equipment required for performance of the Work.
- B. Perform "Project Evaluation and Recommendation" according to NADCA ACR.
- C. Cleaning Plan: Prepare a written plan for air-distribution system cleaning that includes strategies and step-by-step procedures. At a minimum, include the following:
  - 1. Supervisor contact information.
  - 2. Work schedule, including location, times, and impact on occupied areas.
  - 3. Methods and materials planned for each HVAC component type.
  - 4. Required support from other trades.
  - 5. Equipment and material storage requirements.
  - 6. Exhaust equipment setup locations.
- D. Existing Conditions Report: Prepare a written report that documents existing conditions of the systems and equipment. Include documentation of existing conditions, including inspection results, photo images, laboratory results, and interpretations of the laboratory results by an IEP.
  - 1. Prepare written report listing conditions detrimental to performance of the Work.
- E. Proceed with work only after conditions detrimental to performance of the Work have been corrected.
- F. Use the existing service openings, as required for proper cleaning, at various points of the HVAC system for physical and mechanical entry and for inspection.
- G. Comply with NADCA ACR, "Guidelines for Constructing Service Openings in HVAC Systems" Section.
- H. Mark the position of manual volume dampers and air-directional mechanical devices inside the system prior to cleaning.

#### 3.2 CLEANING

- A. Comply with NADCA ACR, including items identified as "recommended," "advised," and "suggested."
- B. Perform electrical lockout and tagout according to Owner's standards or authorities having jurisdiction.
- C. Remove non-adhered substances and deposits from within the HVAC system.

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- D. Complete cleaning in accordance with Owner-Contractor agreed-upon scope of work.
- E. Systems and Components to Be Cleaned: All air-moving and -distribution equipment.
- F. Collect debris removed during cleaning. Ensure that debris is not dispersed outside the HVAC system during the cleaning process.
- G. Particulate Collection:
  - 1. For particulate collection equipment, include adequate filtration to contain debris removed. Locate equipment downwind and away from all air intakes and other points of entry into the building.
  - 2. HEPA filtration with 99.97 percent collection efficiency for particles sized 0.3 micrometer or larger shall be used where the particulate collection equipment is exhausting inside the building,
- H. Control odors and mist vapors during the cleaning and restoration process.
- I. Mark the position of manual volume dampers and air-directional mechanical devices inside the system prior to cleaning. Restore them to their marked position on completion of cleaning.
- J. System components shall be cleaned so that all HVAC system components are visibly clean. On completion, all components must be returned to those settings recorded just prior to cleaning operations.
- K. Clean all air-distribution devices, registers, grilles, and diffusers.
- L. Clean non-adhered substance deposits according to NADCA ACR and the following:
  - 1. Clean air-handling units, airstream surfaces, components, condensate collectors, and drains.
  - 2. Ensure that a suitable operative drainage system is in place prior to beginning wash-down procedures.
  - 3. Clean evaporator coils, reheat coils, and other airstream components.
- M. Air-Distribution Systems:
  - 1. Create service openings in the HVAC system as necessary to accommodate cleaning.
  - 2. Mechanically clean air-distribution systems specified to remove all visible contaminants, so that the systems are capable of passing the HVAC System Cleanliness Tests (see NADCA ACR).
- N. Debris removed from the HVAC system shall be disposed of according to applicable Federal, state, and local requirements.
- O. Mechanical Cleaning Methodology:
  - 1. Source-Removal Cleaning Methods: The HVAC system shall be cleaned using source-removal mechanical cleaning methods designed to extract contaminants from within the

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HVAC system and to safely remove these contaminants from the facility. No cleaning method, or combination of methods, shall be used that could potentially damage components of the HVAC system or negatively alter the integrity of the system.

- a. Use continuously operating vacuum-collection devices to keep each section being cleaned under negative pressure.
- b. Cleaning methods that require mechanical agitation devices to dislodge debris that is adhered to interior surfaces of HVAC system components shall be equipped to safely remove these devices. Cleaning methods shall not damage the integrity of HVAC system components or damage porous surface materials, such as duct and plenum liners.

2. Cleaning Mineral-Fiber Insulation Components:

- a. Fibrous-glass thermal or acoustical insulation elements present in equipment or ductwork shall be thoroughly cleaned with HEPA vacuuming equipment while the HVAC system is under constant negative pressure and shall not be permitted to get wet according to NADCA ACR.
- b. Cleaning methods used shall not cause damage to fibrous-glass components and will render the system capable of passing the HVAC System Cleanliness Tests (see NADCA ACR).
- c. Fibrous materials that become wet shall be discarded and replaced.

P. Coil Cleaning:

1. See NADCA ACR, "Coil Surface Cleaning" Section. Type 1, or Type 1 and Type 2, cleaning methods shall be used to render the coil visibly clean and capable of passing coil cleaning verification.
2. Coil drain pans shall be subject to NADCA ACR, "Non-Porous Surfaces Cleaning Verification." Ensure that condensate drain pans are operational.
3. Electric-resistance coils shall be de-energized, locked out, and tagged before cleaning.
4. Cleaning methods shall not cause any appreciable damage to, cause displacement of, inhibit heat transfer, or cause erosion of the coil surface or fins, and shall comply with coil manufacturer's written recommendations.
5. Rinse thoroughly with clean water to remove any latent residues.

Q. Application of Antimicrobial Treatment:

1. Apply antimicrobial agents and coatings if active fungal growth is determined by the IEP to be at Condition 2 or Condition 3 status according to IICRC S520, as analyzed by a laboratory accredited by AIHA-LAP with an EMLAP certificate, and with results interpreted by an IEP. Apply antimicrobial agents and coatings according to manufacturer's written recommendations and EPA registration listing after the removal of surface deposits and debris.
2. Apply antimicrobial treatments and coatings after the system is rendered clean.
3. Apply antimicrobial agents and coatings directly onto surfaces of interior ductwork.
4. Microbial remediation shall be performed by a qualified CMR and CMRS.

3.3 CLEANLINESS VERIFICATION

- A. Verify cleanliness according to NADCA ACR, "Verification of HVAC System Cleanliness" Section.
- B. Verify HVAC system cleanliness after mechanical cleaning and before applying any treatment or introducing any treatment-related substance to the HVAC system, including biocidal agents and coatings.
- C. Surface-Cleaning Verification: Perform visual inspection for cleanliness. If no contaminants are evident through visual inspection, the HVAC system shall be considered clean. If visible contaminants are evident through visual inspection, those portions of the system where contaminants are visible shall be re-cleaned and subjected to re-inspection for cleanliness.
- D. Verification of Coil Cleaning: Coil will be considered clean if the coil is free of foreign matter and chemical residue, based on a thorough visual inspection.
- E. Additional Verification:
  - 1. Perform surface comparison testing or NADCA vacuum test.
  - 2. Conduct NADCA vacuum gravimetric test analysis for nonporous surfaces.
- F. Prepare a written cleanliness verification report. At a minimum, include the following:
  - 1. Written documentation of the success of the cleaning.
  - 2. Site inspection reports, initialed by supervisor, including notation on areas of inspection, as verified through visual inspection.
  - 3. Surface comparison test results if required.
  - 4. Gravimetric analysis (nonporous surfaces only).
  - 5. System areas found to be damaged.

3.4 RESTORATION

- A. Restore and repair HVAC air-distribution equipment, ducts, plenums, and components according to NADCA ACR, "Restoration and Repair of Mechanical Systems" Section.
- B. Restore service openings capable of future reopening. Comply with requirements in Section 233113 "Metal Ducts."
- C. Replace fibrous-glass materials that cannot be restored by cleaning or resurfacing. Comply with requirements in Section 233113 "Metal Ducts."
- D. Replace damaged insulation according to Section 230713 "Duct Insulation."
- E. Ensure that closures do not hinder or alter airflow.
- F. New closure materials, including insulation, shall match opened materials and shall have removable closure panels fitted with gaskets and fasteners.

- G. Restore manual volume dampers and air-directional mechanical devices inside the system to their marked position on completion of cleaning.
- H. Measure air flows through air-distribution system.

3.5 PROJECT CLOSEOUT

- A. Post-Project Report:
  - 1. Post-cleaning laboratory results if any.
  - 2. Post-cleaning photo images.
  - 3. Post-cleaning verification summary.
- B. Drawings:
  - 1. Deviations of existing system from Owner's record drawings.
  - 2. Location of service openings.

**END OF SECTION 230130.52**

**SECTION 230513 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
  - 1. Motor controllers.
  - 2. Torque, speed, and horsepower requirements of the load.
  - 3. Ratings and characteristics of supply circuit and required control sequence.
  - 4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Comply with NEMA MG 1 unless otherwise indicated.
- B. Comply with IEEE 841 for severe-duty motors.

2.2 MOTOR CHARACTERISTICS

- A. Efficiency: Provide premium efficiency motors throughout.
- B. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.

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- C. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Energy efficient, as defined in NEMA MG 1.
- C. Service Factor: 1.15.
- D. Multispeed Motors: Variable torque.
  - 1. For motors with 2:1 speed ratio, consequent pole, single winding.
  - 2. For motors with other than 2:1 speed ratio, separate winding for each speed.
- E. Multispeed Motors: Separate winding for each speed.
- F. Rotor: Random-wound, squirrel cage.
- G. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- H. Temperature Rise: Match insulation rating.
- I. Insulation: Class F.
- J. Code Letter Designation:
  - 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
  - 2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.
- K. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

- A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
- B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
  - 1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.

2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
  3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
  4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
- C. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

## 2.5 SINGLE-PHASE MOTORS

- A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
1. Permanent-split capacitor.
  2. Split phase.
  3. Capacitor start, inductor run.
  4. Capacitor start, capacitor run.
- B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
- C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- D. Motors 1/20 HP and Smaller: Shaded-pole type.
- E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

**END OF SECTION 230513**

**SECTION 230517 - SLEEVES AND SLEEVE SEALS FOR HVAC PIPING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Sleeves.
2. Stack-sleeve fittings.
3. Sleeve-seal fittings.
4. Grout.
5. Silicone sealants.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

## PART 2 - PRODUCTS

### 2.1 SLEEVES

- 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:
1. Advance Products & Systems, Inc.
  2. CALPICO, Inc.
  3. GPT; an EnPro Industries company.
- B. Galvanized-Steel Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

### 2.2 STACK-SLEEVE FITTINGS

- 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:
1. Jay R. Smith Mfg. Co.
  2. Zurn Industries, LLC.
- B. Description: Manufactured, galvanized cast-iron sleeve with integral cast flashing flange for use in waterproof floors and roofs. Include clamping ring, bolts, and nuts for membrane flashing.
1. Underdeck Clamp: Clamping ring with setscrews.

### 2.3 SLEEVE-SEAL FITTINGS

- 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:
1. Advance Products & Systems, Inc.
  2. CALPICO, Inc.
  3. GPT; an EnPro Industries company.
  4. Metraflex Company (The).
  5. Proco Products, Inc.
- B. Description:
1. Manufactured plastic, sleeve-type, waterstop assembly, made for imbedding in concrete slab or wall.
  2. Plastic or rubber waterstop collar with center opening to match piping OD.

2.4 GROUT

- A. Description: Nonshrink, recommended for interior and exterior sealing openings in nonfire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

2.5 SILICONE SEALANTS

- A. Silicone, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant, ASTM C 920, Type S, Grade NS, Class 25, use NT.
  - 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. Dow Corning Corporation.
    - b. GE Construction Sealants; Momentive Performance Materials Inc.
    - c. Pecora Corporation.
    - d. Polymeric Systems, Inc.
    - e. Schnee-Morehead, Inc., an ITW company.
    - f. Sherwin-Williams Company (The).
  - 2. Sealant shall have a VOC content of 250 g/L or less.
  - 3. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
  - 1. Sleeves are not required for core-drilled holes.

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- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
  - 1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
  - 2. Cut sleeves to length for mounting flush with both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
  - 3. Using grout or silicone sealant, seal space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
  - 1. Cut sleeves to length for mounting flush with both surfaces.
  - 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
  - 3. Seal annular space between sleeve and piping or piping insulation; use sealants appropriate for size, depth, and location of joint.
- E. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke-Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified in Section 078413 "Penetration Firestopping."

## 3.2 STACK-SLEEVE-FITTING INSTALLATION

- A. Install stack-sleeve fittings in new slabs as slabs are constructed.
  - 1. Install fittings that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
  - 2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Comply with requirements for flashing specified in Section 076200 "Sheet Metal Flashing and Trim."
  - 3. Install section of cast-iron soil pipe to extend sleeve to 3 inches above finished floor level.
  - 4. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
  - 5. Using waterproof silicone sealant, seal space between top hub of stack-sleeve fitting and pipe.
- B. Fire-Resistance-Rated, Horizontal Assembly, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.3 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings as new walls and slabs are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout or silicone sealant, seal space around outside of sleeve-seal fittings.

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
  - 1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.
- B. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.

3.5 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
  - 1. Exterior Concrete Walls Above Grade:
    - a. Piping Smaller Than NPS 6: Galvanized Steel pipe sleeves.
  - 2. Concrete Slabs Above Grade:
    - a. Piping Smaller Than NPS 6: Galvanized Steel pipe sleeves.
  - 3. Interior Partitions:
    - a. Piping Smaller Than NPS 6: Galvanized Steel pipe sleeves.

**END OF SECTION 230517**

**SECTION 230518 - ESCUTCHEONS FOR HVAC PIPING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Escutcheons.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

- A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.
- C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.
- D. Split-Casting Brass Type: With polished, chrome-plated finish and with concealed hinge and setscrew.
- E. Split-Plate, Stamped-Steel Type: With chrome-plated finish, concealed hinge, and spring-clip fasteners.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.

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- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
  - 1. Escutcheons for New Piping:
    - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
    - b. Chrome-Plated Piping: One-piece, cast-brass type with polished, chrome-plated finish.
    - c. Insulated Piping: One-piece, stamped-steel type.
    - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
    - e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
    - f. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
    - g. Bare Piping in Equipment Rooms: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
  - 2. Escutcheons for Existing Piping:
    - a. Chrome-Plated Piping: Split-casting brass type with polished, chrome-plated finish.
    - b. Insulated Piping: Split-plate, stamped-steel type with concealed hinge.
    - c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-casting brass type with polished, chrome-plated finish.
    - d. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-casting brass type with polished, chrome-plated finish.
    - e. Bare Piping in Unfinished Service Spaces: Split-casting brass type with polished, chrome-plated finish.
    - f. Bare Piping in Equipment Rooms: Split-casting brass type with polished, chrome-plated finish.
- C. Install floor plates for piping penetrations of equipment-room floors.
- D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
  - 1. New Piping: One-piece, floor-plate type.
  - 2. Existing Piping: Split-casting, floor-plate type.

3.2 FIELD QUALITY CONTROL

- A. Replace broken and damaged escutcheons and floor plates using new materials.

**END OF SECTION 230518**

**SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Metal framing systems.
3. Fastener systems.
4. Pipe stands.
5. Equipment supports.

B. Related Sections:

1. Section 230548 "Vibration and Seismic Controls for HVAC" for vibration isolation devices.
2. Section 233113 "Metal Ducts" for duct hangers and supports.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
  1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
  2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following; include Product Data for components:
  1. Metal framing systems.
  2. Pipe stands.
  3. Equipment supports.
- C. Delegated-Design Submittal: For trapeze hangers 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 trapeze hangers.
  2. Design Calculations: Calculate requirements for designing trapeze hangers.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

#### 1.7 QUALITY ASSURANCE

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

### PART 2 - PRODUCTS

#### 2.1 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
  1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
  2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
  3. Nonmetallic Coatings: Plastic coating, jacket, or liner.

4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

## 2.2 METAL FRAMING SYSTEMS

A. MFMA Manufacturer Metal Framing Systems:

1. Description: Shop- or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
2. Standard: MFMA-4.
3. Channels: Continuous slotted steel channel with inturred lips.
4. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
6. Paint Coating: Epoxy.

## 2.3 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Expansion Anchors: Insert-wedge-type, stainless- steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

## 2.4 PIPE STANDS

- A. General Requirements for Pipe Stands: Shop- or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.
- B. Compact Pipe Stand: One-piece plastic unit with integral-rod roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.
- C. Low-Type, Single-Pipe Stand: One-piece stainless-steel base unit with plastic roller, for roof installation without membrane penetration.
- D. High-Type, Single-Pipe Stand:

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1. Description: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.
  2. Base: Stainless steel.
  3. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
  4. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.
- E. Curb-Mounted-Type Pipe Stands: Shop- or field-fabricated pipe supports made from structural-steel shapes, continuous-thread rods, and rollers, for mounting on permanent stationary roof curb.

2.5 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.6 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
1. Properties: Nonstaining, noncorrosive, and nongaseous.
  2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.
- C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. Fastener System Installation:
1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.

2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- E. Pipe Stand Installation:
1. Pipe Stand Types except Curb-Mounted Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
  2. Curb-Mounted-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. See Section 077200 "Roof Accessories" for curbs.
- F. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- I. Install lateral bracing with pipe hangers and supports to prevent swaying.
- J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- K. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- M. Insulated Piping:
1. Attach clamps and spacers to piping.
    - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
  2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

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3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
  - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
4. Shield Dimensions for Pipe: Not less than the following:
  - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
  - b. NPS 4: 12 inches long and 0.06 inch thick.
  - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
  - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

### 3.2 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

### 3.3 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and 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. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

### 3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

### 3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

### 3.6 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports and attachments for general service applications.
- F. Use stainless-steel pipe hangers and fiberglass strut systems and stainless-steel or corrosion-resistant attachments for hostile environment applications.
- G. Use copper-plated pipe hangers and copper attachments for copper piping and tubing.
- H. Use padded hangers for piping that is subject to scratching.
- I. Use thermal-hanger shield inserts for insulated piping and tubing.

- J. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
  2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
  3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
  4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
  5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
  6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
  7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
  8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
  9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
  10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
  11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.

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12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
  13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
  14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
  15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
  16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
  17. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
  18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
  19. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
  20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
  21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- K. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
  2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- L. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
  2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
  3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
  4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
  5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

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- M. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
  2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction, to attach to top flange of structural shape.
  3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
  4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
  5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
  6. C-Clamps (MSS Type 23): For structural shapes.
  7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
  8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
  9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
  10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
  11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
  12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    - a. Light (MSS Type 31): 750 lb.
    - b. Medium (MSS Type 32): 1500 lb.
    - c. Heavy (MSS Type 33): 3000 lb.
  13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
  14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
  15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- N. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
  2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
  3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- O. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

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- P. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
- Q. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.

**END OF SECTION 230529**

**SECTION 230548 - VIBRATION AND SEISMIC CONTROLS FOR HVAC**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Housed-restrained-spring isolators.
  - 2. Restraint channel bracings.
  - 3. Restraint cables.
  - 4. Seismic-restraint accessories.
  - 5. Mechanical anchor bolts.

1.3 DEFINITIONS

- A. IBC: International Building Code.
- B. ICC-ES: ICC-Evaluation Service.
- C. OSHPD: Office of Statewide Health Planning & Development (for the State of California).

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
  - 2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device and seismic-restraint component required.
    - a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency acceptable to authorities having jurisdiction.
    - b. Annotate to indicate application of each product submitted and compliance with requirements.
- B. Shop Drawings:

1. Detail fabrication and assembly of equipment bases. Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
- C. Delegated-Design Submittal: For each vibration isolation and seismic-restraint device.
1. Include design calculations and details for selecting vibration isolators, seismic restraints, and vibration isolation bases complying with performance requirements, design criteria, and analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  2. Design Calculations: Calculate static and dynamic loading due to equipment weight, operation, and seismic and wind forces required to select vibration isolators and seismic and wind restraints and for designing vibration isolation bases.
    - a. Coordinate design calculations with wind load calculations required for equipment mounted outdoors. Comply with requirements in other Sections for equipment mounted outdoors.
  3. Seismic- Restraint Details:
    - a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
    - b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
    - c. Coordinate seismic-restraint and vibration isolation details with wind-restraint details required for equipment mounted outdoors. Comply with requirements in other Sections for equipment mounted outdoors.
    - d. Preapproval and Evaluation Documentation: By an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show coordination of vibration isolation device installation and seismic bracing for HVAC piping and equipment with other systems and equipment in the vicinity, including other supports and restraints, if any.
- B. Qualification Data: For professional engineer and testing agency.
- C. Welding certificates.
- D. Field quality-control reports.

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1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For air-spring mounts and restrained-air-spring mounts to include in operation and maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, that is an NRTL as defined by OSHA in 29 CFR 1910.7 and that is acceptable to authorities having jurisdiction.
- B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are unavailable, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic-Restraint Loading:
  - 1. Site Class as Defined in the IBC: To be determined.
  - 2. Assigned Seismic Use Group or Building Category as Defined in the IBC: To be determined.
    - a. Component Importance Factor: To be determined.
    - b. Component Response Modification Factor: To be determined.
    - c. Component Amplification Factor: To be determined.
  - 3. Design Spectral Response Acceleration at Short Periods (0.2 Second)
  - 4. Design Spectral Response Acceleration at 1.0-Second Period
  - 5. Rated strengths, features, and applications shall be as defined in reports by an agency acceptable to authorities having jurisdiction.
    - a. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they are subjected.

2.2 HOUSED-RESTRAINED-SPRING ISOLATORS

A. Freestanding, Steel, Open-Spring Isolators with Vertical-Limit Stop Restraint in Two-Part Telescoping Housing.

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. Ace Mountings Co., Inc.
  - b. California Dynamics Corporation.
  - c. Isolation Technology, Inc.
  - d. Kinetics Noise Control, Inc.
  - e. Mason Industries, Inc.
  - f. Vibration Eliminator Co., Inc.
  - g. Vibration Isolation.
  - h. Vibration Mountings & Controls, Inc.
2. Two-Part Telescoping Housing: A steel top and bottom frame separated by an elastomeric material and enclosing the spring isolators. Housings are equipped with adjustable snubbers to limit vertical movement.
  - a. Drilled base housing for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig.
  - b. Threaded top housing with adjustment bolt and cap screw to fasten and level equipment.
3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.3 RESTRAINT CHANNEL BRACINGS

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:

1. B-line, an Eaton business.
2. Hilti, Inc.
3. Mason Industries, Inc.
4. Unistrut; Part of Atkore International.

B. Description: MFMA-4, shop- or field-fabricated bracing assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

#### 2.4 RESTRAINT CABLES

- 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:
1. Kinetics Noise Control, Inc.
  2. Mason Industries, Inc.
  3. Novia; A Division of C&P.
  4. Vibration & Seismic Technologies, LLC.
  5. Vibration Mountings & Controls, Inc.
- B. Restraint Cables: ASTM A 492 stainless-steel cables. End connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; with a minimum of two clamping bolts for cable engagement.

#### 2.5 SEISMIC-RESTRAINT ACCESSORIES

- 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:
1. B-line, an Eaton business.
  2. Kinetics Noise Control, Inc.
  3. Mason Industries, Inc.
  4. Novia; A Division of C&P.
  5. TOLCO.
  6. Vibration & Seismic Technologies, LLC.
- B. Hanger-Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod.

#### 2.6 MECHANICAL ANCHOR BOLTS

- 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:
1. B-line, an Eaton business.
  2. Hilti, Inc.
  3. Kinetics Noise Control, Inc.
  4. Mason Industries, Inc.
- B. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas and equipment to receive vibration isolation and seismic- and wind-control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 APPLICATIONS

- A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.
- B. Hanger-Rod Stiffeners: Install hanger-rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
- C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength is adequate to carry present and future static and seismic loads within specified loading limits.

#### 3.3 VIBRATION CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION

- A. Installation of vibration isolators must not cause any change of position of equipment, piping, or ductwork resulting in stresses or misalignment.
- B. Install cables so they do not bend across edges of adjacent equipment or building structure.
- C. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.
- D. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

#### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:

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1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
  2. Test to 90 percent of rated proof load of device.
  3. Measure isolator restraint clearance.
  4. Measure isolator deflection.
  5. Verify snubber minimum clearances.
  6. Test and adjust restrained-air-spring isolator controls and safeties.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Prepare test and inspection reports.
- 3.5 ADJUSTING
- A. Adjust isolators after piping system is at operating weight.
  - B. Adjust limit stops on restrained-spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

**END OF SECTION 230548**

**SECTION 230553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Equipment labels.
  - 2. Warning signs and labels.
  - 3. Pipe labels.
  - 4. Duct labels.
  - 5. Stencils.
  - 6. Valve tags.
  - 7. Warning tags.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:

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1. Material and Thickness: stainless steel, 0.025-inch or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
  2. Letter Color: Black.
  3. Background Color: White.
  4. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
  5. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
  6. Fasteners: Stainless-steel rivets.
  7. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.
- C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number, and identify Drawing numbers where equipment is indicated (plans, details, and schedules) and the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

## 2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: Black.
- C. Background Color: Yellow.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
- G. Fasteners: Stainless-steel rivets.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

### 2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction according to ASME A13.1.
- B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings; also include pipe size and an arrow indicating flow direction.
  - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
  - 2. Lettering Size: At least 1/2 inch for viewing distances up to 72 inches and proportionately larger lettering for greater viewing distances.

### 2.4 DUCT LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: Black.
- C. Background Color: White.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
- G. Fasteners: Stainless-steel rivets.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings; also include duct size and an arrow indicating flow direction.
  - 1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions or as separate unit on each duct label to indicate flow direction.

## 2.5 STENCILS

### A. Stencils for Piping:

1. Lettering Size: At least 1/2 inch for viewing distances up to 72 inches and proportionately larger lettering for greater viewing distances.
2. Stencil Material: Aluminum.
3. Stencil Paint: Exterior, gloss, acrylic enamel in colors complying with recommendations in ASME A13.1 unless otherwise indicated. Paint may be in pressurized spray-can form.
4. Identification Paint: Exterior, acrylic enamel in colors according to ASME A13.1 unless otherwise indicated. Paint may be in pressurized spray-can form.

### B. Stencils for Ducts:

1. Lettering Size: Minimum letter height of 1-1/4 inches for viewing distances up to 15 feet and proportionately larger lettering for greater viewing distances.
2. Stencil Material: Fiberboard or metal.
3. Stencil Paint: Exterior, gloss, acrylic enamel. Paint may be in pressurized spray-can form.
4. Identification Paint: Exterior, acrylic enamel. Paint may be in pressurized spray-can form.

### C. Stencils for Access Panels and Door Labels, Equipment Labels, and Similar Operational Instructions:

1. Lettering Size: Minimum letter height of 1/2 inch for viewing distances up to 72 inches and proportionately larger lettering for greater viewing distances.
2. Stencil Material: Fiberboard or metal.
3. Stencil Paint: Exterior, gloss, acrylic enamel. Paint may be in pressurized spray-can form.
4. Identification Paint: Exterior, acrylic enamel. Paint may be in pressurized spray-can form.

## 2.6 VALVE TAGS

### A. Description: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass S-hook.

### B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

## 2.7 WARNING TAGS

### A. Description: Preprinted or partially preprinted accident-prevention tags of plasticized card stock with matte finish suitable for writing.

1. Size: 3 by 5-1/4 inches minimum.
2. Fasteners: Brass grommet and wire.
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Safety-yellow background with black lettering.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

#### 3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

#### 3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

#### 3.4 PIPE LABEL INSTALLATION

- A. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels, complying with ASME A13.1, with painted, color-coded bands or rectangles on each piping system.
  1. Identification Paint: Use for contrasting background.
  2. Stencil Paint: Use for pipe marking.
- B. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.
- C. Pipe Label Color Schedule:
  1. Refrigerant Piping: White letters on a safety-purple background.

### 3.5 DUCT LABEL INSTALLATION

- A. Install plastic-laminated duct labels with permanent adhesive on air ducts in the following color codes:
  - 1. Blue: For cold-air supply ducts.
  - 2. Yellow: For hot-air supply ducts.
  - 3. Green: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
- B. Stenciled Duct Label Option: Stenciled labels showing service and flow direction may be provided instead of plastic-laminated duct labels, at Installer's option.
- C. Locate labels near points where ducts enter into and exit from concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

### 3.6 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, shutoff valves, faucets, convenience and lawn-watering hose connections, and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
  - 1. Valve-Tag Size and Shape:
    - a. Refrigerant: 1-1/2 inches, round.
    - b. Gas: 1-1/2 inches, round.

### 3.7 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

**END OF SECTION 230553**

**SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego “Whitebook”, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Balancing Air Systems:
  - a. Constant-volume air systems.
- 2. Testing, Adjusting, and Balancing Equipment:
  - a. Heat-transfer coils.
- 3. Testing, adjusting, and balancing existing systems and equipment.
- 4. Sound tests.
- 5. Vibration tests.
- 6. Duct leakage tests.
- 7. Control system verification.

1.3 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. BAS: Building automation systems.
- C. NEBB: National Environmental Balancing Bureau.
- D. TAB: Testing, adjusting, and balancing.
- E. TABB: Testing, Adjusting, and Balancing Bureau.
- F. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- G. TDH: Total dynamic head.

1.4 PREINSTALLATION MEETINGS

- A. TAB Conference: If requested by the Owner, conduct a TAB conference at Project site after approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Provide a minimum of 14 days' advance notice of scheduled meeting time and location.
  - 1. Minimum Agenda Items:
    - a. The Contract Documents examination report.
    - b. The TAB plan.
    - c. Needs for coordination and cooperation of trades and subcontractors.
    - d. Proposed procedures for documentation and communication flow.

1.5 ACTION SUBMITTALS

- A. Sustainable Design Submittals:
  - 1. TAB Report: Documentation indicating that Work complies with ASHRAE/IES 90.1, Section 6.7.2.3 - "System Balancing."

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
- B. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.
- C. Strategies and Procedures Plan: Within 30 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.
- D. System Readiness Checklists: Within 30 days of Contractor's Notice to Proceed, submit system readiness checklists as specified in "Preparation" Article.
- E. Examination Report: Submit a summary report of the examination review required in "Examination" Article.
- F. Certified TAB reports.
- G. Sample report forms.
- H. Instrument calibration reports, to include the following:
  - 1. Instrument type and make.
  - 2. Serial number.
  - 3. Application.
  - 4. Dates of use.

5. Dates of calibration.

## 1.7 QUALITY ASSURANCE

- A. TAB Specialists Qualifications: Certified by AABC.
  1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC or NEBB.
  2. TAB Technician: Employee of the TAB specialist and certified by AABC or NEBB as a TAB technician.
- B. TAB Specialists Qualifications: Certified by NEBB or TABB.
  1. TAB Field Supervisor: Employee of the TAB specialist and certified by NEBB or TABB.
  2. TAB Technician: Employee of the TAB specialist and certified by NEBB or TABB as a TAB technician.
- C. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."
- D. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.7.2.3 - "System Balancing."

## 1.8 FIELD CONDITIONS

- A. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

## PART 2 - PRODUCTS (Not Applicable)

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.
- B. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.

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- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
- F. Examine equipment performance data including fan and pump curves.
  - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
  - 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- H. Examine test reports specified in individual system and equipment Sections.
- I. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- J. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- K. Examine operating safety interlocks and controls on HVAC equipment.
- L. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

## 3.2 PREPARATION

- A. Prepare a TAB plan that includes the following:
  - 1. Equipment and systems to be tested.
  - 2. Strategies and step-by-step procedures for balancing the systems.
  - 3. Instrumentation to be used.
  - 4. Sample forms with specific identification for all equipment.
- B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:
  - 1. Airside:

- a. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
- b. Duct systems are complete with terminals installed.
- c. Volume, smoke, and fire dampers are open and functional.
- d. Clean filters are installed.
- e. Fans are operating, free of vibration, and rotating in correct direction.
- f. Variable-frequency controllers' startup is complete and safeties are verified.
- g. Automatic temperature-control systems are operational.
- h. Ceilings are installed.
- i. Windows and doors are installed.
- j. Suitable access to balancing devices and equipment is provided.

### 3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" and in this Section.
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
  - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
  - 2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 233300 "Air Duct Accessories."
  - 3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 230713 "Duct Insulation," Section 230716 "HVAC Equipment Insulation," and Section 230719 "HVAC Piping Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

### 3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Cross-check the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

- E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling-unit components.
- L. Verify that air duct system is sealed as specified in Section 233113 "Metal Ducts."

### 3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
  - 1. Measure total airflow.
    - a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
    - b. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
    - c. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
    - d. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.
  - 2. Measure fan static pressures as follows:
    - a. Measure static pressure directly at the fan outlet or through the flexible connection.
    - b. Measure static pressure directly at the fan inlet or through the flexible connection.
    - c. Measure static pressure across each component that makes up the air-handling system.
    - d. Report artificial loading of filters at the time static pressures are measured.
  - 3. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
  - 4. Obtain approval from Construction Manager for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.

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5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.
1. Measure airflow of submain and branch ducts.
  2. Adjust submain and branch duct volume dampers for specified airflow.
  3. Re-measure each submain and branch duct after all have been adjusted.
- C. Adjust air inlets and outlets for each space to indicated airflows.
1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
  2. Measure inlets and outlets airflow.
  3. Adjust each inlet and outlet for specified airflow.
  4. Re-measure each inlet and outlet after they have been adjusted.
- D. Verify final system conditions.
1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
  2. Re-measure and confirm that total airflow is within design.
  3. Re-measure all final fan operating data, rpms, volts, amps, and static profile.
  4. Mark all final settings.
  5. Test system in economizer mode. Verify proper operation and adjust if necessary.
  6. Measure and record all operating data.
  7. Record final fan-performance data.

### 3.6 PROCEDURES FOR MOTORS

- A. Motors 1/2 HP and Larger: Test at final balanced conditions and record the following data:
1. Manufacturer's name, model number, and serial number.
  2. Motor horsepower rating.
  3. Motor rpm.
  4. Phase and hertz.
  5. Nameplate and measured voltage, each phase.
  6. Nameplate and measured amperage, each phase.
  7. Starter size and thermal-protection-element rating.
  8. Service factor and frame size.

### 3.7 PROCEDURES FOR HEAT-TRANSFER COILS

- A. Measure, adjust, and record the following data for each water coil:

1. Entering- and leaving-water temperature.
  2. Water flow rate.
  3. Water pressure drop for major (more than 20 gpm) equipment coils, excluding unitary equipment such as reheat coils, unit heaters, and fan-coil units.
  4. Dry-bulb temperature of entering and leaving air.
  5. Wet-bulb temperature of entering and leaving air for cooling coils.
  6. Airflow.
- B. Measure, adjust, and record the following data for each electric heating coil:
1. Nameplate data.
  2. Airflow.
  3. Entering- and leaving-air temperature at full load.
  4. Voltage and amperage input of each phase at full load.
  5. Calculated kilowatt at full load.
  6. Fuse or circuit-breaker rating for overload protection.
- C. Measure, adjust, and record the following data for each steam coil:
1. Dry-bulb temperature of entering and leaving air.
  2. Airflow.
  3. Inlet steam pressure.
- D. Measure, adjust, and record the following data for each refrigerant coil:
1. Dry-bulb temperature of entering and leaving air.
  2. Wet-bulb temperature of entering and leaving air.
  3. Airflow.
- 3.8 SOUND TESTS
- A. After the systems are balanced and construction is Substantially Complete, measure and record sound levels at 5 locations as designated by the Resident Engineer.
- B. Instrumentation:
1. The sound-testing meter shall be a portable, general-purpose testing meter consisting of a microphone, processing unit, and readout.
  2. The sound-testing meter shall be capable of showing fluctuations at minimum and maximum levels, and measuring the equivalent continuous sound pressure level (LEQ).
  3. The sound-testing meter must be capable of using 1/3 octave band filters to measure mid-frequencies from 31.5 Hz to 8000 Hz.
  4. The accuracy of the sound-testing meter shall be plus or minus one decibel.
- C. Test Procedures:
1. Perform test at quietest background noise period. Note cause of unpreventable sound that affects test outcome.

2. Equipment should be operating at design values.
3. Calibrate the sound-testing meter prior to taking measurements.
4. Use a microphone suitable for the type of noise levels measured that is compatible with meter. Provide a windshield for outside or in-duct measurements.
5. Record a set of background measurements in dBA and sound pressure levels in the eight un-weighted octave bands 31.5 Hz to 4000 Hz (RC) with the equipment off.
6. Take sound readings in dBA and sound pressure levels in the eight un-weighted octave bands 31.5 Hz to 4000 Hz (RC) with the equipment operating.
7. Take readings no closer than 36 inches from a wall or from the operating equipment and approximately 60 inches from the floor, with the meter held or mounted on a tripod.
8. For outdoor measurements, move sound-testing meter slowly and scan area that has the most exposure to noise source being tested. Use A-weighted scale for this type of reading.

D. Reporting:

1. Report shall record the following:
  - a. Location.
  - b. System tested.
  - c. dBA reading.
  - d. Sound pressure level in each octave band with equipment on and off.
2. Plot sound pressure levels on RC worksheet with equipment on and off.

3.9 DUCT LEAKAGE TESTS

- A. Witness the duct pressure testing performed by Installer.
- B. Verify that proper test methods are used and that leakage rates are within specified tolerances.
- C. Report deficiencies observed.

3.10 CONTROLS VERIFICATION

- A. In conjunction with system balancing, perform the following:
  1. Verify temperature control system is operating within the design limitations.
  2. Confirm that the sequences of operation are in compliance with Contract Documents.
  3. Verify that controllers are calibrated and function as intended.
  4. Verify that controller set points are as indicated.
  5. Verify the operation of lockout or interlock systems.
  6. Verify the operation of damper actuators.
  7. Verify that controlled devices are properly installed and connected to correct controller.
  8. Verify that controlled devices travel freely and are in position indicated by controller: open, closed, or modulating.
  9. Verify location and installation of sensors to ensure that they sense only intended temperature, humidity, or pressure.

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- B. Reporting: Include a summary of verifications performed, remaining deficiencies, and variations from indicated conditions.

3.11 PROCEDURES FOR TESTING, ADJUSTING, AND BALANCING EXISTING SYSTEMS

- A. Perform a preconstruction inspection of existing equipment that is to remain and be reused.
  1. Measure and record the operating speed, airflow, and static pressure of each fan.
  2. Measure motor voltage and amperage. Compare the values to motor nameplate information.
  3. Check the refrigerant charge.
  4. Check the condition of filters.
  5. Check the condition of coils.
  6. Check the operation of the drain pan and condensate-drain trap.
  7. Check bearings and other lubricated parts for proper lubrication.
  8. Report on the operating condition of the equipment and the results of the measurements taken. Report deficiencies.

- B. Before performing testing and balancing of existing systems, inspect existing equipment that is to remain and be reused to verify that existing equipment has been cleaned and refurbished. Verify the following:

1. New filters are installed.
2. Coils are clean and fins combed.
3. Drain pans are clean.
4. Fans are clean.
5. Bearings and other parts are properly lubricated.
6. Deficiencies noted in the preconstruction report are corrected.

- C. Perform testing and balancing of existing systems to the extent that existing systems are affected by the renovation work.

1. Compare the indicated airflow of the renovated work to the measured fan airflows, and determine the new fan speed and the face velocity of filters and coils.
2. Verify that the indicated airflows of the renovated work result in filter and coil face velocities and fan speeds that are within the acceptable limits defined by equipment manufacturer.
3. If calculations increase or decrease the airflow rates and water flow rates by more than 5 percent, make equipment adjustments to achieve the calculated rates. If increase or decrease is 5 percent or less, equipment adjustments are not required.
4. Balance each air outlet.

3.12 TOLERANCES

- A. Set HVAC system's airflow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.

2. Air Outlets and Inlets: Plus or minus 10 percent.
  3. Heating-Water Flow Rate: Plus or minus 10 percent.
  4. Cooling-Water Flow Rate: Plus or minus 10 percent.
- B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

### 3.13 PROGRESS REPORTING

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems balancing devices. Recommend changes and additions to systems balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.
- B. Status Reports: Prepare monthly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

### 3.14 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
  2. Include a list of instruments used for procedures, along with proof of calibration.
  3. Certify validity and accuracy of field data.
- B. Final Report Contents: In addition to certified field-report data, include the following:
1. Fan curves.
  2. Manufacturers' test data.
  3. Field test reports prepared by system and equipment installers.
  4. Other information relative to equipment performance; do not include Shop Drawings and Product Data.
- C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
  2. Name and address of the TAB specialist.
  3. Project name.
  4. Project location.
  5. Architect's name and address.
  6. Engineer's name and address.
  7. Contractor's name and address.

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8. Report date.
  9. Signature of TAB supervisor who certifies the report.
  10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
  11. Summary of contents including the following:
    - a. Indicated versus final performance.
    - b. Notable characteristics of systems.
    - c. Description of system operation sequence if it varies from the Contract Documents.
  12. Nomenclature sheets for each item of equipment.
  13. Data for terminal units, including manufacturer's name, type, size, and fittings.
  14. Notes to explain why certain final data in the body of reports vary from indicated values.
  15. Test conditions for fans and pump performance forms including the following:
    - a. Settings for outdoor-, return-, and exhaust-air dampers.
    - b. Conditions of filters.
    - c. Cooling coil, wet- and dry-bulb conditions.
    - d. Face and bypass damper settings at coils.
    - e. Fan drive settings including settings and percentage of maximum pitch diameter.
    - f. Inlet vane settings for variable-air-volume systems.
    - g. Settings for supply-air, static-pressure controller.
    - h. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
  2. Water and steam flow rates.
  3. Duct, outlet, and inlet sizes.
  4. Pipe and valve sizes and locations.
  5. Terminal units.
  6. Balancing stations.
  7. Position of balancing devices.
- E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:
1. Unit Data:
    - a. Unit identification.
    - b. Location.
    - c. Make and type.
    - d. Model number and unit size.
    - e. Manufacturer's serial number.
    - f. Unit arrangement and class.
    - g. Discharge arrangement.
    - h. Sheave make, size in inches, and bore.
    - i. Center-to-center dimensions of sheave and amount of adjustments in inches.
    - j. Number, make, and size of belts.

- k. Number, type, and size of filters.
2. Motor Data:
- a. Motor make, and frame type and size.
  - b. Horsepower and rpm.
  - c. Volts, phase, and hertz.
  - d. Full-load amperage and service factor.
  - e. Sheave make, size in inches, and bore.
  - f. Center-to-center dimensions of sheave and amount of adjustments in inches.
3. Test Data (Indicated and Actual Values):
- a. Total airflow rate in cfm.
  - b. Total system static pressure in inches wg.
  - c. Fan rpm.
  - d. Discharge static pressure in inches wg.
  - e. Filter static-pressure differential in inches wg.
  - f. Preheat-coil static-pressure differential in inches wg.
  - g. Cooling-coil static-pressure differential in inches wg.
  - h. Heating-coil static-pressure differential in inches wg.
  - i. Outdoor airflow in cfm.
  - j. Return airflow in cfm.
  - k. Outdoor-air damper position.
  - l. Return-air damper position.
  - m. Vortex damper position.
- F. Apparatus-Coil Test Reports:
1. Coil Data:
- a. System identification.
  - b. Location.
  - c. Coil type.
  - d. Number of rows.
  - e. Fin spacing in fins per inch o.c.
  - f. Make and model number.
  - g. Face area in sq. ft..
  - h. Tube size in NPS.
  - i. Tube and fin materials.
  - j. Circuiting arrangement.
2. Test Data (Indicated and Actual Values):
- a. Airflow rate in cfm.
  - b. Average face velocity in fpm.
  - c. Air pressure drop in inches wg.
  - d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
  - e. Return-air, wet- and dry-bulb temperatures in deg F.

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- f. Entering-air, wet- and dry-bulb temperatures in deg F.
  - g. Leaving-air, wet- and dry-bulb temperatures in deg F.
  - h. Water flow rate in gpm.
  - i. Water pressure differential in feet of head or psig.
  - j. Entering-water temperature in deg F.
  - k. Leaving-water temperature in deg F.
  - l. Refrigerant expansion valve and refrigerant types.
  - m. Refrigerant suction pressure in psig.
  - n. Refrigerant suction temperature in deg F.
  - o. Inlet steam pressure in psig.
- G. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:
- 1. Unit Data:
    - a. System identification.
    - b. Location.
    - c. Make and type.
    - d. Model number and unit size.
    - e. Manufacturer's serial number.
    - f. Fuel type in input data.
    - g. Output capacity in Btu/h.
    - h. Ignition type.
    - i. Burner-control types.
    - j. Motor horsepower and rpm.
    - k. Motor volts, phase, and hertz.
    - l. Motor full-load amperage and service factor.
    - m. Sheave make, size in inches, and bore.
    - n. Center-to-center dimensions of sheave and amount of adjustments in inches.
  - 2. Test Data (Indicated and Actual Values):
    - a. Total airflow rate in cfm.
    - b. Entering-air temperature in deg F.
    - c. Leaving-air temperature in deg F.
    - d. Air temperature differential in deg F.
    - e. Entering-air static pressure in inches wg.
    - f. Leaving-air static pressure in inches wg.
    - g. Air static-pressure differential in inches wg.
    - h. Low-fire fuel input in Btu/h.
    - i. High-fire fuel input in Btu/h.
    - j. Manifold pressure in psig.
    - k. High-temperature-limit setting in deg F.
    - l. Operating set point in Btu/h.
    - m. Motor voltage at each connection.
    - n. Motor amperage for each phase.
    - o. Heating value of fuel in Btu/h.

- H. Fan Test Reports: For supply, return, and exhaust fans, include the following:
1. Fan Data:
    - a. System identification.
    - b. Location.
    - c. Make and type.
    - d. Model number and size.
    - e. Manufacturer's serial number.
    - f. Arrangement and class.
    - g. Sheave make, size in inches, and bore.
    - h. Center-to-center dimensions of sheave and amount of adjustments in inches.
  2. Motor Data:
    - a. Motor make, and frame type and size.
    - b. Horsepower and rpm.
    - c. Volts, phase, and hertz.
    - d. Full-load amperage and service factor.
    - e. Sheave make, size in inches, and bore.
    - f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
    - g. Number, make, and size of belts.
  3. Test Data (Indicated and Actual Values):
    - a. Total airflow rate in cfm.
    - b. Total system static pressure in inches wg.
    - c. Fan rpm.
    - d. Discharge static pressure in inches wg.
    - e. Suction static pressure in inches wg.
- I. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
1. Report Data:
    - a. System and air-handling-unit number.
    - b. Location and zone.
    - c. Traverse air temperature in deg F.
    - d. Duct static pressure in inches wg.
    - e. Duct size in inches.
    - f. Duct area in sq. ft..
    - g. Indicated airflow rate in cfm.
    - h. Indicated velocity in fpm.
    - i. Actual airflow rate in cfm.
    - j. Actual average velocity in fpm.
    - k. Barometric pressure in psig.
- J. Instrument Calibration Reports:

1. Report Data:
  - a. Instrument type and make.
  - b. Serial number.
  - c. Application.
  - d. Dates of use.
  - e. Dates of calibration.

### 3.15 VERIFICATION OF TAB REPORT

- A. The TAB specialist's test and balance engineer shall conduct the inspection in the presence of commissioning authority.
- B. Commissioning authority shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
- C. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
- D. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
- E. If TAB work fails, proceed as follows:
  1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
  2. If the second final inspection also fails, Owner may contract the services of another TAB specialist to complete TAB work according to the Contract Documents and deduct the cost of the services from the original TAB specialist's final payment.
  3. If the second verification also fails, Owner may contact AABC Headquarters regarding the AABC National Performance Guaranty.
- F. Prepare test and inspection reports.

### 3.16 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

**END OF SECTION 230593**

**SECTION 230713 - DUCT INSULATION**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section includes insulating the following duct services:
  - 1. Indoor, concealed supply and outdoor air.
  - 2. Indoor, exposed supply and outdoor air.
  - 3. Indoor, concealed return located in unconditioned space.
  - 4. Indoor, exposed return located in unconditioned space.
  - 5. Indoor, concealed exhaust between isolation damper and penetration of building exterior.
  - 6. Indoor, exposed exhaust between isolation damper and penetration of building exterior.
  - 7. Outdoor, exposed supply and return.
- B. Related Sections:
  - 1. Section 230716 "HVAC Equipment Insulation."
  - 2. Section 230719 "HVAC Piping Insulation."
  - 3. Section 233113 "Metal Ducts" for duct liners.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).
- B. Sustainable Design Submittals:
  - 1. Product Data: For adhesives, indicating VOC content.
  - 2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
  - 3. Product Data: For coatings, indicating VOC content.
  - 4. Laboratory Test Reports: For coatings, indicating compliance with requirements for low-emitting materials.
  - 5. Product Data: For sealants, indicating VOC content.
  - 6. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
  - 2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
  - 3. Detail application of field-applied jackets.
  - 4. Detail application at linkages of control devices.
  
- D. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:
  - 1. Sheet Form Insulation Materials: 12 inches square.
  - 2. Sheet Jacket Materials: 12 inches square.
  - 3. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
  
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
  
- C. Field quality-control reports.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
  
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
  - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
  - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

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- F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type II for sheet materials.
- G. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSP jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- H. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

## 2.2 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
  - 1. Adhesives shall have a VOC content of 50 g/L or less.
  - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
  - 1. Fiberglass adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
  - 1. Adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

## 2.3 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
  - 1. VOC Content: 250 g/L or less.

RECREATION CENTER IMPROVEMENTS

2. Low-Emitting Materials: Mastic coatings shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.
1. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
  2. Service Temperature Range: Minus 20 to plus 180 deg F.
  3. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
  4. Color: White.
- C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.
1. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
  2. Service Temperature Range: 0 to 180 deg F.
  3. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
  4. Color: White.
- D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.
1. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
  2. Service Temperature Range: Minus 50 to plus 220 deg F.
  3. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
  4. Color: White.
- E. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
1. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
  2. Service Temperature Range: Minus 20 to plus 180 deg F.
  3. Solids Content: 60 percent by volume and 66 percent by weight.
  4. Color: White.

2.4 LAGGING ADHESIVES

- A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.
1. Adhesives shall have a VOC content of 50 g/L or less.
  2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
  3. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
  4. Service Temperature Range: 0 to plus 180 deg F.
  5. Color: White.

## 2.5 SEALANTS

### A. FSK and Metal Jacket Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: Aluminum.
5. Sealant shall have a VOC content of 420 g/L or less.
6. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

### B. ASJ Flashing Sealants, and Vinyl and PVC Jacket Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: White.
5. Sealant shall have a VOC content of 420 g/L or less.
6. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

## 2.6 FACTORY-APPLIED JACKETS

### A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.
5. Vinyl Jacket: White vinyl with a permeance of 1.3 perms when tested according to ASTM E 96/E 96M, Procedure A, and complying with NFPA 90A and NFPA 90B.

## 2.7 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.

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- C. Self-Adhesive Outdoor Jacket: 60-mil-thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with white aluminum-foil facing.

## 2.8 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
  - 1. Width: 3 inches.
  - 2. Thickness: 11.5 mils.
  - 3. Adhesion: 90 ounces force/inch in width.
  - 4. Elongation: 2 percent.
  - 5. Tensile Strength: 40 lbf/inch in width.
  - 6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
  - 1. Width: 3 inches.
  - 2. Thickness: 6.5 mils.
  - 3. Adhesion: 90 ounces force/inch in width.
  - 4. Elongation: 2 percent.
  - 5. Tensile Strength: 40 lbf/inch in width.
  - 6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
  - 1. Width: 2 inches.
  - 2. Thickness: 3.7 mils.
  - 3. Adhesion: 100 ounces force/inch in width.
  - 4. Elongation: 5 percent.
  - 5. Tensile Strength: 34 lbf/inch in width.

## 2.9 SECUREMENTS

- A. Bands:
  - 1. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 316; 0.015 inch thick, 3/4 inch wide with wing seal or closed seal.
- B. Insulation Pins and Hangers:
  - 1. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in

position indicated when self-locking washer is in place. Comply with the following requirements:

- a. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
  - b. Spindle: Aluminum, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
  - c. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
    - a. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
  3. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- C. Wire: 0.062-inch soft-annealed, stainless steel.

## 2.10 CORNER ANGLES

- A. Stainless-Steel Corner Angles: 0.024 inch thick, minimum 1 by 1 inch, stainless steel according to ASTM A 167 or ASTM A 240/A 240M, Type 316.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
  1. Verify that systems to be insulated have been tested and are free of defects.
  2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

### 3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.
- B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Keep insulation materials dry during application and finishing.
- G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- H. Install insulation with least number of joints practical.
- I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
  - 1. Install insulation continuously through hangers and around anchor attachments.
  - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
  - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
- J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- K. Install insulation with factory-applied jackets as follows:
  - 1. Draw jacket tight and smooth.
  - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
  - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
    - a. For below ambient services, apply vapor-barrier mastic over staples.

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4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
  5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.
- L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
  2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
  4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
  2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
  4. Seal jacket to wall flashing with flashing sealant.
- C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.

1. Comply with requirements in Section 078413 "Penetration Firestopping."

E. Insulation Installation at Floor Penetrations:

1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 FINISHES

- A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.

- a. Finish Coat Material: Interior, flat, latex-emulsion size.

- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

- D. Do not field paint aluminum or stainless-steel jackets.

3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

- B. Perform tests and inspections.

- C. Tests and Inspections:

1. Inspect ductwork, randomly selected by Resident Engineer, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to two location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.

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- D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.8 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed return located in unconditioned space.
4. Indoor, exposed return located in unconditioned space.
5. Indoor, concealed exhaust between isolation damper and penetration of building exterior.
6. Indoor, exposed exhaust between isolation damper and penetration of building exterior.
7. Outdoor, concealed supply and return.
8. Outdoor, exposed supply and return.

B. Items Not Insulated:

1. Fibrous-glass ducts.
2. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
3. Factory-insulated flexible ducts.
4. Factory-insulated plenums and casings.
5. Flexible connectors.
6. Vibration-control devices.
7. Factory-insulated access panels and doors.

3.9 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

- A. Service: Supply-air, return-air, outside-air and all associated plenums shall be insulated to an installed rating of R-4.2 with a 25 percent compression.

1. Material: Mineral-fiber blanket.
2. Thickness: 1-1/2 inch, 0.75 pcf.
3. Vapor Retarder Required: Yes.

3.10 ABOVEGROUND, OUTDOOR DUCT AND PLENUM INSULATION SCHEDULE

- A. Service: Supply-air, return-air, outside-air and all associated plenums shall be insulated to an installed rating of R-8.

- B. Refer to Metal Ducts Section 233113 for Double-Wall insulated ducts. All ductwork and plenums installed outside shall be double-wall construction.

3.11 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Ducts and Plenums, Concealed:
  - 1. None.
- D. Ducts and Plenums, Exposed:
  - 1. None.

3.12 OUTDOOR, ALL-LINED JACKET SCHEDULE

- A. Install aluminum jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

**END OF SECTION 230713**

**SECTION 230719 - HVAC PIPING INSULATION**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section includes insulating the following HVAC piping systems:
  - 1. Condensate drain piping, indoors.
- B. Related Sections:
  - 1. Section 230713 "Duct Insulation."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).
- B. Sustainable Design Submittals:
  - 1. Product Data: For adhesives, indicating VOC content.
  - 2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
  - 3. Product Data: For coatings, indicating VOC content.
  - 4. Laboratory Test Reports: For coatings, indicating compliance with requirements for low-emitting materials.
  - 5. Product Data: For sealants, indicating VOC content.
  - 6. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
  - 2. Detail attachment and covering of heat tracing inside insulation.
  - 3. Detail insulation application at pipe expansion joints for each type of insulation.
  - 4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.

5. Detail removable insulation at piping specialties.
  6. Detail application of field-applied jackets.
  7. Detail application at linkages of control devices.
- D. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use.
1. Preformed Pipe Insulation Materials: 12 inches long by NPS 2.
  2. Sheet Form Insulation Materials: 12 inches square.
  3. Jacket Materials for Pipe: 12 inches long by NPS 2.
  4. Sheet Jacket Materials: 12 inches square.
  5. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- C. Field quality-control reports.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
  1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
  2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
  - 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. Aeroflex USA, Inc.
- b. Armacell LLC.
- c. K-Flex USA.

## 2.2 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
  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. Aeroflex USA, Inc.
    - b. Armacell LLC.
    - c. Foster Brand; H. B. Fuller Construction Products.
    - d. K-Flex USA.
  2. Adhesives shall have a VOC content of 50 g/L or less.
  3. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
  1. Verify that systems to be insulated have been tested and are free of defects.
  2. Verify that surfaces to be insulated are clean and dry.
  3. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:

1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
  2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

### 3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
1. Install insulation continuously through hangers and around anchor attachments.
  2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.

- 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
  - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
  - L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
  - M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
  - N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
  - O. For above-ambient services, do not install insulation to the following:
    - 1. Vibration-control devices.
    - 2. Testing agency labels and stamps.
    - 3. Nameplates and data plates.
    - 4. Manholes.
    - 5. Handholes.
    - 6. Cleanouts.

### 3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
  - 1. Seal penetrations with flashing sealant.
  - 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  - 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
  - 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
  2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
  4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.
- F. Insulation Installation at Floor Penetrations:
1. Pipe: Install insulation continuously through floor penetrations.
  2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

### 3.5 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
  2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
  3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
  4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
  5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation

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- by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
  7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
  8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
  9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
  2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
  3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
  4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
  5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
  - 1. Install pipe insulation to outer diameter of pipe flange.
  - 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
  - 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
  - 4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
  - 1. Install mitered sections of pipe insulation.
  - 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Insulation Installation on Valves and Pipe Specialties:
  - 1. Install preformed valve covers manufactured of same material as pipe insulation when available.
  - 2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
  - 3. Install insulation to flanges as specified for flange insulation application.
  - 4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7 FINISHES

- A. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- C. Do not field paint aluminum or stainless-steel jackets.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

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- B. Perform tests and inspections.
- C. Tests and Inspections:
  - 1. Inspect pipe, fittings, strainers, and valves, randomly selected by Resident Engineer, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.9 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
  - 1. Drainage piping located in crawl spaces.
  - 2. Underground piping.
  - 3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.10 INDOOR PIPING INSULATION SCHEDULE

- A. Condensate and Equipment Drain Water below 60 Deg F:
  - 1. All Pipe Sizes: Insulation shall be [ **one of** ] the following:
    - a. Flexible Elastomeric: 1 inch thick.
- B. Refrigerant Suction and Hot-Gas Piping:
  - 1. All Pipe Sizes: Insulation shall be one of the following:
    - a. Flexible Elastomeric: 1 inch thick.
- C. Refrigerant Suction and Hot-Gas Flexible Tubing:
  - 1. All Pipe Sizes: Insulation shall be one of the following:
    - a. Flexible Elastomeric: 1 inch thick.

3.11 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

- A. Refrigerant Suction and Hot-Gas Piping:
  - 1. All Pipe Sizes: Insulation shall be the following:
    - a. Flexible Elastomeric: 2 inches thick.
- B. Refrigerant Suction and Hot-Gas Flexible Tubing:
  - 1. All Pipe Sizes: Insulation shall be the following:
    - a. Flexible Elastomeric: 2 inches thick.

**END OF SECTION 230719**

**SECTION 231123 - FACILITY NATURAL-GAS PIPING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:

1. Pipes, tubes, and fittings.
2. Piping specialties.
3. Piping and tubing joining materials.
4. Manual gas shutoff valves.
5. Earthquake valves.
6. Pressure regulators.
7. Dielectric fittings.

**1.3 DEFINITIONS**

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of the following:

1. Piping specialties.
2. Corrugated, stainless-steel tubing with associated components.
3. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
4. Pressure regulators. Indicate pressure ratings and capacities.
5. Dielectric fittings.

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- B. Shop Drawings: For facility natural-gas piping layout. Include plans, piping layout and elevations, sections, and details for fabrication of pipe anchors, hangers, supports for multiple pipes, alignment guides, expansion joints and loops, and attachments of the same to building structure. Detail location of anchors, alignment guides, and expansion joints and loops.
  - 1. Shop Drawing Scale: 1/4 inch per foot.
  - 2. Detail mounting, supports, and valve arrangements and pressure regulator assembly.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans and details, drawn to scale, on which natural-gas piping is shown and coordinated with other installations, using input from installers of the items involved.
- B. Site Survey: Plans, drawn to scale, on which natural-gas piping is shown and coordinated with other services and utilities.
- C. Qualification Data: For qualified professional engineer.
- D. Welding certificates.
- E. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For pressure regulators to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- C. 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.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Handling Flammable Liquids: Remove and dispose of liquids from existing natural-gas piping according to requirements of authorities having jurisdiction.

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- B. Deliver pipes and tubes 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.
- C. Store and handle pipes and tubes having factory-applied protective coatings to avoid damaging coating, and protect from direct sunlight.
- D. Protect stored PE pipes and valves from direct sunlight.

1.9 PROJECT CONDITIONS

- A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.
- B. Interruption of Existing Natural-Gas Service: Do not interrupt natural-gas service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide purging and startup of natural-gas supply according to requirements indicated:
  - 1. Notify the City of San Diego Project Manager no fewer than three days in advance of proposed interruption of natural-gas service.
  - 2. Do not proceed with interruption of natural-gas service without the City of San Diego's written permission.

1.10 COORDINATION

- A. Coordinate requirements for access panels and doors for valves installed concealed behind finished surfaces. Comply with requirements in Section 083113 "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Minimum Operating-Pressure Ratings:
  - 1. Piping and Valves: 100 psig minimum unless otherwise indicated.
  - 2. Service Regulators: 65 psig minimum unless otherwise indicated.
  - 3. Minimum Operating Pressure: 0.5 psig.
- B. Natural-Gas System Pressure within Buildings: 0.5 psig.

2.2 PIPES, TUBES, AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.

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1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
  2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M for butt welding and socket welding.
  3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
  4. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
    - a. Material Group: 1.1.
    - b. End Connections: Threaded or butt welding to match pipe.
    - c. Lapped Face: Not permitted underground.
    - d. Gasket Materials: ASME B16.20, metallic, flat, asbestos free, aluminum o-rings, and spiral-wound metal gaskets.
    - e. Bolts and Nuts: ASME B18.2.1, carbon steel aboveground and stainless steel underground.
  5. Protective Coating for Underground Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.
    - a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.
  6. Mechanical Couplings:
    - 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:
      - 1) GE Oil & Gas.
      - 2) Smith-Blair, Inc.
      - 3) Victaulic Company.
    - b. Stainless-steel flanges and tube with epoxy finish.
    - c. Buna-nitrile seals.
    - d. Stainless-steel bolts, washers, and nuts.
    - e. Coupling shall be capable of joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
    - f. Steel body couplings installed underground on plastic pipe shall be factory equipped with anode.
- B. PE Pipe: ASTM D 2513, SDR 11.
1. PE Fittings: ASTM D 2683, socket-fusion type or ASTM D 3261, butt-fusion type with dimensions matching PE pipe.
  2. PE Transition Fittings: Factory-fabricated fittings with PE pipe complying with ASTM D 2513, SDR 11; and steel pipe complying with ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
  3. Anodeless Service-Line Risers: Factory fabricated and leak tested.
    - a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet.

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- b. Casing: Steel pipe complying with ASTM A 53/A 53M, Schedule 40, black steel, Type E or S, Grade B, with corrosion-protective coating covering.
  - c. Aboveground Portion: PE transition fitting.
  - d. Outlet shall be threaded or flanged or suitable for welded connection.
  - e. Tracer wire connection.
  - f. Ultraviolet shield.
  - g. Stake supports with factory finish to match steel pipe casing or carrier pipe.
4. Transition Service-Line Risers: Factory fabricated and leak tested.
- a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet connected to steel pipe complying with ASTM A 53/A 53M, Schedule 40, Type E or S, Grade B, with corrosion-protective coating for aboveground outlet.
  - b. Outlet shall be threaded or flanged or suitable for welded connection.
  - c. Bridging sleeve over mechanical coupling.
  - d. Factory-connected anode.
  - e. Tracer wire connection.
  - f. Ultraviolet shield.
  - g. Stake supports with factory finish to match steel pipe casing or carrier pipe.
5. Plastic Mechanical Couplings, NPS 1-1/2 and Smaller: Capable of joining PE pipe to PE pipe.
- 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:
    - 1) Lyall, R. W. & Company, Inc.
    - 2) Mueller Co.
    - 3) Perfection Corporation.
  - b. PE body with molded-in, stainless-steel support ring.
  - c. Buna-nitrile seals.
  - d. Acetal collets.
  - e. Electro-zinc-plated steel stiffener.
6. Plastic Mechanical Couplings, NPS 2 and Larger: Capable of joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
- 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:
    - 1) Lyall, R. W. & Company, Inc.
    - 2) Mueller Co.
    - 3) Perfection Corporation.
  - b. Fiber-reinforced plastic body.

- c. PE body tube.
  - d. Buna-nitrile seals.
  - e. Acetal collets.
  - f. Stainless-steel bolts, nuts, and washers.
7. Steel Mechanical Couplings: Capable of joining plain-end PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
- 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:
    - 1) GE Oil & Gas.
    - 2) Smith-Blair, Inc.
  - b. Stainless-steel flanges and tube with epoxy finish.
  - c. Buna-nitrile seals.
  - d. Stainless-steel bolts, washers, and nuts.
  - e. Factory-installed anode for steel-body couplings installed underground.

## 2.3 PIPING SPECIALTIES

### A. Appliance Flexible Connectors:

- 1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
- 2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
- 3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
- 4. Corrugated stainless-steel tubing with polymer coating.
- 5. Operating-Pressure Rating: 0.5 psig.
- 6. End Fittings: Zinc-coated steel.
- 7. Threaded Ends: Comply with ASME B1.20.1.
- 8. Maximum Length: 72 inches

### B. Quick-Disconnect Devices: Comply with ANSI Z21.41.

- 1. Copper-alloy convenience outlet and matching plug connector.
- 2. Nitrile seals.
- 3. Hand operated with automatic shutoff when disconnected.
- 4. For indoor or outdoor applications.
- 5. Adjustable, retractable restraining cable.

### C. Y-Pattern Strainers:

- 1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
- 2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.

3. Strainer Screen: 40-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig.

D. Basket Strainers:

1. Body: ASTM A 126, Class B, high-tensile cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: 40-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig.

- E. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

2.4 JOINING MATERIALS

- A. Joint Compound and Tape: Suitable for natural gas.
- B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

2.5 MANUAL GAS SHUTOFF VALVES

- A. See "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.
- B. General Requirements for Metallic Valves, NPS 2 and Smaller: Comply with ASME B16.33.
  1. CWP Rating: 125 psig.
  2. Threaded Ends: Comply with ASME B1.20.1.
  3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
  4. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
  5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
  6. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.
- C. One-Piece, Bronze Ball Valve with Bronze Trim: MSS SP-110.

## RECREATION CENTER IMPROVEMENTS

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. A.Y. McDonald Mfg. Co.
    - b. Apollo Valves; Conbraco Industries, Inc.
    - c. BrassCraft Manufacturing Co.; a Masco company.
    - d. Lyall, R. W. & Company, Inc.
    - e. Perfection Corporation.
  2. Body: Bronze, complying with ASTM B 584.
  3. Ball: Chrome-plated brass.
  4. Stem: Bronze; blowout proof.
  5. Seats: Reinforced TFE; blowout proof.
  6. Packing: Separate packnut with adjustable-stem packing threaded ends.
  7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
  8. CWP Rating: 600 psig.
  9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
  10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- D. Bronze Plug Valves: MSS SP-78.
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. A.Y. McDonald Mfg. Co.
    - b. Lee Brass Company.
  2. Body: Bronze, complying with ASTM B 584.
  3. Plug: Bronze.
  4. Ends: Threaded, socket, or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
  5. Operator: Square head or lug type with tamperproof feature where indicated.
  6. Pressure Class: 125 psig.
  7. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
  8. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- E. Valve Boxes:
1. Cast-iron, two-section box.
  2. Top section with cover with "GAS" lettering.
  3. Bottom section with base to fit over valve and barrel a minimum of 5 inches in diameter.
  4. Adjustable cast-iron extensions of length required for depth of bury.

5. Include tee-handle, steel operating wrench with socket end fitting valve nut or flat head, and with stem of length required to operate valve.

## 2.6 EARTHQUAKE VALVES

- A. Earthquake Valves, Maximum Operating Pressure of 5 psig (34.5 kPa): Comply with ASCE 25.
  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. Vanguard Valves, Inc.
  2. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction.
  3. Maximum Operating Pressure: 5 psig.
  4. Cast-aluminum body with nickel-plated chrome steel internal parts.
  5. Nitrile-rubber valve washer.
  6. Sight windows for visual indication of valve position.
  7. Threaded end connections complying with ASME B1.20.1.
  8. Wall mounting bracket with bubble level indicator.
- B. Earthquake Valves, Maximum Operating Pressure of 60 psig (414 kPa): Comply with ASCE 25.
  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. Pacific Seismic Products, Inc.
  2. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction.
  3. Maximum Operating Pressure: 60 psig.
  4. Cast-aluminum body with stainless-steel internal parts.
  5. Nitrile-rubber, reset-stem o-ring seal.
  6. Valve position, open or closed, indicator.
  7. Composition valve seat with clapper held by spring or magnet locking mechanism.
  8. Level indicator.
  9. End Connections: Threaded for valves NPS 2 and smaller; flanged for valves NPS 2-1/2 and larger.

## 2.7 PRESSURE REGULATORS

- A. General Requirements:
  1. Single stage and suitable for natural gas.
  2. Steel jacket and corrosion-resistant components.

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3. Elevation compensator.
  4. End Connections: Threaded for regulators NPS 2 and smaller; flanged for regulators NPS 2-1/2 and larger.
- B. Service Pressure Regulators: Comply with ANSI Z21.80.
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. Actaris.
    - b. American Meter Company.
    - c. Fisher Control Valves & Instruments; a brand of Emerson Process Management.
    - d. Invensys.
    - e. Itron Gas.
    - f. Richards Industries.
  2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
  3. Springs: Zinc-plated steel; interchangeable.
  4. Diaphragm Plate: Zinc-plated steel.
  5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
  6. Orifice: Aluminum; interchangeable.
  7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
  8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
  9. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
  10. Overpressure Protection Device: Factory mounted on pressure regulator.
  11. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
  12. Maximum Inlet Pressure: 100 psig.
- C. Line Pressure Regulators: Comply with ANSI Z21.80.
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. Actaris.
    - b. American Meter Company.
    - c. Eclipse Innovative Thermal Technologies.
    - d. Fisher Control Valves & Instruments; a brand of Emerson Process Management.
    - e. Invensys.
    - f. Itron Gas.
    - g. Maxitrol Company.
    - h. Richards Industries.

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2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
  3. Springs: Zinc-plated steel; interchangeable.
  4. Diaphragm Plate: Zinc-plated steel.
  5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
  6. Orifice: Aluminum; interchangeable.
  7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
  8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
  9. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
  10. Overpressure Protection Device: Factory mounted on pressure regulator.
  11. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
  12. Maximum Inlet Pressure: 5 psig.
- D. Appliance Pressure Regulators: Comply with ANSI Z21.18.
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. Canadian Meter Company Inc.
    - b. Eaton.
    - c. Harper Wyman Co.
    - d. Maxitrol Company.
    - e. SCP, Inc.
  2. Body and Diaphragm Case: Die-cast aluminum.
  3. Springs: Zinc-plated steel; interchangeable.
  4. Diaphragm Plate: Zinc-plated steel.
  5. Seat Disc: Nitrile rubber.
  6. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
  7. Factory-Applied Finish: Minimum three-layer polyester and polyurethane paint finish.
  8. Regulator may include vent limiting device, instead of vent connection, if approved by authorities having jurisdiction.
  9. Maximum Inlet Pressure: 0.5psig.

2.8 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Unions:

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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. A.Y. McDonald Mfg. Co.
  - b. Capitol Manufacturing Company.
  - c. Central Plastics Company.
  - d. HART Industrial Unions, LLC.
  - e. Jomar Valve.
  - f. Matco-Norca.
  - g. Watts; a Watts Water Technologies company.
  - h. Wilkins.
  - i. Zurn Industries, LLC.
  
2. Description:
  - a. Standard: ASSE 1079.
  - b. Pressure Rating: 150 psig.
  - c. End Connections: Solder-joint copper alloy and threaded ferrous.

## 2.9 LABELING AND IDENTIFYING

- A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Close equipment shutoff valves before turning off natural gas to premises or piping section.
- B. Inspect natural-gas piping according to NFPA 54 the International Fuel Gas Code to determine that natural-gas utilization devices are turned off in piping section affected.

- C. Comply with NFPA 54 the International Fuel Gas Code requirements for prevention of accidental ignition.

### 3.3 INDOOR PIPING INSTALLATION

- A. Comply with NFPA 54 the International Fuel Gas Code for installation and purging of natural-gas piping.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.
- D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- G. Locate valves for easy access.
- H. Install natural-gas piping at uniform grade of 2 percent down toward drip and sediment traps.
- I. Install piping free of sags and bends.
- J. Install fittings for changes in direction and branch connections.
- K. Verify final equipment locations for roughing-in.
- L. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.
- M. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.
  - 1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.
- N. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.

## RECREATION CENTER IMPROVEMENTS

- O. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view.
- P. Concealed Location Installations: Except as specified below, install concealed natural-gas piping and piping installed under the building in containment conduit constructed of steel pipe with welded joints as described in Part 2. Install a vent pipe from containment conduit to outdoors and terminate with weatherproof vent cap.
  - 1. Above Accessible Ceilings: Natural-gas piping, fittings, valves, and regulators may be installed in accessible spaces without containment conduit.
  - 2. In Floors: Install natural-gas piping with welded or brazed joints and protective coating in cast-in-place concrete floors. Cover piping to be cast in concrete slabs with minimum of 1-1/2 inches of concrete. Piping may not be in physical contact with other metallic structures such as reinforcing rods or electrically neutral conductors. Do not embed piping in concrete slabs containing quick-set additives or cinder aggregate.
  - 3. In Floor Channels: Install natural-gas piping in floor channels. Channels must have cover and be open to space above cover for ventilation.
  - 4. In Walls or Partitions: Protect tubing installed inside partitions or hollow walls from physical damage using steel striker barriers at rigid supports.
    - a. Exception: Tubing passing through partitions or walls does not require striker barriers.
  - 5. Prohibited Locations:
    - a. Do not install natural-gas piping in or through circulating air ducts, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
    - b. Do not install natural-gas piping in solid walls or partitions.
- Q. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
- R. Connect branch piping from top or side of horizontal piping.
- S. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment. Unions are not required at flanged connections.
- T. Do not use natural-gas piping as grounding electrode.
- U. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.
- V. Install pressure gage upstream and downstream from each line regulator. Pressure gages are specified in Section 230519 "Meters and Gages for HVAC Piping."
- W. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."

- X. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- Y. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

3.4 VALVE INSTALLATION

- A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing, aluminum, or copper connector.
- B. Install underground valves with valve boxes.
- C. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.
- D. Install earthquake valves aboveground outside buildings according to listing.
- E. Install anode for metallic valves in underground PE piping.

3.5 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints:
  - 1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
  - 2. Cut threads full and clean using sharp dies.
  - 3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
  - 4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
  - 5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Welded Joints:
  - 1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
  - 2. Bevel plain ends of steel pipe.
  - 3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.

- F. Flanged Joints: Install gasket material, size, type, and thickness appropriate for natural-gas service. Install gasket concentrically positioned.
- G. Flared Joints: Cut tubing with roll cutting tool. Flare tube end with tool to result in flare dimensions complying with SAE J513. Tighten finger tight, then use wrench. Do not overtighten.
- H. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
  - 1. Plain-End Pipe and Fittings: Use butt fusion.
  - 2. Plain-End Pipe and Socket Fittings: Use socket fusion.

### 3.6 HANGER AND SUPPORT INSTALLATION

- A. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
- B. Comply with requirements for pipe hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- C. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:
  - 1. NPS 1 and Smaller: Maximum span, 96 inches; minimum rod size, 3/8 inch.
  - 2. NPS 1-1/4: Maximum span, 108 inches; minimum rod size, 3/8 inch.
  - 3. NPS 1-1/2 and NPS 2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
  - 4. NPS 2-1/2 to NPS 3-1/2: Maximum span, 10 feet; minimum rod size, 1/2 inch.
  - 5. NPS 4 and Larger: Maximum span, 10 feet; minimum rod size, 5/8 inch.
- D. Install hangers for horizontal drawn-temper copper tubing with the following maximum spacing and minimum rod sizes:
  - 1. NPS 3/8: Maximum span, 48 inches; minimum rod size, 3/8 inch.
  - 2. NPS 1/2 and NPS 5/8: Maximum span, 72 inches; minimum rod size, 3/8 inch.
  - 3. NPS 3/4 and NPS 7/8: Maximum span, 84 inches; minimum rod size, 3/8 inch.
  - 4. NPS 1: Maximum span, 96 inches; minimum rod size, 3/8 inch.
- E. Install hangers for horizontal, corrugated stainless-steel tubing with the following maximum spacing and minimum rod sizes:
  - 1. NPS 3/8: Maximum span, 48 inches; minimum rod size, 3/8 inch.
  - 2. NPS 1/2: Maximum span, 72 inches; minimum rod size, 3/8 inch.
  - 3. NPS 3/4 and Larger: Maximum span, 96 inches; minimum rod size, 3/8 inch.

### 3.7 CONNECTIONS

- A. Connect to utility's gas main according to utility's procedures and requirements.

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- B. Install natural-gas piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.
- C. Install piping adjacent to appliances to allow service and maintenance of appliances.
- D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.
- E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.8 LABELING AND IDENTIFYING

- A. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for piping and valve identification.
- B. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.9 PAINTING

- A. Comply with requirements in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting" for painting interior and exterior natural-gas piping.
- B. Paint exposed, exterior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.
  - 1. Alkyd System: MPI EXT 5.1D.
    - a. Prime Coat: Alkyd anticorrosive metal primer.
    - b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
    - c. Topcoat: Exterior alkyd enamel flat.
    - d. Color: Gray.
- C. Paint exposed, interior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.
  - 1. Latex Over Alkyd Primer System: MPI INT 5.1Q.
    - a. Prime Coat: Alkyd anticorrosive metal primer.
    - b. Intermediate Coat: Interior latex matching topcoat.
    - c. Topcoat: Interior latex flat.
    - d. Color: Gray.

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- D. Damage and Touchup: Repair marred and damaged factory-applied finishes with materials and by procedures to match original factory finish.

3.10 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
  - 1. Test, inspect, and purge natural gas according to NFPA 54 the International Fuel Gas Code and authorities having jurisdiction.
- C. Natural-gas piping will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.11 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain earthquake valves.

3.12 OUTDOOR PIPING SCHEDULE

- A. Aboveground natural-gas piping shall be the following:
  - 1. Steel pipe with wrought-steel fittings and welded joints.

3.13 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES MORE THAN 0.5 PSIG AND LESS THAN 5 PSIG

- A. Aboveground, distribution and branch piping shall be the following:
  - 1. Steel pipe with steel welding fittings and welded joints.

3.14 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

- A. Valves for pipe sizes NPS 2 and smaller at service meter shall be the following:
  - 1. One-piece, bronze ball valve with bronze trim.

**END OF SECTION 231123**

**SECTION 232113 - HYDRONIC PIPING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section includes pipe and fitting materials and joining methods for the following:
  - 1. Copper tube and fittings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of the following:
  - 1. Pipe.
  - 2. Fittings.
  - 3. Joining materials.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Piping layout, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Suspended ceiling components.
  - 2. Other building services.
  - 3. Structural members.
- B. Qualification Data: For Installer.
- C. Field quality-control reports.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Hydronic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature unless otherwise indicated:

1. Condensate-Drain Piping: 150 deg F.
- 2.2 COPPER TUBE AND FITTINGS
  - A. Drawn-Temper Copper Tubing: ASTM B 88, Type L.
- 2.3 JOINING MATERIALS
  - A. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for joining copper with copper; or BAg-1, silver alloy for joining copper with bronze or steel.
- 2.4 DIELECTRIC FITTINGS
  - A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

### PART 3 - EXECUTION

- 3.1 PIPING APPLICATIONS
  - A. Condensate-Drain Piping: Type Lcopper tubing.
- 3.2 PIPING INSTALLATIONS
  - A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
  - B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
  - C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
  - D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
  - E. Install piping to permit valve servicing.
  - F. Install piping at indicated slopes.
  - G. Install piping free of sags and bends.

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- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Select system components with pressure rating equal to or greater than system operating pressure.
- K. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
- L. Install drains, consisting of a tee fitting, NPS 3/4 ball valve, and short NPS 3/4 threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.
- M. Install piping at a uniform grade of 0.2 percent upward in direction of flow.
- N. Reduce pipe sizes using eccentric reducer fitting installed with level side up.
- O. Install branch connections to mains using mechanically formed tee fittings in main pipe, with the branch connected to the bottom of the main pipe. For up-feed risers, connect the branch to the top of the main pipe.
- P. Install unions in piping, NPS 2 and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.
- Q. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for identifying piping.
- R. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- S. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

3.3 HANGERS AND SUPPORTS

- A. Comply with requirements in Section 230529 "Hangers and Supports for HVAC Piping and Equipment" for hanger, support, and anchor devices. Comply with the following requirements for maximum spacing of supports.
- B. Install hangers for drawn-temper copper piping with the following maximum spacing and minimum rod sizes:
  - 1. NPS 3/4: Maximum span, 5 feet; minimum rod size, 1/4 inch.
  - 2. NPS 1: Maximum span, 6 feet; minimum rod size, 1/4 inch.
  - 3. NPS 1-1/4: Maximum span, 7 feet; minimum rod size, 3/8 inch.
  - 4. NPS 1-1/2: Maximum span, 8 feet; minimum rod size, 3/8 inch.
- C. Support vertical runs at roof, at each floor, and at 10-foot intervals between floors.

3.4 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8/A5.8M.

**END OF SECTION 232113**

**SECTION 232300 - REFRIGERANT PIPING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Refrigerant pipes and fittings.
  - 2. Refrigerant piping valves and specialties.
  - 3. Refrigerants.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of valve, refrigerant piping, and piping specialty.
  - 1. Include pressure drop, based on manufacturer's test data, for the following:
    - a. Thermostatic expansion valves.
    - b. Solenoid valves.
    - c. Hot-gas bypass valves.
    - d. Filter dryers.
    - e. Strainers.
    - f. Pressure-regulating valves.
- B. Shop Drawings:
  - 1. Show piping size and piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.
  - 2. Show interface and spatial relationships between piping and equipment.
  - 3. Shop Drawing Scale: 1/4 inch equals 1 foot.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

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- B. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to 2010 ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
- B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."
- C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.7 PRODUCT STORAGE AND HANDLING

- A. Store piping with end caps in place to ensure that piping interior and exterior are clean when installed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Line Test Pressure for Refrigerant R-410A:
  - 1. Suction Lines for Air-Conditioning Applications: 300 psig.
  - 2. Suction Lines for Heat-Pump Applications: 535 psig.
  - 3. Hot-Gas and Liquid Lines: 535 psig.

2.2 COPPER TUBE AND FITTINGS

- A. Copper Tube: ASTM B 88, Type K.
- B. Wrought-Copper Fittings: ASME B16.22.
- C. Wrought-Copper Unions: ASME B16.22.
- D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.
- E. Brazing Filler Metals: AWS A5.8/A5.8M.

## F. Flexible Connectors:

1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
2. End Connections: Socket ends.
3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch-long assembly.
4. Working Pressure Rating: Factory test at minimum 500 psig.
5. Maximum Operating Temperature: 250 deg F.

## 2.3 VALVES AND SPECIALTIES

## A. Diaphragm Packless Valves:

1. Body and Bonnet: Forged brass or cast bronze; globe design with straight-through or angle pattern.
2. Diaphragm: Phosphor bronze and stainless steel with stainless-steel spring.
3. Operator: Rising stem and hand wheel.
4. Seat: Nylon.
5. End Connections: Socket, union, or flanged.
6. Working Pressure Rating: 500 psig.
7. Maximum Operating Temperature: 275 deg F.

## B. Packed-Angle Valves:

1. Body and Bonnet: Forged brass or cast bronze.
2. Packing: Molded stem, back seating, and replaceable under pressure.
3. Operator: Rising stem.
4. Seat: Nonrotating, self-aligning polytetrafluoroethylene.
5. Seal Cap: Forged-brass or valox hex cap.
6. End Connections: Socket, union, threaded, or flanged.
7. Working Pressure Rating: 500 psig.
8. Maximum Operating Temperature: 275 deg F.

## C. Check Valves:

1. Body: Ductile iron, forged brass, or cast bronze; globe pattern.
2. Bonnet: Bolted ductile iron, forged brass, or cast bronze; or brass hex plug.
3. Piston: Removable polytetrafluoroethylene seat.
4. Closing Spring: Stainless steel.
5. Manual Opening Stem: Seal cap, plated-steel stem, and graphite seal.
6. End Connections: Socket, union, threaded, or flanged.
7. Maximum Opening Pressure: 0.50 psig.
8. Working Pressure Rating: 500 psig.
9. Maximum Operating Temperature: 275 deg F.

## D. Service Valves:

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1. Body: Forged brass with brass cap including key end to remove core.
  2. Core: Removable ball-type check valve with stainless-steel spring.
  3. Seat: Polytetrafluoroethylene.
  4. End Connections: Copper spring.
  5. Working Pressure Rating: 500 psig.
- E. Solenoid Valves: Comply with AHRI 760 and UL 429; listed and labeled by a National Recognized Testing Laboratory (NRTL).
1. Body and Bonnet: Plated steel.
  2. Solenoid Tube, Plunger, Closing Spring, and Seat Orifice: Stainless steel.
  3. Seat: Polytetrafluoroethylene.
  4. End Connections: Threaded.
  5. Electrical: Molded, watertight coil in NEMA 250 enclosure of type required by location with 1/2-inch conduit adapter.
  6. Working Pressure Rating: 400 psig.
  7. Maximum Operating Temperature: 240 deg F.
- F. Safety Relief Valves: Comply with 2010 ASME Boiler and Pressure Vessel Code; listed and labeled by an NRTL.
1. Body and Bonnet: Ductile iron and steel, with neoprene O-ring seal.
  2. Piston, Closing Spring, and Seat Insert: Stainless steel.
  3. Seat: Polytetrafluoroethylene.
  4. End Connections: Threaded.
  5. Working Pressure Rating: 400 psig.
  6. Maximum Operating Temperature: 240 deg F.
- G. Thermostatic Expansion Valves: Comply with AHRI 750.
1. Body, Bonnet, and Seal Cap: Forged brass or steel.
  2. Diaphragm, Piston, Closing Spring, and Seat Insert: Stainless steel.
  3. Packing and Gaskets: Non-asbestos.
  4. Capillary and Bulb: Copper tubing filled with refrigerant charge.
  5. Reverse-flow option (for heat-pump applications).
  6. End Connections: Socket, flare, or threaded union.
  7. Working Pressure Rating: 450 psig.
- H. Hot-Gas Bypass Valves: Comply with UL 429; listed and labeled by an NRTL.
1. Body, Bonnet, and Seal Cap: Ductile iron or steel.
  2. Diaphragm, Piston, Closing Spring, and Seat Insert: Stainless steel.
  3. Packing and Gaskets: Non-asbestos.
  4. Solenoid Tube, Plunger, Closing Spring, and Seat Orifice: Stainless steel.
  5. Seat: Polytetrafluoroethylene.
  6. Equalizer: As recommended by manufacturer.
  7. Electrical: Molded, watertight coil in NEMA 250 enclosure of type required by location with 1/2-inch conduit adapter and coil.
  8. End Connections: Socket.

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9. Throttling Range: As recommended by manufacturer.
10. Working Pressure Rating: 500 psig.
11. Maximum Operating Temperature: 240 deg F.

I. Straight-Type Strainers:

1. Body: Welded steel with corrosion-resistant coating.
2. Screen: 100-mesh stainless steel.
3. End Connections: Socket or flare.
4. Working Pressure Rating: 500 psig.
5. Maximum Operating Temperature: 275 deg F.

J. Angle-Type Strainers:

1. Body: Forged brass or cast bronze.
2. Drain Plug: Brass hex plug.
3. Screen: 100-mesh monel.
4. End Connections: Socket or flare.
5. Working Pressure Rating: 500 psig.
6. Maximum Operating Temperature: 275 deg F.

K. Moisture/Liquid Indicators:

1. Body: Forged brass.
2. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
3. Indicator: Color coded to show moisture content in parts per million (ppm).
4. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
5. End Connections: Socket or flare.
6. Working Pressure Rating: 500 psig.
7. Maximum Operating Temperature: 240 deg F.

L. Permanent Filter Dryers: Comply with AHRI 730.

1. Body and Cover: Painted-steel shell.
2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated alumina.
4. Designed for reverse flow (for heat-pump applications).
5. End Connections: Socket.
6. Access Ports: NPS 1/4 connections at entering and leaving sides for pressure differential measurement.
7. Maximum Pressure Loss: 2 psig.
8. Rated Flow: As recommended by manufacturer.
9. Working Pressure Rating: 500 psig.
10. Maximum Operating Temperature: 240 deg F.

M. Mufflers:

1. Body: Welded steel with corrosion-resistant coating.

2. End Connections: Socket or flare.
  3. Working Pressure Rating: 500 psig.
  4. Maximum Operating Temperature: 275 deg F.
- N. Receivers: Comply with AHRI 495.
1. Comply with ASME Boiler and Pressure Vessel Code; listed and labeled by an NRTL.
  2. Comply with UL 207; listed and labeled by an NRTL.
  3. Body: Welded steel with corrosion-resistant coating.
  4. Tappings: Inlet, outlet, liquid level indicator, and safety relief valve.
  5. End Connections: Socket or threaded.
  6. Working Pressure Rating: 500 psig.
  7. Maximum Operating Temperature: 275 deg F.
- O. Liquid Accumulators: Comply with AHRI 495.
1. Body: Welded steel with corrosion-resistant coating.
  2. End Connections: Socket or threaded.
  3. Working Pressure Rating: 500 psig.
  4. Maximum Operating Temperature: 275 deg F.

## 2.4 REFRIGERANTS

- A. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Atofina Chemicals, Inc.
    - b. DuPont Fluorochemicals Div.

## PART 3 - EXECUTION

### 3.1 PIPING APPLICATIONS FOR REFRIGERANT R-410A

- A. Suction Lines NPS 1-1/2 and Smaller for Conventional Air-Conditioning Applications: Copper, Type K(A), annealed-temper tubing and wrought-copper fittings with brazed joints.
- B. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type K, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.
- C. Safety-Relief-Valve Discharge Piping: Copper, Type K, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.

### 3.2 VALVE AND SPECIALTY APPLICATIONS

- A. Install diaphragm packless valves in suction and discharge lines of compressor.
- B. Install service valves for gage taps at inlet and outlet of hot-gas bypass valves and strainers if they are not an integral part of valves and strainers.
- C. Install a check valve at the compressor discharge and a liquid accumulator at the compressor suction connection.
- D. Except as otherwise indicated, install diaphragm packless valves on inlet and outlet side of filter dryers.
- E. Install a full-size, three-valve bypass around filter dryers.
- F. Install solenoid valves upstream from each expansion valve and hot-gas bypass valve. Install solenoid valves in horizontal lines with coil at top.
- G. Install thermostatic expansion valves as close as possible to distributors on evaporators.
  - 1. Install valve so diaphragm case is warmer than bulb.
  - 2. Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line.
  - 3. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.
- H. Install safety relief valves where required by 2010 ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside according to ASHRAE 15.
- I. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.
- J. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for the device being protected:
  - 1. Solenoid valves.
  - 2. Thermostatic expansion valves.
  - 3. Hot-gas bypass valves.
  - 4. Compressor.
- K. Install filter dryers in liquid line between compressor and thermostatic expansion valve, and in the suction line at the compressor.
- L. Install receivers sized to accommodate pump-down charge.
- M. Install flexible connectors at compressors.

### 3.3 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- B. Install refrigerant piping according to ASHRAE 15.
- C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping adjacent to machines to allow service and maintenance.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Select system components with pressure rating equal to or greater than system operating pressure.
- J. Refer to Section 230923 "Direct Digital Control (DDC) System for HVAC" and Section 230993.11 "Sequence of Operations for HVAC DDC" for solenoid valve controllers, control wiring, and sequence of operation.
- K. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- L. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Section 083113 "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.
- M. Install refrigerant piping in protective conduit where installed belowground.
- N. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.
- O. Slope refrigerant piping as follows:
  - 1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
  - 2. Install horizontal suction lines with a uniform slope downward to compressor.
  - 3. Install traps and double risers to entrain oil in vertical runs.

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- 4. Liquid lines may be installed level.
- P. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.
- Q. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- R. Identify refrigerant piping and valves according to Section 230553 "Identification for HVAC Piping and Equipment."
- S. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- T. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- U. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

3.4 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."
- D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
  - 1. Use Type BCuP (copper-phosphorus) alloy for joining copper socket fittings with copper pipe.
  - 2. Use Type BAg (cadmium-free silver) alloy for joining copper with bronze or steel.
- E. Threaded Joints: Thread steel pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and to restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads unless dry-seal threading is specified.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- F. Steel pipe can be threaded, but threaded joints must be seal brazed or seal welded.
- G. Welded Joints: Construct joints according to AWS D10.12M/D10.12.

- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

### 3.5 HANGERS AND SUPPORTS

- A. Comply with requirements for pipe hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- B. Install the following pipe attachments:
  - 1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet long.
  - 2. Roller hangers and spring hangers for individual horizontal runs 20 feet or longer.
  - 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
  - 4. Spring hangers to support vertical runs.
  - 5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
- C. Install hangers for copper tubing with the following maximum spacing and minimum rod diameters:
  - 1. NPS 1/2: Maximum span, 60 inches; minimum rod, 1/4 inch.
  - 2. NPS 5/8: Maximum span, 60 inches; minimum rod, 1/4 inch.
  - 3. NPS 1: Maximum span, 72 inches; minimum rod, 1/4 inch.
  - 4. NPS 1-1/4: Maximum span, 96 inches; minimum rod, 3/8 inch.
  - 5. NPS 1-1/2: Maximum span, 96 inches; minimum rod, 3/8 inch.

### 3.6 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
  - 1. Comply with ASME B31.5, Chapter VI.
  - 2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
  - 3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in "Performance Requirements" Article.
    - a. Fill system with nitrogen to the required test pressure.
    - b. System shall maintain test pressure at the manifold gage throughout duration of test.
    - c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
    - d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.
- B. Prepare test and inspection reports.

### 3.7 SYSTEM CHARGING

- A. Charge system using the following procedures:
  - 1. Install core in filter dryers after leak test but before evacuation.
  - 2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
  - 3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
  - 4. Charge system with a new filter-dryer core in charging line.

### 3.8 ADJUSTING

- A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.
- B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
- C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.
- D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
  - 1. Open shutoff valves in condenser water circuit.
  - 2. Verify that compressor oil level is correct.
  - 3. Open compressor suction and discharge valves.
  - 4. Open refrigerant valves except bypass valves that are used for other purposes.
  - 5. Check open compressor-motor alignment and verify lubrication for motors and bearings.
- E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

**END OF SECTION 232300**

**SECTION 233113 - METAL DUCTS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Double-wall rectangular ducts and fittings.
3. Single-wall round ducts and fittings.
4. Sheet metal materials.
5. Duct liner.
6. Sealants and gaskets.
7. Hangers and supports.
8. Seismic-restraint devices.

B. Related Sections:

1. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Section 233300 "Air Duct Accessories" for dampers, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."
1. Seismic Hazard Level B: Seismic force to weight ratio, 0.30.
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of the following products:
1. Liners and adhesives.
  2. Sealants and gaskets.
  3. Seismic-restraint devices.
- B. Sustainable Design Submittals:
1. Product Data: For adhesives, indicating VOC content.
  2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
  3. Product Data: For sealants, indicating VOC content.
  4. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings:
1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
  2. Factory- and shop-fabricated ducts and fittings.
  3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
  4. Elevation of top of ducts.
  5. Dimensions of main duct runs from building grid lines.
  6. Fittings.
  7. Reinforcement and spacing.
  8. Seam and joint construction.
  9. Penetrations through fire-rated and other partitions.
  10. Equipment installation based on equipment being used on Project.
  11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
  12. Hangers and supports, including methods for duct and building attachment, seismic restraints, and vibration isolation.
- D. Delegated-Design Submittal:
1. Sheet metal thicknesses.
  2. Joint and seam construction and sealing.
  3. Reinforcement details and spacing.
  4. Materials, fabrication, assembly, and spacing of hangers and supports.
  5. Design Calculations: Calculations, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation for selecting hangers and supports and seismic restraints.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

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1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
2. Suspended ceiling components.
3. Structural members to which duct will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including the following:
  - a. Luminaires.
  - b. Air outlets and inlets.
  - c. Speakers.
  - d. Sprinklers.
  - e. Access panels.
  - f. Perimeter moldings.

B. Welding certificates.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

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- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

## 2.2 DOUBLE-WALL RECTANGULAR DUCTS AND FITTINGS

- 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:
1. McGill AirFlow LLC.
  2. MKT Metal Manufacturing.
  3. Sheet Metal Connectors, Inc.
- B. Rectangular Ducts: Fabricate ducts with indicated dimensions for the inner duct.
- C. Outer Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- D. Required Performance R-Value: The double wall insulated assembly shall perform at R-8 and meet all California Title-24 Energy Code requirements.
- E. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- F. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- G. Interstitial Insulation: Fibrous-glass liner complying with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."
1. R-Value:
    - a. Ducts installed outdoors - Provide R-8 meeting all California Title-24 Energy Code requirements.
    - b. Ducts installed indoors – see schedule below at the end of the section.
  2. Install spacers that position the inner duct at uniform distance from outer duct without compressing insulation.
  3. Coat insulation with antimicrobial coating.
  4. Cover insulation with polyester film complying with UL 181, Class 1.

- H. Inner Duct: Minimum 0.028-inch perforated galvanized sheet metal having 3/32-inch diameter perforations, with overall open area of 23 percent.
- I. Formed-on Transverse Joints (Flanges): Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- J. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

### 2.3 SINGLE-WALL ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise 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. Ductmate Industries, Inc.
    - b. Elgen Manufacturing.
    - c. Linx Industries (formerly Lindab).
    - d. McGill AirFlow LLC.
    - e. MKT Metal Manufacturing.
    - f. SEMCO LLC.
    - g. Sheet Metal Connectors, Inc.
    - h. Spiral Manufacturing Co., Inc.
    - i. Stamped Fittings Inc.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
  - 1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

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1. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.
- D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

## 2.4 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
  1. Galvanized Coating Designation: G90.
  2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. PVC-Coated, Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
  1. Galvanized Coating Designation: G90.
  2. Minimum Thickness for Factory-Applied PVC Coating: 4 mils thick on sheet metal surface of ducts and fittings exposed to corrosive conditions, and minimum 1 mil thick on opposite surface.
  3. Coating Materials: Acceptable to authorities having jurisdiction for use on ducts listed and labeled by an NRTL for compliance with UL 181, Class 1.
- D. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.
- E. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.
- F. Aluminum Sheets: Comply with ASTM B 209 Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.
- G. Factory- or Shop-Applied Antimicrobial Coating:
  1. Apply to the surface of sheet metal that will form the interior surface of the duct. An untreated clear coating shall be applied to the exterior surface.
  2. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
  3. Coating containing the antimicrobial compound shall have a hardness of 2H, minimum, when tested according to ASTM D 3363.

4. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
  5. Antimicrobial coating on sheet metal is not required for duct containing liner treated with antimicrobial coating.
- H. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- I. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

## 2.5 DUCT LINER

- A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."
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. CertainTeed Corporation.
    - b. Johns Manville; a Berkshire Hathaway company.
    - c. Knauf Insulation.
    - d. Owens Corning.
    - 1) Type II, Rigid: 0.23 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
  2. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
  3. Water-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
    - a. Adhesive shall have a VOC content of 80 g/L or less.
    - b. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Insulation Pins and Washers:
1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch-diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.

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2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick stainless steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- C. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 7-11, "Flexible Duct Liner Installation."
1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
  2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
  3. Butt transverse joints without gaps, and coat joint with adhesive.
  4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
  5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
  6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm.
  7. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
  8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
    - a. Fan discharges.
    - b. Intervals of lined duct preceding unlined duct.
    - c. Upstream edges of transverse joints.
  9. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.
    - a. Sheet Metal Inner Duct Perforations: 3/32-inch diameter, with an overall open area of 23 percent.
  10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices.

## 2.6 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width: 4 inches.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. Sealant shall have a VOC content of 420 g/L or less.

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. Sealant shall have a VOC content of 420 g/L or less.

E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

F. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

## 2.7 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

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- B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
- C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
- D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
- E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.
- F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- H. Trapeze and Riser Supports:
  - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
  - 2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
  - 3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

2.8 SEISMIC-RESTRAINT DEVICES

- 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:
  - 1. B-line, an Eaton business.
  - 2. Ductmate Industries, Inc.
  - 3. Elgen Manufacturing.
  - 4. Hilti, Inc.
  - 5. Kinetics Noise Control, Inc.
  - 6. Mason Industries, Inc.
  - 7. TOLCO.
  - 8. Unistrut; Part of Atkore International.
  - 9. Vibration & Seismic Technologies, LLC.
- B. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an agency acceptable to authorities having jurisdiction.
  - 1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
- C. Channel Support System: Shop- or field-fabricated support assembly made of slotted steel channels rated in tension, compression, and torsion forces and with accessories for attachment to

braced component at one end and to building structure at the other end. Include matching components and corrosion-resistant coating.

- D. Restraint Cables: ASTM A 492, stainless-steel cables with end connections made of cadmium-plated steel assemblies with brackets, swivel, and bolts designed for restraining cable service; and with an automatic-locking and clamping device or double-cable clips.
- E. Hanger Rod Stiffener: Reinforcing steel angle clamped to hanger rod.
- F. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

### PART 3 - EXECUTION

#### 3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

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- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

## 3.2 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

## 3.3 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
  - 1. Where practical, install concrete inserts before placing concrete.
  - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
  - 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
  - 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
  - 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.

- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

#### 3.4 SEISMIC-RESTRAINT-DEVICE INSTALLATION

- A. Install ducts with hangers and braces designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."
  - 1. Brace a change of direction longer than 12 feet.
- B. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.
- C. Install cables so they do not bend across edges of adjacent equipment or building structure.
- D. Install cable restraints on ducts that are suspended with vibration isolators.
- E. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction.
- F. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.
- G. Drilling for and Setting Anchors:
  - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcement or embedded items during drilling. Notify the Resident Engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
  - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
  - 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
  - 4. Set anchors to manufacturer's recommended torque, using a torque wrench.
  - 5. Install zinc-coated steel anchors for interior applications and stainless-steel anchors for applications exposed to weather.

### 3.5 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

### 3.6 PAINTING

- A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

### 3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Leakage Tests:
  - 1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
  - 2. Test the following systems:
    - a. Ducts with a Pressure Class of 2-Inch wg and higher: Test representative duct sections, selected by Resident Engineer from sections installed, totaling no less than 25 percent of total installed duct area for each designated pressure class.
  - 3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
  - 4. Test for leaks before applying external insulation.
  - 5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
  - 6. Give seven days' advance notice for testing.
- C. Duct System Cleanliness Tests:
  - 1. Visually inspect duct system to ensure that no visible contaminants are present.
  - 2. Test sections of metal duct system, chosen randomly by Owner, for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."
    - a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.

- D. Duct system will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

### 3.8 DUCT CLEANING

- A. Clean new and existing duct system(s) before testing, adjusting, and balancing.
- B. Use service openings for entry and inspection.
  - 1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Section 233300 "Air Duct Accessories" for access panels and doors.
  - 2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
  - 3. Remove and reinstall ceiling to gain access during the cleaning process.
- C. Particulate Collection and Odor Control:
  - 1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
  - 2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.
- D. Clean the following components by removing surface contaminants and deposits:
  - 1. Air outlets and inlets (registers, grilles, and diffusers).
  - 2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
  - 3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
  - 4. Coils and related components.
  - 5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
  - 6. Supply-air ducts, dampers, actuators, and turning vanes.
  - 7. Dedicated exhaust and ventilation components and makeup air systems.
- E. Mechanical Cleaning Methodology:
  - 1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
  - 2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.

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3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.9 START UP

- A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.10 DUCT SCHEDULE

- A. Fabricate ducts with galvanized sheet steel:
- B. Supply Ducts:
  1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:
    - a. Minimum SMACNA Seal Class: A.
    - b. SMACNA Leakage Class for Rectangular: 12.
    - c. SMACNA Leakage Class for Round and Flat Oval: 12.
  2. Ducts Connected to Constant-Volume Air-Handling Units including rooftop packaged units:
    - a. Minimum SMACNA Seal Class: A.
    - b. SMACNA Leakage Class for Rectangular: 6.
    - c. SMACNA Leakage Class for Round and Flat Oval: 6.
- C. Return Ducts:
  1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:
    - a. Minimum SMACNA Seal Class: A.
    - b. SMACNA Leakage Class for Rectangular: 12.
    - c. SMACNA Leakage Class for Round and Flat Oval: 12.
  2. Ducts Connected to Air-Handling Units including rooftop packaged units:

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- a. Minimum SMACNA Seal Class: A.
  - b. SMACNA Leakage Class for Rectangular: 6.
  - c. SMACNA Leakage Class for Round and Flat Oval: 6.
- D. Exhaust Ducts:
1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
    - a. Pressure Class: Negative 1-inch wg.
    - b. Minimum SMACNA Seal Class: A if negative pressure.
    - c. SMACNA Leakage Class for Rectangular: 12.
    - d. SMACNA Leakage Class for Round and Flat Oval: 24.
- E. Intermediate Reinforcement:
1. Galvanized-Steel Ducts: Galvanized steel or carbon steel coated with zinc-chromate primer.
  2. Stainless-Steel Ducts:
    - a. Exposed to Airstream: Match duct material.
    - b. Not Exposed to Airstream: Galvanized.
  3. Aluminum Ducts: Aluminum or galvanized sheet steel coated with zinc chromate.
- F. Liner (Indoor applications only):
1. Supply Air Ducts: Flexible elastomeric, 2inch thick.
  2. Return Air Ducts: Flexible elastomeric, 2 inch thick.
  3. Exhaust Air Ducts: Flexible elastomeric, 1 inch thick.
  4. Supply Fan Plenums: Flexible elastomeric, 2inch thick.
  5. Return- and Exhaust-Fan Plenums: Flexible elastomeric, 2 inches thick.
  6. Transfer Ducts: Flexible elastomeric, 1 inch thick.
- G. Elbow Configuration:
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
    - a. Velocity 1000 fpm or Lower:
      - 1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
      - 2) Mitered Type RE 4 without vanes.
    - b. Velocity 1000 to 1500 fpm:
      - 1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
      - 2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.

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- 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
- c. Velocity 1500 fpm or Higher:
  - 1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
  - 2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
  - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
- 2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
  - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
  - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
  - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
- 3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."
  - a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
    - 1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
    - 2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
    - 3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
    - 4) Radius-to Diameter Ratio: 1.5.
  - b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
  - c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.
- H. Branch Configuration:
  - 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
    - a. Rectangular Main to Rectangular Branch: 45-degree entry.
    - b. Rectangular Main to Round Branch: Spin in.

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2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
  - a. Velocity 1000 fpm or Lower: 90-degree tap.
  - b. Velocity 1000 to 1500 fpm: Conical tap.
  - c. Velocity 1500 fpm or Higher: 45-degree lateral.

**END OF SECTION 233113**

**SECTION 233300 - AIR DUCT ACCESSORIES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Backdraft and pressure relief dampers.
- 2. Barometric relief dampers.
- 3. Manual volume dampers.
- 4. Flange connectors.
- 5. Turning vanes.
- 6. Duct-mounted access doors.
- 7. Flexible connectors.
- 8. Duct accessory hardware.

B. Related Requirements:

- 1. Section 233723 "HVAC Gravity Ventilators" for roof-mounted ventilator caps.

1.3 ACTION SUBMITTALS

- A. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.

- 1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:
  - a. Special fittings.
  - b. Manual volume damper installations.
  - c. Control-damper installations.
  - d. Fire-damper, smoke-damper, combination fire- and smoke-damper, ceiling, and corridor damper installations, including sleeves; and duct-mounted access doors.
  - e. Wiring Diagrams: For power, signal, and control wiring.

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1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from Installers of the items involved.
- B. Source quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For air duct accessories 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. Fusible Links: Furnish quantity equal to 10 percent of amount installed.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MATERIALS

- A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
  - 1. Galvanized Coating Designation: G90.
  - 2. Exposed-Surface Finish: Mill phosphatized.
- B. Aluminum Sheets: Comply with ASTM B 209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.
- C. Extruded Aluminum: Comply with ASTM B 221, Alloy 6063, Temper T6.

- D. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- E. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

### 2.3 BACKDRAFT AND PRESSURE RELIEF DAMPERS

- 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:
  - 1. American Warming and Ventilating; a Mestek Architectural Group company.
  - 2. Cesco Products; a division of MESTEK, Inc.
  - 3. Flex-Tek Group.
  - 4. Greenheck Fan Corporation.
  - 5. Lloyd Industries, Inc.
  - 6. Nailor Industries Inc.
  - 7. NCA Manufacturing, Inc.
  - 8. Pottorff.
  - 9. Ruskin Company.
  - 10. Vent Products Co., Inc.
- B. Description: Gravity balanced.
- C. Maximum Air Velocity: As indicated on drawings.
- D. Maximum System Pressure: As indicated on drawings.
- E. Frame: 0.05-inch-thick, galvanized sheet steel, with welded corners and mounting flange.
- F. Blades: Multiple single-piece blades, center pivoted, maximum 6-inch width, 0.050-inch-thick aluminum sheet with sealed edges.
- G. Blade Action: Parallel.
- H. Blade Seals: Extruded vinyl, mechanically locked.
- I. Blade Axles:
  - 1. Material: Galvanized steel.
  - 2. Diameter: 0.20 inch.
- J. Tie Bars and Brackets: Galvanized steel.
- K. Return Spring: Adjustable tension.
- L. Bearings: Steel ball.

M. Accessories:

1. Adjustment device to permit setting for varying differential static pressure.
2. Counterweights and spring-assist kits for vertical airflow installations.
3. Electric actuators.
4. Chain pulls.
5. Screen Mounting: Front mounted in sleeve.
  - a. Sleeve Thickness: 20 gage minimum.
  - b. Sleeve Length: 6 inches minimum.
6. Screen Mounting: Rear mounted.
7. Screen Material: Aluminum.
8. Screen Type: Insect.
9. 90-degree stops.

2.4 BAROMETRIC RELIEF DAMPERS

- 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:
1. American Warming and Ventilating; a Mestek Architectural Group company.
  2. Cesco Products; a division of MESTEK, Inc.
  3. Greenheck Fan Corporation.
  4. Lloyd Industries, Inc.
  5. Nailor Industries Inc.
  6. NCA Manufacturing, Inc.
  7. Pottorff.
  8. Ruskin Company.
  9. Vent Products Co., Inc.
- B. Suitable for horizontal or vertical mounting.
- C. Maximum Air Velocity: As indicated on drawings.
- D. Maximum System Pressure: As indicated on drawings.
- E. Frame: Hat-shaped, 0.063-inch-thick, galvanized sheet steel, with welded corners and mounting flange.
- F. Blades:
1. Multiple, 0.050-inch-thick aluminum sheet.
  2. Maximum Width: 6 inches.
  3. Action: Parallel.
  4. Balance: Gravity.
  5. Eccentrically pivoted.

- G. Blade Seals: Neoprene.
- H. Blade Axles: Galvanized steel.
- I. Tie Bars and Brackets:
  - 1. Material: Galvanized steel.
  - 2. Rattle free with 90-degree stop.
- J. Return Spring: Adjustable tension.
- K. Bearings: Stainless steel.
- L. Accessories:
  - 1. Flange on intake.
  - 2. Adjustment device to permit setting for varying differential static pressures.

## 2.5 MANUAL VOLUME DAMPERS

- A. Standard, Steel, Manual Volume Dampers:
  - 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. Aire Technologies.
    - b. American Warming and Ventilating; a Mestek Architectural Group company.
    - c. Flexmaster U.S.A., Inc.
    - d. Flex-Tek Group.
    - e. McGill AirFlow LLC.
    - f. Nailor Industries Inc.
    - g. Pottorff.
    - h. Ruskin Company.
    - i. Trox USA Inc.
    - j. Vent Products Co., Inc.
  - 2. Standard leakage rating, with linkage outside airstream.
  - 3. Suitable for horizontal or vertical applications.
  - 4. Frames:
    - a. Frame: Hat-shaped, 0.064-inch-thick stainless steel.
    - b. Mitered and welded corners.
    - c. Flanges for attaching to walls and flangeless frames for installing in ducts.
  - 5. Blades:

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- a. Multiple or single blade.
  - b. Parallel- or opposed-blade design.
  - c. Stiffen damper blades for stability.
  - d. Galvanized-steel, 0.064 inch thick.
6. Blade Axles: Galvanized steel.
7. Bearings:
- a. Stainless-steel sleeve.
  - b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
8. Tie Bars and Brackets: Galvanized steel.
- B. Low-Leakage, Steel, Manual Volume Dampers:
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. American Warming and Ventilating: a Mestek Architectural Group company.
    - b. Flex-Tek Group.
    - c. McGill AirFlow LLC.
    - d. Nailor Industries Inc.
    - e. Pottorff.
    - f. Ruskin Company.
    - g. Trox USA Inc.
    - h. Vent Products Co., Inc.
  2. Comply with AMCA 500-D testing for damper rating.
  3. Low-leakage rating, with linkage outside airstream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.
  4. Suitable for horizontal or vertical applications.
  5. Frames:
    - a. Hat shaped.
    - b. 0.064-inch-thick, galvanized sheet steel.
    - c. Mitered and welded corners.
    - d. Flanges for attaching to walls and flangeless frames for installing in ducts.
  6. Blades:
    - a. Multiple or single blade.
    - b. Parallel- or opposed-blade design.
    - c. Stiffen damper blades for stability.
    - d. Galvanized, roll-formed steel, 0.064 inch thick.
  7. Blade Axles: Stainless steel.

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- 8. Bearings:
  - a. Stainless-steel sleeve.
  - b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
- 9. Blade Seals: Neoprene.
- 10. Jamb Seals: Cambered stainless steel.
- 11. Tie Bars and Brackets: Galvanized steel.
- 12. Accessories:
  - a. Include locking device to hold single-blade dampers in a fixed position without vibration.

C. Jackshaft:

- 1. Size: 1-inch diameter.
- 2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
- 3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.

D. Damper Hardware:

- 1. Zinc-plated, die-cast core with dial and handle made of 3/32-inch-thick zinc-plated steel, and a 3/4-inch hexagon locking nut.
- 2. Include center hole to suit damper operating-rod size.
- 3. Include elevated platform for insulated duct mounting.

2.6 FIRE DAMPERS

- A. Closing rating in ducts up to 4-inch wg static pressure class and minimum 2000-fpm velocity.
- B. Fire Rating: 1-1/2 and 3 hours.
- C. Frame: Curtain type with blades outside airstream except when located behind grille where blades may be inside airstream; fabricated with roll-formed, 0.034-inch-thick galvanized steel; with mitered and interlocking corners.
- D. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel.
  - 1. Minimum Thickness: 0.05 or 0.138 inch thick, as indicated, and of length to suit application.
  - 2. Exception: Omit sleeve where damper-frame width permits direct attachment of perimeter mounting angles on each side of wall or floor; thickness of damper frame must comply with sleeve requirements.
- E. Mounting Orientation: Vertical or horizontal as indicated.

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- F. Blades: Roll-formed, interlocking, 0.034-inch-thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch-thick, galvanized-steel blade connectors.
- G. Horizontal Dampers: Include blade lock and stainless-steel closure spring.
- H. Heat-Responsive Device: Replaceable, 212 deg F rated, fusible links.

2.7 FLANGE CONNECTORS

- 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:
  - 1. CL WARD & Family Inc.
  - 2. Ductmate Industries, Inc.
  - 3. Hardcast, Inc.
  - 4. Nexus PDQ.
  - 5. Ward Industries; a brand of Hart & Cooley, Inc.
- B. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
- C. Material: Galvanized steel.
- D. Gage and Shape: Match connecting ductwork.

2.8 TURNING VANES

- 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:
  - 1. Aero-Dyne Sound Control Co.
  - 2. CL WARD & Family Inc.
  - 3. Ductmate Industries, Inc.
  - 4. Duro Dyne Inc.
  - 5. Elgen Manufacturing.
  - 6. Hardcast, Inc.
  - 7. METALAIRE, Inc.
  - 8. SEMCO LLC.
  - 9. Ward Industries; a brand of Hart & Cooley, Inc.
- B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
  - 1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

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- C. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
- D. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vaness and Vane Runners," and 4-4, "Vane Support in Elbows."
- E. Vane Construction: Single or Double wall.
- F. Vane Construction: Single wall for ducts up to 48 inches wide and double wall for larger dimensions.

## 2.9 DUCT-MOUNTED ACCESS DOORS

- 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:
  - 1. Aire Technologies.
  - 2. Ductmate Industries, Inc.
  - 3. Elgen Manufacturing.
  - 4. Flexmaster U.S.A., Inc.
  - 5. Greenheck Fan Corporation.
  - 6. McGill AirFlow LLC.
  - 7. Nailor Industries Inc.
  - 8. Pottorff.
  - 9. Ventfabrics, Inc.
  - 10. Ward Industries; a brand of Hart & Cooley, Inc.
- B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 7-2, "Duct Access Doors and Panels," and 7-3, "Access Doors - Round Duct."
  - 1. Door:
    - a. Double wall, rectangular.
    - b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
    - c. Vision panel.
    - d. Hinges and Latches: 1-by-1-inchbutt or piano hinge and cam latches.
    - e. Fabricate doors airtight and suitable for duct pressure class.
  - 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
  - 3. Number of Hinges and Locks:
    - a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
    - b. Access Doors up to 18 Inches Square: Two hinges and two sash locks.
    - c. Access Doors up to 24 by 48 Inches: Three hinges and two compression latches.

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- d. Access Doors Larger Than 24 by 48 Inches: Four hinges and two compression latches with outside and inside handles.

C. Pressure Relief Access Door:

1. Door and Frame Material: Galvanized sheet steel.
2. Door: Double wall with insulation fill with metal thickness applicable for duct pressure class.
3. Operation: Open outward for positive-pressure ducts and inward for negative-pressure ducts.
4. Factory set at 10-inch wg.
5. Doors close when pressures are within set-point range.
6. Hinge: Continuous piano.
7. Latches: Cam.
8. Seal: Neoprene or foam rubber.
9. Insulation Fill: 1-inch-thick, fibrous-glass or polystyrene-foam board.

2.10 DUCT ACCESS PANEL ASSEMBLIES

- 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:

1. 3M.
2. Ductmate Industries, Inc.
3. Flame Gard, Inc.

- B. Labeled according to UL 1978 by an NRTL.

- C. Panel and Frame: Minimum thickness 0.0528-inch carbon steel.

- D. Fasteners: Carbon steel. Panel fasteners shall not penetrate duct wall.

- E. Gasket: Comply with NFPA 96; grease-tight, high-temperature ceramic fiber, rated for minimum 2000 deg F.

- F. Minimum Pressure Rating: 10-inch wg, positive or negative.

2.11 FLEXIBLE CONNECTORS

- 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:

1. CL WARD & Family Inc.
2. Ductmate Industries, Inc.
3. Duro Dyne Inc.
4. Elgen Manufacturing.
5. Harcast, Inc.

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6. JP Lamborn Co.
  7. Ventfabrics, Inc.
  8. Ward Industries; a brand of Hart & Cooley, Inc.
- B. Materials: Flame-retardant or noncombustible fabrics.
- C. Coatings and Adhesives: Comply with UL 181, Class 1.
- D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch-wide, 0.028-inch-thick, galvanized sheet steel or 0.032-inch-thick aluminum sheets. Provide metal compatible with connected ducts.
- E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
1. Minimum Weight: 26 oz./sq. yd..
  2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
  3. Service Temperature: Minus 40 to plus 200 deg F.
- F. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.
1. Minimum Weight: 24 oz./sq. yd..
  2. Tensile Strength: 530 lbf/inch in the warp and 440 lbf/inch in the filling.
  3. Service Temperature: Minus 50 to plus 250 deg F.
- G. High-Temperature System, Flexible Connectors: Glass fabric coated with silicone rubber.
1. Minimum Weight: 16 oz./sq. yd..
  2. Tensile Strength: 285 lbf/inch in the warp and 185 lbf/inch in the filling.
  3. Service Temperature: Minus 67 to plus 500 deg F.
- H. High-Corrosive-Environment System, Flexible Connectors: Glass fabric with chemical-resistant coating.
1. Minimum Weight: 14 oz./sq. yd..
  2. Tensile Strength: 450 lbf/inch in the warp and 340 lbf/inch in the filling.
  3. Service Temperature: Minus 67 to plus 500 deg F.
- I. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in compression, and with a load stop. Include rod and angle-iron brackets for attaching to fan discharge and duct.
1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
  2. Outdoor Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.

5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
7. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch movement at start and stop.

## 2.12 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.
- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Compliance with ASHRAE/IESNA 90.1-2004 includes Section 6.4.3.3.3 - "Shutoff Damper Controls," restricts the use of backdraft dampers, and requires control dampers for certain applications. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.
- D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
  1. Install steel volume dampers in steel ducts.
  2. Install aluminum volume dampers in aluminum ducts.
- E. Set dampers to fully open position before testing, adjusting, and balancing.
- F. Install test holes at fan inlets and outlets and elsewhere as indicated.
- G. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:

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1. On both sides of duct coils.
  2. Upstream and downstream from duct filters.
  3. At outdoor-air intakes and mixed-air plenums.
  4. At drain pans and seals.
  5. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
  6. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
  7. At each change in direction and at maximum 50-foot spacing.
  8. Upstream from turning vanes.
  9. Control devices requiring inspection.
  10. Elsewhere as indicated.
- H. Install access doors with swing against duct static pressure.
- I. Access Door Sizes:
1. One-Hand or Inspection Access: 8 by 5 inches.
  2. Two-Hand Access: 12 by 6 inches.
  3. Head and Hand Access: 18 by 10 inches.
  4. Head and Shoulders Access: 21 by 14 inches.
  5. Body Access: 25 by 14 inches.
  6. Body plus Ladder Access: 25 by 17 inches.
- J. Label access doors according to Section 230553 "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.
- K. Install flexible connectors to connect ducts to equipment.
- L. For fans developing static pressures of 5-inch wg and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
- M. Connect terminal units to supply ducts directly or with maximum 12-inch lengths of flexible duct. Do not use flexible ducts to change directions.
- N. Connect diffusers or light troffer boots to ducts directly or with maximum 60-inch lengths of flexible duct clamped or strapped in place.
- O. Connect flexible ducts to metal ducts with adhesive plus sheet metal screws.
- P. Install duct test holes where required for testing and balancing purposes.
- Q. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop of fans.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors and verify that purpose of access door can be performed.
3. Operate fire, smoke, and combination fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
4. Inspect turning vanes for proper and secure installation.

**END OF SECTION 233300**

**SECTION 233423 - HVAC POWER VENTILATORS**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section..

1.2 SUMMARY

- A. Section Includes:
  - 1. Centrifugal roof ventilators.
  - 2. Propeller fans.
  - 3. Ceiling Fans

1.3 PERFORMANCE REQUIREMENTS

- A. Project Altitude: Base fan-performance ratings on actual Project site elevations.
- B. Operating Limits: Classify according to AMCA 99.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Also include the following:
  - 1. Certified fan performance curves with system operating conditions indicated.
  - 2. Certified fan sound-power ratings.
  - 3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
  - 4. Material thickness and finishes, including color charts.
  - 5. Dampers, including housings, linkages, and operators.
  - 6. Roof curbs.
  - 7. Fan speed controllers.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 2. Wiring Diagrams: For power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:
  - 1. Roof framing and support members relative to duct penetrations.
  - 2. Ceiling suspension assembly members.
  - 3. Size and location of initial access modules for acoustical tile.
  - 4. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
- B. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For power ventilators to include in emergency, operation, and maintenance manuals.

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. Belts: One set for each belt-driven unit.

1.8 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. AMCA Compliance: Fans shall have AMCA-Certified performance ratings and shall bear the AMCA-Certified Ratings Seal.
- C. UL Standards: Power ventilators shall comply with UL 705. Power ventilators for use for restaurant kitchen exhaust shall also comply with UL 762.

1.9 COORDINATION

- A. Coordinate size and location of structural-steel support members.
- B. Coordinate sizes and locations of concrete bases with actual equipment provided.
- C. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

- D. The ceiling fans shall be as follows:
  - 1. The fan shall meet the requirements of NFPA 13 (National Fire Code for Sprinklers) in regards to blocking obstructions below sprinkler heads.
  - 2. The fan shall meet the air velocity requirements for ESFP sprinklers.

**PART 2 - PRODUCTS**

2.1 CENTRIFUGAL ROOF VENTILATORS

- 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:
  - 1. Acme Engineering & Manufacturing Corp.
  - 2. Aerovent; a division of Twin City Fan Companies, Ltd.
  - 3. American Coolair Corporation.
  - 4. Broan-NuTone LLC.
  - 5. Carnes Company.
  - 6. Central Blower Company.
  - 7. Delhi Industries Inc.
  - 8. Greenheck Fan Corporation.
  - 9. Loren Cook Company.
  - 10. PennBarry.
  - 11. W.W. Grainger, Inc.
- B. Housing: Removable, spun-aluminum, dome top and outlet baffle; square, one-piece, aluminum base with venturi inlet cone.
  - 1. Upblast Units: Provide spun-aluminum discharge baffle to direct discharge air upward, with rain and snow drains.
  - 2. Hinged Subbase: Galvanized-steel hinged arrangement permitting service and maintenance.
- C. Fan Wheels: Aluminum hub and wheel with backward-inclined blades.
- D. Belt Drives:
  - 1. Resiliently mounted to housing.
  - 2. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
  - 3. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
  - 4. Pulleys: Cast-iron, adjustable-pitch motor pulley.
  - 5. Fan and motor isolated from exhaust airstream.
- E. Accessories:
  - 1. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted outside fan housing, factory wired through an internal aluminum conduit.
  - 2. Bird Screens: Removable, 1/2-inch mesh, aluminum or brass wire.

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3. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.
- F. Roof Curbs: Galvanized steel; mitered and welded corners; 1-1/2-inch-thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to suit roof opening and fan base.
1. Configuration: Self-flashing without a cant strip, with mounting flange.
  2. Overall Height: 12 inches.

2.2 PROPELLER FANS

- 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:
1. Acme Engineering & Manufacturing Corp.
  2. Aerovent; a division of Twin City Fan Companies, Ltd.
  3. Airmaster Fan Company.
  4. Broan-NuTone LLC.
  5. Carnes Company.
  6. Chicago Blower Corporation.
  7. JencoFan.
  8. King Company.
  9. Loren Cook Company.
  10. Moffitt Corporation Inc.
  11. New York Blower Company (The).
  12. Peerless Blowers.
  13. PennBarry.
  14. Quietaire Inc.
  15. W.W. Grainger, Inc.
- B. Housing: Galvanized-steel sheet with flanged edges and integral orifice ring with baked-enamel finish coat applied after assembly.
- C. Fan Wheel: Replaceable, cast-aluminum, airfoil blades fastened to cast-aluminum hub; factory set pitch angle of blades.
- D. Fan Drive: Motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing.
- E. Accessories:
1. Gravity Shutters: Aluminum blades in aluminum frame; interlocked blades with nylon bearings.
  2. Motor-Side Back Guard: Galvanized steel, complying with OSHA specifications, removable for maintenance.
  3. Wall Sleeve: Galvanized steel to match fan and accessory size.
  4. Weathershield Hood: Galvanized steel to match fan and accessory size.

5. Weathershield Front Guard: Galvanized steel with expanded metal screen.
6. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
7. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.

### 2.3 MOTORS

- A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors.
  1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
- B. Enclosure Type: Totally enclosed, fan cooled.

### 2.4 SOURCE QUALITY CONTROL

- A. Certify sound-power level ratings according to AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.
- B. Certify fan performance ratings, including flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests according to AMCA 210, "Laboratory Methods of Testing Fans for Aerodynamic Performance Rating." Label fans with the AMCA-Certified Ratings Seal.

### 2.5 CEILING FANS

- A. Basis of Design Product: Minka Aire F624-ABD
  1. Blade Sweep: 62 inches.
  2. Number of Blades: 3.
  3. Blade Material: ABS Construction.
  4. Blade Finish: To be selected by Architect from manufacturers full range.
  5. Full Power CFM: 7,567.
  6. Motor Size: 172X16MM
  7. Weight: 13.76 lb.
- B. Basis of Design Product: Minka Aire F524-ABD
  1. Blade Sweep: 52 inches.
  2. Number of Blades: 3.
  3. Blade Material: ABS Construction.
  4. Blade Finish: To be selected by Architect from manufacturers full range.
  5. Full Power CFM: 5,816.
  6. Motor Size: 153X15MM
  7. Weight: 10.36 lb.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install power ventilators level and plumb.
- B. Equipment Mounting:
  - 1. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
- C. Secure roof-mounted fans to roof curbs with cadmium-plated hardware. See Section 077200 "Roof Accessories" for installation of roof curbs.
- D. Install units with clearances for service and maintenance.
- E. Label units according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

#### **3.2 CONNECTIONS**

- A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 233300 "Air Duct Accessories."
- B. Install ducts adjacent to power ventilators to allow service and maintenance.
- C. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

#### **3.3 FIELD QUALITY CONTROL**

- A. 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.
- B. Tests and Inspections:
  - 1. Verify that shipping, blocking, and bracing are removed.

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2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
  3. Verify that cleaning and adjusting are complete.
  4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
  5. Adjust belt tension.
  6. Adjust damper linkages for proper damper operation.
  7. Verify lubrication for bearings and other moving parts.
  8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
  9. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
  10. Shut unit down and reconnect automatic temperature-control operators.
  11. Remove and replace malfunctioning units and retest as specified above.
- C. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Prepare test and inspection reports.

3.4 ADJUSTING

- A. Adjust damper linkages for proper damper operation.
- B. Adjust belt tension.
- C. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.
- D. Replace fan and motor pulleys as required to achieve design airflow.
- E. Lubricate bearings.

**END OF SECTION 233423**

**SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Rectangular and square ceiling diffusers.
2. Perforated diffusers.
3. Modular core supply grilles.
4. Adjustable bar registers and grilles.

B. Related Sections:

1. Section 089119 "Fixed Louvers" for fixed and adjustable louvers and wall vents, whether or not they are connected to ducts.
2. Section 233300 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

B. Samples for Initial Selection: For diffusers, registers, and grilles with factory-applied color finishes.

C. Samples for Verification: For diffusers, registers, and grilles, in manufacturer's standard sizes to verify color selected.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:
  - 1. Ceiling suspension assembly members.
  - 2. Method of attaching hangers to building structure.
  - 3. Size and location of initial access modules for acoustical tile.
  - 4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
  - 5. Duct access panels.
- B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 CEILING DIFFUSERS

- A. Rectangular and Square Ceiling Diffusers:
  - 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. Carnes Company.
    - b. Hart & Cooley Inc.
    - c. Kees, Inc.
    - d. Krueger.
    - e. METALAIRE, Inc.
    - f. Nailor Industries Inc.
    - g. Price Industries.
    - h. Titus.
    - i. Tuttle & Bailey.
  - 2. Material: Steel or Aluminum.
  - 3. Finish: Baked enamel, color selected by Architect.
  - 4. Face Size: 24 by 24 inches or as indicated on drawings.
  - 5. Face Style: As indicated on drawings.
  - 6. Mounting: As indicated on drawings.
  - 7. Pattern: Adjustable.
  - 8. Dampers: Radial opposed blade.
  - 9. Accessories:
    - a. Equalizing grid.
    - b. Plaster ring.
- B. Perforated Diffuser:

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. Air Research Diffuser Products, Inc.
  - b. Carnes Company.
  - c. Hart & Cooley Inc.
  - d. Krueger.
  - e. METALAIRE, Inc.
  - f. Nailor Industries Inc.
  - g. Price Industries.
  - h. Shoemaker Mfg. Co.
  - i. Titus.
  - j. Tuttle & Bailey.
  - k. Warren Technology.
2. Material: Steel backpan and pattern controllers, with steel face.
3. Finish: Baked enamel, color selected by Architect.
4. Face Size: 24 by 24 inches or as indicated on drawings.
5. Duct Inlet: Square.
6. Face Style: Flush.
7. Mounting: Surface T-bar.
8. Dampers: Radial opposed blade.
9. Accessories:
  - a. Equalizing grid.
  - b. Plaster ring.

## 2.2 HIGH-CAPACITY DIFFUSERS

### A. Modular Core Supply Grilles:

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. Air Research Diffuser Products, Inc.
  - b. Carnes Company.
  - c. Hart & Cooley Inc.
  - d. Krueger.
  - e. METALAIRE, Inc.
  - f. Nailor Industries Inc.
  - g. Price Industries.
  - h. Titus.
  - i. Tuttle & Bailey.
2. Throw: Extended distance for airflow rates.
3. Material: Steel.

4. Grilles per Unit: Four.
5. Finish: White baked acrylic.
6. Border: 1-1/2-inch width with countersunk screw holes.
7. Blades:
  - a. Airfoil, individually adjustable horizontally.
  - b. Double deflection.
  - c. Set in modules.
8. Modules: Removable; rotatable.
9. Mounting: Surface.

### 2.3 REGISTERS AND GRILLES

#### A. Adjustable Bar Register:

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. Carnes Company.
  - b. Dayus Register & Grille Inc.
  - c. Hart & Cooley Inc.
  - d. Kees, Inc.
  - e. Krueger.
  - f. METALAIRE, Inc.
  - g. Nailor Industries Inc.
  - h. Price Industries.
  - i. Raymon-Donco.
  - j. Shoemaker Mfg. Co.
  - k. Titus.
  - l. Tuttle & Bailey.
2. Material: Steel.
3. Finish: Baked enamel, color selected by Architect.
4. Face Blade Arrangement: Vertical spaced 3/4 inch apart.
5. Core Construction: Integral.
6. Rear-Blade Arrangement: Horizontal spaced 3/4 inch apart.
7. Frame: 1 inch wide.
8. Mounting: Countersunk screw.
9. Damper Type: Adjustable opposed blade.

#### B. Adjustable Bar Grille:

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:

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- a. Carnes Company.
- b. Dayus Register & Grille Inc.
- c. Hart & Cooley Inc.
- d. Kees, Inc.
- e. Krueger.
- f. METALAIRE, Inc.
- g. Nailor Industries Inc.
- h. Price Industries.
- i. Raymon-Donco.
- j. Shoemaker Mfg. Co.
- k. Titus.
- l. Tuttle & Bailey.

2. Material: Steel.
3. Finish: Baked enamel, color selected by Architect.
4. Face Blade Arrangement: Vertical spaced 3/4 inch apart.
5. Core Construction: Integral.
6. Rear-Blade Arrangement: Horizontal spaced 3/4 inch apart.
7. Frame: 1 inch wide.
8. Mounting: Countersunk screw.

2.4 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install diffusers, registers, and grilles level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Resident Engineer for a determination of final location.

- C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

- A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

**END OF SECTION 233713**

**SECTION 233723 - HVAC GRAVITY VENTILATORS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Roof hoods.
  - 2. Goosenecks.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Ventilators shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of ventilator components, noise or metal fatigue caused by ventilator blade rattle or flutter, or permanent damage to fasteners and anchors.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes, without buckling, opening of joints, overstressing of components, failure of connections, or other detrimental effects.
- C. Water Entrainment: Limit water penetration through unit to comply with ASHRAE 62.1.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. LEED Submittals:
  - 1. Product Data for Prerequisite IEQ 1: Documentation indicating that units comply with ASHRAE 62.1, Section 5 - "Systems and Equipment."
- C. Shop Drawings: For gravity ventilators. Include plans, elevations, sections, details, ventilator attachments to curbs, and curb attachments to roof structure.
  - 1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Roof framing plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
  - 1. Structural members to which roof curbs and ventilators will be attached.
  - 2. Sizes and locations of roof openings.
- B. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
  - 2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.7 COORDINATION

- A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5 or T-52.
- B. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming or as otherwise recommended by metal producer for required finish.
- C. Galvanized-Steel Sheet: ASTM A 653/A 653M, G90 zinc coating, mill phosphatized.
- D. Fasteners: Same basic metal and alloy as fastened metal or 300 Series stainless steel unless otherwise indicated. Do not use metals that are incompatible with joined materials.
  - 1. Use types and sizes to suit unit installation conditions.
  - 2. Use hex-head or Phillips pan-head screws for exposed fasteners unless otherwise indicated.
- E. Post-Installed Fasteners for Concrete and Masonry: Torque-controlled expansion anchors made from stainless-steel components, with capability to sustain without failure a load equal to 4 times the loads imposed for concrete, or 6 times the load imposed for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

## 2.2 FABRICATION, GENERAL

- A. Factory or shop fabricate gravity ventilators to minimize field splicing and assembly. Disassemble units to the minimum extent as necessary for shipping and handling. Clearly mark units for reassembly and coordinated installation.
- B. Fabricate frames, including integral bases, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- C. Fabricate units with closely fitted joints and exposed connections accurately located and secured.
- D. Fabricate supports, anchorages, and accessories required for complete assembly.
- E. Perform shop welding by AWS-certified procedures and personnel.

## 2.3 ROOF HOODS

- 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:
  - 1. Acme Engineering & Manufacturing Corp.
  - 2. Aerovent; a division of Twin City Fan Companies, Ltd.
  - 3. Carnes Company.
  - 4. Greenheck Fan Corporation.
  - 5. JencoFan.
  - 6. Loren Cook Company.
  - 7. PennBarry.
  - 8. Twin City Fan & Blower.
- B. Factory or shop fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figures 6-6 and 6-7.
- C. Materials: Aluminum sheet, minimum 0.063-inch-thick base and 0.050-inch-thick hood; suitably reinforced.
- D. Roof Curbs: Galvanized-steel sheet; with mitered and welded corners; 1-1/2-inch-thick, rigid fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to fit roof opening and ventilator base.
  - 1. Configuration: Self-flashing without a cant strip, with mounting flange.
- E. Bird Screening: Galvanized-steel, 1/2-inch-square mesh, 0.041-inch wire.
- F. Insect Screening: Aluminum, 18-by-16 mesh, 0.012-inch wire.

G. Galvanized-Steel Sheet Finish:

1. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil for topcoat and an overall minimum dry film thickness of 2 mils.
  - a. Color and Gloss: As selected by Architect from manufacturer's full range.

2.4 GOOSENECKS

- A. Factory or shop fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 6-5; with a minimum of 0.052-inch-thick, galvanized-steel sheet.
- B. Roof Curbs: Galvanized-steel sheet; with mitered and welded corners; 1-1/2-inch-thick, rigid fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to fit roof opening and ventilator base.
  1. Configuration: Self-flashing without a cant strip, with mounting flange.
- C. Bird Screening: Galvanized-steel, 1/2-inch-square mesh, 0.041-inch wire.
- D. Insect Screening: Aluminum, 18-by-16 mesh, 0.012-inch wire.
- E. Galvanized-Steel Sheet Finish:
  1. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil for topcoat and an overall minimum dry film thickness of 2 mils.
    - a. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install gravity ventilators level, plumb, and at indicated alignment with adjacent work.
- B. Install goosenecks on curb base where throat size exceeds 9 by 9 inches.
- C. Install gravity ventilators with clearances for service and maintenance.
- D. Install perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Install concealed gaskets, flashings, joint fillers, and insulation as installation progresses. Comply with Section 079200 "Joint Sealants" for sealants applied during installation.

- F. Label gravity ventilators according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."
- G. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
- H. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

### 3.2 CONNECTIONS

- A. Duct installation and connection requirements are specified in Section 233113 "Metal Ducts" and Section 233116 "Nonmetal Ducts." Drawings indicate general arrangement of ducts and duct accessories.

### 3.3 ADJUSTING

- A. Adjust damper linkages for proper damper operation.

**END OF SECTION 233723**

**SECTION 235123 - GAS VENTS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Listed double-wall vents.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for product.
- B. Shop Drawings: For vents.
  - 1. Include plans, elevations, sections, and attachment details.
  - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 3. Detail fabrication and assembly of hangers and seismic restraints.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Sample Warranty: For special warranty.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.

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2. AWS D9.1/D9.1M, "Sheet Metal Welding Code," for shop and field welding of joints and seams in vents.
- B. Certified Sizing Calculations: Manufacturer shall certify venting system sizing calculations.

PART 2 - PRODUCTS

2.1 LISTED TYPE B VENTS

- 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:
  1. American Metal Products.
  2. Cleaver-Brooks.
  3. Hart & Cooley Inc.
  4. Heat-Fab, Inc.
  5. Industrial Chimney Company.
  6. M&G DuraVent, Inc.; a member of the M&G Group.
  7. Metal-Fab, Inc.
  8. Selkirk Corporation.
  9. Tru-Flex Metal Hose Corp.
  10. Van-Packer Company, Inc.
- B. Description: Double-wall metal vents tested according to UL 441 and rated for 480 deg F continuously for Type B; with neutral or negative flue pressure complying with NFPA 211.
- C. Construction: Inner shell and outer jacket separated by at least a 1/4-inch airspace.
- D. Inner Shell: ASTM A 666, Type 430 stainless steel.
- E. Outer Jacket: Galvanized steel.
- F. Accessories: Tees, elbows, increasers, draft-hood connectors, terminations, adjustable roof flashings, storm collars, support assemblies, thimbles, firestop spacers, and fasteners; fabricated from similar materials and designs as vent-pipe straight sections; all listed for same assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATION

- A. Listed Type B Vents: Vents for certified gas appliances.

3.3 INSTALLATION OF LISTED VENTS

- A. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Section 077200 "Roof Accessories."
- B. Comply with minimum clearances from combustibles and minimum termination heights according to product listing or NFPA 211, whichever is most stringent.
- C. Seal between sections of positive-pressure vents according to manufacturer's written installation instructions, using sealants recommended by manufacturer.
- D. Support vents at intervals recommended by manufacturer to support weight of vents and all accessories, without exceeding appliance loading.
- E. Lap joints in direction of flow.

3.4 CLEANING

- A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris, and repair damaged finishes.

**END OF SECTION 235123**

**SECTION 235533.16 - GAS-FIRED UNIT HEATERS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

**1.2 SUMMARY**

- A. Section includes gas-fired unit heaters.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of gas-fired unit heater.
  - 1. Include rated capacities, operating characteristics, and accessories.
- B. Shop Drawings: For gas-fired unit heaters; signed and sealed by a qualified professional engineer. Include plans, elevations, sections, and attachment details.
  - 1. Prepare by or under the supervision of a qualified professional engineer detailing fabrication and assembly of gas-fired unit heaters, as well as procedures and diagrams.
  - 2. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
  - 3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 4. Include diagrams for power, signal, and control wiring.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: Plans, elevations, and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Structural members to which equipment will be attached.
  - 2. Items penetrating roof and the following:
    - a. Vent and gas piping rough-ins and connections.

- B. Seismic Qualification Certificates: For gas-fired unit heaters, accessories, and components, from manufacturer.
    - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
    - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
  - C. Field quality-control reports.
  - D. Sample Warranty: For special warranty.
- 1.5 CLOSEOUT SUBMITTALS
- A. Operation and Maintenance Data: For gas-fired unit heaters to include in emergency, 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. Fan Belts: One for each belt-driven fan size.
- 1.7 QUALITY ASSURANCE
- A. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."
- 1.8 WARRANTY
- A. Special Warranty: Manufacturer agrees to repair or replace heat exchanger of gas-fired unit heater that fails in materials or workmanship within specified warranty period.
    - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 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:
1. Lennox Industries, Inc.; Lennox International.
  2. Modine Manufacturing Company.
  3. REZNOR; Thomas & Betts Corporation, a member of ABB Group.
  4. Sterling HVAC Products; a Mestek company.
  5. Trane.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Gas-fired unit heaters shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. Seismic Fabrication Requirements: Fabricate and reinforce suspension attachments of gas-fired unit heaters, accessories mountings, and components with reinforcement strong enough to withstand seismic forces defined in Section 230548 "Vibration and Seismic Controls for HVAC".
  2. The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
- 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.

2.3 MANUFACTURED UNITS

- A. Description: Factory assembled, piped, and wired, and complying with ANSI Z83.8/CSA 2.6.
- B. Gas Type: Design burner for natural gas having characteristics same as those of gas available at Project site.
- C. Type of Venting: Powered vented.
- D. Housing: Steel, with integral draft hood and inserts for suspension mounting rods.
1. External Casings and Cabinets: Powder coating over corrosion-resistant-treated surface.
  2. Discharge Louvers: Independently adjustable, horizontal blades.
- E. Accessories:
1. Four-point suspension kit.

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2. Power Venter: Centrifugal aluminized-steel fan, with stainless-steel shaft; 120-V ac motor.
- F. Heat Exchanger: Stainless steel.
- G. Burner Material: Stainless steel.
- H. Propeller Unit Fan:
1. Formed-steel propeller blades riveted to heavy-gage steel spider bolted to cast-iron hub, dynamically balanced, and resiliently mounted.
  2. Fan-Blade Guard: Galvanized steel, complying with OSHA specifications, removable for maintenance.
- I. Centrifugal Unit Fan:
1. Steel, centrifugal fan dynamically balanced and resiliently mounted.
  2. Belt-Driven Drive Assembly:
    - a. Resiliently mounted to housing, with the following features:
      - 1) Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
      - 2) Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
      - 3) Pulleys: Cast-iron, adjustable-pitch motor pulley.
- J. Controls: Regulated redundant gas valve containing pilot solenoid valve, electric gas valve, pilot filter, pressure regulator, pilot shutoff, and manual shutoff all in one body.
1. Gas Control Valve: Single stage.
  2. Ignition: Standing pilot.
  3. Fan Thermal Switch: Operates fan on heat-exchanger temperature.
  4. Vent Flow Verification: Differential pressure switch to verify open vent.
  5. Control transformer.
  6. High Limit: Thermal switch or fuse to stop burner.
  7. Thermostat: Devices and wiring are specified in Section 230923.27 "Temperature Instruments."
  8. Wall-Mounted Thermostat:
    - a. Single stage.
    - b. Fan on-off-automatic switch.
    - c. 24-V ac.
    - d. 50 to 90 deg F operating range.
- K. Electrical Connection: Factory wire motors and controls for a single electrical connection.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install and connect gas-fired unit heaters and associated gas and vent features and systems according to NFPA 54, applicable local codes and regulations, and manufacturer's written instructions.

#### 3.2 EQUIPMENT MOUNTING

- A. Suspended Units: Suspend from substrate using threaded rods, spring hangers, and building attachments. Secure rods to unit hanger attachments. Adjust hangers so unit is level and plumb.
- B. Substrate-Mounted Units: Provide supports connected to substrate. Secure units to supports.
  - 1. Spring hangers and seismic restraints are specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment" and Section 230548 "Vibration and Seismic Controls for HVAC."
  - 2. Threaded Rods, Spring Hangers, Building Attachments, and Seismic Restraints: Comply with requirements in Section 230529 "Hangers and Supports for HVAC Piping and Equipment." and Section 230548 "Vibration and Seismic Controls for HVAC."
  - 3. Anchor the unit to resist code-required horizontal acceleration.

#### 3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to gas-fired unit heater, allow space for service and maintenance.
- C. Vent Connections: Comply with Section 235123 "Gas Vents."
- D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- E. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

#### 3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
  2. Verify bearing lubrication.
  3. Verify proper motor rotation.
  4. Test Reports: Prepare a written report to record the following:
    - a. Test procedures used.
    - b. Test results that comply with requirements.
    - c. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- C. Gas-fired unit heater will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- 3.5 ADJUSTING
- A. Adjust initial temperature and humidity set points.
  - B. Adjust burner and other unit components for optimum heating performance and efficiency.
- 3.6 DEMONSTRATION
- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain gas-fired unit heaters.

**END OF SECTION 235533.16**

**SECTION 237413 - PACKAGED, OUTDOOR, CENTRAL-STATION AIR-HANDLING UNITS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. This Section includes packaged, outdoor, central-station air-handling units (rooftop units) with the following components and accessories:
  - 1. Direct-expansion cooling.
  - 2. Heat-pump refrigeration components.
  - 3. Economizer outdoor- and return-air damper section.
  - 4. Integral, space temperature controls.
  - 5. Roof curbs.

1.3 DEFINITIONS

- A. DDC: Direct-digital controls.
- B. ECM: Electrically commutated motor.
- C. RTU: Rooftop unit. As used in this Section, this abbreviation means packaged, outdoor, central-station air-handling units. This abbreviation is used regardless of whether the unit is mounted on the roof or on a concrete base on ground.

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design RTU supports to comply with wind and seismic performance requirements, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Seismic Performance: RTUs shall withstand the effects of earthquake motions determined according to 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."

1.5 ACTION SUBMITTALS

- A. Product Data: Include manufacturer's technical data for each RTU, including rated capacities, dimensions, required clearances, characteristics, furnished specialties, and accessories.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 1. Wiring Diagrams: Power, signal, and control wiring.
- C. Delegated-Design Submittal: For RTU supports 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. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
  - 2. Detail mounting, securing, and flashing of roof curb to roof structure. Indicate coordinating requirements with roof membrane system.
  - 3. Wind- and Seismic-Restraint Details: Detail fabrication and attachment of wind and seismic restraints and snubbers. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors.

1.6 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Structural members to which RTUs will be attached.
  - 2. Roof openings
  - 3. Roof curbs and flashing.
- B. Manufacturer Seismic Qualification Certification: Submit certification that RTUs, accessories, and components will withstand seismic forces defined in "Performance Requirements" Article and in Section 230548 "Vibration and Seismic Controls for HVAC."
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Field quality-control test reports.
- D. Warranty: Special warranty specified in this Section.

1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For RTUs to include in emergency, operation, and maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Fan Belts: One set for each belt-driven fan.
  - 2. Filters: One set of filters for each unit.

1.9 QUALITY ASSURANCE

- A. ARI Compliance:
  - 1. Comply with ARI 203/110 and ARI 303/110 for testing and rating energy efficiencies for RTUs.
  - 2. Comply with ARI 270 for testing and rating sound performance for RTUs.
- B. ASHRAE Compliance:
  - 1. Comply with ASHRAE 15 for refrigeration system safety.
  - 2. Comply with ASHRAE 33 for methods of testing cooling and heating coils.
  - 3. Comply with applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
- C. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."
- D. NFPA Compliance: Comply with NFPA 90A and NFPA 90B.
- E. UL Compliance: Comply with UL 1995.
- F. 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.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace components of RTUs that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period for Compressors: Manufacturer's standard, but not less than five years from date of Substantial Completion.

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2. Warranty Period for Gas Furnace Heat Exchangers: Manufacturer's standard, but not less than five years from date of Substantial Completion.
3. Warranty Period for Solid-State Ignition Modules: Manufacturer's standard, but not less than three years from date of Substantial Completion.
4. Warranty Period for Control Boards: Manufacturer's standard, but not less than three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 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:
  1. AAON.
  2. Addison.
  3. Carrier Corporation; a unit of United Technologies Corp.
  4. Engineered Air.
  5. Lennox Industries, Inc.; Lennox International.
  6. Trane.
  7. YORK; a Johnson Controls company.

2.2 CASING

- A. General Fabrication Requirements for Casings: Formed and reinforced double-wall insulated panels, fabricated to allow removal for access to internal parts and components, with joints between sections sealed.
- B. Exterior Casing Material: Galvanized steel with factory-painted finish, with pitched roof panels and knockouts with grommet seals for electrical and piping connections and lifting lugs.
  1. Exterior Casing Thickness: 0.079 inch thick.
- C. Inner Casing Fabrication Requirements:
  1. Inside Casing: Galvanized steel, 0.034 inch thick, perforated 40 percent free area.
- D. Casing Insulation and Adhesive: Comply with NFPA 90A or NFPA 90B.
  1. Materials: ASTM C 1071, Type I.
  2. Thickness: 1 inch.
  3. Liner materials shall have air-stream surface coated with an erosion- and temperature-resistant coating or faced with a plain or coated fibrous mat or fabric.
  4. Liner Adhesive: Comply with ASTM C 916, Type I.

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- E. Condensate Drain Pans: Formed sections of stainless-steel sheet, a minimum of 2 inches deep, and complying with ASHRAE 62.1.
  - 1. Double-Wall Construction: Fill space between walls with foam insulation and seal moisture tight.
  - 2. Drain Connections: Threaded nipple both sides of drain pan.
  - 3. Pan-Top Surface Coating: Corrosion-resistant compound.
- F. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

2.3 FANS

- A. Direct-Driven Supply-Air Fans: Double width, forward curved or backward inclined, centrifugal; with permanently lubricated, multispeed motor resiliently mounted in the fan inlet. Aluminum or painted-steel wheels, and galvanized- or painted-steel fan scrolls.
- B. Belt-Driven Supply-Air Fans: Double width, forward curved, centrifugal; with permanently lubricated, single-speed motor installed on an adjustable fan base resiliently mounted in the casing. Aluminum or painted-steel wheels, and galvanized- or painted-steel fan scrolls.
- C. Condenser-Coil Fan: Propeller, mounted on shaft of permanently lubricated motor.
- D. Relief-Air Fan: Forward curved or Backward inclined, shaft mounted on permanently lubricated motor.
- E. Seismic Fabrication Requirements: Fabricate fan section, internal mounting frame and attachment to fans, fan housings, motors, casings, accessories, and other fan section components with reinforcement strong enough to withstand seismic forces defined in Section 230548 "Vibration and Seismic Controls for HVAC" when fan-mounted frame and RTU-mounted frame are anchored to building structure.
- F. Fan Motor: Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."

2.4 COILS

- A. Supply-Air Refrigerant Coil:
  - 1. Copper-plate fin and seamless copper tube in steel casing with equalizing-type vertical distributor.
  - 2. Polymer strip shall prevent all copper coil from contacting steel coil frame or condensate pan.
  - 3. Coil Split: Interlaced.
  - 4. Condensate Drain Pan: Stainless steel formed with pitch and drain connections complying with ASHRAE 62.1.

2.5 REFRIGERANT CIRCUIT COMPONENTS

- A. Compressor: Hermetic, scroll, mounted on vibration isolators; with internal overcurrent and high-temperature protection, internal pressure relief.
- B. Refrigeration Specialties:
  - 1. Refrigerant: R-410A.
  - 2. Expansion valve with replaceable thermostatic element.
  - 3. Refrigerant filter/dryer.
  - 4. Manual-reset high-pressure safety switch.
  - 5. Automatic-reset low-pressure safety switch.
  - 6. Minimum off-time relay.
  - 7. Automatic-reset compressor motor thermal overload.
  - 8. Brass service valves installed in compressor suction and liquid lines.
  - 9. Low-ambient kit high-pressure sensor.

2.6 AIR FILTRATION

- A. Minimum arrestance according to ASHRAE 52.1, and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.
  - 1. Pleated: Minimum 90 percent arrestance, and MERV 8.

2.7 DAMPERS

- A. Outdoor-Air Damper: Linked damper blades, for 0 to 25 percent outdoor air, with manual damper filter.
- B. Outdoor- and Return-Air Mixing Dampers: Parallel- or opposed-blade galvanized-steel dampers mechanically fastened to cadmium plated for galvanized-steel operating rod in reinforced cabinet. Connect operating rods with common linkage and interconnect linkages so dampers operate simultaneously.
  - 1. Damper Motor: Modulating with adjustable minimum position.
  - 2. Relief-Air Damper: Gravity actuated or motorized, as required by ASHRAE/IESNA 90.1, with bird screen and hood.

2.8 ELECTRICAL POWER CONNECTION

- A. Provide for single connection of power to unit with unit-mounted disconnect switch accessible from outside unit and control-circuit transformer with built-in overcurrent protection.

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## 2.9 CONTROLS

- A. Control equipment and sequence of operation are specified in Section 230923 "Direct Digital Control (DDC) System for HVAC" and Section 230993.11 "Sequence of Operations for HVAC DDC."
- B. Basic Unit Controls:
  - 1. Control-voltage transformer.
  - 2. Wall-mounted thermostat or sensor with the following features:
    - a. Heat-cool-off switch.
    - b. Fan on-auto switch.
- C. DDC Controller:
  - 1. Controller shall have volatile-memory backup.
  - 2. Safety Control Operation:
    - a. Smoke Detectors: Stop fan and close outdoor-air damper if smoke is detected. Provide additional contacts for alarm interface to fire alarm control panel.
    - b. Firestats: Stop fan and close outdoor-air damper if air greater than 130 deg F enters unit. Provide additional contacts for alarm interface to fire alarm control panel.
    - c. Fire Alarm Control Panel Interface: Provide control interface to coordinate with operating sequence described in Section 283111 "Digital, Addressable Fire-Alarm System" and Section 283112 "Zoned (DC Loop) Fire-Alarm System."
    - d. Low-Discharge Temperature: Stop fan and close outdoor-air damper if supply air temperature is less than 40 deg F.
    - e. Defrost Control for Condenser Coil: Pressure differential switch to initiate defrost sequence.
  - 3. Scheduled Operation: Occupied and unoccupied periods on seven-day clock with a minimum of two programmable periods per day.
  - 4. Unoccupied Period:
    - a. Heating Setback: 10 deg F.
    - b. Cooling Setback: System off.
    - c. Override Operation: Two hours.
  - 5. Supply Fan Operation:
    - a. Occupied Periods: Run fan continuously.
    - b. Unoccupied Periods: Cycle fan to maintain setback temperature.
  - 6. Refrigerant Circuit Operation:
    - a. Occupied Periods: Cycle or stage compressors to match compressor output to cooling load to maintain discharge temperature. Cycle condenser fans to maintain



- C. Filter differential pressure switch with sensor tubing on either side of filter. Set for final filter pressure loss.
- D. Coil guards of painted, galvanized-steel wire.

#### 2.11 ROOF CURBS

- A. Roof curbs with vibration isolators and wind or seismic restraints are specified in Section 230548 "Vibration and Seismic Controls for HVAC."

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of RTUs.
- B. Examine roughing-in for RTUs to verify actual locations of piping and duct connections before equipment installation.
- C. Examine roofs for suitable conditions where RTUs will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Equipment Mounting:
  - 1. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
- B. Roof Curb: Install on roof structure, level and secure. Install RTUs on curbs and coordinate roof penetrations and flashing with roof construction specified in Section 077200 "Roof Accessories." Secure RTUs to upper curb rail, and secure curb base to roof framing or concrete base with anchor bolts.

#### 3.3 CONNECTIONS

- A. Install condensate drain, minimum connection size, with trap and indirect connection to nearest roof drain or area drain.
- B. Install piping adjacent to RTUs to allow service and maintenance.

- C. Duct installation requirements are specified in other HVAC Sections. Drawings indicate the general arrangement of ducts. The following are specific connection requirements:
  - 1. Install ducts to termination at top of roof curb.
  - 2. Remove roof decking only as required for passage of ducts. Do not cut out decking under entire roof curb.
  - 3. Connect supply ducts to RTUs with flexible duct connectors specified in Section 233300 "Air Duct Accessories."
  - 4. Install return-air duct continuously through roof structure.

### 3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- B. Perform tests and inspections and prepare test reports.
  - 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. Report results in writing.
- C. Tests and Inspections:
  - 1. After installing RTUs and after electrical circuitry has been energized, test units for compliance with requirements.
  - 2. Inspect for and remove shipping bolts, blocks, and tie-down straps.
  - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Remove and replace malfunctioning units and retest as specified above.

### 3.5 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
- B. Complete installation and startup checks according to manufacturer's written instructions and do the following:
  - 1. Inspect for visible damage to unit casing.
  - 2. Inspect for visible damage to furnace combustion chamber.
  - 3. Inspect for visible damage to compressor, coils, and fans.
  - 4. Inspect internal insulation.
  - 5. Verify that labels are clearly visible.
  - 6. Verify that clearances have been provided for servicing.

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7. Verify that controls are connected and operable.
8. Verify that filters are installed.
9. Clean condenser coil and inspect for construction debris.
10. Remove packing from vibration isolators.
11. Inspect operation of barometric relief dampers.
12. Verify lubrication on fan and motor bearings.
13. Inspect fan-wheel rotation for movement in correct direction without vibration and binding.
14. Adjust fan belts to proper alignment and tension.
15. Start unit according to manufacturer's written instructions.
  - a. Start refrigeration system.
  - b. Do not operate below recommended low-ambient temperature.
  - c. Complete startup sheets and attach copy with Contractor's startup report.
16. Inspect and record performance of interlocks and protective devices; verify sequences.
17. Operate unit for an initial period as recommended or required by manufacturer.
18. Calibrate thermostats.
19. Adjust and inspect high-temperature limits.
20. Inspect outdoor-air dampers for proper stroke and interlock with return-air dampers.
21. Start refrigeration system and measure and record the following when ambient is a minimum of 15 deg F above return-air temperature:
  - a. Coil leaving-air, dry- and wet-bulb temperatures.
  - b. Coil entering-air, dry- and wet-bulb temperatures.
  - c. Outdoor-air, dry-bulb temperature.
  - d. Outdoor-air-coil, discharge-air, dry-bulb temperature.
22. Inspect controls for correct sequencing of heating, mixing dampers, refrigeration, and normal and emergency shutdown.
23. Measure and record the following minimum and maximum airflows. Plot fan volumes on fan curve.
  - a. Supply-air volume.
  - b. Return-air volume.
  - c. Relief-air volume.
  - d. Outdoor-air intake volume.
24. Simulate maximum cooling demand and inspect the following:
  - a. Compressor refrigerant suction and hot-gas pressures.
  - b. Short circuiting of air through condenser coil or from condenser fans to outdoor-air intake.
25. Verify operation of remote panel including pilot-light operation and failure modes. Inspect the following:
  - a. High-temperature limit on gas-fired heat exchanger.
  - b. Low-temperature safety operation.
  - c. Filter high-pressure differential alarm.

- d. Economizer to minimum outdoor-air changeover.
  - e. Relief-air fan operation.
  - f. Smoke and firestat alarms.
26. After startup and performance testing and prior to Substantial Completion, replace existing filters with new filters.

3.6 CLEANING AND ADJUSTING

- A. 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 site during other-than-normal occupancy hours for this purpose.
- B. After completing system installation and testing, adjusting, and balancing RTU and air-distribution systems, clean filter housings and install new filters.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain RTUs. Refer to Section 017900 "Demonstration and Training."

**END OF SECTION 237413**

**SECTION 238126 - SPLIT-SYSTEM AIR-CONDITIONERS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section..

**1.2 SUMMARY**

- A. Section includes split-system air-conditioning and heat-pump units consisting of separate evaporator-fan and compressor-condenser components.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 2. Wiring Diagrams: For power, signal, and control wiring.
- C. Samples for Initial Selection: For units with factory-applied color finishes.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.
- B. Warranty: Sample of special warranty.

**1.5 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, 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. Filters: One set for each air-handling unit.
  - 2. Gaskets: One set for each access door.
  - 3. Fan Belts: One set for each air-handling unit fan.

1.7 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. ASHRAE Compliance:
  - 1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
  - 2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - "Procedures," and Section 7 - "Construction and System Start-up."
- C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.

1.8 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Section 033000 "Cast-in-Place Concrete."
- B. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period:
    - a. For Compressor: Five years from date of Substantial Completion.
    - b. For Parts: One year from date of Substantial Completion.
    - c. For Labor: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 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:

1. Carrier Corporation; a unit of United Technologies Corp.
2. Coleman Company Inc. (The).
3. First Operations LP.
4. Friedrich Air Conditioning Company.
5. Koldwave, Inc.
6. Lennox Industries, Inc.; Lennox International.
7. Mitsubishi Electric & Electronics USA, Inc.
8. Mitsubishi Electric Sales Canada Inc.
9. Mitsubishi Heavy Industries America, Inc.
10. SANYO North America Corporation.
11. Trane.
12. YORK; a Johnson Controls company.

2.2 INDOOR UNITS (5 TONS OR LESS)

- A. Concealed Evaporator-Fan Components:

1. Chassis: Galvanized steel with flanged edges, removable panels for servicing, and insulation on back of panel.
2. Insulation: Faced, glass-fiber duct liner.
3. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 206/110.
4. Fan: Forward-curved, double-width wheel of galvanized steel; directly connected to motor.
5. Fan Motors:
  - a. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
  - b. Multitapped, multispeed with internal thermal protection and permanent lubrication.
  - c. Wiring Terminations: Connect motor to chassis wiring with plug connection.
6. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
7. Filters: Permanent, cleanable.
8. Condensate Drain Pans:
  - a. Fabricated with one percent slope in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and humidifiers, and to direct water toward drain connection.

- 1) Length: Extend drain pan downstream from leaving face to comply with ASHRAE 62.1.
  - 2) Depth: A minimum of 2 inches deep.
- b. Single-wall, stainless-steel sheet.
  - c. Drain Connection: Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on both ends of pan.
  - d. Units with stacked coils shall have an intermediate drain pan to collect condensate from top coil.

### 2.3 OUTDOOR UNITS (5 TONS OR LESS)

#### A. Air-Cooled, Compressor-Condenser Components:

1. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
2. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation device. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
  - a. Compressor Type: Scroll.
  - b. Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
  - c. Refrigerant Charge: R-410A.
  - d. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and liquid subcooler. Comply with ARI 206/110.
3. Heat-Pump Components: Reversing valve and low-temperature-air cutoff thermostat.
4. Fan: Aluminum-propeller type, directly connected to motor.
5. Motor: Permanently lubricated, with integral thermal-overload protection.
6. Low Ambient Kit: Permits operation down to 45 deg F.
7. Mounting Base: Polyethylene.

### 2.4 ACCESSORIES

- A. Control equipment and sequence of operation are specified in Section 230923 "Direct Digital Control (DDC) System for HVAC" and Section 230993.11 "Sequence of Operations for HVAC DDC."
- B. Thermostat: Low voltage with subbase to control compressor and evaporator fan.
- C. Thermostat: Wireless infrared functioning to remotely control compressor and evaporator fan, with the following features:
  1. Compressor time delay.
  2. 24-hour time control of system stop and start.

3. Liquid-crystal display indicating temperature, set-point temperature, time setting, operating mode, and fan speed.
  4. Fan-speed selection including auto setting.
- D. Automatic-reset timer to prevent rapid cycling of compressor.
- E. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.
- F. Drain Hose: For condensate.

## 2.5 CAPACITIES AND CHARACTERISTICS

- A. See Schedule on drawings.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install units level and plumb.
- B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
- C. Install roof-mounted, compressor-condenser components on equipment supports specified in Section 077200 "Roof Accessories." Anchor units to supports with removable, cadmium-plated fasteners.
- D. Equipment Mounting:
1. Install ground-mounted, compressor-condenser components on polyethylene mounting base.
  2. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
- E. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

### 3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.

- C. Duct Connections: Duct installation requirements are specified in Section 233113 "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply and return ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Section 233300 "Air Duct Accessories."

### 3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. 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.
- C. Tests and Inspections:
  - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Prepare test and inspection reports.

### 3.4 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.

### 3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units.

**END OF SECTION 238126**

**SECTION 23 99 99 – GYMNASIUM AIR CONDITIONING BASIS OF DESIGN (PHASE  
2 BASE BID)**

\*The stated performance requirements will eliminate the use of unit heaters and ventilation fans. Provide credit.

Scope:

The design of the gymnasium Phase 2 Base Bid shall be a design-build by the contractor. The contractor shall be responsible for a complete design and installation of a heating, ventilation, and air conditioning system for the gymnasium building at Park De La Cruz. The contractor is responsible for coordination of work between all disciplines. All work to be compliant with the latest adopted editions of the applicable codes and standards. The contractor shall be responsible for running all loads and sizing the equipment.

It is proposed that the mechanical equipment associated with the HVAC design to be located on the North side of the gymnasium. All equipment shall be placed on concrete pads. Contractor shall construct a masonry enclosure for HVAC equipment with adequate space for equipment and manufacturer's required clearances. Enclosure to be 12 feet high with a 10 foot wide double steel gate – Enclosure materials, colors and gate construction shall match the existing trash enclosure. See attached site plan for related scope.

Supply and return ductwork shall be routed so that it limits the visual exposure of ducts on the exterior wall of the gymnasium. The ductwork inside the gym shall be designed so that it does not interfere with any existing gymnasium equipment (i.e. basketball hoops, partitions, score boards, gym lighting etc.) or operations.

Medium pressure natural gas piping is available at the exterior of the gymnasium building. The contractor shall be responsible for designing a low pressure gas supply system with seismic shutoff valves, including the sizing and extending of the natural gas service to the location of the mechanical equipment.

The contractor shall use the existing underground conduit from the recreation center to the gymnasium for power supply of the mechanical equipment. The existing conduit will need to be extended from the exterior gym wall to the location of mechanical equipment. Coordinate the final routing.

After completion of the design, the contractor shall submit shop drawings for approval from the city and design team. Upon receiving approval, submit for plan check and process permits. Contractor is responsible for the payment of all permitting fees. Once approved, the contractor shall proceed with the construction for the gymnasium Phase 2 Base Bid.

The design-build contractor shall follow all specified performance. In addition, the proposed installation shall meet all specified base contract requirements.

## HEATING, VENTILATING AND AIR CONDITIONING

1. General: Design, engineer, permit and install, test, start-up and balance a complete heating, ventilating and air conditioning (HVAC) system for the gymnasium at the Park De La Cruz Community Center.
2. Title-24 Compliance: Provide performance based Title-24 compliance calculations for the new HVAC system design. The goal is to perform 15% better than Title -24.
3. Submit and coordinate for incentives through SDG&E Saving-By-Design program.
4. HVAC Systems and Free Cooling: The following HVAC system shall be provided: Title-24 compliant HVAC equipment providing conditioned air to the gymnasium complete with acoustically lined sheet metal ductwork consisting of supply, return, relief and exhaust systems. Provide 100% outside air economizers and modulating power exhausts.
5. Demolition Work: The scope of work shall include demolition work of the existing propeller wall fans and louvers serving the gym area. Coordinate patching and repair of existing walls as required. Paint to match existing.
6. General: The outside design conditions shall be based on the Title 24 1% design values for San Diego.
7. HVAC Basic Requirements: provide detailed calculations for all systems prior to construction to confirm final sizes and equipment and system efficiencies and submit for approval by the city.
  - a. Quality: The system designs must be based on an overall level of quality and maintainability. The designs shall incorporate proven technology and equipment.
  - b. HVAC Systems: The HVAC system for main buildings shall be the following:
    - i. Ultra-high efficiency packaged gas fired air conditioning unit (min. 15% better than current Title-24 energy efficiency ratio (EER).
  - c. HVAC System Configuration: Provide a single gas/electric packaged unit mounted on concrete pad on grade.
  - d. Spare Parts: Provide two (2) sets of spare filters and belts for unit. Clearly label and tag each item.
  - e. The system design shall provide flexibility in terms of operation and maintenance. Ensure that all components and equipment are easily accessible for maintenance and replacement.
  - f. All refrigerants shall be non-CFC type such as R-410A.
  - g. Provide duct mounted smoke detectors on all air moving systems exceeding 2000 cfm as required by Code. Provide a complete operational system including electrical wiring and fire alarm fan shutdown.
  - h. Mechanical equipment shall be designed to operate with Daintree wireless controls per city of San Diego standards.

8. Temperature Control: The following temperatures shall be maintained during occupied periods:
  - a. Gym set point shall be 75 ( $\pm 2$ ) degrees F with humidity control.
9. Occupancy Loads:
  - a. Gymnasium 15 sf/person 255 btuh sensible, 875 btuh latent
10. Lighting Loads: Refer to the project specific electrical design drawings and the limits set by the California Title 24 Standards. Use default lighting power density based on the actual lighting design.
11. Size the equipment, considering air infiltration, and carry a minimum safety factor of 15% in final selection.
12. Miscellaneous Heat Gains: Calculations shall include air handling unit's fan motor heat. At a minimum, an equipment load of 0.5 watts/sf shall be utilized.
13. Ventilation Requirements
  - a. The gymnasium shall be provided with at least 15 cfm/person outdoor ventilation air or 0.5 cfm/sf, whichever is greater.
  - b. The system design shall include CO<sub>2</sub> sensors for demand ventilation control.
14. Ducting Design Criteria: All ductwork shall be designed in accordance with SMACNA Design Manuals and ASHRAE Handbook fundamentals, Duct Design Chapter. The selection of the duct sizes should ensure that the duct pressure is minimized, in addition to selecting ducting at air velocities that do not generate noise (breakout or airside). The following shall be adhered to when designing the ducting systems:
  - a. Duct systems shall be designed to obtain the lowest cost-beneficial pressure loss. The systems shall be fully ducted return, no plenum return will be allowed.
  - b. Distribution system pressure losses shall be determined by total pressure.
  - c. Horizontal duct distribution shall be routed to avoid or minimize architecturally and/or structurally induced dynamic losses.
  - d. Sheet metal gauges shall be minimum 22 gauge and in accordance with CMC, not SMACNA. Construction of ductwork, except for gauge thickness, shall be in accordance with SMACNA 2006 Second Edition for the appropriate duct pressure classification.
  - e. Provide drive slip or equivalent flat seams for ducts exposed in the conditioned space. On ducts over 48" wide, provide standard reinforcing on inside of duct.
  - f. Supply and return air ducts shall be sized for friction losses between 0.08 to 0.10 inches WG/100 feet but not exceeding a velocity of 1,000 fpm, with runs over 75' in length selected for 800 FPM maximum. Note: Constant volume systems shall be designed for the low end of the friction range and variable volume systems to the high end of the range for the full cfm without diversity.

- g. Provide 2 inch double wall acoustic insulation with sheet metal perforated lining for all supply and return ductwork within minimum 20 feet of all air moving fan sections, associated with packaged unit. Provide 1 inch acoustic insulation on all miscellaneous exhaust or supply ductwork within 10 feet of the fan.
  - h. All exterior ductwork shall be insulated to an installed R-value of R-8.
  - i. Provide seismic supports and restraints per SMACNA latest edition Seismic Restraint Manual.
15. Grilles, Diffusers, Registers
- a. Provide commercial grade high capacity drum supply louvers similar to Titus DL, or equal, for supply and heavy duty steel return and exhaust grilles.
16. Air Filtration: Provide the following:
- a. Provide filters as per Cal Green and ASHRAE guidelines.
  - b. Filters shall be rated per ASHRAE 52 –76 Standard Test Method.
  - c. The filter media shall be fabricated so that fibrous shedding does not exceed the levels prescribed by ASHRAE 52.
17. System Start Up, Testing, Balancing, and Adjusting: The work includes system start-up, test, adjust, and balance (TAB) of HVAC air distribution systems. Include sound testing and vibration recordings for HVAC equipment. The work shall be performed by an independent qualified agency accredited by American Air Balance Council (AABC) or by National Environmental Balancing Bureau (NEBB).
18. Space Pressurization: No space shall be over pressurized to the point of affecting the operation of doors as required by the guidelines of Americans with Disabilities Act (ADA).
19. Maintenance Manuals and As-Built Drawings: Upon completion of work, the design build team shall provide to the owner three bound copies of maintenance manuals showing all approved shop drawings and maintenance and operations documentation. Include a half size set of the as-built drawings folded and bound into the maintenance manuals. Incorporate all red-lines from field notes onto the design CAD files and submit two hard copies of the final full size As-builds along with one editable electronic CAD file of the drawings burnt onto a CD file format.
20. Natural Gas: A pressure regulator shall reduce gas pressure to 7”-11” water column. A California approved earthquake shut-off valve shall be provided in the incoming line.
- a. The natural gas piping system shall be sized in accordance with the California Plumbing Code, with a maximum pressure drop in the system of 0.5 inches water column, no diversity allowed. Underground pipes shall be “PE” type; above ground shall be black steel.
21. Condensate Drain: Provide type “L” copper condensate drain piping for mechanical equipment. Install per manufacturer’s recommendation.

## ELECTRICAL

- 1) Code Compliance Requirements
  - a) All work to be compliant with the latest adopted editions of the following codes and standards:
    - i) California Electrical Code - CEC (NFPA 70)
    - ii) California Building Code – CBC
- 2) Life-Cycle Requirements
  - a) The design, engineering, materials and products selected must allow for the continuous use and operation of the facility for the programmed life cycle.
  - b) As a minimum level of performance the following elements shall be considered primary requirement and be included in the design and construction for all structures:
    - i) Ease of electrical systems operation, including both users and maintenance personnel.
    - ii) Ease of isolating elements of a system to minimize impact to other components of the system in the event of a failure, maintenance, etc.
    - iii) 25 – 30% load growth factor over the facilities lifecycle.
    - iv) All materials and products to be commercially and readily available.
    - v) Selection of products to allow for industry standard, non-proprietary equipment.
    - vi) Specialized equipment that may/will require service for a 3rd party shall have a on-site response time of 8-hours or less from the first call.
- 3) Coordination
  - a) Provide coordination with all other disciplines to allow for an integrated and deliberate interface between the structure’s electrical system and all other systems.
- 4) Electrical Equipment Layout
  - a) All electrical equipment shall be laid out to allow for working clearances as prescribed in the CEC.
- 5) Grounding and Bonding
  - a) All buildings or structures shall be provided with a grounding electrode system in compliance with CEC’s requirements. The grounding system designed shall include the following minimum features:
    - i) Provide separate equipment grounding conductor with all feeders and branch circuit phase conductors sized in accordance with CEC Table 250.122.
- 6) Raceway
  - a) All conductors shall be enclosed within a raceway system. All raceway shall be designed and installed in compliance with the CEC and shall incorporate the following requirements:

- i) All raceways to be concealed unless otherwise noted or installed in an unfinished space.
- ii) Conduits fill rates shall not exceed 40%.
- iii) All metal conduit fittings shall be steel compression type fittings.
- iv) All exposed outdoor conduits shall be GRC.
- v) All exposed conduits subject to severe physical damage shall be GRC.
- vi) All exposed conduits not subject to physical damage shall be EMT.
- vii) All conduits in damp or wet location shall be GRC.
- viii) Connection to vibrating equipment including transformers and motor-driven equipment shall be LFMC with a maximum of 6' in length.
- ix) All conduits routed on roof shall be routed a minimum of 3.5 inches roof to the bottom of the conduit.
- x) All conduit shall be secured to the structure via the use of two hole conduit straps.
- xi) Minimum conduit size is 3/4" C indoors and a minimum 1" C underground.
- xii) All enclosures, pull-boxes, vaults, etc to be permanently labeled based on its contents. (i.e. "POWER", "SIGNAL", etc.)
- xiii) All underground pathways to be schedule 40 PVC.

## 7) Power Requirements

### a) System Description

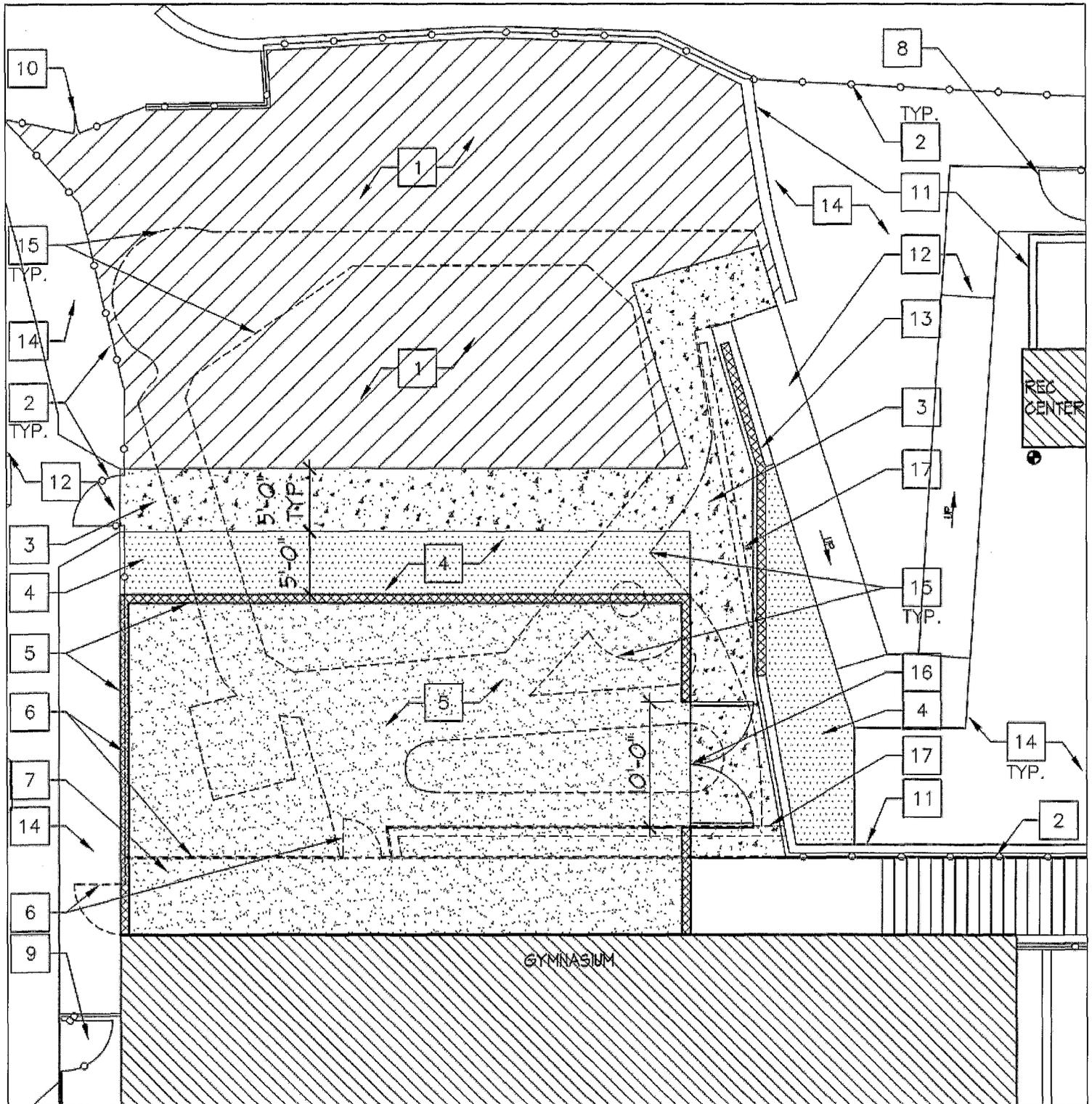
- i) Provide new interior electrical system consisting of conduits, feeders and branch wiring, grounding including accessories and devices as necessary and required for a complete useable system to feed additional HVAC loads.
- ii) Select electrical characteristics of the power system to provide a safe, efficient and economical distribution of power based upon the size and type of electrical loads to be served. Use distribution and utilization voltages of the highest level that is particular for the load to be served.
- iii) New electrical equipment shall be tested in accordance with NETA acceptance testing.
- iv) The interior distribution system shall re-feed the existing panel currently feeding the building.
- v) Backup/temporary power shall be provided to existing loads to remain during hours of operation.
- vi) The interior distribution system shall be fed from Community Center using existing conduits. Existing underground conduits between buildings shall be used as much as possible.

### b) General

- i) The use of load centers is not permitted.

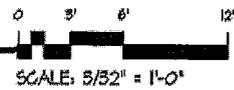
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- ii) The design of the power distribution system shall allow for a 25-30% growth for all distribution equipment, including panelboards.
  - iii) Provide a minimum of six (6) spare circuit breakers per power panelboard.
  - iv) When possible match the existing site equipment manufacturer.
  - v) All disconnect switches to be lockable “on” and “off”. NEMA 3R for all outdoor locations.
  - vi) All equipment to be fully bussed.
- c) Wiring Methods
- i) No underground splices shall be permitted.
- d) Conductors
- i) All conductors shall be copper.
  - ii) Conductors #10 and smaller shall be solid.
  - iii) Conductors #8 and larger shall be stranded.
  - iv) Conductors shall meet the requirements of CEC.
- e) Receptacles
- i) 20 amp minimum – NEMA 20R.
  - ii) Ground pin down.
  - iii) Outdoor receptacles shall be weatherproof, GFCI, and with a while in use cover.
  - iv) Locations of receptacles shall meet the requirements of CEC.
- f) Motors
- i) Provide disconnects for all equipment. Coordinate with other disciplines.



**1 GYM HVAC ENCLOSURE AND SITE WORK CONCEPT SKETCH**

3/32" = 1'-0"



**GENERAL NOTES**

1. REMOVE EXISTING CONCRETE AND CLEAR & GRUB ENTIRE AREA OF WORK. REFERENCE SITE PLAN A-001.
2. SEE NEXT PAGE FOR KEYNOTES.

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**PARK DE LA CRUZ COMMUNITY CENTER & GYM IMPROVEMENTS**

**(P) PHASE 2 BASE BID GYMNASIUM AIR CONDITIONING ENCLOSURE AND SITE WORK**

DATE: FEBRUARY 28, 2017

799 | SPEC 239999-8

## KEY NOTES

- 1 CLEAR & GRUB. REGRADE FOR POSITIVE DRAINAGE AWAY FROM BUILDINGS. APPLY HYDRO-BLANKET OR EQUAL BONDED FIBER MATRIX PRODUCT FOR EROSION CONTROL.
- 2 EXSTING FENCE & GATES TO REMAIN
- 3 POUR 4" THICK ADA COMPLIANT CONCRETE WALKWAY.
- 4 PROVIDE LANDSCAPE PLANTING AND IRRIGATION
- 5 12'-0" HIGH CMU HVAC ENCLOSURE. MATCH EXISTING TRASH ENCLOSURE MATERIALS AND FINISH. PROVIDE CONCRETE EQUIPMENT PADS AND GRAVEL THROUGHOUT. SIZE AS NECESSARY FOR EQUIPMENT & CLEARANCES.
- 6 REMOVE EXISTING FENCE
- 7 (E) CONCRETE WALKWAY. REMOVE IF NECESSARY.
- 8 REPLACE FENCE & GATES. PHASE 1 BASE BID SCOPE.
- 9 (E) HVAC ENCLOSURE AND EQUIPMENT TO REMAIN
- 10 EXISTING VEHICULAR ACCESS GATE TO REMAIN
- 11 EXISTING CONCRETE BLOCK WALL TO REMAIN
- 12 EXISTING CONCRETE WALKWAY AND RAMP TO REMAIN
- 13 PROVIDE KEYSTONE RETAINING WALL AS NECESSARY. TO MATCH EXISTING RETAINING WALL.
- 14 EXISTING LANDSCAPE AREA. REPAIR AS NECESSARY.
- 15 REMOVE EXISING CONCRETE WALKWAY AND CURB
- 16 PROVIDE 10'-0" WIDE STEEL GATE. MATCH EXISTING TRASH ENCLOSURE.
- 17 REMOVE EXISTING 12" HIGH RETAINING WALL AS NECESSARY.

NOTE: SEE PAGE #239999-8 FOR CONCEPT SKETCH

## PARK DE LA CRUZ COMMUNITY CENTER & GYM IMPROVEMENTS

PHASE 2 BASE BID  
(P) GYMNASIUM AIR CONDITIONING  
ENCLOSURE AND SITE WORK

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section..

1.2 SUMMARY

- A. Section Includes:
  - 1. Copper building wire rated 600 V or less.
  - 2. Connectors, splices, and terminations rated 600 V and less.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: Indicate type, use, location, and termination locations.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA.
  - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. 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:

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1. Belden Inc.
  2. Okonite Company (The).
  3. Southwire Company.
  4. Or approved equal.
- C. Standards:
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
  2. RoHS compliant.
  3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.
- E. Conductor Insulation:
1. Type THHN and Type THWN-2: Comply with UL 83.
- 2.2 CONNECTORS AND SPLICES
- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
1. Material: Copper.
  2. Type: One hole with standard barrels.
  3. Termination: Crimp.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN/THWN-2, single conductors in raceway.
- B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.

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- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.
- E. Exposed Branch Circuits, Including in Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.
- G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

- A. 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-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
  - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
  - 2. Perform each of the following visual and electrical tests:
    - a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
    - b. Test bolted connections for high resistance using one of the following:
      - 1) A low-resistance ohmmeter.
      - 2) Calibrated torque wrench.
    - c. Inspect compression-applied connectors for correct cable match and indentation.
    - d. Inspect for correct identification.
    - e. Inspect cable jacket and condition.
    - f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
    - g. Continuity test on each conductor and cable.
    - h. Uniform resistance of parallel conductors.
- C. Cables will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports to record the following:

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1. Procedures used.
2. Results that comply with requirements.
3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

**END OF SECTION 260519**

**SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section includes grounding and bonding systems and equipment.
- B. Section includes grounding and bonding systems and equipment, plus the following special applications:
  - 1. Underground distribution grounding.
  - 2. Foundation steel electrodes.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans showing dimensioned locations of grounding features specified in "Field Quality Control" Article, including the following:
  - 1. Ground rods.
- B. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Certified by NETA.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- 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 UL 467 for grounding and bonding materials and equipment.

## 2.2 MANUFACTURERS

- 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:

1. Burndy; Part of Hubbell Electrical Systems.
2. Dossert; AFL Telecommunications LLC.
3. ERICO International Corporation.

## 2.3 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

- B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
5. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

## 2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

- B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

- C. Bus-Bar Connectors: Compression type, copper or copper alloy, with two wire terminals.

- D. Cable-to-Cable Connectors: Compression type, copper or copper alloy.

- E. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.

- F. Conduit Hubs: Mechanical type, terminal with threaded hub.

- G. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.

- H. Water Pipe Clamps:

1. Mechanical type, two pieces with stainless-steel bolts.
  - a. Listed for direct burial.

2.5 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.
  - 1. Bury at least 24 inches below grade.
- C. Conductor Terminations and Connections:
  - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
  - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
  - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
  - 4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Grounding Handholes: Install a driven ground rod through handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor.

3.3 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
  - 1. Feeders and branch circuits.
  - 2. Lighting circuits.
  - 3. Receptacle circuits.
  - 4. Single-phase motor and appliance branch circuits.
  - 5. Three-phase motor and appliance branch circuits.
  - 6. Flexible raceway runs.
- C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers,

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humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

- D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- E. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.
- F. Metallic Fences: Comply with requirements of IEEE C2.
  - 1. Grounding Conductor: Bare copper, not less than No. 8 AWG.
  - 2. Gates: Shall be bonded to the grounding conductor with a flexible bonding jumper.
  - 3. Barbed Wire: Strands shall be bonded to the grounding conductor.

### 3.4 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.
  - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
  - 2. Use exothermic welds for all below-grade connections.
- C. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Section 260543 "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches deep, with cover.
  - 1. Install at least one test well for each service unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
  - 1. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- E. Grounding and Bonding for Piping:
  - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts

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- of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
  3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- F. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.
- G. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
  2. Make connections with clean, bare metal at points of contact.
  3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
  4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
  5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
  1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
  2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
  3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at individual ground rods. Make tests at ground rods before any conductors are connected.
    - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    - b. Perform tests by fall-of-potential method according to IEEE 81.
- D. Grounding system will be considered defective if it does not pass tests and inspections.

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- E. Prepare test and inspection reports.
- F. Report measured ground resistances that exceed the following values:
  - 1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
  - 2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
- G. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Resident Engineer promptly and include recommendations to reduce ground resistance.

**END OF SECTION 260526**

**SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Steel slotted support systems.
  - 2. Conduit and cable support devices.
  - 3. Structural steel for fabricated supports and restraints.
  - 4. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
  - 5. Fabricated metal equipment support assemblies.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
    - a. Slotted support systems, hardware, and accessories.
    - b. Clamps.
    - c. Hangers.
    - d. Sockets.
    - e. Eye nuts.
    - f. Fasteners.
    - g. Anchors.
    - h. Saddles.
    - i. Brackets.
  - 2. Include rated capacities and furnished specialties and accessories.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. For fabrication and installation details for electrical hangers and support systems.
  - 1. Hangers. Include product data for components.
  - 2. Slotted support systems.
  - 3. Equipment supports.

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4. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Suspended ceiling components.
2. Ductwork, piping, fittings, and supports.
3. Structural members to which hangers and supports will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Items penetrating finished ceiling, including the following:
  - a. Luminaires.
  - b. Air outlets and inlets.
  - c. Speakers.
  - d. Sprinklers.
  - e. Access panels.
  - f. Projectors.

- B. Seismic Qualification Data: Certificates, for hangers and supports for electrical equipment and systems, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

- C. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.

- B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Hangers and supports shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

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1. The term "withstand" means "the supported equipment and systems will remain in place without separation of any parts when subjected to the seismic forces specified and the supported equipment and systems will be fully operational after the seismic event."
  2. Component Importance Factor: 1.5.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame Rating: Class 1.
  2. Self-extinguishing according to ASTM D 635.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.
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. Allied Tube & Conduit; a part of Atkore International.
    - b. B-line, an Eaton business.
    - c. ERICO International Corporation.
    - d. GS Metals Corp.
    - e. Thomas & Betts Corporation; A Member of the ABB Group.
    - f. Unistrut; Part of Atkore International.
  2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
  3. Material for Channel, Fittings, and Accessories: Galvanized steel.
  4. Channel Width: 1-1/4 inches.
  5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
  6. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
  7. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
  8. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Conduit and Cable Support Devices: Stainless-steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.
- D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

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- 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:
    - 1) Hilti, Inc.
    - 2) ITW Ramset/Red Head; Illinois Tool Works, Inc.
    - 3) MKT Fastening, LLC.
  2. Mechanical-Expansion Anchors: Insert-wedge-type, [zinc-coated] [stainless] steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
    - 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:
      - 1) B-line, an Eaton business.
      - 2) Empire Tool and Manufacturing Co., Inc.
      - 3) Hilti, Inc.
      - 3) ITW Ramset/Red Head; Illinois Tool Works, Inc.
    3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
    4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
    5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
    6. Toggle Bolts: All-steel springhead type.
    7. Hanger Rods: Threaded steel.
- 2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES
- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
  - B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
  1. NECA 1.
  2. NECA 101
- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.

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- C. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
  - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT and RMC may be supported by openings through structure members, according to NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
  - 1. To Wood: Fasten with lag screws or through bolts.
  - 2. To New Concrete: Bolt to concrete inserts.
  - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  - 4. To Existing Concrete: Expansion anchor fasteners.
  - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
  - 6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
  - 7. To Light Steel: Sheet metal screws.
  - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that comply with seismic-restraint strength and anchorage requirements.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 033000 "Cast-in-Place Concrete."
- C. Anchor equipment to concrete base as follows:
  - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
  - 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

**END OF SECTION 260529**

**SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal conduits and fittings.
2. Nonmetallic conduits and fittings.
3. Boxes, enclosures, and cabinets.
4. Handholes and boxes for exterior underground cabling.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for firestopping at conduit and box entrances.
2. Section 260543 "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.

1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.
- B. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
  1. Structural members in paths of conduit groups with common supports.

2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.

B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:

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. AFC Cable Systems; a part of Atkore International.
  - b. Allied Tube & Conduit; a part of Atkore International.
  - c. Anamet Electrical, Inc.
  - d. O-Z/Gedney; a brand of Emerson Industrial Automation.
  - e. Western Tube and Conduit Corporation.
2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. GRC: Comply with ANSI C80.1 and UL 6.
4. IMC: Comply with ANSI C80.6 and UL 1242.
5. EMT: Comply with ANSI C80.3 and UL 797.
6. FMC: Comply with UL 1; zinc-coated steel.
7. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

B. Metal Fittings:

1. Comply with NEMA FB 1 and UL 514B.
2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Fittings, General: Listed and labeled for type of conduit, location, and use.
4. Fittings for EMT:
  - a. Material: Steel.
  - b. Type: compression.
5. 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.

C. 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 AND FITTINGS

A. Nonmetallic Conduit:

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. AFC Cable Systems; a part of Atkore International.
  - b. Anamet Electrical, Inc.
  - c. Arcco Corporation.
  - d. CANTEX INC.
2. Listing and Labeling: Nonmetallic conduit shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. ENT: Comply with NEMA TC 13 and UL 1653.
4. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.

B. Nonmetallic Fittings:

1. Fittings, General: Listed and labeled for type of conduit, location, and use.
2. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
3. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 BOXES, ENCLOSURES, AND CABINETS

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:

1. Crouse-Hinds, an Eaton business.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman; a brand of Pentair Equipment Protection.
5. Hubbell Incorporated; Wiring Device-Kellems.
6. Thomas & Betts Corporation; A Member of the ABB Group.

B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

D. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.

E. Paddle Fan Outlet Boxes: Nonadjustable, designed for attachment of paddle fan weighing 70 lb.

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1. Listing and Labeling: Paddle fan outlet boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- G. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- H. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.
1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
- I. Cabinets:
1. NEMA 250, Type 1 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.
- 2.4 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING
- A. General Requirements for Handholes and Boxes:
1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
  2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- 2.5 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES
- A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.
1. Tests of materials shall be performed by an independent testing agency.
  2. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.

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: GRC.

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3. Underground Conduit: RNC, Type EPC-40-PVC.
  4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
  5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed, Not Subject to Physical Damage: EMT.
  2. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
    - a. Loading dock.
    - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    - c. Mechanical rooms.
    - d. Gymnasiums.
  3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
  4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
  5. Damp or Wet Locations: GRC.
  6. 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.
- C. Minimum Raceway Size: 3/4-inch 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. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
  3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

### 3.2 INSTALLATION

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- B. 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.
- C. Do not fasten conduits onto the bottom side of a metal deck roof.
- D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

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- E. Complete raceway installation before starting conductor installation.
- F. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- G. 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 of changes in direction.
- H. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- I. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- J. Support conduit within 12 inches of enclosures to which attached.
- K. Stub-ups to Above Recessed Ceilings:
  - 1. Use EMT, IMC, or RMC for raceways.
  - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- L. 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.
- M. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- N. 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 trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- O. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- P. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- Q. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- R. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- S. 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

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blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.

- T. 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 conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  2. Where an underground service raceway enters a building or structure.
  3. Conduit extending from interior to exterior of building.
  4. Where otherwise required by NFPA 70.
- U. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- V. Expansion-Joint Fittings:
1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
  2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
    - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
    - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
  3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
  4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
  5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- W. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.
- X. 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 bottom of box unless otherwise indicated.
- Y. 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 box and cover plate or supported equipment and box.

- Z. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- AA. Locate boxes so that cover or plate will not span different building finishes.
- BB. 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.
- CC. 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. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 312000 "Earth Moving" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Section 312000 "Earth Moving."
3. 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 of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 312000 "Earth Moving."
4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
  - a. 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 from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
6. 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. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

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- D. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables but short enough to preserve adequate working clearances in enclosure.
- 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 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.6 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.7 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 260533**

**SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL  
SYSTEMS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Rigid nonmetallic duct.
  - 2. Duct accessories.
  - 3. Precast concrete handholes.

1.3 DEFINITIONS

- A. Direct Buried: Duct or a duct bank that is buried in the ground, without any additional casing materials such as concrete.
- B. Duct: A single duct or multiple ducts. Duct may be either installed singly or as component of a duct bank.
- C. Duct Bank:
  - 1. Two or more ducts installed in parallel, with or without additional casing materials.
  - 2. Multiple duct banks.
- D. GRC: Galvanized rigid (steel) conduit.
- E. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include duct-bank materials, including spacers and miscellaneous components.
  - 2. Include duct, conduits, and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
  - 3. Include accessories for handholes.
  - 4. Include underground-line warning tape.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: For duct and duct bank. Show duct profiles and coordination with other utilities and underground structures.
  - 1. Include plans and sections, drawn to scale, and show bends and locations of expansion fittings.
- B. Qualification Data: For professional engineer and testing agency responsible for testing nonconcrete handholes and boxes.
- C. Product Certificates: For concrete and steel used in precast concrete handholes, as required by ASTM C 858.
- D. Source quality-control reports.
- E. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

1.7 FIELD CONDITIONS

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions, and then only after arranging to provide temporary electrical service according to requirements indicated:
  - 1. Notify the City no fewer than 5 days in advance of proposed interruption of electrical service.
  - 2. Do not proceed with interruption of electrical service without the Residents Engineer's written permission.
- B. Ground Water: Assume ground-water level is at grade level unless a lower water table is noted on Drawings.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND FITTINGS

- A. GRC: Comply with ANSI C80.1 and UL 6.

2.2 RIGID NONMETALLIC DUCT

- A. Underground Plastic Utilities Duct: Type EPC-40-PVC RNC, complying with NEMA TC 2 and UL 651, with matching fittings complying with NEMA TC 3 by same manufacturer as duct.

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- B. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.
- C. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 DUCT ACCESSORIES

- A. Duct Spacers: Factory-fabricated, rigid, PVC interlocking spacers; sized for type and size of duct with which used, and selected to provide minimum duct spacing indicated while supporting duct during concreting or backfilling.
- B. Underground-Line Warning Tape: Comply with requirements for underground-line warning tape specified in Section 260553 "Identification for Electrical Systems."

2.4 PRECAST CONCRETE HANDHOLES AND BOXES

- A. 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 box.
- B. Comply with ASTM C 858 for design and manufacturing processes.
- C. Frame and Cover: Weatherproof steel frame, with steel cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing bolts.
- D. Frame and Cover: Weatherproof steel frame, with hinged steel access door assembly with tamper-resistant, captive, cover-securing bolts.
  - 1. Cover Hinges: Concealed, with hold-open ratchet assembly.
  - 2. Cover Handle: Recessed.
- E. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
- F. Cover Legend: Molded lettering, "ELECTRIC" or as indicated for each service.
- G. Configuration: Units shall be designed for flush burial closed bottom unless otherwise indicated.
- H. Extensions and Slabs: Designed to mate with bottom of enclosure. Same material as enclosure.
  - 1. Extension shall provide increased depth of 12 inches.
  - 2. Slab: Same dimensions as bottom of enclosure, and arranged to provide closure.
- I. Joint Sealant: Asphaltic-butyl material with adhesion, cohesion, flexibility, and durability properties necessary to withstand maximum hydrostatic pressures at the installation location with the ground-water level at grade.
- J. Knockout Panels: Precast openings in walls, arranged to match dimensions and elevations of approaching duct, plus an additional 12 inches vertically and horizontally to accommodate alignment variations.

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1. Knockout panels shall be located no less than 6 inches from interior surfaces of walls, floors, or frames and covers of handholes, but close enough to corners to facilitate racking of cables on walls.
  2. Knockout panel opening shall have cast-in-place, welded-wire fabric reinforcement for field cutting and bending to tie in to concrete envelopes of duct.
  3. Knockout panels shall be framed with at least two additional No. 3 steel reinforcing bars in concrete around each opening.
- K. Duct Entrances in Handhole Walls: Cast end-bell or duct-terminating fitting in wall for each entering duct.
1. Type and size shall match fittings to duct to be terminated.
  2. Fittings shall align with elevations of approaching duct and be located near interior corners of handholes to facilitate racking of cable.
- L. Handholes 12 inches wide by 24 inches long and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.
- 2.5 SOURCE QUALITY CONTROL
- A. Test and inspect precast concrete utility structures according to ASTM C 1037.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate layout and installation of duct, duct bank, manholes, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field. Notify Resident Engineer if there is a conflict between areas of excavation and existing structures or archaeological sites to remain.
- B. Coordinate elevations of duct and duct-bank entrances into manholes, handholes, and boxes with final locations and profiles of duct and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct and duct bank will drain to manholes and handholes, and as approved by Resident Engineer.
- C. Clear and grub vegetation to be removed, and protect vegetation to remain according to Section 311000 "Site Clearing." Remove and stockpile topsoil for reapplication according to Section 311000 "Site Clearing."

3.2 UNDERGROUND DUCT APPLICATION

- A. Duct for Electrical Feeders 600 V and Less: Type EPC-40-PVC RNC, direct-buried unless otherwise indicated.
- B. Duct for Electrical Branch Circuits: Type EPC-40-PVC RNC, direct-buried unless otherwise indicated.

3.3 UNDERGROUND ENCLOSURE APPLICATION

- A. Handholes and 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 Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Precast concrete, AASHTO HB 17, H-10 structural load rating.
  3. Cover design load shall not exceed the design load of the handhole or box.

3.4 EARTHWORK

- A. Excavation and Backfill: Comply with Section 312000 "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment.
- B. Restoration: Replace area immediately after backfilling is completed.
- C. Restore surface features at areas disturbed by excavation, and re-establish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.
- D. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Section 329200 "Turf and Grasses" and Section 329300 "Plants."
- E. Cut and patch existing pavement in the path of underground duct, duct bank, and underground structures according to "Cutting and Patching" Article in Section 017300 "Execution."

3.5 DUCT AND DUCT-BANK INSTALLATION

- A. Where indicated on Drawings, install duct, spacers, and accessories into the duct-bank configuration shown. Duct installation requirements in this Section also apply to duct bank.
- B. Install duct according to NEMA TCB 2.
- C. Slope: Pitch duct a minimum slope of 1:300 down toward manholes and handholes and away from buildings and equipment. Slope duct from a high point between two manholes, to drain in both directions.
- D. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches, both horizontally and vertically, at other locations unless otherwise indicated.
- E. Joints: Use solvent-cemented joints in duct and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent duct do not lie in same plane.
- F. Terminator Entrances to Manholes and Concrete and Polymer Concrete Handholes: Use manufactured, cast-in-place duct terminators, with entrances into structure spaced approximately 6 inches o.c. for 4-inch duct, and vary proportionately for other duct sizes.

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1. Begin change from regular spacing to terminator spacing 10 feet from the terminator, without reducing duct line slope and without forming a trap in the line.
  2. Expansion and Deflection Fittings: Install an expansion and deflection fitting in each duct in the area of disturbed earth adjacent to manhole or handhole. Install an expansion fitting near the center of all straight line duct with calculated expansion of more than 3/4 inch.
- G. Building Wall Penetrations: Make a transition from underground duct to GRC at least 10 feet outside the building wall, without reducing duct line slope away from the building and without forming a trap in the line. Use fittings manufactured for RNC-to-GRC transition. Install GRC penetrations of building walls as specified in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."
- H. Sealing: Provide temporary closure at terminations of duct with pulled cables. Seal spare duct at terminations. Use sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.
- I. Pulling Cord: Install 200-lbf-test nylon cord in empty ducts.
- J. Direct-Buried Duct and Duct Bank:
1. Excavate trench bottom to provide firm and uniform support for duct. Comply with requirements in Section 312000 "Earth Moving" for preparation of trench bottoms for pipes less than 6 inches in nominal diameter.
  2. Width: Excavate trench 12 inches wider than duct on each side.
  3. Depth: Install top of duct at least 36 inches below finished grade unless otherwise indicated.
  4. Set elevation of bottom of duct bank below frost line.
  5. Support ducts on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
  6. Spacer Installation: Place spacers close enough to prevent sagging and deforming of duct, with not less than five spacers per 20 feet of duct. Place spacers within 24 inches of duct ends. Stagger spacers approximately 6 inches between tiers. Secure spacers to earth and to ducts to prevent floating during concreting. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
  7. Install duct with a minimum of 3 inches between ducts for like services and 6 inches between power and communications duct.
  8. Elbows: Install manufactured duct elbows for stub-ups, at building entrances, and at changes of direction in duct direction unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
  9. Install manufactured GRC elbows for stub-ups, at building entrances, and at changes of direction in duct.
    - a. Couple RNC duct to GRC with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
    - b. Stub-ups to Outdoor Equipment: Extend concrete-encased GRC horizontally a minimum of 60 inches from edge of base. Install insulated grounding bushings on terminations at equipment.
  10. After installing first tier of duct, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inches over duct and hand tamp. Firmly tamp

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backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction. Comply with requirements in Section 312000 "Earth Moving" for installation of backfill materials.

- a. Place minimum 3 inches of sand as a bed for duct. Place sand to a minimum of 6 inches above top level of duct.
  - b. Place minimum 6 inches of engineered fill above concrete encasement of duct.
- K. Underground-Line Warning Tape: Bury nonconducting underground line specified in Section 260553 "Identification for Electrical Systems" no less than 12 inches above all concrete-encased duct and duct banks. Align tape parallel to and within 3 inches of centerline of duct bank. Provide an additional warning tape for each 12-inch increment of duct-bank width over a nominal 18 inches. Space additional tapes 12 inches apart, horizontally.

### 3.6 INSTALLATION OF CONCRETE MANHOLES, HANDHOLES, AND BOXES

#### A. Precast Concrete Handhole and Manhole Installation:

1. Comply with ASTM C 891 unless otherwise indicated.
2. Install units level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances.
3. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

#### B. Elevations:

1. Handhole Covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch above finished grade.
2. Where indicated, cast handhole cover frame integrally with handhole structure.

### 3.7 GROUNDING

- #### A. Ground underground ducts and utility structures according to Section 260526 "Grounding and Bonding for Electrical Systems."

### 3.8 FIELD QUALITY CONTROL

#### A. Perform the following tests and inspections:

1. Demonstrate capability and compliance with requirements on completion of installation of underground duct, duct bank, and utility structures.
2. Pull solid aluminum or wood test mandrel through duct to prove joint integrity and adequate bend radii, and test for out-of-round duct. Provide a minimum 12-inch-long mandrel equal to duct size minus 1/4 inch. If obstructions are indicated, remove obstructions and retest.

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3. Test handhole grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Section 260526 "Grounding and Bonding for Electrical Systems."
    - B. Correct deficiencies and retest as specified above to demonstrate compliance.
    - C. Prepare test and inspection reports.
- 3.9 CLEANING
- A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of duct until duct cleaner indicates that duct is clear of dirt and debris. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

**END OF SECTION 260543**

**SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Color and legend requirements for raceways, conductors, and warning labels and signs.
- 2. Labels.
- 3. Tapes and stencils.
- 4. Fasteners for labels and signs.
- 5. Cable Ties.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.

- B. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1 and IEEE C2.
- 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.

## 2.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600 V or Less:
  - 1. Black letters on an orange field.
  - 2. Legend: Indicate voltage and system or service type.
  
- B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.
  - 1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
  - 2. Colors for 208/120-V Circuits:
    - a. Phase A: Black.
    - b. Phase B: Red.
    - c. Phase C: Blue.
  - 3. Colors for 480/277-V Circuits:
    - a. Phase A: Brown.
    - b. Phase B: Orange.
    - c. Phase C: Yellow.
  - 4. Color for Neutral: White.
  - 5. Color for Equipment Grounds: Green.
  
- C. Warning Label Colors:
  - 1. Identify system voltage with black letters on an orange background.
  
- D. Warning labels and signs 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."
  
- E. Equipment Identification Labels:
  - 1. Black letters on a white field.

## 2.3 LABELS

- A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
  
- B. Equipment Labels: Engraved, laminated acrylic or Melamine label; Punched or drilled for screw mounting. Black letters on a white background. Minimum letter height shall be 3/8 inch.

## 2.4 TAPES AND STENCILS

- A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils thick by 1 to 2 inches wide; compounded for outdoor use.
- C. Underground-Line Warning Tape:
  - 1. Tape:
    - a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical utility lines.
    - b. Printing on tape shall be permanent and shall not be damaged by burial operations.
    - c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
  - 2. Color and Printing:
    - a. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.
    - b. Inscriptions for Red-Colored Tapes: "ELECTRIC LINE, HIGH VOLTAGE".

## 2.5 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.
  - 1. Minimum Width: 3/16 inch.
  - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
  - 3. Temperature Range: Minus 40 to plus 185 deg F.
  - 4. Color: Black except where used for color-coding.
- B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self extinguishing, one piece, self locking, Type 6/6 nylon.
  - 1. Minimum Width: 3/16 inch.
  - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
  - 3. Temperature Range: Minus 40 to plus 185 deg F.
  - 4. Color: Black.

## 2.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Verify identity of each item before installing identification products.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- E. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
  - 1. Secure tight to surface of conductor, cable, or raceway.
- F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- G. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- H. Vinyl Wraparound Labels:
  - 1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
  - 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
- I. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.
- J. Self-Adhesive Labels:
  - 1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
  - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.
- K. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.
- L. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.

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1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- M. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.
- N. Underground Line Warning Tape:
  1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches overall.
  2. Install underground-line warning tape for direct-buried cables and cables in raceways.
- O. Signs:
  1. Attach signs with mechanical fasteners appropriate to the location and substrate.
  2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.

### 3.2 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30A and 120V to Ground: Identify with self-adhesive raceway labels or vinyl tape applied in bands.
  1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- D. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding tape to identify the phase.
  1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- E. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
- F. Instructional Signs: Drilled labels, including the color code for grounded and ungrounded conductors.
- G. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Drilled labels.

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1. Apply to exterior of door, cover, or other access.
  2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:
- H. Arc Flash Warning Labeling: Self-adhesive labels.
- I. Equipment Identification Labels:
1. Indoor Equipment: Labels with 2 cadmium – plated screws.
  2. Outdoor Equipment: Laminated acrylic or melamine sign.
  3. Equipment to Be Labeled:
    - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a screw type, engraved, laminated acrylic or melamine label.
    - b. Enclosures and electrical cabinets.
    - c. Access doors and panels for concealed electrical items.
    - d. Switchboards.
    - e. Transformers: Label that includes tag designation indicated on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
    - f. Enclosed switches.
    - g. Enclosed circuit breakers.
    - h. Remote-controlled switches, dimmer modules, and control devices.
    - i. Monitoring and control equipment.

**END OF SECTION 260553**

**SECTION 260923 - LIGHTING CONTROL DEVICES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Photoelectric switches.
- 2. Emergency shunt relays.

B. Related Requirements:

- 1. Section 262726 "Wiring Devices" for wall-box dimmers, non-networkable wall-switch occupancy sensors, and manual light switches.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

- 1. Show installation details for the following:
  - a. Photoelectric switches.
- 2. Interconnection diagrams showing field-installed wiring.
- 3. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) and elevations, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

- 1. Suspended ceiling components.
- 2. Structural members to which equipment will be attached.
- 3. Items penetrating finished ceiling, including the following:
  - a. Luminaires.
  - b. Air outlets and inlets.

- c. Speakers.
  - d. Sprinklers.
  - e. Access panels.
  - f. Control modules.
  - g. Fire Alarm Devices.
- B. Field quality-control reports.
- C. Sample Warranty: For manufacturer's warranties.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of lighting control device to include in operation and maintenance manuals.

#### 1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace lighting control devices that fail(s) in materials or workmanship within specified warranty period.
- 1. Failures include, but are not limited to, the following:
    - a. Faulty operation of lighting control devices.
  - 2. Warranty Period: Two year(s) from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 OUTDOOR PHOTOELECTRIC SWITCHES

- 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:
- 1. Cooper Industries, Inc.
  - 2. Intermatic, Inc.
  - 3. Leviton Manufacturing Co., Inc.
  - 4. NSi Industries LLC.
- B. Description: Solid state, with SPST dry contacts rated for 1800 VA inductive, to operate connected relay, contactor coils, or microprocessor input; complying with UL 773A, and compatible with ballasts and LED lamps.
- 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  - 2. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range, and a directional lens in front of the photocell to prevent fixed light sources from causing turn-off.
  - 3. Time Delay: Fifteen-second minimum, to prevent false operation.
  - 4. Failure Mode: Luminaire stays ON.

2.2 EMERGENCY SHUNT RELAY

- 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:
1. Hubbell Building Automation, Inc.
  2. Leviton Manufacturing Co., Inc.
  3. Lithonia Lighting; Acuity Brands Lighting, Inc.
  4. Lutron Electronics Co., Inc.
- B. Description: NC, electrically held relay, arranged for wiring in parallel with manual or automatic switching contacts; complying with UL 924.
1. Coil Rating: 120 V.

2.3 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.
- B. Examine walls and ceilings for suitable conditions where lighting control devices will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SENSOR INSTALLATION

- A. Comply with NECA 1.
- B. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.

3.3 WIRING INSTALLATION

- A. Comply with NECA 1.
- B. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch.
- C. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- D. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
- E. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

- A. Identify components and power and control wiring according to Section 260553 "Identification for Electrical Systems."
  - 1. Identify controlled circuits in lighting contactors.
  - 2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.
- B. Label time switches and contactors with a unique designation.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate lighting control devices and 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:
  - 1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start 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.

3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting lighting control devices to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
1. For daylighting controls, adjust set points and deadband controls to suit Owner's operations.

**END OF SECTION 260923**

**SECTION 260943 - NETWORK LIGHTING, HVAC AND ENERGY MANAGEMENT**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. The control system specified in this section shall provide controls based on time, location, sensor data (both occupancy, daylighting and other environmental information), and manual interaction.
- B. The system shall be capable of advanced lighting control (on/off and dimming).
- C. The system shall be capable of managing packaged HVAC units capable of utilizing certified ZigBee interoperable thermostats.
- D. The system shall be capable of advanced plug load control.
- E. The system shall enable the monitoring and recording of sensor information and power measurement.
- F. All system devices shall be networked together.
- G. Control communications between devices shall be primarily achieved wirelessly.
- H. The system shall be capable of being managed and controlled remotely via a standard Web browser.
- I. The system shall be capable of creating and adjusting control zones, as granular as a single luminaire and as broad as a full facility.
- J. The system shall not require any installation of dedicated control wiring to a central controller or panel.
- K. The system shall utilize open, standardized communications between devices, and allow control devices from multiple vendors to interoperate.
- L. The system shall be capable of managing automated demand response connection and action using industry standard Open ADR elements.
- M. A cloud based server option shall be available.

**1.2 QUALITY ASSURANCE**

- A. The manufacturing facility must meet IS9001 requirements.

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- B. All applicable products must be UL / CSA / FCC Listed or other acceptable national testing organization.

1.3 COORDINATION

- A. Coordinate controls with BMS through BACnet interface.
- B. The installing contractor shall be responsible for a complete and functional system in accordance with all applicable local and national codes.

1.4 SUBMITTALS

- A. Product Datasheets (general device description, dimensions, electrical specifications, wiring details, nomenclature).
- B. Example Contractor Startup/Commissioning Worksheet – must be complete prior to factory start-up.
- C. Hardware and Software Operations Manuals.
- D. Shop Drawings showing a riser diagram (typical per room type showing detailed drawings showing device connections), sequence of operation, and overall wireless/wired network system including, but not limited to, Wireless Area Controllers, Wireless Adaptors, and Wireless Devices including switches, sensors, thermostats, etc.
- E. Other operational descriptions as needed.

1.5 WARRANTY

- A. All devices in networked control system including the Area Controller shall have a 5 year warranty.
- B. The System Controller shall have a 3 year warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. This specification is based on certified standards-compliant ZigBee® Building Automation platform.

2.2 SYSTEM REQUIREMENTS

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- A. System shall utilize a large-scale wireless mesh network using the open ZigBee® industry standard for wireless communications to communicate between all controls devices throughout the building. All components shall utilize that standard (as written) for communications.
- B. System shall be capable of using a variety of standards-based control devices from multiple vendors. These devices shall include occupancy sensors, environmental sensors, photocell sensors, manual switches/dimmers, ballasts, LED drivers, embedded luminaires, thermostats, plug load controllers, personal handheld devices and others. Any combination of the above devices shall be possible, and all devices within the site shall be networked and accessible via a single interface.
- C. System shall be capable of controlling most standard fluorescent and LED luminaires, both separately and together as part of a single system.
- D. All system settings, controls settings, status monitoring and zone strategies shall be manageable from a standard Web-based software interface. This interface shall be accessible from any remote location with network access.
- E. Control areas shall consist of one or more intelligent control components, be capable of operation within the area, and be capable of being connected to a higher level network backbone. System shall be capable of creating and reconfiguring multiple zones within each area, or adding new devices to an existing zone, all from the software interface and without wiring.
- F. System shall be able to accommodate up to 100 devices for each area, without requiring a “bridge” device. Multiple areas can be integrated via a higher level network backbone to build out a larger system.
- G. Devices within a control area can be installed in any order and can be flexibly assigned to zones in any combination as needed.
- H. Control areas must continue to provide control in the event of a system communication failure with the backbone network or the management software becoming unavailable.
- I. System shall have a controller (Wireless Area Controller, WAC) that manages the operation of each control area. This controller must be wall or ceiling mounted, capable of accessing and controlling wirelessly connected system devices and linking into an Ethernet network.
- J. System shall provide an energy management dashboard that displays real-time and historical energy usage data by zone.
- K. System shall be capable of operating each lighting control zone according to one of the following control strategies. The control strategies should be utilized only in a manner consistent with local energy codes.
  1. Partial-On / Auto-Off with
    - a. Centrally adjustable off-delay

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- b. Configurable on and off dimming levels and transition times for zones that have dimmable luminaires, enabling task tuning
    - c. Manual override timeout
  - 2. Manual-On / Auto-Off with
    - a. Centrally adjustable off-delay
  - 3. Scheduled On with
    - a. Configurable dimming level and transition times for zones that have dimmable luminaires, enabling task tuning
  - 4. Scheduled Off
  - 5. Auto-to-Override On
  - 6. Manual-to-Timed On
- L. Daylighting shall be configurable centrally. It shall be possible to enable or disable daylighting for zones with a photocell sensor, calibrate and configure the set point from a central location.
- M. It shall be possible to vary control strategies at different times of the day and to do so for each zone.
- N. Control profiles shall be available optionally to allow many zones to be configured to use the same control profile. This will allow rapid adjustments to the control strategy used for each zone. Control profiles shall allow specification of the control strategy, and control settings for each control strategy (such as the off-delay for an Auto-On strategy).
- O. Personal control shall be available through a web-based user interface, allowing configuration from any computer and operating system.
- P. Control software shall enable logging of power consumption, zone and space utilization (occupancy), System shall display system performance data in a web-based graphical format, and make such data available for download to .CSV, .PDF, .PNG and .SVG files.
- Q. Control software shall enable integration with a BMS via BACnet IP.
- R. System shall monitor the health and state of control devices, and provide the means to display this information, generate reports on space utilization and provide the means to notify select individuals, either through a web interface, or via emails, of important issues.
- S. System shall have a mechanism to restrict access by individual users or groups of users, by zones or by feature groups through the web user interface.
- T. System shall have a backup and restore mechanism to deal with controller and system-level component failure. This mechanism shall ensure that the system can be returned to the original state at the time of backup.

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- U. System shall have an upgrade mechanism to ensure that controllers and system-level components can be upgraded. For control devices that support over-the-air wireless upgrade, the system shall provide a mechanism to upgrade the firmware of these devices.
- V. System shall be capable of managing control devices across multiple facilities using the corporate network or the Internet.
- W. System shall be capable of interfacing with MODBUS power meters, having a minimum capacity of 3 phases and an option for 24 phases per meter, to be used in conjunction with current transformers for monitoring of any load up to 5000 Amps.
- X. System shall be capable of reading and recording pulse meter output from certified interoperable pulse devices.

### 2.3 NETWORK DEVICE SPECIFICATIONS

#### A. Wireless Area Controller (WAC)

1. Device shall be capable of connecting to control devices via the open ZigBee industry standard for wireless communication.
2. Device shall be powered by a standard 120V receptacle to enable flexible placement in normal spaces and optional power over Ethernet.
3. Device shall have two RJ-45 ports to enable daisy chaining of device to other area controller devices further upstream or downstream, and ultimately to the System Controller.
4. Device shall have USB ports for PC-based and USB memory stick configuration and maintenance.
5. Device shall be capable of being a DHCP client or be set to a fixed IP address.
6. The Device shall be capable of receiving automatic time updates from an internet NTP server if connected.
7. Device shall be capable of managing up to 100 wireless devices and presenting them to the management software. Multiple such devices can be used to support a larger system.
8. Device shall have visual feedback (eg., LEDs) to enable rapid identification of the device's state and health.

#### B. System Controller

1. Device shall be powered by a standard 120V outlet to enable flexible placement in normal spaces.
2. Device shall have two RJ-45 ports, one to enable connectivity between the device and Area Controllers, and the second, to provide the option for connectivity to the web user interface (eg., to the corporate network for access to the web user interface).
3. Device shall have a web server to deliver a web user interface for the system.
4. Device shall have a USB port to allow USB memory stick configuration and maintenance.

### 2.4 WIRELESS DEVICE SPECIFICATIONS

## RECREATION CENTER IMPROVEMENTS

## A. All Wireless Devices

1. All wireless device parameters shall be adjustable via software.
2. Devices shall be capable of communicating via an open ZigBee industry standard for its wireless communications.
3. It shall be possible to monitor battery powered devices from the control and monitoring software. Battery powered devices shall last 5 years under normal operating conditions.

## B. Wireless Adapter

1. Wireless adapter shall be designed to easily connect to standard junction boxes with  $\frac{3}{4}$  " knockouts.
2. Device shall be powered by 120-277VAC, be capable of switching 120-277VAC with loads rated to 15A and be able to measure current flow of connected loads with 2% accuracy from 30ma to 15A.
3. Device shall have 0-10VDC to control dimmable ballasts and LED drivers, with a maximum sourcing of 5mA, typically enabling control of 10 or more ballasts or drivers.
4. Device shall have 24VDC (input/output) and 0-10VDC (input) to power and control auxiliary relays, occupancy sensors, photocells but not limited to other low voltage devices.

## C. Wireless Fixture Adapter

1. Wireless fixture adapter shall be designed to easily integrate into commonly available lighting fixtures for installation at the manufacturer or on site.
2. Device shall be powered by 120-277VAC and be capable of switching 120-277VAC with loads rated to 2A.
3. Device shall have 0-10VDC to control dimmable ballasts and LED drivers, with a maximum sourcing of 5mA, typically enabling control of a single ballast or driver.
4. Device shall have 24VDC (input/output) and 0-10VDC (input) to power and control auxiliary relays, occupancy sensors, photocells but not limited to other low voltage devices.

## D. Wireless General Purpose Adapter

1. Wireless general purpose adapter shall be designed to easily connect to standard junction boxes with  $\frac{3}{4}$  " knockouts for connecting to non-lighting loads.
2. Device shall be powered by 120-277VAC and be capable of switching 120-277VAC with loads rated to 15A.
3. Device shall have a 0-10Vdc output to control general purpose actuators with a maximum sinking of 5mA.
4. Devices shall have 24VDC (input/output) and 0-10VDC (input) to power and control low voltage devices including binary and analog sensors.

## E. Wireless Sensor Adapter

1. Device shall be powered by 24V AC/DC.

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2. Device shall provide (4) 10k Type 3 thermistor inputs and (2) 0-10Vdc inputs from analogue sensors.
  3. Device shall have an internal battery backup and data storage to allow logging of thermistor data for 14 days at 5 minute intervals.
- F. Wireless Occupancy Sensors
1. The device shall use Passive Infra-Red (PIR) sensors to detect motion. Wall mount and ceiling mount with different range and lens angles must be available.
  2. The device shall be configurable as an occupancy or vacancy sensor via software.
  3. The device shall be capable of partial on control to luminaires.
- G. Wireless Photo Sensor
1. The device shall measure light levels from 1 to 2000 lux (0.1 to 185 FC) in a 60° cone.
- H. Wireless Wall Dimmer/Switch
1. Device shall provide dimming and switching depending on configuration.
  2. Device shall wall mount and be compatible with standard switch box mounting.
- I. Wireless Plug Load Adapter
1. Wireless adapter shall be designed to easily mount to standard NEMA duplex receptacles via 3 tamper proof mounting screws using existing wall outlet cover plate holes.
  2. Device shall be powered by 106-127VAC and be capable of switching loads up to 20A.
  3. Device shall be able to switch either receptacle independently and measure power consumption of connected loads. Switched receptacle shall be clearly marked.
  4. The device shall automatically turn off empty sockets to prevent shock.
- J. Wireless High Bay Adapter
1. Device shall mount in luminaire ¾" knock out.
  2. Device shall provide switching and 0-10VDC dimming control.
  3. Device shall have integrated high bay occupancy sensor.
- K. Wireless Thermostat
1. Device shall be compatible with the following systems:
    - a. 1 Stage Heat / 1 Stage Cool Conventional System
    - b. 2 Stage Heat / 2 Stage Cool Conventional System
    - c. 3 Stage Heat / 2 Stage Cool Conventional System
    - d. 1 Stage Heat / 1 Stage Cool Heat Pump System (without Auxiliary Heating)
    - e. 2 Stage Heat / 1 Stage Cool Heat Pump System (with Auxiliary Heating)
    - f. 2 Stage Heat / 2 Stage Cool Heat Pump System (without Auxiliary Heating)
    - g. 3 Stage Heat / 2 Stage Cool Heat Pump System (with Auxiliary Heating)

2. Device shall be surfaced mounted with manual user display and interface.
3. Device shall conform with ZigBee standard as defined above.
4. Device shall interoperate with compatible system devices.

## 2.5 MANAGEMENT SOFTWARE

- A. Software interface shall be made available to networked computing devices via standard Web browser, without requiring local installation on computers or other access devices.
- B. Software shall have online help that explains the use and operation.
- C. Software shall be able to connect with the system under management via LAN (local area network), WAN (wide area network) or the Internet.
- D. Software shall require that all users login with a User Name and Password and shall also support a LDAP (Lightweight Directory Access Protocol) client to authenticate users against a LDAP directory.
- E. Software shall provide at least four permission levels including System Administrator, Facility Administrator, Tenant and Individual User. Access to different parts of the application will be appropriately limited on the basis of permission levels.
- F. Software shall provide individual or group access to specific zones or collections of zones to allow flexible restriction of access.
- G. Software shall have means to enable backup and restore of all essential system state data that is required to recover from hardware failure in controllers.
- H. Software shall provide the means to commission devices, networks, zones and facilities including defining facilities, defining the network settings (eg. channel mask, network ID), adding new devices to the system, creating zones, creating hierarchical zone structures and assigning devices to zones, labeling devices, networks, zones and facilities.
- I. Software shall provide the flexibility to add or remove devices from zones to adjust the operational control behavior of a zone. For example adding an occupancy sensor or switch to a parent zone allows occupancy or manual control to be applied to all fixtures in all child (and descendent) zones.
- J. Software shall provide the means to commission controls including defining control profiles (commonly used control strategies and settings), control strategies (eg. OFF, ON, Auto ON/Auto OFF, Manual ON/Auto OFF, Timed ON, Auto OFF), and control settings (eg. sensor off-delay, dimming level percentage etc.).
- K. Software shall provide the means to commission controls on a schedule including varying control profiles or strategies with control settings at different times of the day for each day. This can be done for each zone independently or for groups of zones. Calendar settings shall include start and end day/hour/minute.

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- L. Daylight savings time adjustments shall be performance automatically.
- M. Software shall provide an easy-to-use view of all scheduled settings across all zones.
- N. Software shall provide the means to commission daylighting set points (including daytime and night time set points) and to schedule daylight calibration to automatically at night.
- O. All control settings shall be stored on the area controller and the host server.
- P. Changes made to the operation of the system shall be done in real-time as they are applied in the software.
- Q. Software shall allow the luminaire ballast profile to be defined for each ballast model used in a facility. This ballast profile will be used to determine energy consumption at different dimming levels for greater energy consumption calculation accuracy.
- R. Software shall show cost savings, energy savings and CO2 emissions reduced, in comparison with baseline data. Baseline data shall be calculated based on opening/closing times and luminaire power consumption prior to a controls upgrade.
- S. Software shall provide inputs for variable energy rates including at least four time of day rates as well as winter and summer rates for calculation of baseline and current energy use.
- T. Software shall show a dashboard summarizing the state and health of the system, utilization of the lights, the current state of demand-response, and the facility and user-selectable zone energy usage on a daily, weekly, monthly or annual basis. The data shall be presented graphically on screen and available for print or export to .CSV, .PDF, .PNG and .SVG formats.
- U. Software shall show a list of all zones, their location within the facility, any active alarms associated with each zone, their active control profile or control strategy, the state of the zone (eg., occupied/vacant, dim level) and the devices within the zone.
- V. Software shall allow manual operations of each zone including on/off and dimming control or device identification (blink identification).
- W. Software shall provide a floor plan view allowing floor plans to be uploaded as .JPEG, .PNG, .BMP or .GIF formats. Zones can be placed on floor plan to show the current state including the current dimming light level and occupancy state, the control setting and strategy and the current energy consumption. Multiple floor plans can be uploaded per facility.
- X. Energy comparison, usage, savings, zone utilization and facility utilization reports shall be available displayed on a user friendly graphical display, exportable to .CSV and printable.
- Y. Reports shall be available per zone, per facility and custom user specified.
- Z. Reports shall have available user-definable timescale and timeframe (hourly, daily, monthly, and annually).

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- AA. Energy comparison, usage and savings reports shall be available in kWh, \$, CO2 emissions and percentages.
- BB. Energy and zone usage reports shall be available with minimum, average and maximum values.
- CC. Zone utilization reports shall be made available for minutes occupied, average zone light level and manual overrides. Facility utilizations shall be made available for minutes occupied, percent occupancy and load utilization as a percentage.
- DD. Software shall show, for all devices: device ID, model, location, wattage, last alarm associated with the device, zone membership, area controller associated with the device and the last event (with time of occurrence) associated with the device (eg., switched on/off, occupied/vacant, light level detected, depending on device type). The list of information provided shall be user customizable.
- EE. Software shall allow on/off flash device identification.
- FF. Software shall provide all events and alarms for devices, facilities, schedules, area controllers and zones providing information on the state and any alterations made within the system.
- GG. Software shall allow events and alarms to be filtered by severity and sorted by timeframe, type, category, classification, area controller, zone or device.
- HH. Software shall allow notification of events and alarms to be presented through the web user interface or via email notification. Software shall provide the means to configure the mail server settings, and to create rules (eg. send emails whenever an event occurs or configuration change).
- II. Software shall allow interfacing of controls with demand-response programs, and in particular, use the OpenADR v1.0 protocol.
- JJ. Software shall allow specification of control strategy for the three demand-response severity levels (moderate, high and very high). Control strategies can be changed to turn lights off, to reduce the current light level by a specified dimming level percentage (with an optional minimum level requirement for safety), or to set the light level to a specified dimming level percentage. The off-delay can also be adjusted as part of the response to the demand-response severity level.
- KK. Software shall allow the adjustment of the control strategy and control setting for any zone independently, or multiple zones or all zones collectively.

2.6 BMS COMPATIBILITY

- A. System shall provide BACnet IP extension (server-side) as a software extension to its management software. No additional hardware shall be required.
- B. BACnet IP extension shall provide configuration interfaces to allow interworking with a BMS.
- C. BACnet IP extension shall communicate the state of facilities, area controllers and zones.

- D. BACnet IP extension shall allow manual override using BACnet to change the state of zones from the BMS.
- E. BACnet IP extension shall allow schedules for control profiles for any zone to be set or changed using BACnet from the BMS.

#### 2.7 INSTALLATION AND COMMISSIONING FEATURES

- A. Wireless devices will not require any wiring between them (although some may require local wiring).
- B. Wireless Area controllers shall be networked via standard Ethernet (LAN or WAN) to the System Controller to facilitate commissioning.
- C. All wireless devices shall attempt to join control network when initially powered.
- D. Once the software is installed the system shall allow all wireless devices to join the system and auto-discover all devices without requiring commissioning.
- E. Once devices are associated to zones and zones to area controllers the software shall automatically determine and adjust membership of wireless devices to area controllers (or wireless networks) without requiring commissioning.
- F. All system devices shall be capable of being given user-defined names and assigned to any zone within the system.
- G. Upgrade via software shall be supported for control devices that support over the air updates.
- H. All control devices shall have LEDs providing device status including normal operation and improperly configured.
- I. All control devices shall have means to restore to factory-defaults.
- J. Wireless adapters shall have self-test mode for verification of correct wiring to wired devices, including occupancy sensors photocells, ballasts and drivers.

**END OF SECTION 260943**

**SECTION 262200 - LOW-VOLTAGE TRANSFORMERS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes: Distribution, dry-type transformers rated 600 V and less, with capacities up to 1500 kVA.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type and size of transformer.
  2. Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer.
- B. Shop Drawings:
1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  2. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment.
  3. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Seismic Qualification Certificates: For transformers, accessories, and components, from manufacturer.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- B. Qualification Data: For testing agency.
- C. Source quality-control reports.

- D. Field quality-control reports.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For transformers to include in emergency, operation, and maintenance manuals.

#### 1.6 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.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- 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:
  - 1. Eaton.
  - 2. Federal Pacific.
  - 3. General Electric Company.
  - 4. MGM Transformer Company.
  - 5. Sola/Hevi-Duty; a brand of Emerson Electric Co.
  - 6. Square D; by Schneider Electric.
- B. Source Limitations: Obtain each transformer type from single source from single manufacturer.

#### 2.2 GENERAL TRANSFORMER REQUIREMENTS

- A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.
- 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. Transformers Rated 15 kVA and Larger: Comply with NEMA TP 1 energy-efficiency levels as verified by testing according to NEMA TP 2.

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- D. Cores: Electrical grade, non-aging silicon steel with high permeability and low hysteresis losses.
- E. Coils: Continuous windings without splices except for taps.
  - 1. Internal Coil Connections: Brazed or pressure type.
  - 2. Coil Material: Copper.
- F. Encapsulation: Transformers smaller than 30 kVA shall have core and coils completely resin encapsulated.
- G. Shipping Restraints: Paint or otherwise color code bolts, wedges, blocks, and other restraints that are to be removed after installation and before energizing. Use fluorescent colors that are easily identifiable inside the transformer enclosure.

### 2.3 DISTRIBUTION TRANSFORMERS

- A. Comply with NFPA 70, and list and label as complying with UL 1561.
- B. Provide transformers that are constructed to withstand seismic forces.
- C. Cores: One leg per phase.
- D. Enclosure: Ventilated.
  - 1. NEMA 250, Type 2: Core and coil shall be encapsulated within resin compound utilizing a vacuum pressure impregnation process to seal out moisture and air.
  - 2. KVA Ratings: Based on convection cooling only and not relying on auxiliary fans.
- E. Transformer Enclosure Finish: Comply with NEMA 250.
  - 1. Finish Color: Gray.
- F. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and two 2.5 percent taps below normal full capacity.
- G. Insulation Class, 30 kVA and Larger: 220 deg C, UL-component-recognized insulation system with a maximum of 115-deg C rise above 40-deg C ambient temperature.
- H. Neutral: Rated 200 percent of full load current for K-factor rated transformers.
- I. Fungus Proofing: Permanent fungicidal treatment for coil and core.

### 2.4 IDENTIFICATION DEVICES

- A. Nameplates: Engraved, laminated-plastic or metal nameplate for each distribution transformer, mounted with corrosion-resistant screws. Nameplates and label products are specified in Section 260553 "Identification for Electrical Systems."

## 2.5 SOURCE QUALITY CONTROL

- A. Test and inspect transformers according to IEEE C57.12.01 and IEEE C57.12.91.
  - 1. Resistance measurements of all windings at the rated voltage connections and at all tap connections.
  - 2. Ratio tests at the rated voltage connections and at all tap connections.
  - 3. Phase relation and polarity tests at the rated voltage connections.
  - 4. No load losses, and excitation current and rated voltage at the rated voltage connections.
  - 5. Impedance and load losses at rated current and rated frequency at the rated voltage connections.
  - 6. Applied and induced tensile tests.
  - 7. Regulation and efficiency at rated load and voltage.
  - 8. Insulation Resistance Tests:
    - a. High-voltage to ground.
    - b. Low-voltage to ground.
    - c. High-voltage to low-voltage.
  - 9. Temperature tests.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.
- B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.
- C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.
- D. Verify that ground connections are in place and requirements in Section 260526 "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance shall be 5 ohms at location of transformer.
- E. Environment: Enclosures shall be rated for the environment in which they are located. Covers for NEMA 250, Type 4X enclosures shall not cause accessibility problems.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install transformers level and plumb on a concrete base with vibration-dampening supports. Locate transformers away from corners and not parallel to adjacent wall surface.

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- B. Construct concrete bases according to Section 033000 "Cast-in-Place Concrete" and anchor floor-mounted transformers according to manufacturer's written instructions, seismic codes applicable to Project, and requirements in Section 260529 "Hangers and Supports for Electrical Systems."
  - 1. Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.
- C. Secure transformer to concrete base according to manufacturer's written instructions.
- D. Secure covers to enclosure and tighten all bolts to manufacturer-recommended torques to reduce noise generation.
- E. Remove shipping bolts, blocking, and wedges.

3.3 CONNECTIONS

- A. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- B. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. 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-486B.
- D. Provide flexible connections at all conduit and conductor terminations and supports to eliminate sound and vibration transmission to the building structure.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- C. Perform tests and inspections and prepare test reports.
  - 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. Perform each visual and mechanical inspection and electrical test stated in NETA ATS for dry-type, air-cooled, low-voltage transformers. Certify compliance with test parameters.

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- E. Remove and replace units that do not pass tests or inspections and retest as specified above.
- F. Test Labeling: On completion of satisfactory testing of each unit, attach a dated and signed "Satisfactory Test" label to tested component.

3.5 ADJUSTING

- A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 5 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.
- B. Output Settings Report: Prepare a written report recording output voltages and tap settings.

3.6 CLEANING

- A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

**END OF SECTION 262200**

**SECTION 262413 - SWITCHBOARDS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Service and distribution switchboards rated 600 V and less.
2. Disconnecting and overcurrent protective devices.
3. Identification.

1.3 ACTION SUBMITTALS

- A. Product Data: For each switchboard, overcurrent protective device, surge protection device, ground-fault protector, accessory, and component.

1. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

- B. 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. Detail enclosure types for types other than NEMA 250, Type 1.
3. Detail bus configuration, current, and voltage ratings.
4. Detail short-circuit current rating of switchboards and overcurrent protective devices.
5. Include descriptive documentation of optional barriers specified for electrical insulation and isolation.
6. Detail utility company's metering provisions with indication of approval by utility company.
7. Include evidence of NRTL listing for series rating of installed devices.
8. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
9. Include time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.
10. Include diagram and details of proposed mimic bus.
11. Include schematic and wiring diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Seismic Qualification Data: Certificates, for switchboards, overcurrent protective devices, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. 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.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For switchboards and components to include in emergency, operation, and maintenance manuals.
  - 1. In addition to items specified in "Operation and Maintenance Data," include the following:
    - a. Routine maintenance requirements for switchboards and all installed components.
    - b. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
    - c. Time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.

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. Potential Transformer Fuses: Equal to 10 percent of quantity installed for each size and type but no fewer than two of each size and type.
  - 2. Control-Power Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than two of each size and type.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers qualified as defined in NEMA PB 2.1 and trained in electrical safety as required by NFPA 70E.

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B. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver switchboards in sections or lengths that can be moved past obstructions in delivery path.

B. Remove loose packing and flammable materials from inside switchboards and connect factory-installed space heaters to temporary electrical service to prevent condensation.

C. Handle and prepare switchboards for installation according to NECA 400 and NEMA PB 2.1.

1.9 FIELD CONDITIONS

A. Installation Pathway: Remove and replace access fencing, doors, lift-out panels, and structures to provide pathway for moving switchboards into place.

B. Environmental Limitations:

1. Rate equipment for continuous operation under the following conditions unless otherwise indicated:

- a. Ambient Temperature: Not exceeding 104 deg F.
- b. Altitude: Not exceeding 6600 feet.

C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions according to requirements indicated:

- 1. Notify Owner no fewer than seven days in advance of proposed interruption of electric service.
- 2. Do not proceed with interruption of electric service without Owner's written permission.
- 3. Comply with NFPA 70E.

1.10 COORDINATION

A. Coordinate layout and installation of switchboards 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. 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. Manufacturer's Warranty: Manufacturer agrees to repair or replace switchboard enclosures, buswork, overcurrent protective devices, accessories, and factory installed interconnection wiring 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 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Switchboards shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation. Shake-table testing shall comply with ICC-ES AC156.
  - 2. 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 and the unit will be fully operational after the seismic event."

2.2 SWITCHBOARDS

- 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:
  - 1. Eaton.
  - 2. General Electric Company.
  - 3. SIEMENS Industry, Inc.; Energy Management Division.
  - 4. Square D; by Schneider Electric.
- B. Source Limitations: Obtain switchboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.
- C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for switchboards including clearances between switchboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- 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 NEMA PB 2.
- F. Comply with NFPA 70.
- G. Comply with UL 891.
- H. Front-Connected, Front-Accessible Switchboards:

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1. Main Devices: Fixed, individually mounted.
  2. Branch Devices: Panel mounted.
  3. Sections front and rear aligned.
- I. Nominal System Voltage: 480Y/277 V and 208Y/120 V (refer to drawings).
- J. Main-Bus Continuous: 1200A and 800A (refer to drawings).
- K. Seismic Requirements: Fabricate and test switchboards according to IEEE 344 to withstand seismic forces.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    - a. 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 and the unit will be fully operational after the seismic event."
- L. Indoor Enclosures: Steel, NEMA 250, Type 1.
- M. Enclosure Finish for Indoor Units: Factory-applied finish in manufacturer's standard gray finish over a rust-inhibiting primer on treated metal surface.
- N. Outdoor Enclosures: Type 3R.
1. Finish: Factory-applied finish in manufacturer's standard color; undersurfaces treated with corrosion-resistant undercoating.
  2. Enclosure: Downward, rearward sloping roof; bolt-on rear covers for each section, with provisions for padlocking.
- O. Barriers: Between adjacent switchboard sections.
- P. Insulation and isolation for main bus of main section and main and vertical buses of feeder sections.
- Q. Space Heaters: Factory-installed electric space heaters of sufficient wattage in each vertical section to maintain enclosure temperature above expected dew point.
1. Space-Heater Control: Thermostats to maintain temperature of each section above expected dew point.
  2. Space-Heater Power Source: Transformer, factory installed in switchboard.
- R. Service Entrance Rating: Switchboards intended for use as service entrance equipment shall contain from one to six service disconnecting means with overcurrent protection, a neutral bus with disconnecting link, a grounding electrode conductor terminal, and a main bonding jumper.
- S. Utility Metering Compartment: Barrier compartment and section complying with utility company's requirements; hinged sealable door; buses provisioned for mounting utility company's current transformers and potential transformers or potential taps as required by utility company. 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.

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- T. Bus Transition and Incoming Pull Sections: Matched and aligned with basic switchboard.
- U. Hinged Front Panels: Allow access to circuit breaker, metering, accessory, and blank compartments.
- V. Buses and Connections: Three phase, four wire unless otherwise indicated.
  - 1. Provide phase bus arrangement A, B, C from front to back, top to bottom, and left to right when viewed from the front of the switchboard.
  - 2. Phase- and Neutral-Bus Material: Hard-drawn copper of 98 percent conductivity.
  - 3. Copper feeder circuit-breaker line connections.
  - 4. Ground Bus: 1/4-by-2-inch-or Minimum-size required by UL 891, hard-drawn copper of 98 percent conductivity, equipped with compression connectors for feeder and branch-circuit ground conductors.
  - 5. 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.
  - 6. Disconnect Links:
    - a. Bond neutral bus to equipment-ground bus for switchboards utilized as service equipment or separately derived systems.
  - 7. Neutral Buses: 100 percent of the ampacity of phase buses unless otherwise indicated, equipped with compression connectors for outgoing circuit neutral cables. Brace bus extensions for busway feeder neutral bus.
  - 8. Isolation Barrier Access Provisions: Permit checking of bus-bolt tightness.
- W. Future Devices: Equip compartments with mounting brackets, supports, bus connections, and appurtenances at full rating of circuit-breaker compartment.
- X. Bus-Bar Insulation: Factory-applied, flame-retardant, tape wrapping of individual bus bars or flame-retardant, spray-applied insulation. Minimum insulation temperature rating of 105 deg C.

2.3 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. MCCB Features and Accessories:
    - a. Standard frame sizes, trip ratings, and number of poles.
    - b. Lugs: Compression style, suitable for number, size, trip ratings, and conductor material.
    - c. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

2.4 ACCESSORY COMPONENTS AND FEATURES

- A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

2.5 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 EXAMINATION

- A. Receive, inspect, handle, and store switchboards according to NECA 400 and NEMA PB 2.1.
  - 1. Lift or move panelboards with spreader bars and manufacturer-supplied lifting straps following manufacturer's instructions.
  - 2. Use rollers, slings, or other manufacturer-approved methods if lifting straps are not furnished.
  - 3. Protect from moisture, dust, dirt, and debris during storage and installation.
  - 4. Install temporary heating during storage per manufacturer's instructions.
- B. Examine switchboards before installation. Reject switchboards that are moisture damaged or physically damaged.
- C. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance of the Work or that affect the performance of the equipment.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install switchboards and accessories according to NEMA PB 2.1.
- B. Equipment Mounting: Install switchboards on concrete base, 4-inch nominal thickness. Comply with requirements for concrete base specified in drawings.
  - 1. Install conduits entering underneath the switchboard, entering under the vertical section where the conductors will terminate. Install with couplings flush with the concrete base. Extend 2 inches above concrete base after switchboard is anchored in place.
  - 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.

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- 5. Anchor switchboard to building structure at the top of the switchboard if required or recommended by the manufacturer.
  
- C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, straps and brackets, and temporary blocking of moving parts from switchboard units and components.
  
- D. Operating Instructions: Frame and mount the printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.
  
- E. Install filler plates in unused spaces of panel-mounted sections.
  
- F. Install overcurrent protective devices, surge protection devices, and instrumentation.
  - 1. Set field-adjustable switches and circuit-breaker trip ranges.
  
- G. Install spare-fuse cabinet.
  
- H. Comply with NECA 1.

3.3 CONNECTIONS

- A. Bond conduits entering underneath the switchboard to the equipment ground bus with a bonding conductor sized per NFPA 70.
  
- B. Support and secure conductors within the switchboard according to NFPA 70.

3.4 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
  
- B. Switchboard Nameplates: Label each switchboard compartment with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
  
- C. 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."

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
  - 1. Acceptance Testing:

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- a. Test insulation resistance for each switchboard bus, component, connecting supply, feeder, and control circuit. Open control and metering circuits within the switchboard, and remove neutral connection to surge protection and other electronic devices prior to insulation test. Reconnect after test.
  - b. Test continuity of each circuit.
2. Test ground-fault protection of equipment for service equipment per NFPA 70.
  3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  4. Correct malfunctioning units on-site where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- B. Switchboard will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports, including a certified report that identifies switchboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- 3.6 ADJUSTING
- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- 3.7 PROTECTION
- A. Temporary Heating: Apply temporary heat, to maintain temperature according to manufacturer's written instructions, until switchboard is ready to be energized and placed into service.

**END OF SECTION 262413**

**SECTION 262416 - PANELBOARDS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Distribution panelboards.

1.3 DEFINITIONS

- A. ATS: Acceptance testing specification.
- B. GFCI: Ground-fault circuit interrupter.
- C. GFEP: Ground-fault equipment protection.
- D. HID: High-intensity discharge.
- E. MCCB: Molded-case circuit breaker.
- F. SPD: Surge protective device.
- G. VPR: Voltage protection rating.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of panelboard.
  - 1. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
  - 2. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
  - 1. Include dimensioned plans, elevations, sections, and details.
  - 2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.

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3. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
  4. Detail bus configuration, current, and voltage ratings.
  5. Short-circuit current rating of panelboards and overcurrent protective devices.
  6. Include evidence of NRTL listing for series rating of installed devices.
  7. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For testing agency.
  - B. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.
- 1.6 CLOSEOUT SUBMITTALS
- A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals, include the following:
    1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
- 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. Keys: Two spares for each type of panelboard cabinet lock.
- 1.8 QUALITY ASSURANCE
- A. Manufacturer Qualifications: ISO 9001 or 9002 certified.
- 1.9 DELIVERY, STORAGE, AND HANDLING
- A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.
  - B. Handle and prepare panelboards for installation according to NECA 407 and NEMA PB 1.
- 1.10 FIELD CONDITIONS
- A. Environmental Limitations:
    1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete.

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2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
  - a. Ambient Temperature: Not exceeding minus 22 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 Owner or others unless permitted under the following conditions:
  1. Notify Owner no fewer than seven days in advance of proposed interruption of electric service.
  2. Do not proceed with interruption of electric service without Owner's written permission.
  3. Comply with NFPA 70E.

1.11 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.
  1. Panelboard Warranty Period: 18 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANELBOARDS AND LOAD CENTERS COMMON REQUIREMENTS

- A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces.
- B. 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.
- C. 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.
- D. Comply with NEMA PB 1.
- E. Comply with NFPA 70.
- F. Enclosures: Flush and Surface-mounted, dead-front cabinets.
  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.

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2. Height: 84 inches maximum.
  3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims shall cover all live parts and shall have no exposed hardware.
  4. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.
  5. Finishes:
    - a. Panels and Trim: galvanized 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: Same finish as panels and trim.
- G. Incoming Mains:
1. Location: Top and Bottom (refer to drawings).
  2. Main Breaker: Main lug interiors up to 400 amperes shall be field convertible to main breaker.
- H. Phase, Neutral, and Ground Buses:
1. Material: Hard-drawn copper, 98 percent conductivity.
    - a. Plating shall run entire length of bus.
    - b. Bus shall be fully rated the entire length.
  2. Interiors shall be factory assembled into a unit. Replacing switching and protective devices shall not disturb adjacent units or require removing the main bus connectors.
  3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
  4. Full-Sized Neutral: Equipped with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure. Do not mount neutral bus in gutter.
  5. Split Bus: Vertical buses divided into individual vertical sections.
- I. Conductor Connectors: Suitable for use with conductor material and sizes.
1. Material: Hard-drawn copper, 98 percent conductivity.
  2. Terminations shall allow use of 75 deg C rated conductors without derating.
  3. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.
  4. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
  5. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.
  6. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
- J. NRTL Label: Panelboards or load centers shall be labeled by an NRTL acceptable to authority having jurisdiction for use as service equipment with one or more main service disconnecting and overcurrent protective devices. Panelboards or load centers shall have meter enclosures, wiring,

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connections, and other provisions for utility metering. Coordinate with utility company for exact requirements.

- K. Future Devices: Panelboards or load centers shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
  - 1. Percentage of Future Space Capacity: 20 percent.
- L. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.
  - 1. Panelboards and overcurrent protective devices rated 240 V or less shall have short-circuit ratings as shown on Drawings, but not less than 10,000 A rms symmetrical.
  - 2. Panelboards and overcurrent protective devices rated above 240 V and less than 600 V shall have short-circuit ratings as shown on Drawings, but not less than 14,000 A rms symmetrical.

## 2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to ASCE/SEI 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 POWER PANELBOARDS

- 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:
  - 1. Eaton.
  - 2. General Electric Company; GE Energy Management - Electrical Distribution.
  - 3. SIEMENS Industry, Inc.; Energy Management Division.
  - 4. Square D; Schneider Electric
- B. Panelboards: NEMA PB 1, distribution type.
- C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
  - 1. For doors more than 36 inches high, provide two latches, keyed alike.
- D. Mains: Circuit breaker.
- E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
- F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers.

2.4 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- 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:
1. Eaton.
  2. General Electric Company; GE Energy Management - Electrical Distribution.
  3. SIEMENS Industry, Inc.; Energy Management Division.
  4. Square D; Schneider Electric
- B. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.
1. Thermal-Magnetic Circuit Breakers:
    - a. Inverse time-current element for low-level overloads.
    - b. Instantaneous magnetic trip element for short circuits.
    - c. 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. MCCB Features and Accessories:
    - a. Standard frame sizes, trip ratings, and number of poles.
    - b. Breaker handle indicates tripped status.
    - c. UL listed for reverse connection without restrictive line or load ratings.
    - d. Lugs: Compression style, suitable for number, size, trip ratings, and conductor materials.
    - e. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and HID lighting circuits.
    - f. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in off position.

2.5 IDENTIFICATION

- A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.
- B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.
- C. Circuit Directory: Computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.
1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.
- B. Receive, inspect, handle, and store panelboards according to NECA 407 and NEMA PB 1.1.
- C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.
- D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- 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. Comply with NECA 1.
- C. Install panelboards and accessories according to NECA 407 and NEMA PB 1.1.
- D. Equipment Mounting:
  - 1. Attach panelboard to the vertical finished or structural surface behind the panelboard.
- E. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.
- F. Mount top of trim 90 inches above finished floor unless otherwise indicated.
- G. Mount panelboard cabinet plumb and rigid without distortion of box.
- H. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- I. Mount surface-mounted panelboards to steel slotted supports 5/8 inch in depth. Orient steel slotted supports vertically.
- J. Install overcurrent protective devices and controllers not already factory installed.
  - 1. Set field-adjustable, circuit-breaker trip ranges.

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- 2. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written instructions.
- K. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.
- L. Install filler plates in unused spaces.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.
- 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 power panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Acceptance Testing Preparation:
  - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
  - 2. Test continuity of each circuit.
- B. Tests and Inspections:
  - 1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers stated in NETA ATS, Paragraph 7.6 Circuit Breakers.
  - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- C. Panelboards will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results, with comparisons of the two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes. Prior to making circuit changes to achieve load balancing, inform Resident Engineer of effect on phase color coding.
  - 1. Measure loads during period of normal facility operations.
  - 2. Perform circuit changes to achieve load balancing outside normal facility operation schedule or at times directed by the Resident Engineer. Avoid disrupting services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
  - 3. After changing circuits to achieve load balancing, recheck loads during normal facility operations. Record load readings before and after changing circuits to achieve load balancing.
  - 4. Tolerance: Maximum difference between phase loads, within a panelboard, shall not exceed 20 percent.

3.6 PROTECTION

- A. Temporary Heating: Prior to energizing panelboards, apply temporary heat to maintain temperature according to manufacturer's written instructions.

**END OF SECTION 262416**

**SECTION 262726 - WIRING DEVICES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Straight-blade convenience, receptacles.
- 2. GFCI receptacles.
- 3. Toggle switches
- 4. Wall switch sensor light switches with dual technology sensors.
- 5. Wall-box dimmers.
- 6. Wall plates.

1.3 DEFINITIONS

A. Abbreviations of Manufacturers' Names:

- 1. Cooper: Cooper Wiring Devices; Division of Cooper Industries, Inc.
- 2. Hubbell: Hubbell Incorporated: Wiring Devices-Kellems.
- 3. Leviton: Leviton Mfg. Company, Inc.
- 4. Pass & Seymour: Pass& Seymour/Legrand.

B. BAS: Building automation system.

C. EMI: Electromagnetic interference.

D. GFCI: Ground-fault circuit interrupter.

E. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

F. RFI: Radio-frequency interference.

G. SPD: Surge protective device.

H. UTP: Unshielded twisted pair.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

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- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

PART 2 - PRODUCTS

2.1 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.
- D. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 STRAIGHT-BLADE RECEPTACLES

- A. Duplex 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. 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. Eaton (Arrow Hart).
    - b. Hubbell Incorporated; Wiring Device-Kellems.
    - c. Leviton Manufacturing Co., Inc.

2.3 GFCI RECEPTACLES

- A. General Description:

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1. 125 V, 20 A, straight blade.
  2. Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, UL 943 Class A, and FS W-C-596.
- B. Duplex GFCI Convenience Receptacles:
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. Eaton (Arrow Hart).
    - b. Hubbell Incorporated; Wiring Device-Kellems.
    - c. Leviton Manufacturing Co., Inc.
- 2.4 TOGGLE SWITCHES
- A. Comply with NEMA WD 1, UL 20, and FS W-S-896.
- B. Switches, 120/277 V, 20 A:
1. Single Pole:
    - 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:
      - 1) Eaton (Arrow Hart).
      - 2) Hubbell Incorporated; Wiring Device-Kellems.
      - 3) Leviton Manufacturing Co., Inc.
  2. Three Way:
    - 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:
      - 1) Eaton (Arrow Hart).
      - 2) Hubbell Incorporated; Wiring Device-Kellems.
      - 3) Leviton Manufacturing Co., Inc.
- 2.5 WALL SWITCH SENSOR LIGHT SWITCH, DUAL TECHNOLOGY
- 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:
1. Eaton (Arrow Hart).
  2. Hubbell Incorporated; Wiring Device-Kellems.
  3. Leviton Manufacturing Co., Inc.

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- B. Description: Switchbox-mounted, combination lighting-control sensor and conventional switch lighting-control unit using dual technology.
  - 1. Connections: Provisions for connection to BAS.
  - 2. Connections: Hard wired.
  - 3. Rated 960 W at 120-V ac for tungsten lighting, 10 A at 120-V ac or 10 A at 277-V ac for fluorescent or LED lighting, and 1/4 hp at 120-V ac.
  - 4. Integral relay for connection to BAS.
  - 5. Adjustable time delay of 15 minutes.
  - 6. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc.
  - 7. Comply with NEMA WD 1, UL 20, and FS W-S-896.

2.6 WALL-BOX DIMMERS

- A. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.
- B. Control: Continuously adjustable slider or toggle switch; with single-pole or three-way switching. Comply with UL 1472.
- C. LED Lamp Dimmer Switches: Modular; compatible with LED lamps; trim potentiometer to adjust low-end dimming; capable of consistent dimming with low end not greater than 20 percent of full brightness.

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: Smooth, high-impact thermoplastic.
  - 3. Material for Unfinished Spaces: Smooth, high-impact thermoplastic.
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant thermoplastic 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.
- B. Wall Plate Color: For plastic covers, match device color.

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 of solid wire 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. Pigtailling 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 in length.
  5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid 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.
  - 2. Install hospital-grade receptacles in patient-care areas with the ground pin or neutral blade at the top.
- 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. Dimmers:
  - 1. Install dimmers within terms of their listing.
  - 2. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.
- H. 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.
- I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

### 3.2 GFCI RECEPTACLES

- A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

### 3.3 IDENTIFICATION

- A. Comply with Section 260553 "Identification for Electrical Systems."
- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

### 3.4 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.

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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.
- C. Test straight-blade for the retention force of the grounding blade according to NFPA 99. Retention force shall be not less than 4 oz..
- D. Wiring device will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

**END OF SECTION 262726**

**SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Fusible switches.
  - 2. Enclosures.

1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
  - 1. Enclosure types and details for types other than NEMA 250, Type 1.
  - 2. Current and voltage ratings.
  - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
  - 4. Include evidence of a nationally recognized testing laboratory (NRTL) listing for series rating of installed devices.
  - 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
- B. Shop Drawings: For enclosed switches and circuit breakers.
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Include wiring diagrams for power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals.
  - 1. Include the following:
    - a. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

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. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Accredited by NETA.
  - 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
  - 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
  - 2. Altitude: Not exceeding 6600 feet.

1.10 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 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 and the unit will be fully operational after the seismic event."

2.2 GENERAL REQUIREMENTS

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with NFPA 70.

2.3 FUSIBLE SWITCHES

- 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:
  - 1. ABB Inc.
  - 2. Eaton.
  - 3. General Electric Company.
  - 4. SIEMENS Industry, Inc.: Energy Management Division.
  - 5. Square D; by Schneider Electric.
- B. Type HD, Heavy Duty:
  - 1. Single throw.
  - 2. Three pole.
  - 3. 600-V ac.

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4. 200 A and smaller.
  5. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses.
  6. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
  2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
  3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
  4. Lugs: Mechanical type, suitable for number, size, and conductor material.
  5. Service-Rated Switches: Labeled for use as service equipment.

## 2.4 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
- B. Enclosure Finish: The enclosure shall be gray baked enamel paint, electrodeposited on cleaned, phosphatized galvanized steel (NEMA 250 Types 3R, 12).

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
  1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

### 3.2 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

- A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.
  1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
  2. Outdoor Locations: NEMA 250, Type 3R.

3.3 INSTALLATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- C. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- D. Install fuses in fusible devices.
- E. Comply with NFPA 70 and NECA 1.

3.4 IDENTIFICATION

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
  - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
  - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections for Switches:
  - 1. Visual and Mechanical Inspection:
    - a. Inspect physical and mechanical condition.
    - b. Inspect anchorage, alignment, grounding, and clearances.
    - c. Verify that the unit is clean.
    - d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
    - e. Verify that fuse sizes and types match the Specifications and Drawings.
    - f. Verify that each fuse has adequate mechanical support and contact integrity.
    - g. Inspect bolted electrical connections for high resistance using one of the two following methods:
      - 1) Use a low-resistance ohmmeter.
        - a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
      - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.

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- a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
  - h. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.
  - i. Verify correct phase barrier installation.
  - j. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.
- C. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.
- 1. Test procedures used.
  - 2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
  - 3. List deficiencies detected, remedial action taken, and observations after remedial action.

3.6 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

**END OF SECTION 262816**

**SECTION 265119 - LED INTERIOR LIGHTING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego "Whitebook", apply to this Section..

1.2 SUMMARY

- A. Section includes the following types of LED luminaires:
  - 1. Downlight.
  - 2. Strip light.
  - 3. Surface mount, linear.
  - 4. Surface mount, nonlinear.
  - 5. Suspended, nonlinear.
  - 6. Materials.
  - 7. Finishes.
  - 8. Luminaire support.
- B. Related Requirements:
  - 1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
  - 2. Section 260943 "Network Lighting, HVAC, and Energy Management" for wireless automatic control of lighting, including wireless area controllers, wireless adaptors, wireless thermostats, wireless sensor and wireless switches.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Arrange in order of luminaire designation.
  2. Include data on features, accessories, and finishes.
  3. Include physical description and dimensions of luminaires.
  4. Include emergency lighting units, including batteries and chargers.
  5. Include life, output (lumens, CCT, and CRI), and energy efficiency data.
  6. Photometric data and adjustment factors based on laboratory tests, complying with IES Lighting Measurements Testing and Calculation Guides, of each luminaire type. The adjustment factors shall be for lamps and accessories identical to those indicated for the luminaire as applied in this Project IES LM-79 and IES LM-80.
    - a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
    - b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
- B. Shop Drawings: For nonstandard or custom luminaires.
1. Include plans, elevations, sections, and mounting and attachment details.
  2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  3. Include diagrams for power, signal, and control wiring.
- C. Sustainable Design Submittals:
1. Product Data: Indicating luminaire is certified by Design Lights Consortium.
- D. Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Luminaires.
  2. Suspended ceiling components.
  3. Partitions and millwork that penetrate the ceiling or extend to within 12 inches of the plane of the luminaires.
  4. Structural members to which equipment or luminaires will be attached.
  5. Initial access modules for acoustical tile, including size and locations.
  6. Items penetrating finished ceiling, including the following:
    - a. Other luminaires.

- b. Air outlets and inlets.
- c. Speakers.
- d. Sprinklers.
- e. Access panels.
- f. Fire alarm devices.
- g. Ceiling-mounted projectors.

7. Moldings.

- B. Qualification Data: For testing laboratory providing photometric data for luminaires.
- C. Seismic Qualification Certificates: For luminaires, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
- D. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- E. Product Certificates: For each type of luminaire.
- F. Product Test Reports: For each luminaire, for tests performed by manufacturer and witnessed by a qualified testing agency.
- G. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
  - 1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

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. Diffusers and Lenses: 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.

1.8 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.
- B. Provide luminaires from a single manufacturer for each luminaire type.
- C. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.10 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE 7.
- B. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.
  - 1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

2.2 LUMINAIRE REQUIREMENTS

- 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. Standards:
  - 1. California Title 24 compliant.
  - 2. UL Listing: Listed for damp and wet location.
  - 3. Recessed luminaires shall comply with NEMA LE 4.
- C. CRI of minimum 80. CCT of 3500 K at lower level and 4100 K at all other floors.

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- D. Rated lamp life of 50,000 hours to L70.
- E. Lamps dimmable from 100 percent to 0 percent of maximum light output.
- F. Internal driver with wireless controls. Internal drivers without wireless controls shall be provided with wireless adaptors.
- G. Nominal Operating Voltage: 120 V ac.
  - 1. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
- H. Housings:
  - 1. Extruded-aluminum housing and heat sink.
  - 2. Clear powder-coat finish.

2.3 DOWNLIGHT

- 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:
  - 1. GE Lighting Solutions.
  - 2. Lightolier; a Philips group brand.
  - 3. Lithonia Lighting; Acuity Brands Lighting, Inc.
- B. Minimum 1,500 lumens. Minimum allowable efficacy of 80 lumens per watt.
- C. Universal mounting bracket.
- D. Integral junction box with conduit fittings.
- E. Wireless Controls: External wireless adaptor.
- F. Optics:
  - 1. Fixed lens.
  - 2. Wide light distribution.

2.4 HIGHBAY, NONLINEAR

- 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:
  - 1. Cooper Lighting, an Eaton business.
  - 2. GE Lighting Solutions.
  - 3. Juno Lighting Group by Schneider Electric.
  - 4. Lighting Science Group.
  - 5. Light Edge Inc.

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- B. Minimum 20,000 lumens. Minimum allowable efficacy of 80 lumens per watt.
- C. Wireless Control: Internal to luminaire.
- D. Integral occupancy sensor.

2.5 STRIP LIGHT

- 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:
  - 1. Cooper Lighting, an Eaton business.
  - 2. GE Lighting Solutions.
  - 3. Lighting Science Group.
  - 4. Lithonia Lighting; Acuity Brands Lighting, Inc.
- B. Minimum 3000 lumens. Minimum allowable efficacy of 80 lumens per watt.
- C. Integral junction box with conduit fittings.
- D. Wireless Control: Internal to luminaire.

2.6 RECESSED LINEAR

- 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:
  - 1. Cooper Lighting, an Eaton business.
  - 2. Finelite.
  - 3. GE Lighting Solutions.
  - 4. Lithonia Lighting; Acuity Brands Lighting, Inc.
- B. Minimum 4,000 lumens. Minimum allowable efficacy of 85 lumens per watt.
- C. Integral junction box with conduit fittings.
- D. Wireless Control: Internal to luminaire.

2.7 SURFACE MOUNT, LINEAR

- 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:
  - 1. GE Lighting Solutions.
  - 2. Lighting Science Group.
  - 3. Lightolier; a Philips group brand.
  - 4. AFX Lighting
  - 5. ILP Lighting
  - 6. Lithonia Lighting; Acuity Brands Lighting, Inc.

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- B. Minimum 2900 lumens. Minimum allowable efficacy of 80 lumens per watt.
- C. Integral junction box with conduit fittings.
- D. Wireless Control: Internal to luminaire.

2.8 SURFACE MOUNT, LINEAR, UNDER CABINET

- 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:
  - 1. Finelite.
  - 2. GE Lighting Solutions.
  - 3. Lighting Science Group.
  - 4. Lightolier; a Philips group brand.
  - 5. Lithonia Lighting; Acuity Brands Lighting, Inc.
- B. Minimum 1000 lumens. Minimum allowable efficacy of 80 lumens per watt.
- C. Integral junction box with conduit fittings.

2.9 SUSPENDED, NONLINEAR

- 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:
  - 1. Edge Lighting.
  - 2. Elite Lighting Corporation.
  - 3. Eureka.
  - 4. Stone Lighting
- B. Minimum 800 lumens. Minimum allowable efficacy of 85 lumens per watt.
- C. Integral junction box with conduit fittings.
- D. Wireless Controls: External wireless adaptor.

2.10 MATERIALS

- A. Metal Parts:
  - 1. Free of burrs and sharp corners and edges.
  - 2. Sheet metal components shall be steel unless otherwise indicated.
  - 3. Form and support to prevent warping and sagging.
- B. 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.

- C. Diffusers and Globes:
  - 1. Clear glass
  - 2. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
  - 3. Glass: Annealed crystal glass unless otherwise indicated.
  - 4. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
  
- D. Housings:
  - 1. Extruded-aluminum housing and heat sink.
  - 2. Clear anodized finish.
  
- E. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
  - 1. Label shall include the following lamp characteristics:
    - a. "USE ONLY" and include specific lamp type.
    - b. Lamp diameter, shape, size, wattage, and coating.
    - c. CCT and CRI for all luminaires.

## 2.11 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

## 2.12 LUMINAIRE SUPPORT

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:
  - 1. Sized and rated for luminaire weight.
  - 2. Able to maintain luminaire position after cleaning and relamping.
  - 3. Provide support for luminaire without causing deflection of ceiling or wall.
  - 4. Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.
- E. Flush-Mounted Luminaire Support:
  - 1. Secured to outlet box.
  - 2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
  - 3. Trim ring flush with finished surface.
- F. Wall-Mounted Luminaire Support:
  - 1. Attached using through bolts and backing plates on either side of wall.
  - 2. Do not attach luminaires directly to gypsum board.
- G. Ceiling-Mounted Luminaire Support:
  - 1. Ceiling mount with two 5/32-inch-diameter aircraft cable supports adjustable to 120 inches in length.
  - 2. Ceiling mount with pendant mount with 5/32-inch-diameter aircraft cable supports adjustable to 120 inches in length.
- H. Suspended Luminaire Support:
  - 1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
  - 2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
  - 3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of luminaire chassis, including one at each end.
  - 4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.
- I. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.
  2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
  3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.
- J. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.
- K. Comply with requirements in Section 260943 "Network Lighting, HVAC, and Energy Management" for wireless lighting controls connection.

### 3.3 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

### 3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
  2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

### 3.5 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
  2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
  3. Adjust the aim of luminaires in the presence of the Resident Engineer.

**END OF SECTION 265119**

**SECTION 265619 – LED EXTERIOR LIGHTING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 2015 Greenbook and City of San Diego “Whitebook”, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Exterior solid-state luminaires that are designed for and exclusively use LED lamp technology.
- 2. Luminaire supports.

B. Related Requirements:

- 1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
- 2. Section 260943 "Network Lighting, HVAC, and Energy Management" for wireless automatic control of lighting, including wireless area controllers, wireless adaptors, wireless thermostats, wireless sensor and wireless switches.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color rendering index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. Lumen: Measured output of lamp and luminaire, or both.
- F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of luminaire.
  - 1. Arrange in order of luminaire designation.

2. Include data on features, accessories, and finishes.
  3. Include physical description and dimensions of luminaire.
  4. Lamps, include life, output (lumens, CCT, and CRI), and energy-efficiency data.
  5. Photometric data and adjustment factors based on laboratory tests, complying with IES Lighting Measurements Testing and Calculation Guides, of each luminaire type. The adjustment factors shall be for lamps and accessories identical to those indicated for the luminaire as applied in this Project IES LM-80.
    - a. **Manufacturer's Certified Data:** Photometric data certified by manufacturer's laboratory with a current accreditation under the NVLAP for Energy Efficient Lighting Products.
    - b. **Testing Agency Certified Data:** For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
  6. Wiring diagrams for power, control, and signal wiring.
  7. Photoelectric relays.
  8. Means of attaching luminaires to supports and indication that the attachment is suitable for components involved.
- B. **Shop Drawings:** For nonstandard or custom luminaires.
1. Include plans, elevations, sections, and mounting and attachment details.
  2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  3. Include diagrams for power, signal, and control wiring.
- C. **Sustainable Design Submittals:**
1. Product Data: BUG ratings.
  2. Product Data: Luminaire calculations.
- D. **Product Schedule:** For luminaires and lamps. Use same designations indicated on Drawings.
- E. **Delegated-Design Submittal:** For luminaire supports.
1. Include design calculations for luminaire supports and seismic restraints.
- 1.5 **INFORMATIONAL SUBMITTALS**
- A. **Coordination Drawings:** Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Luminaires.
  2. Structural members to which equipment and luminaires will be attached.
  3. Above-grade utilities and structures.
  4. Existing above-grade utilities and structures.
  5. Building features.
  6. Vertical and horizontal information.

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- B. Qualification Data: For testing laboratory providing photometric data for luminaires.
- C. Seismic Qualification Data: For luminaires, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Product Certificates: For each type of the following:
  - 1. Luminaire.
  - 2. Photoelectric relay.
- E. Product Test Reports: For each luminaire, for tests performed by manufacturer and witnessed by a qualified testing agency.
- F. Source quality-control reports.
- G. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and photoelectric relays to include in operation and maintenance manuals.
  - 1. Provide a list of all lamp types used on Project. Use ANSI and manufacturers' codes.
  - 2. Provide a list of all photoelectric relay types used on Project; use manufacturers' codes.

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. Lamps: Ten for every 100 of each type and rating installed. Furnish at least one of each type.
  - 2. Glass, Acrylic, 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.
  - 3. Diffusers and Lenses: One for every 100 of each type and rating installed. Furnish at least one of each type.
  - 4. Globes and Guards: One for every 20 of each type and rating installed. Furnish at least one of each type.

1.8 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturers' laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

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- B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products and complying with applicable IES testing standards.
- C. Provide luminaires from a single manufacturer for each luminaire type.
- D. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.
- E. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering prior to shipping.

1.10 FIELD CONDITIONS

- A. Verify existing and proposed utility structures prior to the start of work associated with luminaire installation.
- B. Mark locations of exterior luminaires for approval by Resident Engineer prior to the start of luminaire installation.

1.11 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures, including luminaire support components.
    - b. Faulty operation of luminaires and accessories.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 2. Warranty Period: 2 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.

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1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

## 2.2 LUMINAIRE REQUIREMENTS

- 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. UL Compliance: Comply with UL 1598 and listed for wet location.
- C. CRI of minimum 80. CCT of 3500 K in lower level and 4100 K in other areas.
- D. L70 lamp life of 50,000 hours.
- E. Lamps dimmable from 100 percent to 0 percent of maximum light output.
- F. Internal driver.
- G. Nominal Operating Voltage: 120 V ac.
- H. Lamp Rating: Lamp marked for outdoor use and in enclosed locations.
- I. Source Limitations: Obtain luminaires from single source from a single manufacturer.

## 2.3 LUMINAIRE TYPES

- A. Area and Site:
  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. GE Lighting Solutions.
    - b. Dual-Lite
    - c. Lightolier; a Philips group brand.
    - d. Lithonia Lighting; Acuity Brands Lighting, Inc.
  2. Luminaire Shape: Square.
  3. Mounting: Building with extruded-aluminum.
  4. Distribution: Varies per luminaire.
  5. Diffusers and Globes: Polycarbonate lens.
  6. Housings:
    - a. Extruded-aluminum housing and heat sink.
    - b. Clear anodized finish.
  7. Wireless Controls: External wireless adaptor.
- B. Canopy:

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. GE Lighting Solutions.
  - b. KIM Lighting.
  - c. Eclipse Lighting
  - d. Lightolier; a Philips group brand.
  - e. Lithonia Lighting; Acuity Brands Lighting, Inc.
2. Shape: Square.
3. Dimensions: 12 inches square.
4. Diffusers and Globes: Clear polycarbonate.
5. Housings:
  - a. Extruded-aluminum housing and heat sink.
  - b. Clear anodized finish.
6. Wireless Controls: External wireless adaptor.

#### 2.4 MATERIALS

- A. Metal Parts: Free of burrs and sharp corners and edges.
- B. Sheet Metal Components: Corrosion-resistant aluminum. Form and support to prevent warping and sagging.
- C. 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.
- D. Lens and Refractor Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.
- E. 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.
- F. Housings:
  1. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use.
  2. Provide filter/breather for enclosed luminaires.
- G. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp characteristics:
  - a. "USE ONLY" and include specific lamp type.
  - b. Lamp diameter, shape, size, wattage and coating.
  - c. CCT and CRI for all luminaires.

## 2.5 FINISHES

- A. Variations in Finishes: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- B. 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.

## 2.6 LUMINAIRE SUPPORT COMPONENTS

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire electrical conduit to verify actual locations of conduit connections before luminaire installation.
- C. Examine walls, roofs, and canopy ceilings and overhang ceilings for suitable conditions where luminaires will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Comply with NECA 1.
- B. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.
- C. Fasten luminaire to structural support.
- D. Supports:

1. Sized and rated for luminaire weight.
  2. Able to maintain luminaire position after cleaning and relamping.
  3. Support luminaires without causing deflection of finished surface.
  4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- E. Wall-Mounted Luminaire Support:
1. Attached to structural members in walls.
- F. Wiring Method: Install cables in raceways. Conceal raceways and cables.
- G. Install luminaires level, plumb, and square with finished grade unless otherwise indicated.
- H. Coordinate layout and installation of luminaires with other construction.
- I. Adjust luminaires that require field adjustment or aiming. Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources, favoring a north orientation.
- J. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" and Section 260533 "Raceways and Boxes for Electrical Systems" for wiring connections and wiring methods.
- 3.3 INSTALLATION OF INDIVIDUAL GROUND-MOUNTED LUMINAIRES
- A. Aim as indicated on Drawings.
  - B. Install on concrete base with top 4 inches above finished grade or surface at luminaire location. Cast conduit into base, and finish by troweling and rubbing smooth. Concrete materials, installation, and finishing.
- 3.4 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.
- 3.5 IDENTIFICATION
- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- 3.6 FIELD QUALITY CONTROL
- A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.

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- B. Perform the following tests and inspections:
1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
  2. 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 IES testing guide(s):
    - a. IES LM-5.
    - b. IES LM-50.
    - c. IES LM-52.
    - d. IES LM-64.
    - e. IES LM-72.
  2. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
- D. Luminaire will be considered defective if it does not pass tests and inspections.
- E. 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.

3.7 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
  2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
  3. Adjust the aim of luminaires in the presence of the Resident Engineer.

**END OF SECTION 265619**

**SECTION 27 51 24 - ASSISTIVE LISTENING SYSTEMS**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes assistive listening systems.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include material descriptions, dimensions of individual components and profiles.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For manufacturer's warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For Assistive Listening System to include operation and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
  - 1. Personnel certified by NICET as Audio Systems Level III Technician.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and/or Installer agree to repair or replace components of the Assistive Listening System that fail(s) in materials or workmanship within specified warranty period.
  - 1. Warranty Period: 3 years from date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Bosch.
  - 2. Telex.
  - 3. Listen Technologies.
  - 4. Or equal.

2.2 SYSTEM DESCRIPTION

- 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. The hearing assist system shall be FM type and deployed to provide noise free coverage of the Cafeteria/auditorium/multi-purpose room seating area. The system shall include the following features:
  - 1. Field Strength: Maximum 8000 micro-volts per meter at 30 meters.
  - 2. Transmitter Input: Balanced bridging with a nominal level of 0.03 to 1.0 volt RMS.
  - 3. An automatic gain control shall minimize overload and distortion due to excess-signal input.
  - 4. Antenna Type: 75-ohm, half-wave, coaxial. Coordinate antenna location with Construction Manager.
  - 5. Receiver Type: 72-76 MHz band and include earphone and belt clip-carrying case. Receiver shall be battery powered and have approximately a 15-hour life when used with alkaline batteries.

2.3 PORTABLE FM ASSISTIVE LISTENING SYSTEM

- A. The portable FM Assistive Listening System shall be packaged in a portable case complete with all the component of the Assistive Listening System.
- B. The transmitter shall be portable complete with power supply, antenna, connectors for balanced and un-balanced inputs, 17 channels and volume adjustment. The transmitter shall have the following performance characteristics:
 

1. RF Frequency Range	72 to 76 MHz
2. Number of Channels	17
3. Frequency Accuracy	+/- .005%
4. Transmission Range	up to 400 Feet
5. Frequency Response	50 Hz to 15 kHz
6. Signal to Noise Ratio	70 db.
7. Sound Pressure Level:	110 db to 118 db.

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- 8. Peak Clipping Level: 18 db min.
  
- C. Receivers shall be portable and compatible with the transmitter and shall have the following characteristics and or features:
  - 1. RF Frequency Range 72 to 76 MHz
  - 2. Number of Channels 17
  - 3. Frequency Response 50 Hz to 15 kHz
  - 4. Headset Jacks Mono and Stereo
  - 5. Display LCD
  - 6. Signal to Noise Ratio 79 db.
  - 7. Power Two AA batteries
  - 8. Headphones Stereo Ear Bud
  - 9. Hearing Aid Capable 25%
  
- D. ACCESSORIES
  - 1. Furnish transmitter and receiver carrying case with capabilities for charging of the receiver units. The carrying case shall be capable of storing and charging 7 head phones.
  - 2. Furnish all interconnection cables as required.
  - 3. Furnish four (4) spare ear bud covers with each carrying case.

PART 3 - EXECUTION

3.1 DEMONSTRATION

- A. Engage a factory-authorized service representative to train District's maintenance personnel to adjust, operate, and maintain clock-and-program-control system components

**END OF SECTION 27 51 24**

**SECTION 283110 - FIRE DETECTION AND ALARM SYSTEM**

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The Contractor shall furnish all equipment, devices, materials, tools, labor, drawings, permits and all associated documentation necessary for a complete fire alarm system, ready for operational turn-over in accordance with the requirements of the NFPA-72, The National Fire Alarm Code, and the Authority Having Jurisdiction. The Contractor shall provide all devices and equipment required by the drawings and specifications. The Contractor may not delete any equipment or devices without submission and approval of a request for information detailing all deletions.

1.2 QUALITY

- A. To ensure reliability and complete compatibility, all items of the Fire Alarm System, including control panels, power supplies, as well as all initiating devices and notification appliances, shall be listed by Underwriters Laboratories inc. (UL) and shall bear the "UL" label. The fire alarm control panel equipment shall be U.L. Listed under the UL 864 Standard Control Units and Accessories for Fire Alarm Systems.

1.3 ACCEPTABLE MANUFACTURERS AND DISTRIBUTORS

- A. All references to manufacturer's model numbers and other pertinent information herein is intended to establish the standard of FCI equipment, performance, function, and quality. The system shall be installed by a Platinum Level Distributor. The contractor shall have an office within 30 miles of the project site.
- B. The fire alarm contractor shall supply and install FCI equipment. The fire alarm contractor shall not outsource any equipment, and/or labor.
- C. The equipment, programming, and installation shall be provided by an approved Platinum Level engineered systems distributor of FCI, located within San Diego County.
- D. The contractor shall provide a certificate from the manufacturer, for 1 year parts warranty.
- E. The installing contractor shall provide a 24/7 service department and house spare products in their inventory, for all products used in this specification.
- F. The contractor shall be a UL Certified Installer, FCI factory trained technicians, and shall have a NICET Level 4 technician on staff.

1.4 SCOPE

- A. A new intelligent reporting, networked, fully peer-to-peer, microprocessor controlled fire detection system shall be installed in accordance with the specifications and drawings.

B. Basic Performance:

1. Signaling Line Circuits (SLC) serving the addressable devices shall be wired Class B.
2. Initiation Device Circuits (IDC) serving the non-addressable devices connected to addressable monitor modules shall be wired Class B.
3. Notification Appliance Circuits (NAC) serving strobes and speakers shall be wired Class B.
4. Transponders shall operate in a peer-to-peer fashion with other panels and transponders in the system.
5. All network node communications shall be communicated between panels and transponders on a single pair of copper wires or fiber optic cables.
6. All signaling line circuits (SLC) shall reside in the remote Transponders. The SLC modules shall operate in a peer-to-peer fashion with all other panels and transponders in the system. Systems that provide a "Degraded" mode of operation upon loss of the INCC Command Center or a short in the riser shall not be acceptable.

C. BASIC SYSTEM FUNCTIONAL OPERATION

1. When a fire alarm condition is detected and reported by one of the system alarm initiating devices, the following functions shall immediately occur:
  - a. The System Alarm LED'S shall flash.
  - b. A local piezo-electric signal in the control panel shall sound at a pulse rate.
  - c. The LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
  - d. The historical log shall record the information associated with the fire alarm control panel condition, along with the time and date of occurrence.
  - e. All system output programs assigned via control-by-event equations to be activated by the particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.

1.5 STANDARDS

- A. The system shall conform to the latest editions of the following codes and standards:
  1. NFPA 72 - National Fire Alarm Code
  2. NEC 760 - National Electrical Code
  3. Americans with Disabilities Act (ADA)

1.6 WARRANTY

- A. The system shall be installed by a Platinum level distributor. The installing contractor shall warranty the entire installation for 1 year.

1.7 INTERFACING WITH RELATED SYSTEMS

- A. Coordinate with the appropriate contractors for interfacing to other building systems as required including but not limited to the sprinkler systems and the HVAC systems.

PART 2 - PRODUCTS

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2.1 EQUIPMENT AND MATERIAL, GENERAL

- A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protective signaling system, meeting the California Fire Alarm Code.
- B. All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.
- C. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

2.2 CONDUIT AND WIRE

- A. Conduit:
  - 1. Conduit shall be in accordance with The California Electrical Code (CEC), local and state requirements.
  - 2. Where required, all wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross sectional area where three or more cables are contained within a single conduit.
  - 3. Cable must be separated from any open conductors of power, or Class 1 circuits, and shall not be placed in any conduit, junction box, or raceway containing these conductors, per CEC Article 760-29.
  - 4. Wiring for 24 volt DC control, alarm notification, emergency communication, and similar power limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
  - 5. Conduit shall not enter the fire alarm control panel, or any other remotely mounted control panel equipment or back boxes, except where conduit entry is specified by the FACP manufacturer.
  - 6. Conduit shall be 3/4 inch (19.1 mm) minimum.
- B. Wire:
  - 1. All fire alarm system wiring shall be new and power limited under CEC 760 part A and C.
  - 2. Wiring shall be in accordance with local, state and national codes (e.g., CEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for Initiating Device Circuits and Signaling Line Circuits, and 14 AWG (1.63 mm) for Notification Appliance Circuits.
  - 3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
  - 4. Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation as indicated in CEC (e.g., FPLR).
  - 5. All field wiring shall be electrically supervised for open circuit and ground fault.
  - 6. The fire alarm control panel shall be capable of t-tapping Class B (NFPA Style 4) Signaling Line Circuits (SLCs). Systems which do not allow or have restrictions in, for example, the amount of t-taps, length of t-taps etc., are not acceptable.

- C. Terminal Boxes, Junction Boxes, and Cabinets: All boxes and cabinets shall be UL listed for their use and purpose.
- D. Initiating circuits shall be arranged to serve like categories (manual, smoke, waterflow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.
- E. The fire alarm control panel shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the main power distribution panel as FIRE ALARM. Fire alarm control panel primary power wiring shall be 12 AWG. The control panel cabinet shall be grounded securely to either a cold water pipe or grounding rod.

### 2.3 FIRE ALARM CONTROL PANEL

- A. The Fire Alarm Control Panel shall supply the user interface including an LCD display, and Intelligent Loop Interface Modules (S3). The Fire Panel shall consist of the following units, and components, each of which is described in detail in this section:
  - 1. System Cabinet
  - 2. Power Supply Module (FLPS-7-RB) with batteries
  - 3. Color Touchscreen LCD Display (LCD-SLP)
  - 4. Intelligent Loop Main Board Interface (SLP-RB)
  - 5. DACT (DACT-E3)
  - 6. RS-485 Repeater (RPT-E3)
- B. System Cabinet
  - 1. The system cabinet shall be either surface or semi-flush mounted with a texture finish. The system cabinet houses one Power Supply Module, one SLP-RB assembly, and other optional modules listed above. A minimum of a 1-inch wiring gutter space shall be provided behind the mounting plate. Wiring shall be terminated on removable terminal blocks to allow field servicing of all modules without disrupting system wiring.
- C. Power Supply Module (FLPS-7-RB)
  - 1. The FLPS-7-RB power supply shall use the latest technologies to provide power and shall incorporate the following features:
    - a. Power saving switching technology using no step-down transformers
    - b. 7 Amp continuous rated output to supply up to all power necessary under normal and emergency conditions
    - c. Integral Battery Charger with capacity to charge up to 55 amp-hour batteries while under full load.
- D. Batteries
  - 1. Batteries shall be of sufficient capacity to provide power for the entire system upon loss of normal AC power for a period of twenty-four (24) hours with fifteen (15) minutes of alarm signaling at the end of this twenty four hour period as required by NFPA 72, Local Systems.
- E. LCD Display Module (LCD-SLP)
  - 1. The LCD display shall be a 4.3 touchscreen RS-485 based textual annunciator with the capability of being mounted locally or remotely. It provides audible and visual annunciation of all alarms and trouble signals. Dedicated LED's shall be provided for:
    - a. AC Power On (green)

- b. Alarm (red)
  - c. Supervisory (yellow)
  - d. System Trouble (yellow)
  - e. Power Fault (yellow)
  - f. Ground Fault (yellow)
  - g. System Silenced (yellow)
  - h. Hazard (blue)
2. The 4.3" touchscreen display shall provide status of all analog/addressable sensors, monitor, and control modules. The display shall be of the liquid crystal type (LCD), clearly visible in the dark and under all light conditions. The panel shall contain four (4) functional keys:
- a. Alarm Acknowledge
  - b. Trouble Acknowledge
  - c. Signal Silence
  - d. System Reset/Lamp Test
3. The panel shall contain three (4) configuration buttons:
- F. Intelligent Loop Interface (SLP-RB)
1. The system shall be of multiprocessor design to allow maximum flexibility of capabilities and operation. The Intelligent Loop Interface shall be capable of mounting in a standalone enclosure or integrated with the Fire Alarm Control Panel described above.
- a. Field Programmable
    - 1) The system shall be capable of being programmed by means of a Field Configuration Program (FCP) allowing programming to be downloaded via portable computer from any node on the network.
  - b. RS-232C Serial Output
    - 1) A supervised RS-232C serial port shall be provided to operate remote printers and/or video terminals, accept a downloaded program from a portable computer, or provide 80 column readout of all alarms, troubles, location descriptions, time, date, etc. The communication shall be standard ASCII code operating from 1200 to 115,200 baud rate.
  - c. RS-485 Serial Output
    - 1) Each SLP-RB shall incorporate an RS-485 bus via a ribbon harness for connection of modules inside the same cabinet, and via a four wire quick connector for connection of modules up to 3000 feet from the cabinet. This RS-485 bus shall support up to sixteen (16) ASM-16 auxiliary switch modules, six (6) LCD-SLP Annunciators and five (5) LCD-7100 annunciators.
  - d. Peer-to-Peer panel configuration.
    - 1) All Loop Interface Modules shall incorporate it's own programming, log functions, Central Processor Unit, and control by event (CBE) programming. In the event that any loop becomes disabled, each remaining loop driver shall continue to communicate with the remainder of the network and maintain normal operation. "Degrade" configurations under these conditions are not acceptable.
  - e. Control-by-Event (CBE) Program
    - 1) The SLP-RB shall be capable of programming using Boolean logic including AND, OR, NOT, and TIMING functions to provide complete programming flexibility.
  - f. Alarm Verification

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- 1) Smoke detector alarm verification shall be a standard option while allowing other devices (i.e.: manual stations, sprinkler flow, etc.) to create an immediate alarm. This feature shall be selectable for smoke sensors that are installed in environments prone to nuisance or unwanted alarms.
- g. Alarm Signals
  - 1) All alarm signals shall be automatically latched or “locked in” at the control panel until the operated device is returned to normal and the control panel is manually reset. When used for sprinkler flow, the “SIGNAL SILENCE” switch may be bypassed, if required by the AHJ.
- h. Electrically Supervised
  - 1) Each SLC and NAC circuit shall be capable shall be electrically supervised for opens, shorts and ground faults. The occurrence of any fault shall activate the system trouble circuitry but shall not interfere with the proper operation of any other circuit. A yellow “SYSTEM TROUBLE” LED’S shall light and the system audible sounder shall steadily sound when any trouble is detected in the system. Failure of power, open or short circuits on the SLC or NAC circuits, disarrangement in system wiring, failure of the microprocessor or any identification module, or system ground faults shall activate this trouble circuit. A trouble signal may be acknowledged by operating the “TROUBLE ACKNOWLED’SGE” switch. This shall silence the sounder. If subsequent trouble conditions occur, the trouble circuitry will resound. During an alarm, all trouble signals shall be suppressed with the exception of lighting the yellow “SYSTEM TROUBLE” LED’S.
- i. Drift Compensation - Analog Smoke Sensors
  - 1) System software shall automatically adjust each analog smoke sensor approximately once each week for changes in sensitivity due to the effects of component aging or environment (i.e.: dust). Each sensor shall maintain its actual sensitivity under adverse conditions to respond to alarm conditions while ignoring the factors which generally contribute to nuisance alarms. The system trouble circuitry shall activate, display “DIRTY DETECTOR” and “VERY DIRTY DETECTOR” indications and identify the individual unit that requires maintenance.
- j. Analog Smoke Sensor Test
  - 1) System software shall automatically test each analog smoke sensor a minimum of three times daily. The test shall be a recognized functional test of each photocell (analog photoelectric sensors) and ionization chamber (analog ionization sensors) as required annually by NFPA 72. Failure of a sensor shall activate the system trouble circuitry, display a “Test Failed” indication, and identify the individual device that failed.
- k. Central Station Option
  - 1) The fire alarm control panel shall provide an integral Digital Alarm Communicator Transmitter (DACT) for signaling to a Central Station. The DACT shall contain a “Dialer-Runaway” feature preventing unnecessary transmissions as the result of intermittent faults in the system and shall be Carrier Access Code (CAC) compliant, accepting up to 20-digit central station telephone numbers. The fire alarm system shall transmit both alarm and trouble signals with the alarm having priority over the trouble signal.
- l. Network Annunciator Option
  - 1) Each SLP-RB and associated display shall provide the option of being configured as a network annunciator. The options for annunciation shall default as a regional annunciator with the capability of selecting global

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- annunciation to provide system wide protection as well as Acknowledge, Silence, and Reset capabilities.
- m. Redundant History Log
    - 1) Each SLP-RB shall contain a full 4100 event history log supporting local and network functions. In the event that a main processor or network node is lost the entire log shall be accessible at any other Loop Interface board. This shall be demonstrated by removing power from the INCC Command Center followed by the extraction of the history log from any loop driver location including the INCC Command Center or Transponder.
  - n. LED'S Indicator and Outputs
    - 1) Each SLP-RB Loop Interface shall incorporate as a minimum the following Diagnostic LED'S indicators:
      - a) Power (green)
      - b) Alarm (red)
      - c) Supervisory (yellow)
      - d) General Trouble (yellow)
      - e) Ground Fault (yellow)
      - f) Transmit (green)
      - g) Receive (green)
  - o. Auxiliary Power Outputs
    - 1) Each SLP-RB Loop Interface shall provide the following supply outputs as follows:
      - a) 24 VDC Non-resettable, 1 amp. max., power limited.
      - b) 24 VDC Resettable, 1 amp. max., power limited.
  - p. Microprocessor
    - 1) The Loop interface shall incorporate a 32 bit RISC processor. An isolated "watchdog" circuit shall monitor the microprocessor and upon failure shall activate the system trouble circuits on the display. The microprocessor shall access the system program, for all control-by-event (CBE) functions. The system program shall not be lost upon failure of both primary and secondary power. Programming shall supporting Boolean logic including AND, OR, NOT, TIME DELAY functions for maximum flexibility.
  - q. Auto Programming
    - 1) The system shall provide means for all SLC devices on any SLC loop to be pre-programmed into the system. Upon activation of auto programming, only the devices that are present will activate. This allows for a system to be commissioned in phases without the need of additional downloads.
  - r. Environmental Drift Compensation
    - 1) The system shall provide means for setting Environmental Drift Compensation by device. When a detector accumulates dust in the chamber and reaches an unacceptable level but yet still below the allowed limit, the control panel shall indicate a maintenance alert warning. When the detector accumulates dust in the chamber above the allowed limit, the control panel shall indicate a maintenance urgent warning.
  - s. NON-FIRE Alarm Module Reporting
    - 1) A non-reporting type ID shall be available for use for energy management or other non-fire situations. NON-FIRE point operation shall not affect control panel operation nor shall it display a message at the panel LDC. Activation of a NON-FIRE point shall activate control by event logic but shall not cause any indication on the control panel.
  - t. One-Man Walk Test

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- 1) The system shall provide both a basic and advanced walk test for testing the entire fire alarm system. The basic walk test shall allow a single operator to run audible tests on the panel. All logic equation automation shall be suspended during the test and while annunciators can be enabled for the test, all shall default to the disabled state. During an advanced walk test, field supplied output point programming will react to input stimuli such as CBE and logic equations. When points are activated in advanced test mode, each initiating event shall latch the input. The advanced test shall be audible and shall be used for pull station verification, magnet activated tests on input devices, input and output device and wiring operation/verification.
  - 2) This test feature is simply intended to provide for certain random spot testing of the system and is not intended to comply with the requirements of testing fire alarm systems in accordance with NFPA 72, as it is impossible to test all of the functions and verify things such as annunciation with only one person.
- u. Signaling Line Circuits
- 1) Each SLP-RB module shall provide communication with all analog/addressable (initiation/control) devices via two (2) signaling line circuits modules (SLC-PM). Each signaling line circuit shall be capable of being wired Class B, Style 4 or Class A, Style 6. The circuits shall be capable of operating in an NFPA Style 7 configuration when equipped with isolator modules between each module type device and isolator sensor bases. Each circuit shall communicate with a maximum of one-hundred-fifty-nine (159) analog sensors and one-hundred-fifty-nine (159) addressable monitor/control devices. A unique 40 character identifier shall be available for each device. The devices shall be of the Velocity series with the capability to poll 10 devices at a time with a maximum polling time of 2 seconds when both SLC's are fully loaded.
- v. Notification Appliance Circuits
- 1) Four (4) independent NAC circuits shall be provided on the SLP-RB, polarized, and rated at 2 amperes DC per circuit, individually over current protected and supervised for opens, grounds, and short circuits. They shall be capable of being wired Class B, Style Y, or Class A, Style Z.
- w. Alarm Dry Contacts
- 1) Alarm dry contacts (Form C) shall be provided and shall be rated 2 amps @ 30 VDC (resistive) and shall transfer whenever a system alarm occurs.
- x. Supervisory Dry Contacts
- 1) Supervisory dry contacts (Form C) shall be provided and shall be rated 2 amps @ 30 VDC (resistive) and shall transfer whenever a system Supervisory condition occurs.
- y. Trouble Dry Contacts
- 1) Trouble dry contacts (Form C) shall be provided and shall be rated at 2 amps @ 30 VDC (resistive) and shall transfer whenever a system trouble occurs.
- G. Network Repeater Module
1. The Intelligent Network Interface shall provide interconnection and protection of remote INCC Command Centers and Transponders. The repeater shall regenerate and condition the token passing, 625 k-baud signal between units. The Repeater shall be available in wire, fiber, or wire/fiber configurations as determined by field conditions. Fiber configurations shall utilize "ST" type connectors and be able to operate with up to 200-micron multimode fiber, but optimize for 62.5/125. The interface shall have a jumper to allow selection of

ground detection of wiring when used in the wire mode. The interface shall have integral LED's to display current status of the board.

#### 2.4 Supplemental Notification Appliance Circuit (SNAC)

- A. Supplemental Notification Appliance Circuit (HPF24) shall be Model HPF24S8 offering up to 8.0 amps (8.0 amps continuous) of regulated 24-volt power. HPF24 shall include the following features:
1. Integral Charger: Charge up to 18.0 amp-hour batteries and support 60-hour standby.
  2. 2 Input Triggers. Input trigger shall be Notification Appliance Circuit (from fire alarm control panel) or relay.
  3. Surface-mount back box.
  4. Ability to delay AC fail delay in accordance with applicable NFPA requirements.
  5. Power limited circuitry in accordance with applicable UL standards.
  6. Operates as sync follower or a sync generator.

#### 2.5 SYSTEM PERIPHERALS

- A. Addressable Devices – General
1. Addressable devices shall provide an address-setting means using rotary decimal switches.
  2. Addressable devices shall use simple to install and maintain decade (numbered 0 to 9) type address switches by using a standard screwdriver to rotate two dials on the device to set the address. Devices which use a binary address set via dipswitch packages, a handheld device programmer or other special tools for setting the device address are not acceptable.
  3. Detectors shall be analog and addressable, and shall connect to the fire alarm control panel's Signaling Line Circuits.
  4. Addressable thermal and smoke detectors shall provide dual (2) status LED's. Both LED's shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LED's shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the flashing mode operation of the detector LED's can be programmed off via the fire control panel program.
  5. The fire alarm control panel shall permit detector sensitivity adjustment through field programming of the system. Sensitivity can be automatically adjusted by the panel on a time-of-day basis.
  6. Using software in the INCC Command Center, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 2.
  7. The detectors shall be ceiling-mount and shall include a separate twist-lock base which includes a tamper proof feature.
  8. The following bases and auxiliary functions shall be available:
    - a. Standard base with remote LED output
    - b. Sounder base rated at 85 DBA minimum.
    - c. Form-C Relay base rated 30VDC, 2.0A
    - d. Isolator base
  9. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.

10. Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (ION, PHOTO, THERMAL).
- B. Addressable Manual Station (MS-7AF)
1. Manual fire alarm stations shall be non-code, non-break glass type, equipped with key lock so that they may be tested without operating the handle. In addition:
    - a. The manual fire alarm station shall be located on an accessible path of travel with front and parallel approach.
    - b. The manual fire alarm station shall be operable without requiring tight grasping, pinching, or twisting of the wrist.
    - c. The manual fire alarm station shall not require more than 5-lb pull force to activate.
  2. An operated station shall be visually apparent, as operated, at a minimum distance of 100 feet (30.5 m) from the front or side.
  3. Stations must be designed such that after an actual activation, they cannot be restored to normal except by key reset.
  4. Manual stations shall be constructed of Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 Inches (44 mm) or larger.
  5. Manual stations shall be constructed of high impact Lexan, with operating instructions provided on the cover. The word FIRE shall appear on the manual station in letters one half inch (12.7 mm) in size or larger.
  6. Addressable manual stations shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status.
- C. Intelligent Thermal Detectors
1. Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. It shall connect via two wires to the fire alarm control panel signaling line circuit.
- D. Addressable Dry Contact Monitor Module (AMM-2F)
1. Addressable monitor module shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to one of the fire alarm control panel SLC's.
  2. The monitor module shall mount in any standard deep electrical box.
  3. The IDC zone shall be suitable for Style B operation.
- E. Addressable Relay Module (AOM-2RF)
1. Addressable Relay Modules shall be available for HVAC control and other building functions. The relay shall have two (2) form C sets of contacts that operate in tandem and are rated for a minimum of 2.0 Amps resistive or 1.0 Amps inductive. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or NAC's may be energized at the same time on the same pair of wires.
  2. The relay module shall mount in a standard 4-inch square (101.6 mm square), 2-1/8 inch (54 mm) deep electrical box, or to a surface mounted back box.
- F. Sprinkler Waterflow Switches (provided and installed by the sprinkler contractor)
1. Waterflow Switches shall be an integral, mechanical, non-coded, non-accumulative retard type.

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2. Waterflow Switches shall have an alarm transmission delay time which is conveniently adjustable from 0 to 60 seconds. Initial settings shall be 30-45 seconds.
  3. All waterflow switches shall come from a single manufacturer and series.
  4. Waterflow switches shall be provided and connected under this section but installed by the mechanical contractor.
  5. Where possible, locate waterflow switches a minimum of one (1) foot from a fitting which changes the direction of the flow and a minimum of three (3) feet from a valve.
- G. Sprinkler and Standpipe Valve Supervisory Switches (provided and installed by the sprinkler contractor):
1. Each sprinkler system water supply control valve riser, zone control valve, and standpipe system riser control valve shall be equipped with a supervisory switch. Standpipe hose valves, and test and drain valves shall not be equipped with supervisory switches.
  2. PIV (post indicator valve) or main gate valves shall be equipped with a supervisory switch.
  3. The switch shall be mounted so as not to interfere with the normal operation of the valve and adjusted to operate within two revolutions toward the closed position of the valve control, or when the stem has moved no more than one-fifth of the distance from its normal position.
  4. The supervisory switch shall be contained in a weatherproof aluminum housing, which shall provide a 3/4 inch (19 mm) conduit entrance and incorporate the necessary facilities for attachment to the valves.
  5. The switch housing shall be finished in red baked enamel.
  6. The entire installed assembly shall be tamper proof and arranged to cause a switch operation if the housing cover is removed, or if the unit is removed from its mounting.
  7. Valve supervisory switches shall be provided and connected under this section and installed by mechanical contractor.
- H. LCD Display Annunciator Requirements
1. Furnish and install where shown on the plans a remote serial annunciator, model LCD-SLP with E3BB-BA2 back box. The annunciator shall provide an 4.3" Touchscreen display, which shall duplicate all information on the basic system display including any network nodes its host panel is annunciating, with the exception of menus. It shall also contain the following function keys: Alarm Acknowledge, Trouble Acknowledge, Signal Silence, System Reset/Lamp Test and System Drill Test.
  2. The annunciator shall contain a key lock, which will enable the switches only when placed in the "ON" position, with the exception of the Trouble Acknowledge, which is used to silence the local trouble audible sounder. The annunciator shall also contain the following LED's: Alarm, Supervisory, System Trouble, Power Fault, System Silenced.
- I. Audible Evacuation Horns
1. The horn appliances shall be System Sensor horns and the horn strobe appliances shall be System Sensor horn Strobes. The horn shall be UL Listed under Standard 464 for Audible Signal Appliances and horns equipped with strobes shall be listed under UL Standard 1971 for Emergency Devices for the Hearing-Impaired. In addition, the strobes shall be certified to meet the requirements of FCC Part 15, Class B and shall incorporate low temperature compensation to ensure the lowest possible current consumption.
  2. All horns shall use solid-state components and shall provide field selectable operation with volume control and tone control. All models shall have a peak anechoic sound output of 83 dB at 10 feet and an adjustable frequency range of 800 to 1200 Hz. All inputs shall employ terminals that accept #12 to #18 AWG wire sizes.

3. The strobe portion of the appliance shall produce a flash rate of one (1) flash per second over the Regulated Voltage Range and shall incorporate a Xenon flashtube enclosed in a rugged Lexan® lens. The strobe shall be of low current design. Where Multi- Candela Chime Strobes are specified, the strobe intensity shall have a minimum of four (4) field selectable settings and shall be rated per UL Standard 1971 at: 15/30/75/110cd or 135/185cd for wall mount and 15/30/75/95cd or 115/177cd for ceiling mount. The selector switch for selecting the candela shall be tamper resistant and not accessible from the front of the appliance. The 1575 candela strobe shall be specified when 15 candela UL Standard 1971 listing with 75 candela on-axis is required (e.g. ADA compliance).
4. When synchronization is required, the strobe portion of the appliance shall be compatible with System Sensor's MDL3R sync modules or FCI's HPF24S8 Power Supply with built-in Patented Sync Protocol. The strobes shall not drift out of synchronization at any time during operation. If the sync module or Power Supply fails to operate, (i.e., contacts remain closed), the strobe shall revert to a non-synchronized flash rate.

J. Strobe Devices

1. Strobes shall meet the requirements of the ADA, UL Standard 1971 and shall meet the following criteria:
  - a. The maximum pulse duration shall be 2/10 of one second.
  - b. Strobe intensity shall meet the requirements of UL 1971.
  - c. The flash rate shall meet the requirements of UL 1971.
  - d. Strobe candela rating shall be determined by positioning the selector switch on the back of the device.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Install system components and all associated devices in accordance with applicable NFPA Standards and manufacturer's recommendations.
- B. Installation personnel shall be supervised by persons who are qualified in the installation, inspection, and testing of fire alarm systems. Examples of qualified personnel shall include, but not be limited to, the following:
  1. Factory trained and certified personnel.
  2. National Institute of Certification in Engineering Technologies (NICET) fire alarm Level 3 certified personnel.
  3. Personnel licensed or certified by state or local authority.

3.2 EQUIPMENT INSTALLATION

- A. Furnish and install a complete Fire Alarm System as described herein and as shown on the plans. Include sufficient control unit(s), annunciator(s), manual stations, automatic fire detectors, smoke detectors, audible and visible notification appliances, wiring, terminations, electrical boxes, and all other necessary material for a complete operating system.
- B. Device Location-Indicating Lights: Locate in the public space immediately adjacent to the device they monitor.

### 3.3 WIRING INSTALLATION

- A. System Wiring: Wire and cable shall be a type listed for its intended use by an approval agency acceptable to the Authority Having Jurisdiction (AHJ) and shall be installed in accordance with the appropriate articles from the current approved edition of the Code.
- B. Contractor shall obtain from the Fire Alarm System Manufacturer written instruction regarding the appropriate wire/cable to be used for this installation. No deviation from the written instruction shall be made by the Contractor without the prior written approval of the Fire Alarm System Manufacturer.
- C. Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm initiating device circuits wiring and a different color code for supervisory circuits. Color-code notification appliance circuits differently from alarm-initiating circuits. Paint fire alarm system junction boxes and covers red.

### 3.4 TESTING

- A. Provide the service of a competent, factory-trained technician authorized by Gamewell-FCI to technically supervise and participate during the pre-testing and acceptance testing of the system.
  - 1. Before energizing the cables and wires, conduct a complete visual inspection of all control panel connections and test wiring for short circuits, ground faults, continuity, and insulation.
  - 2. Close each sprinkler system control valve and verify proper supervisory alarm at the Fire Alarm Panel.
  - 3. Verify activation of all flow switches.
  - 4. Open initiating device circuits and verify that the trouble signal actuates.
  - 5. Open signaling line circuits and verify that the trouble signal actuates.
  - 6. Open and short notification appliance circuits and verify that trouble signal actuates.
  - 7. Ground initiating device circuits and verify response of trouble signals.
  - 8. Ground signaling line circuits and verify response of trouble signals.
  - 9. Ground notification appliance circuits and verify response of trouble signals.
  - 10. Check installation, supervision, and operation of all intelligent smoke detectors.
  - 11. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the Fire Alarm Panel and the correct activation of the control points.
  - 12. When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

### 3.5 ACCEPTANCE TESTING

- A. Provide the service of a competent, factory-trained technician authorized by Gamewell-FCI to technically supervise and participate during the pre-testing and acceptance testing of the system.
- B. Before the installation shall be considered completed and acceptable by the AHJ, a complete test using as a minimum, the following scenarios shall be performed and witnessed by a representative

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approved by the specifying engineer. The monitoring company and/or the fire department must be notified prior to the final test in accordance with local requirements.

- C. The contractor's job foreman, in the presence of a representative of the manufacturer, a representative of the owner, and the fire department shall operate every installed device to verify proper operation and correct annunciation at the control panel.
- D. The signaling line circuits and notification appliance circuits shall be opened in at least two (2) locations to verify the presence of supervision.
- E. When the testing has been completed to the satisfaction of both the contractor's job foreman and the representatives of the manufacturer and owner, a notarized letter co-signed by each attesting to the satisfactory completion of said testing shall be forwarded to the owner and the fire department.
- F. The contractor shall leave the fire alarm system in proper working order, and, without additional expense to the owner, shall replace any defective materials or equipment provided by him under this contract within one year (365 days) from the date of final acceptance by the awarding authority.

3.6 INSTRUCTION

- A. Provide instruction for operating the system. Provide (1) two-hour training periods, to be scheduled at the owner's discretion, any time during the three year warranty period. "Hands-on" demonstrations of the operation of all system components and the entire system functions shall be provided. If products ordered in advance are included in Project, insert a schedule below.

**END OF SECTION 283110**

**SECTION 31 20 00 - EARTH MOVING**

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, walks, pavements,.
3. Excavating and backfilling for buildings and structures.
4. Subbase course for concrete pavements.
5. Excavating and backfilling trenches for utilities and pits for buried utility structures.

1.2 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course, or the subgrade if there is no subbase course, and hot-mix asphalt paving or concrete paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

E. Fill: Soil materials used to raise existing grades.

F. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock-excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

H. Subbase Course: Aggregate layer placed between the subgrade and base course for asphalt or concrete pavement.

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- I. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase or base course if there is no subbase, drainage fill, drainage course, or topsoil materials.
- J. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of the following manufactured products required:
  - 1. Geotextiles.
  - 2. Warning tapes.

1.4 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Resident Engineer and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by Resident Engineer or authorities having jurisdiction.
  - 3. Maintain emergency vehicle access traffic ways at all times. If the Work impacts the emergency vehicle access traffic way, coordinate with the local Fire Marshal.
- B. Utility Locator Service: Retain a professional utility locator service and have all existing underground utilities located and surface-identified before beginning earth-moving operations.
- C. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures are in place.
- D. Do not commence earth-moving operations until plant-protection measures are in place.
- E. Existing Utilities: Do not interrupt utilities serving facilities occupied by City or others unless permitted in writing by Resident Engineer and then only after arranging to provide temporary utility services according to requirements indicated.
  - 1. Notify Resident Engineer not less than five days in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without Resident Engineer's written permission.
- F. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

## PART 2 - PRODUCTS

### 2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, free of rock or gravel larger than 4 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
  - 1. Expansion Index: Not more than 50 as measured by ASTM D 4829.
  - 2. Upper 18 inches of subgrade fill under landscaped areas: Soil containing not more than 10% stones or lumps larger than 1-1/2 inches.
- C. Unsatisfactory Soils: Soil Classification Groups OL, CH, MH, OH, and PT according to ASTM D 2487; Soil Classification Groups GC, SC, CL and ML where those soils are classified as medium or highly expansive by ASTM D 4829.
  - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Backfill and Fill: Satisfactory soil materials.
- E. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- F. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 294/D 2940M; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- G. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- H. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- I. Drainage Course (Capillary Break): Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.
- J. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and zero to 5 percent passing a No. 4 sieve.
- K. Sand: ASTM C 33/C 33M; fine aggregate.

- L. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

## 2.2 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

### 3.2 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.

### 3.3 EXPLOSIVES

- A. Explosives: Do not use explosives.

### 3.4 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock,

soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

### 3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
  1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
- B. Excavations at Edges of Tree- and Plant-Protection Zones:
  1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

### 3.6 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

### 3.7 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.
  1. Clearance: 12 inches each side of pipe or conduit unless otherwise indicated.
- C. Trench Bottoms:
  1. Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
  2. Unless indicated otherwise, excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

### 3.8 SUBGRADE INSPECTION

- A. Notify Resident Engineer when excavations have reached required subgrade.
- B. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
  - 1. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Testing Agency, and replace with compacted backfill or fill as directed.
- C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Testing Agency, without additional compensation.

### 3.9 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Resident Engineer.
  - 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Resident Engineer.

### 3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
  - 2. Obtain Resident Engineer's acceptance of stockpile locations prior to creation. If stockpile must be moved, obtain Resident Engineer's acceptance.

### 3.11 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
  - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
  - 2. Surveying locations of underground utilities for Record Documents.
  - 3. Testing and inspecting underground utilities.
  - 4. Removing concrete formwork.
  - 5. Removing trash and debris.
  - 6. Removing temporary shoring, bracing, and sheeting.
  - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
  - 1. Unless otherwise indicated, provide pea gravel bedding for sanitary sewer and storm sewer piping.
  - 2. Clean sand may be used for bedding under piping other than sewer piping.
- C. Backfill voids with satisfactory soil while removing shoring and bracing.
- D. Initial Backfill:
  - 1. Soil Backfill: Place and compact initial backfill of pea gravel or satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.
    - a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- E. Final Backfill:
  - 1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
- F. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.13 SOIL FILL

- A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.
- B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- C. Place and compact fill material in layers to required elevations.
- D. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.14 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

### 3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
  1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 90 percent.
  2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.
  3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
  4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent, except for areas under structures, building slabs, pavements and walkways.

### 3.16 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
  1. Provide a smooth transition between adjacent existing grades and new grades.
  2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

### 3.17 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
  1. If subdrainage textile is indicated on drawings, install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
  2. Place base course material under hot-mix asphalt pavement.
  3. Shape base course to required crown elevations and cross-slope grades.

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4. Place subbase course and base course 6 inches or less in compacted thickness in a single layer.
5. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
6. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.18 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
  1. Scarify or remove and replace soil material to depth as directed by Geotechnical Engineer; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
  1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off District's property.

**END OF SECTION 31 20 00**

**SECTION 323113 - CHAIN LINK FENCES AND GATES**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Chain-link fences.
2. Swing gates.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for cast-in-place concrete post footings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
  - a. Fence and gate posts, rails, and fittings.
  - b. Chain-link fabric, reinforcements, and attachments.
  - c. Accessories: .
  - d. Gates and hardware.

B. Shop Drawings: For each type of fence and gate assembly.

1. Include plans, elevations, sections, details, and attachments to other work.
2. Include accessories, hardware, gate operation, and operational clearances.

C. Samples for Verification: For each type of component with factory-applied finish, prepared on Samples of size indicated below:

1. Polymer-Coated Components: In 6-inch lengths for components and on full-sized units for accessories.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For factory-authorized service representative.

B. Product Certificates: For each type of chain-link fence and gate.

C. Product Test Reports: For framework strength according to ASTM F 1043, for tests performed by a qualified testing agency.

- D. Sample Warranty: For special warranty.

#### 1.4 FIELD CONDITIONS

- A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

#### 1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure to comply with performance requirements.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 2. Warranty Period: Five years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Lightning Protection System: Maximum resistance-to-ground value of 25 ohms at each grounding location along fence under normal dry conditions.

#### 2.2 CHAIN-LINK FENCE FABRIC

- A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist according to "CLFMI Product Manual" and requirements indicated below:
  - 1. Fabric Height: As indicated on Drawings.
  - 2. Steel Wire for Fabric: Wire diameter of 0.148 inch.
    - a. Mesh Size: 2 inches.
    - a. Polymer-Coated Fabric: ASTM F 668, Class 2b over zinc-coated steel wire.
      - 1) Color: Black, according to ASTM F 934.
  - 3. Selvage: Knuckled at both selvages.

2.3 FENCE FRAMEWORK

- A. Posts and Rails: ASTM F 1043 for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F 1043 or ASTM F 1083 based on the following:
1. Fence Height: 8'-0".
  2. Heavy-Industrial-Strength Material: Group IA, round steel pipe, Schedule 40.
    - a. Line Post: As indicated on Drawings. Min. 2.375 inches in diameter.
    - b. End, Corner, and Pull Posts: As indicated on Drawings. Min. 2.875 inches in diameter.
  3. Horizontal Framework Members: Intermediate, top, and bottom rails for 8'-0" high fence according to ASTM F 1043.
    - a. Top Rail: As indicated on Drawings. Min. 1.66 inches in diameter.
  4. Brace Rails: ASTM F 1043.
  5. Metallic Coating for Steel Framework:
    - a. Type A: Not less than minimum 2.0-oz./sq. ft. average zinc coating according to ASTM A 123/A 123M or 4.0-oz./sq. ft. zinc coating according to ASTM A 653/A 653M.
  6. Polymer coating over metallic coating.
    - a. Color: Black to match chain-link fabric, according to ASTM F 934.

2.4 SWING GATES

- A. General: ASTM F 900 for gate posts and single swing gate types.
1. Gate Leaf Width: As indicated on Drawings.
  2. Framework Member Sizes and Strength: Based on gate fabric height of 72 inches or less or as indicated on Drawings.
- B. Pipe and Tubing:
1. Zinc-Coated Steel: ASTM F 1043 and ASTM F 1083; protective coating and finish to match fence framework.
  2. Gate Posts: Round tubular steel.
  3. Gate Frames and Bracing: Round tubular steel.
- C. Frame Corner Construction: Welded.
- D. Hardware:
1. Hinges: 180-degree outward swing.
  2. Cane Bolt: Per drawing

3. Latch: Per drawing

## 2.5 FITTINGS

- A. Provide fittings according to ASTM F 626.
- B. Post Caps: Provide for each post.
  1. Provide line post caps with loop to receive tension wire or top rail.
- C. Rail and Brace Ends: For each gate, corner, pull, and end post.
- D. Rail Fittings: Provide the following:
  1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.
  2. Rail Clamps: Line and corner boulevard clamps for connecting intermediate and bottom rails to posts.
- E. Tension and Brace Bands: Pressed steel.
- F. Tension Bars: Steel, length not less than 2 inches shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.
- G. Truss Rod Assemblies: Steel, hot-dip galvanized after threading rod and turnbuckle or other means of adjustment.
- H. Tie Wires, Clips, and Fasteners: According to ASTM F 626.
  1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, according to the following:
    - a. Hot-Dip Galvanized Steel: 0.148-inch-diameter wire; galvanized coating thickness matching coating thickness of chain-link fence fabric.
- I. Finish:
  1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz./sq. ft. of zinc.

## 2.6 GROUT AND ANCHORING CEMENT

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout, recommended in writing by manufacturer, for exterior applications.
- B. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating, and that is recommended in writing by manufacturer for exterior applications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.
  - 1. Do not begin installation before final grading is completed unless otherwise permitted by Resident Engineer.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 CHAIN-LINK FENCE INSTALLATION

- A. Install chain-link fencing according to ASTM F 567 and more stringent requirements specified.
- B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
- C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
  - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
  - 2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
    - a. Posts Set into Sleeves in Concrete: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed according to anchoring material manufacturer's written instructions. Finish anchorage joint to slope away from post to drain water.
- D. Terminal Posts: Install terminal end, corner, and gate posts according to ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of as indicated on Drawings. For runs exceeding 500 feet, space pull posts an equal distance between corner or end posts.
- E. Line Posts: Space line posts as indicated on drawings.
- F. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fence posts. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.

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1. Locate horizontal braces at midheight of fabric 72 inches or higher, on fences with top rail, and at two-third fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- G. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fence posts. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.
- H. Intermediate and Bottom Rails: Secure to posts with fittings.
- I. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 2-inch bottom clearance between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.
- J. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts, with tension bands spaced not more than 15 inches o.c.
- K. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric according to ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.
  1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and to braces at 24 inches o.c.
- L. Fasteners: Install nuts for tension bands and carriage bolts on the side of fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

3.4 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests.

3.6  
ADJUSTING
- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware and other moving parts.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain chain-link fences and gates.

**END OF SECTION 323113**

## **SUPPLEMENTARY SPECIAL PROVISIONS**

### **APPENDICES**

**APPENDIX A**  
**NEPA, CEQA and NOE**



U.S. Department of Housing and Urban  
Development  
451 Seventh Street, SW  
Washington, DC 20410  
www.hud.gov  
espanol.hud.gov

**Environmental Review for Activity/Project that is Categorically  
Excluded Subject to Section 58.5  
Pursuant to 24 CFR 58.35(a)**

**Project Information**

**Project Name:** Park de la Cruz Improvements

**Responsible Entity:** City of San Diego

**Grant Recipient** (if different than Responsible Entity):

**State/Local Identifier:** California / City of San Diego (063210)

**Preparer:** Krissy Toft-Maier

**Certifying Officer Name and Title:** Alyssa Muto, Deputy Director, Planning Department, City of San Diego

**Grant Recipient** (if different than Responsible Entity):

**Consultant** (if applicable):

**Direct Comments to:** Krissy Toft-Maier; email: [ktoft@sandiego.gov](mailto:ktoft@sandiego.gov)

**Project Location:** 3901 Landis Street, San Diego, CA 92105

**Description of the Proposed Project** [24 CFR 50.12 & 58.32; 40 CFR 1508.25]: The proposed project will provide path of travel and facility interior and exterior accessibility improvements to the existing community center building and gymnasium. Improvements will include new sidewalks, walkways, doorways and stairways; handrails/hardware; flooring; upgrades to the existing restrooms and kitchen; new fire sprinklers, fire alarms, security system and communication system; new windows, HVAC systems, ceilings, building roof and electrical and lighting upgrades at Park de la Cruz.

**Level of Environmental Review Determination:**

Categorically Excluded per 24 CFR 58.35(a), and subject to laws and authorities at §58.5:

Categorically excluded per 24 CFR 58.35(a)(3)(iii): Rehabilitation of buildings and improvements; non-residential structures including commercial, industrial and public buildings and 24 CFR 58.35(a)(1): Acquisition, repair, improvement, reconstruction, or rehabilitation of public facilities and improvements (other than buildings).

**Funding Information**

Grant Number	HUD Program	Funding Amount
B-16-MC-06-0542	CDBG	\$5,000,000

**Estimated Total HUD Funded Amount:** \$5,000,000

**Estimated Total Project Cost** (HUD and non-HUD funds) [24 CFR 58.32(d)]: \$9,850,000

**Compliance with 24 CFR 50.4, 58.5, and 58.6 Laws and Authorities**

Record below the compliance or conformance determinations for each statute, executive order, or regulation. Provide credible, traceable, and supportive source documentation for each authority. Where applicable, complete the necessary reviews or consultations and obtain or note applicable permits of approvals. Clearly note citations, dates/names/titles of contacts, and page references. Attach additional documentation as appropriate.

Compliance Factors: Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5 and §58.6	Are formal compliance steps or mitigation required?	Compliance determinations
<b>STATUTES, EXECUTIVE ORDERS, AND REGULATIONS LISTED AT 24 CFR 50.4 &amp; 58.6</b>		
<b>Airport Hazards</b>  24 CFR Part 51 Subpart D	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	The proposed project does not involve the sale or acquisition of existing property.  The proposed project site is not located within the RCZ or APZ of any airport or military CZ.  Source: City of San Diego PTS Database Metadata-San Diego Regional Airport Authority.
<b>Coastal Barrier Resources</b>  Coastal Barrier Resources Act, as amended by the Coastal Barrier Improvement Act of 1990 [16 USC 3501]	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	The proposed project is located in HUD Region IX (CA). There are no designated coastal barrier resources in HUD Region IX.
<b>Flood Insurance</b>  Flood Disaster Protection Act of 1973 and National Flood Insurance Reform Act of 1994 [42 USC 4001-4128 and 42 USC 5154a]	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	The proposed project does involve the acquisition, construction or rehabilitation of insurable structures, buildings or mobile homes. The structure or part of the structure is not located in a FEMA designated Special Flood Hazard Area.
<b>STATUTES, EXECUTIVE ORDERS, AND REGULATIONS LISTED AT 24 CFR 50.4 &amp; 58.5</b>		
<b>Clean Air</b>  Clean Air Act, as amended, particularly section 176(c) & (d); 40 CFR Parts 6, 51, 93	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	The proposed project site is located within a “non-attainment” area and conforms with the EPA-approved California State Implementation Plan- San Diego County Air Quality Management Plans per contact with the California Environmental Protection Agency Air Resources Board.

		Source: CA EPA Air Resources Board SIP Strategy <a href="http://www.arb.ca.gov/planning/sip/sip.html">http://www.arb.ca.gov/planning/sip/sip.html</a>
<b>Coastal Zone Management</b>  Coastal Zone Management Act, sections 307(c) & (d)	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	The proposed project does not involve the placement, erection, or removal of materials or an increase in the intensity of use in the Coastal Zone per the City of San Diego and California Coastal Commission Coastal Development Permit Jurisdiction boundaries.  Source: <a href="http://coastalmanagement.noaa.gov/mystate/ca.html">http://coastalmanagement.noaa.gov/mystate/ca.html</a>  City of San Diego PTS (Project Tracking System) Database Metadata- City of San Diego and California Coastal Commission Coastal Development Permit Jurisdiction.
<b>Contamination and Toxic Substances</b>  24 CFR Part 50.3(i) & 58.5(i)(2)	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	The proposed project site is not located adjacent to any uses associated with hazardous materials. There are no dumps, landfills, industrial sites, underground storage tanks, or any other facilities capable of releasing toxic chemicals, hazardous wastes or radioactive materials near the project.  Source: Envirostor CA Department of Toxic Substance Control: <a href="http://www.envirostor.dtsc.ca.gov">http://www.envirostor.dtsc.ca.gov</a>  State Water Resources Control Board: <a href="http://geotracker.waterboards.ca.gov">http://geotracker.waterboards.ca.gov</a>
<b>Endangered Species</b>  Endangered Species Act of 1973, particularly section 7; 50 CFR Part 402	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	Due to the highly urbanized nature of the area, there are no sensitive plant or animal species, habitats or wildlife migration corridors within or adjacent to the area.  Source: City of San Diego PTS Database Metadata- Multiple Habitat Planning Area July 2002
<b>Explosive and Flammable Hazards</b>  24 CFR Part 51 Subpart C	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	The proposed project site is not located adjacent to any uses associated with hazardous materials. There are no dumps, landfills, industrial sites, underground storage tanks, or any other facilities capable of releasing toxic chemicals, hazardous wastes or radioactive materials near the project.  Source: Envirostor CA Department of Toxic Substance Control: <a href="http://www.envirostor.dtsc.ca.gov">http://www.envirostor.dtsc.ca.gov</a>  State Water Resources Control Board: <a href="http://geotracker.waterboards.ca.gov">http://geotracker.waterboards.ca.gov</a>
<b>Farmlands Protection</b>	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	The project does not include prime and unique farmland, or other farmland of statewide or local importance. The site is located within a completely

<p>Farmland Protection Policy Act of 1981, particularly sections 1504(b) and 1541; 7 CFR Part 658</p>		<p>urbanized neighborhood and is developed with urban land uses.</p> <p>Source: State of California Department of Conservation Farmland Mapping and Monitoring Program, 1984-2004 and State of California Department of Conservation, California Williamson Act Lands 2004</p>
<p><b>Floodplain Management</b></p> <p>Executive Order 11988, particularly section 2(a); 24 CFR Part 55</p>	<p>Yes No  <input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>The project does not involve property acquisition, management, construction or improvements within a 100-year floodplain identified by FEMA maps. Project site is located in Zone X and would not affect any floodplain management</p> <p>Source: Panel 1901 of 2375; May 16, 2012.</p>
<p><b>Historic Preservation</b></p> <p>National Historic Preservation Act of 1966, particularly sections 106 and 110; 36 CFR Part 800</p>	<p>Yes No  <input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>The proposed project site is not listed on the National Register of Historic Places or identified as a historic resource designated by the City of San Diego Historical Resources Board. No historic properties located on the National Register are located on or adjacent to the project.</p> <p>Source: National Park Service National Register of Historic Places Database- <a href="http://www.nps.gov/nr/">http://www.nps.gov/nr/</a>  HRB Listing of Historical Sites/Resources <a href="http://www.sandiego.gov/planning/programs/historical">www.sandiego.gov/planning/programs/historical</a></p>
<p><b>Noise Abatement and Control</b></p> <p>Noise Control Act of 1972, as amended by the Quiet Communities Act of 1978; 24 CFR Part 51 Subpart B</p>	<p>Yes No  <input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>The proposed project is rehabilitation of an existing facility and does not involve development of noise sensitive uses. The construction activities will not cause a permanent increase in ambient noise levels that exceed an average of 65 decibels.</p> <p>Source:  <a href="https://www.onecpd.info/onecpd/assets/File/Noise-Guidebook">https://www.onecpd.info/onecpd/assets/File/Noise-Guidebook</a></p>
<p><b>Sole Source Aquifers</b></p> <p>Safe Drinking Water Act of 1974, as amended, particularly section 1424(e); 40 CFR Part 149</p>	<p>Yes No  <input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>There are no sole source aquifers located within the City of San Diego's boundaries.</p> <p>Source: EPA Designated Sole Source Aquifers in EPA Region IX.  <a href="http://epa.gov/Region9/water/groundwater/ssa">http://epa.gov/Region9/water/groundwater/ssa</a></p>
<p><b>Wetlands Protection</b></p> <p>Executive Order 11990, particularly sections 2 and 5</p>	<p>Yes No  <input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>The proposed project does not involve new construction within or adjacent to wetlands, marshes, wet meadows, mud flats or natural ponds.</p> <p>Source: USDI Fish and Wildlife Service, Wetlands Online Mapper.  <a href="http://www.fws.gov/wetlands/Data/Mapper.html">http://www.fws.gov/wetlands/Data/Mapper.html</a></p>

<b>Wild and Scenic Rivers</b>  Wild and Scenic Rivers Act of 1968, particularly section 7(b) and (c)	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	The City of San Diego does not contain a Wild or Scenic River within its boundaries.  Source: National Park Service Designated Wild and Scenic Rivers List, 3/24/08  <a href="http://www.rivers.gov/california.php">http://www.rivers.gov/california.php</a>
<b>ENVIRONMENTAL JUSTICE</b>		
<b>Environmental Justice</b>  Executive Order 12898	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	The proposed project site is suitable for its proposed use and will not be adversely impacted by adverse environmental conditions.  <a href="http://www2.epa.gov/laws-regulations/summary-executive-order-12898-federal-actions-address-environmental-justice">http://www2.epa.gov/laws-regulations/summary-executive-order-12898-federal-actions-address-environmental-justice</a>

**Field Inspection** (Date and completed by):

**Summary of Findings and Conclusions:** Proposed project site is an existing facility which does not require any mitigation for compliance with any listed statutes or authorities.

**Mitigation Measures and Conditions [40 CFR 1505.2(c)]**

Summarize below all mitigation measures adopted by the Responsible Entity to reduce, avoid, or eliminate adverse environmental impacts and to avoid non-compliance or non-conformance with the above-listed authorities and factors. These measures/conditions must be incorporated into project contracts, development agreements, and other relevant documents. The staff responsible for implementing and monitoring mitigation measures should be clearly identified in the mitigation plan.

Law, Authority, or Factor	Mitigation Measure

**Determination:**

- This categorically excluded activity/project converts to **EXEMPT** per Section 58.34(a)(12), because it does not require any mitigation for compliance with any listed statutes or authorities, nor requires any formal permit or license; **Funds may be committed and drawn down after certification of this part** for this (now) EXEMPT project; OR
- This categorically excluded activity/project cannot convert to Exempt status because one or more statutes or authorities listed at Section 58.5 requires formal consultation or mitigation. Complete consultation/mitigation protocol requirements, **publish NOI/RROF and obtain "Authority to**

consultation/mitigation protocol requirements, **publish NOI/RROF and obtain "Authority to Use Grant Funds"** (HUD 7015.16) per Section 58.70 and 58.71 before committing or drawing down any funds; OR

- This project is not categorically excluded OR, if originally categorically excluded, is now subject to a full Environmental Assessment according to Part 58 Subpart E due to extraordinary circumstances (Section 58.35(c)).

Preparer Signature: Krissy Toft-Maier Date: 6/8/16

Name/Title/Organization: Krissy Toft-Maier, HUD Programs Coordinator, City of San Diego

Responsible Entity Agency Official Signature:

Alyssa Muto Date: 6/15/16

Name/Title: Alyssa Muto, Deputy Director, Planning Department, City of San Diego

This original, signed document and related supporting material must be retained on file by the Responsible Entity in an Environmental Review Record (ERR) for the activity/project (ref: 24 CFR Part 58.38) and in accordance with recordkeeping requirements for the HUD program(s).

NOTICE OF EXEMPTION

(Check one or both)

TO: X 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
DEVELOPMENT SERVICES DEPARTMENT
1222 FIRST AVENUE, MS 501
SAN DIEGO, CA 92101

OFFICE OF PLANNING AND RESEARCH
1400 TENTH STREET, ROOM 121
SACRAMENTO, CA 95814

PROJECT TITLE: PARK DE LA CRUZ IMPROVEMENTS

PROJECT LOCATION-SPECIFIC: 3901 Landis Street, San Diego CA 92105

PROJECT LOCATION-CITY/COUNTY: San Diego/San Diego

DESCRIPTION OF NATURE AND PURPOSE OF THE PROJECT: The proposed project will provide path of travel and facility interior and exterior accessibility improvements to the existing community center building and gymnasium. Improvements will include new sidewalks, walkways, doorways and stairways; handrails/hardware; flooring; upgrades to the existing restrooms and kitchen; new fire sprinklers, fire alarms, security system and communication system; new windows, HVAC systems, ceilings, building roof and electrical and lighting upgrades at Park de la Cruz.

NAME OF PUBLIC AGENCY APPROVING PROJECT: City of San Diego

NAME OF PERSON OR AGENCY CARRYING OUT PROJECT: City of San Diego Park and Recreation Department
202 C Street
San Diego, CA 92101
(619) 525-8213

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))
(X) CATEGORICAL EXEMPTION; 15301, EXISTING FACILITIES
( ) STATUTORY EXEMPTIONS:

REASONS WHY PROJECT IS EXEMPT: The City of San Diego conducted an environmental review which has determined that the project meets the criteria set forth in State CEQA Guidelines Sections 15301 Existing Facilities which allows for minor alteration to existing public or private structures involving negligible or no expansion of use and does not trigger any of the exceptions to categorical exemptions found in State CEQA Guideline Section 15300.2.

LEAD AGENCY CONTACT PERSON: Alyssa Muto, Deputy Director

TELEPHONE: (619) 533-3103

IF FILED BY APPLICANT:

- 1. ATTACH CERTIFIED DOCUMENT OF EXEMPTION FINDING.
2. HAS A NOTICE OF EXEMPTION BEEN FILED BY THE PUBLIC AGENCY APPROVING THE PROJECT?
( ) YES ( ) NO

IT IS HEREBY CERTIFIED THAT THE CITY OF SAN DIEGO HAS DETERMINED THE ABOVE ACTIVITY TO BE EXEMPT FROM CEQA

[Handwritten Signature]
SIGNATURE/TITLE

DEPUTY DIRECTOR

6/15/16
DATE

CHECK ONE:

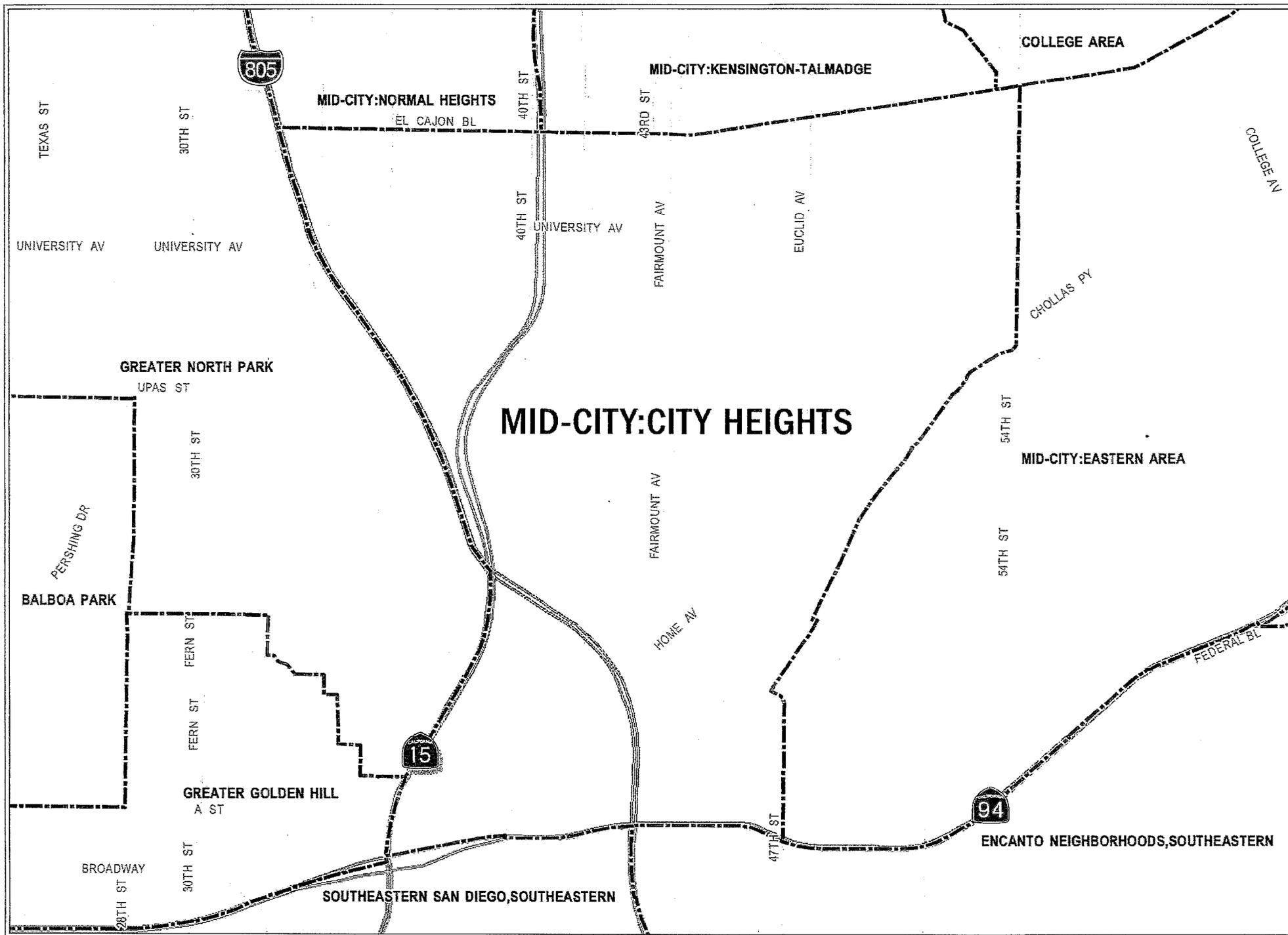
- (X) SIGNED BY LEAD AGENCY
( ) SIGNED BY APPLICANT

DATE RECEIVED FOR FILING WITH COUNTY CLERK OR OPR:

Revised 010410mjh

**PROJECT LOCATION MAP – 3901 Landis Street, San Diego, CA 92105**  
**Park & Recreation Department- Park de la Cruz Improvements**





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Park de La Cruz Neighborhood Recreation Center & Gym  
Appendix A - NEPA, CEQA and NOE

# Parcel Information Report

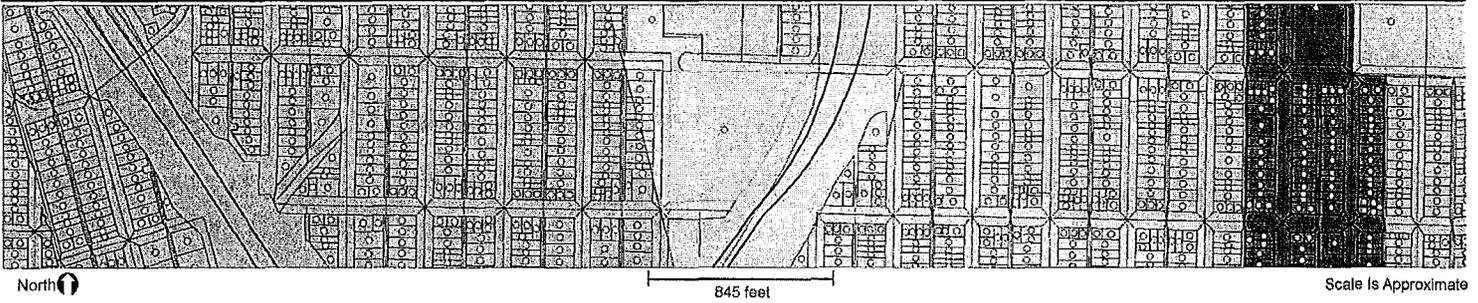


5/3/2016 16:06:53

Report Number 101

THE CITY OF SAN DIEGO  
Development Services Department  
1222 First Avenue, San Diego, CA 92101-4154

Page 1 of 2



## Map Layers Included In Report

Description	Visible	Transparent	Has Intersecting Features
Roads	<input checked="" type="checkbox"/>		No
Freeways	<input checked="" type="checkbox"/>		No
Parcels	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Yes
Affordable Housing Parking Demand	<input checked="" type="checkbox"/>		Yes
Airports: Airport Approach Overlay Zone (SDIA)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No
Airports: Airport Influence Areas	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No
Airports: Safety Zones	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No
Base Zones ("Official Zoning Map")	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Yes
Coastal Overlay Zone (Permit Jurisdictions)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No
Community Plan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Yes
FEMA Floodways & Floodplains	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Yes
Historic Districts: Existing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No
Historic Districts: Potential	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No

Every reasonable effort has been made to assure the accuracy of this map. However, neither the SanGIS participants nor San Diego Data Processing Corporation assume any liability arising from its use.

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PROPRIETARY INFORMATION: The use of this information is pursuant to sublicense agreement only. Any resale or relicensing of this information is prohibited, except in accordance with such sublicensing agreements.

## Intersecting Features

Parcels					
APN	Recordation	Owner Information	Valuation	Other	
447-660-0300	Record: 012800 Date: Legal:	CITY OF SAN DIEGO PUBLIC AGENCY	Land: Imp: Total:	\$0 \$0 \$0	Units: 0 Taxable: <input type="checkbox"/> Own Occ: <input type="checkbox"/>
Address(es) PARK (EX HWY)2.97 AC M/L IN 00000 3901 LANDIS ST					
760-104-2700	Record: 559036 Date: 0/26/201 Legal:	CITY OF SAN DIEGO PUBLIC AGENCY	Land: Imp: Total:	\$163,976 \$1,818,556 \$1,982,532	Units: 0 Taxable: <input type="checkbox"/> Own Occ: <input type="checkbox"/>
Address(es) 00000 3901 LANDIS ST					

Affordable Housing Parking Demand	
Feature Name	Feature Detail
PARKING DEMAND: High	FINAL SCORE: 1.5

Base Zones ("Official Zoning Map")		
Zonename	Ordinance Number	Implementation Date
OP-1-1	R-301263	02/28/2006

# Parcel Information Report



5/3/2016 16:06:53

Report Number 101

THE CITY OF SAN DIEGO  
Development Services Department  
1222 First Avenue, San Diego, CA 92101-4154

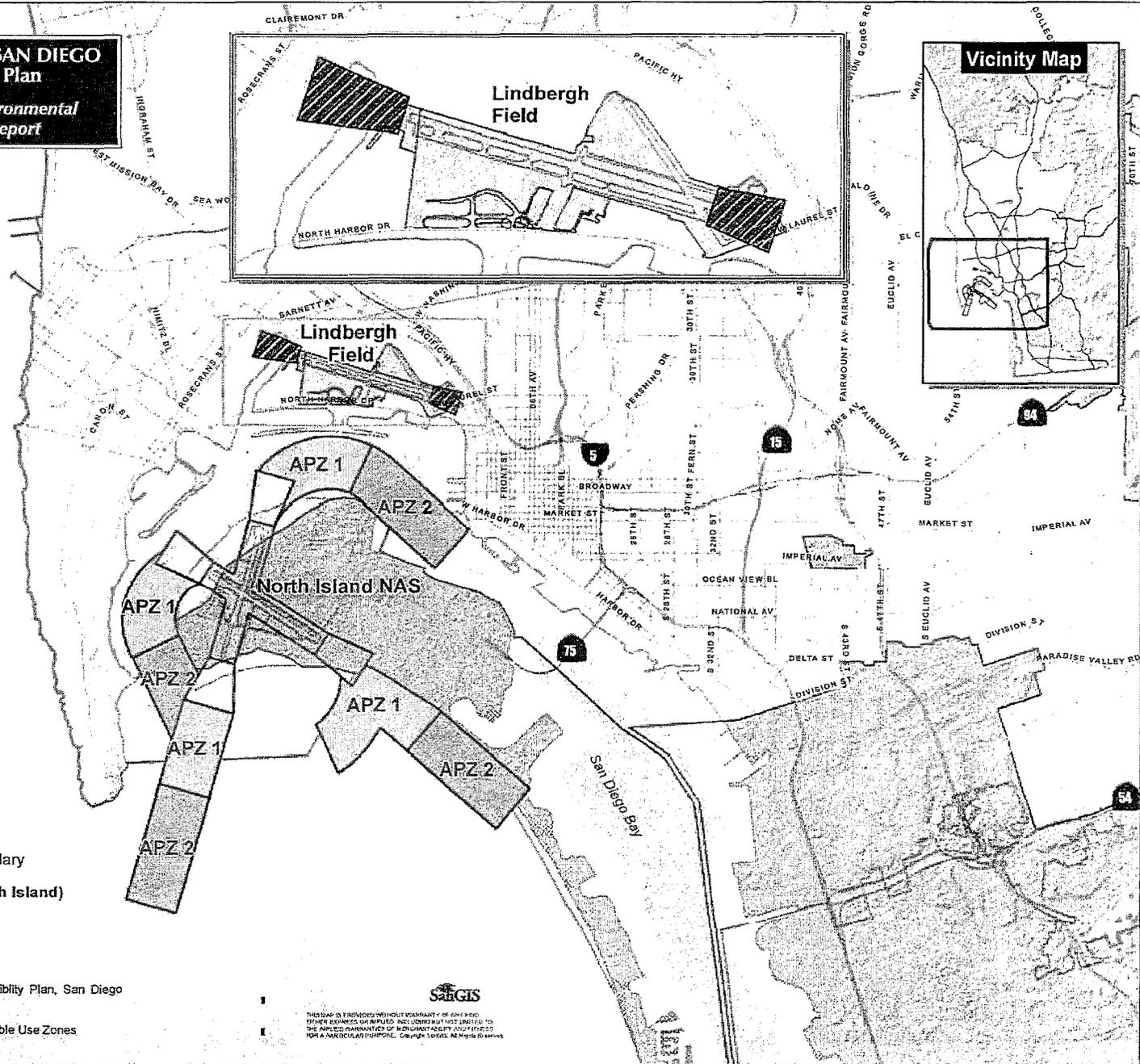
Page 2 of 2

Community Plan	
Community Plan Name	Code
MID-CITY:CITY HEIGHTS	56

FEMA Floodways Floodplains	
Feature Name	Feature Detail
Flood Designation:	Flood Zone: X / Special Flood Hazard Area? NO / Floodway? NO



**THE CITY OF SAN DIEGO**  
**General Plan**  
*Program Environmental*  
*Impact Report*



**Figure 3.5-5**  
**San Diego International**  
**Airport-Lindbergh Field**  
**and NAS North Island**  
**Safety Areas**

**Safety Areas (Lindbergh Field)**

- Runway Protection Zone
- Lindbergh Field Property Boundary

**Accident Potential Zones (NAS North Island)**

- APZ 1
- APZ 2

Source: Adopted 2004 Airport Land Use Compatibility Plan, San Diego County Regional Airport Authority

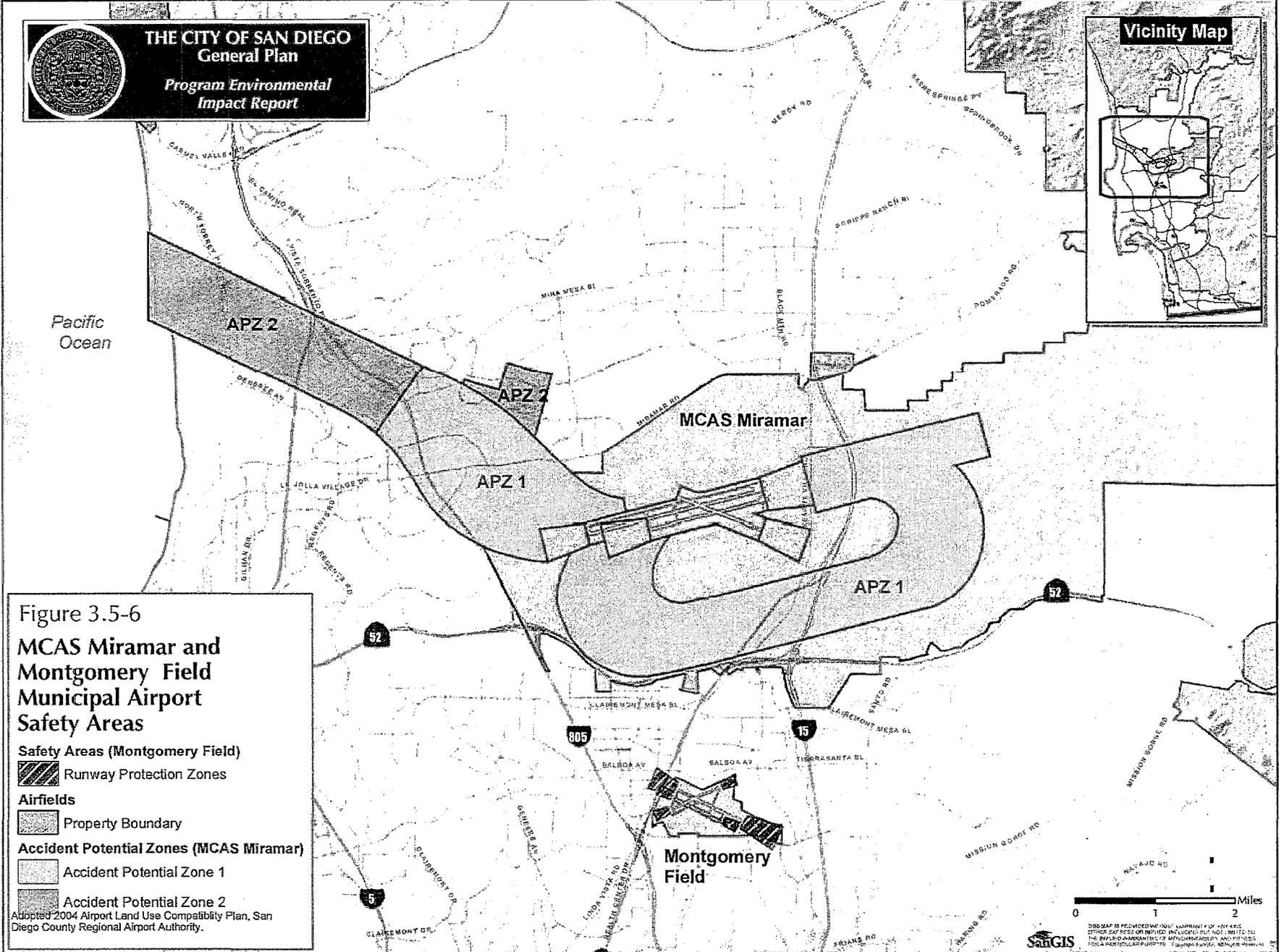
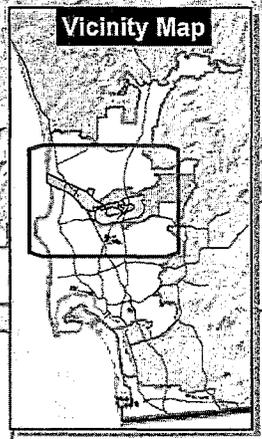
Source: NAS North Island Air Installations Compatible Use Zones (January 1984)



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**THE CITY OF SAN DIEGO**  
 General Plan  
 Program Environmental  
 Impact Report



**Figure 3.5-6**  
**MCAS Miramar and**  
**Montgomery Field**  
**Municipal Airport**  
**Safety Areas**

**Safety Areas (Montgomery Field)**  
 Runway Protection Zones

**Airfields**  
 Property Boundary

**Accident Potential Zones (MCAS Miramar)**  
 Accident Potential Zone 1  
 Accident Potential Zone 2

Adopted 2004 Airport Land Use Compatibility Plan, San Diego County Regional Airport Authority.



# ENVIROSTOR MAP – 3901 Landis Street, San Diego, CA 92105

## Park de la Cruz Improvements- Park and Recreation Department



SHOW SITES WITHIN 1000 FEET OF THE FOLLOWING ADDRESS: 3901 Landis Street 92105

PROJECT NAME	STATUS	PROJECT TYPE	ADDRESS	CITY
CRISPWOOD POINT ELEMENTARY	CERTIFIED	SCHOOL CLEANUP	39TH STREET/LANDIS AVENUE	SAN DIEGO

# GEOTRACKER – 3901 Landis Street, San Diego, CA 92105

## Park de la Cruz Improvements- Park and Recreation Department

### GEOTRACKER

3901 Landis Street 92105

Map Address: 3901 Landis Street, San Diego, CA 92105

Map Satellite

**MAP LAYERS**

- Leaking Underground Storage Tank (LUST) Cleanup Sites
- Cleanup Program Sites
- Land Disposal Sites
- Military Sites
- WDR Sites
- Irrigated Lands Regulatory Program
- Permitted Underground Storage Tank (UST) Facilities
- Oil and Gas Monitoring
- Non-Case Information / Project Sites
- Sampling Points - Public
- Field Points
- DTSC Cleanup Sites
- DTSC Haz Waste Permit
- DWR Groundwater Basins - [NEC](#)
- Public Water Systems - [NEC](#)

SIGNIFIES A CLOSED SITE

[Measure a Distance](#)   [View on GAMA](#)

3901 Landis St, San Diego, CA 92105, USA

LIMIT TO SITES WITHIN  FEET OF THIS LOCATION

[REMOVE SEARCH RADIUS](#)

**SITES FOUND IN SEARCH RADIUS**

SITE NAME	GLOBAL ID	STATUS	ADDRESS	CITY
6 SITES LISTED				
<a href="#">EXPORT THIS LIST TO EXCEL</a>				



**THE CITY OF SAN DIEGO**  
General Plan

*Conservation Element*

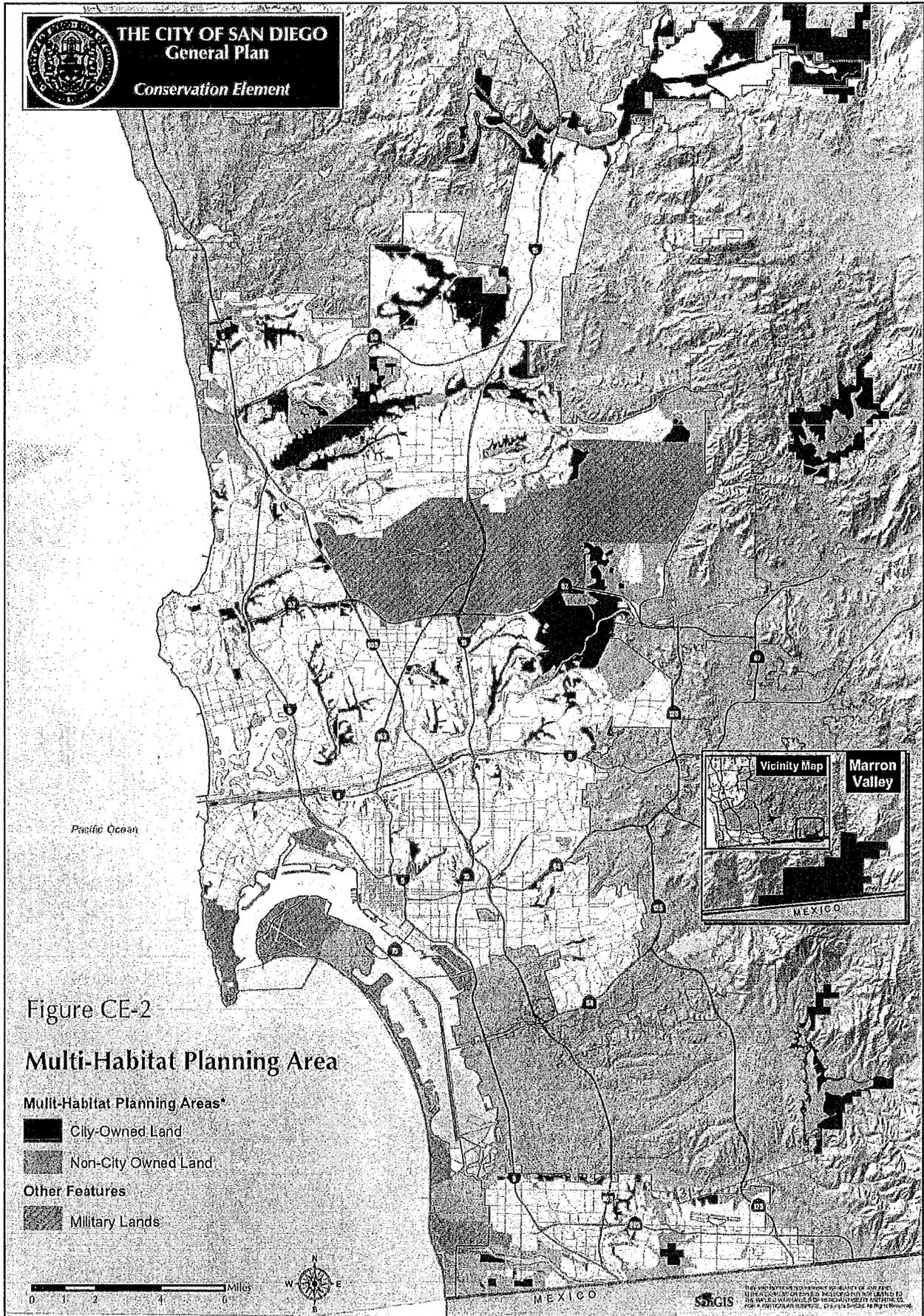


Figure CE-2

**Multi-Habitat Planning Area**

**Multi-Habitat Planning Areas\***

-  City-Owned Land
-  Non-City Owned Land

**Other Features**

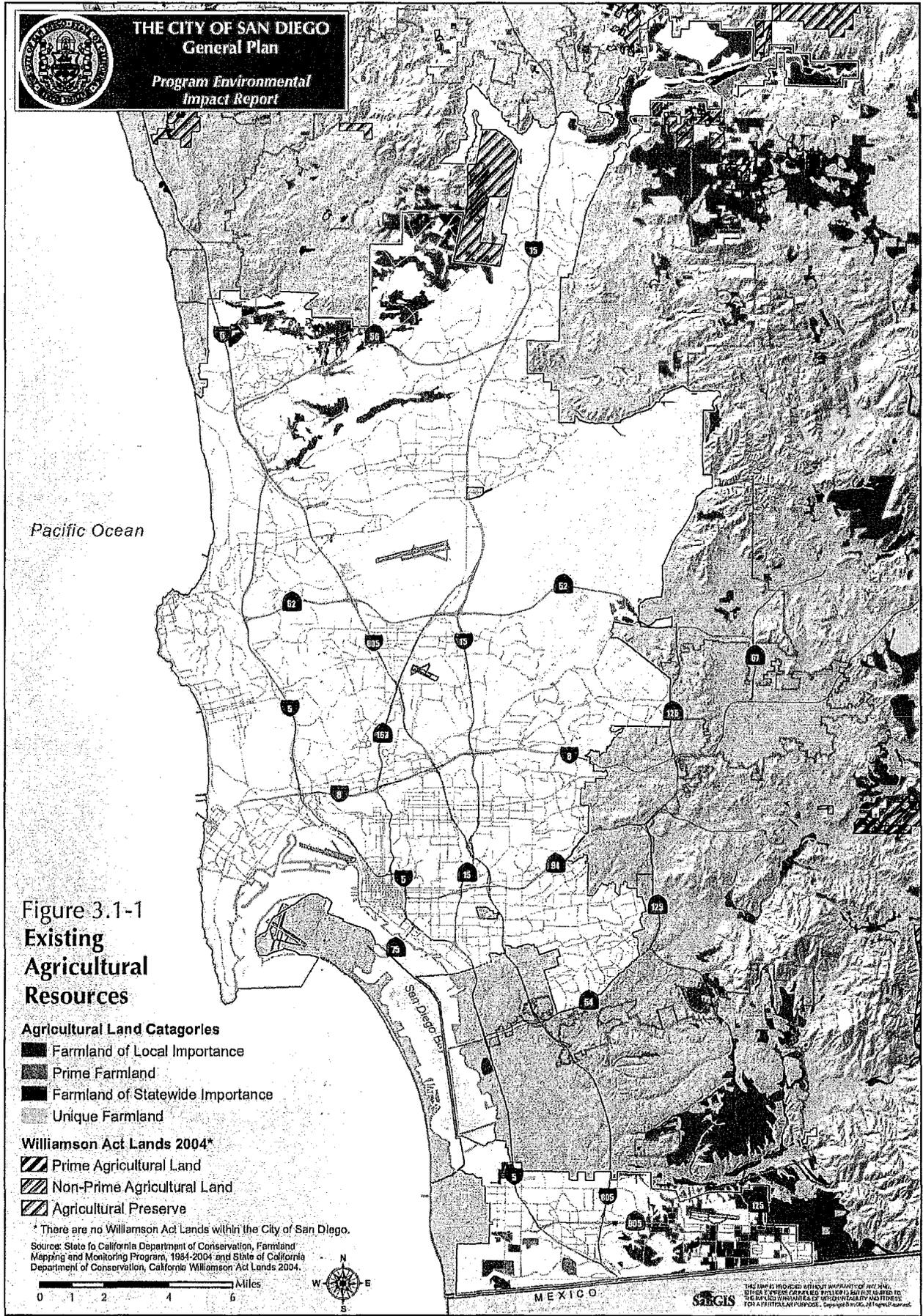
-  Military Lands





**THE CITY OF SAN DIEGO**  
General Plan

Program Environmental  
Impact Report



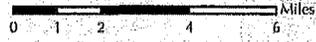
**Figure 3.1-1**  
**Existing**  
**Agricultural**  
**Resources**

- Agricultural Land Categories**
- Farmland of Local Importance
  - Prime Farmland
  - Farmland of Statewide Importance
  - Unique Farmland

- Williamson Act Lands 2004\***
- Prime Agricultural Land
  - Non-Prime Agricultural Land
  - Agricultural Preserve

\* There are no Williamson Act Lands within the City of San Diego.

Source: State to California Department of Conservation, Farmland Mapping and Monitoring Program, 1984-2004 and State of California Department of Conservation, California Williamson Act Lands 2004.



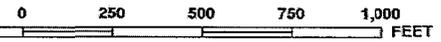
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JOINS PANEL 1638

Program at 1-800-638-6620.



MAP SCALE 1" = 500'



NOTE: IN THE RA THE MIS

PANEL 1901G

**FIRM**  
FLOOD INSURANCE RATE MAP  
SAN DIEGO COUNTY,  
CALIFORNIA  
AND INCORPORATED AREAS

PANEL 1901 OF 2375  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SAN DIEGO, CITY OF	060295	1901	G

Notice to User: The Map Number shown below should be used when placing map orders, the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
06073C1901G  
**MAP REVISED**  
MAY 16, 2012

  
Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

# Campo-Cottonwood Sole Source Aquifer

## Designated Area

### Notes and Explanation:

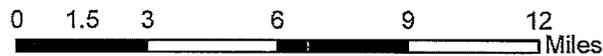
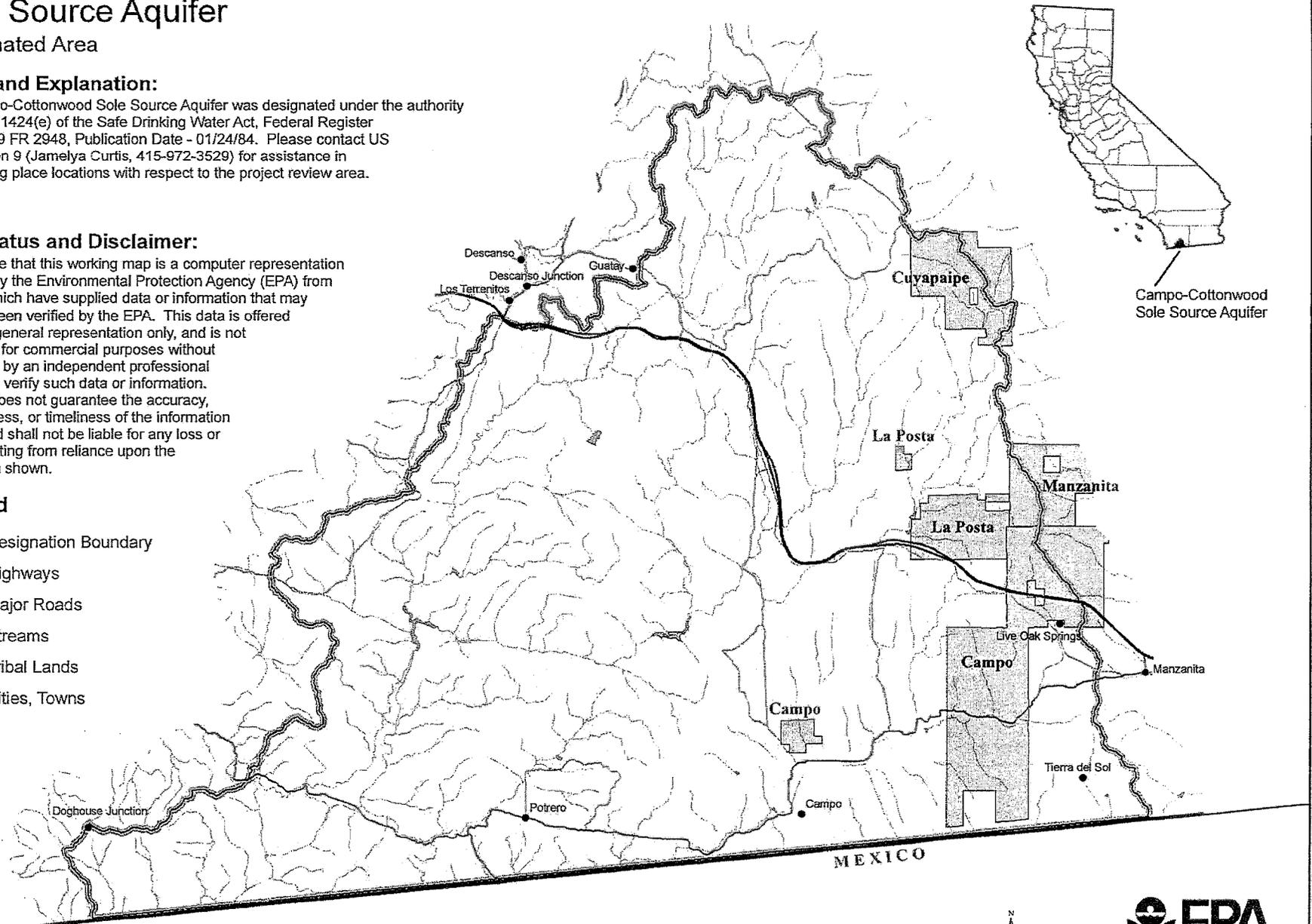
The Campo-Cottonwood Sole Source Aquifer was designated under the authority of Section 1424(e) of the Safe Drinking Water Act, Federal Register Citation-49 FR 2948, Publication Date - 01/24/84. Please contact US EPA Region 9 (Jamelya Curtis, 415-972-3529) for assistance in determining place locations with respect to the project review area.

### Map Status and Disclaimer:

Please note that this working map is a computer representation compiled by the Environmental Protection Agency (EPA) from sources which have supplied data or information that may not have been verified by the EPA. This data is offered here as a general representation only, and is not to be used for commercial purposes without verification by an independent professional qualified to verify such data or information. The EPA does not guarantee the accuracy, completeness, or timeliness of the information shown, and shall not be liable for any loss or injury resulting from reliance upon the information shown.

### Legend

-  Designation Boundary
-  Highways
-  Major Roads
-  Streams
-  Tribal Lands
-  Cities, Towns



# Ocotillo-Coyote Wells Sole Source Aquifer Designated Area

## Notes and Explanation:

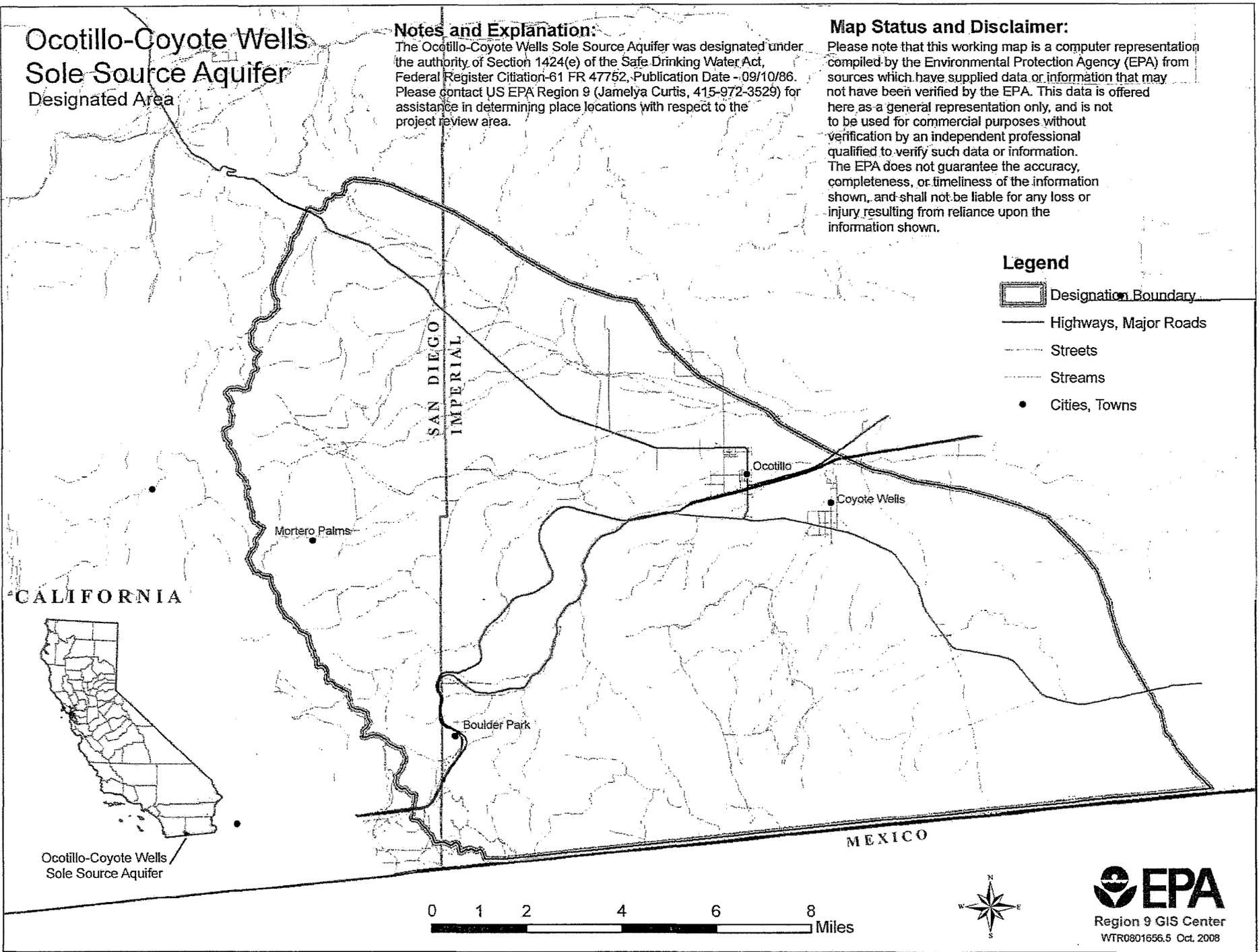
The Ocotillo-Coyote Wells Sole Source Aquifer was designated under the authority of Section 1424(e) of the Safe Drinking Water Act, Federal Register Citation-61 FR 47752, Publication Date - 09/10/86. Please contact US EPA Region 9 (Jamelya Curtis, 415-972-3529) for assistance in determining place locations with respect to the project review area.

## Map Status and Disclaimer:

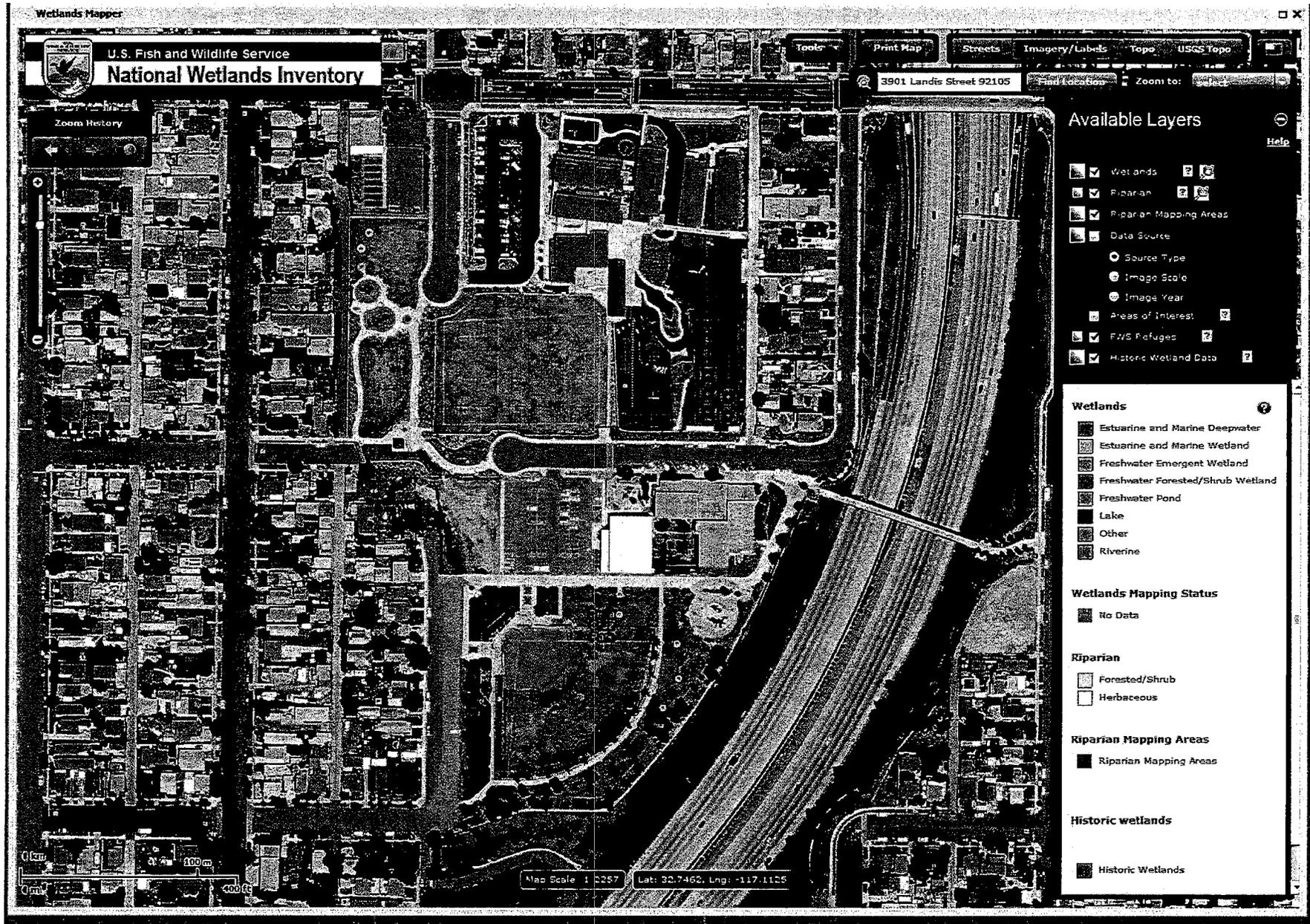
Please note that this working map is a computer representation compiled by the Environmental Protection Agency (EPA) from sources which have supplied data or information that may not have been verified by the EPA. This data is offered here as a general representation only, and is not to be used for commercial purposes without verification by an independent professional qualified to verify such data or information. The EPA does not guarantee the accuracy, completeness, or timeliness of the information shown, and shall not be liable for any loss or injury resulting from reliance upon the information shown.

## Legend

-  Designation Boundary
-  Highways, Major Roads
-  Streets
-  Streams
-  Cities, Towns



**Wetlands Mapper – 3901 Landis Street, San Diego, CA 92105**  
**Park de la Cruz Improvements- Park and Recreation Department**





Date of Notice: June 23, 2016

# NOTICE OF RIGHT TO APPEAL ENVIRONMENTAL DETERMINATION

## PLANNING DEPARTMENT

---

**PROJECT NAME/NUMBER:** Park de la Cruz Improvements

**COMMUNITY PLAN AREA:** Mid-City: City Heights

**COUNCIL DISTRICT:** 9

**LOCATION:** 3901 Landis Street, San Diego, CA 92105

**PROJECT DESCRIPTION:** The proposed project will provide path of travel and facility interior and exterior accessibility improvements to the existing community center building and gymnasium. Improvements will include new sidewalks, walkways, doorways and stairways; handrails/hardware; flooring; upgrades to the existing restrooms and kitchen; new fire sprinklers, fire alarms, security system and communication system; new windows, HVAC systems, ceilings, building roof and electrical and lighting upgrades at Park de la Cruz.

**ENTITY CONSIDERING PROJECT APPROVAL:** City of San Diego Mayor- Appointed Designee

**ENVIRONMENTAL DETERMINATION:** CEQA exemption §Section 15301 (Existing Facilities)

**ENTITY MAKING ENVIRONMENTAL DETERMINATION:** City of San Diego Mayor-Appointed Designee

**STATEMENT SUPPORTING REASON FOR ENVIRONMENTAL DETERMINATION:** The City of San Diego conducted an environmental review and determined the project meets the categorical exemption criteria set forth in the CEQA State Guidelines: §Section 15301 (Existing Facilities) which allows for the operation, repair, maintenance, permitting, leasing, licensing or minor alterations of existing public or private structures or facilities involving negligible or no expansion of use.

In addition, the exceptions set forth in the CEQA State Guidelines §15300.2 do not apply to this project wherein: a) the project would not impact an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies; b) no cumulative impacts of successive projects of the same type in the same place were identified; c) there is no reasonable possibility that the project would have a significant effect on the environment due to unusual circumstances; d) the project would not result in damage to scenic resources, including but not limited to, trees, historic buildings, rock outcroppings, or similar resources, within a highway officially designated as a state scenic highway; e) the project is not located on a site which is included on any list compiled pursuant to Section 65962.5 of the Government Code; and f) the project would not cause a substantial adverse change in the significance of a historical resource.

**CITY STAFF CONTACT:**

Krissy Toft-Maier

**MAILING ADDRESS:**

1200 Third Avenue, Suite 1400, MS 56D  
San Diego, CA 92101

**PHONE NUMBER:**

(619) 236-6312

---

On June 15, 2016, the City of San Diego made the above-referenced environmental determination pursuant to the California Environmental Quality Act (CEQA). This determination is appealable to the City Council. If you have any questions about this determination, contact City Staff listed above.

Applications to appeal this CEQA determination must be filed in the office of the City Clerk within 10 business days from the date of the posting of this Notice. The appeal application can be obtained from the City Clerk, 202 'C' Street, Second Floor, San Diego, CA 92101. This information will be made available in alternative formats upon request.

<b>POSTED IN THE OFFICE OF DSD</b>	
<b>Posted</b>	<u>JUN 22 2016</u> <i>ML</i>
<b>Removed</b>	<u>JUL 18 2016</u>
<b>Posted by</b>	<u><i>myrabe</i></u>

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

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

1. **PURPOSE**

- 1.1 To establish a Departmental policy and procedure for issuance, proper usage and charges for fire hydrant meters.

2. **AUTHORITY**

- 2.1 All authorities and references shall be current versions and revisions.
- 2.2 San Diego Municipal Code (NC) Chapter VI, Article 7, Sections 67.14 and 67.15
- 2.3 Code of Federal Regulations, Safe Drinking Water Act of 1986
- 2.4 California Code of Regulations, Titles 17 and 22
- 2.5 California State Penal Code, Section 498B.0
- 2.6 State of California Water Code, Section 110, 500-6, and 520-23
- 2.7 Water Department Director

**Reference**

- 2.8 State of California Guidance Manual for Cross Connection Programs
- 2.9 American Water Works Association Manual M-14, Recommended Practice for Backflow Prevention
- 2.10 American Water Works Association Standards for Water Meters
- 2.11 U.S.C. Foundation for Cross Connection Control and Hydraulic Research Manual

3. **DEFINITIONS**

- 3.1 **Fire Hydrant Meter:** A portable water meter which is connected to a fire hydrant for the purpose of temporary use. (These meters are sometimes referred to as Construction Meters.)

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3.2 **Temporary Water Use:** Water provided to the customer for no longer than twelve (12) months.

3.3 **Backflow Preventor:** A Reduced Pressure Principal Assembly connected to the outlet side of a Fire Hydrant Meter.

4. **POLICY**

4.1 The Water Department shall collect a deposit from every customer requiring a fire hydrant meter and appurtenances prior to providing the meter and appurtenances (see Section 7.1 regarding the Fees and Deposit Schedule). The deposit is refundable upon the termination of use and return of equipment and appurtenances in good working condition.

4.2 Fire hydrant meters will have a 2 ½" swivel connection between the meter and fire hydrant. The meter shall not be connected to the 4" port on the hydrant. All Fire Hydrant Meters issued shall have a Reduced Pressure Principle Assembly (RP) as part of the installation. Spanner wrenches are the only tool allowed to turn on water at the fire hydrant.

4.3 The use of private hydrant meters on City hydrants is prohibited, with exceptions as noted below. All private fire hydrant meters are to be phased out of the City of San Diego. All customers who wish to continue to use their own fire hydrant meters must adhere to the following conditions:

a. Meters shall meet all City specifications and American Water Works Association (AWWA) standards.

b. Customers currently using private fire hydrant meters in the City of San Diego water system will be allowed to continue using the meter under the following conditions:

1. The customer must submit a current certificate of accuracy and calibration results for private meters and private backflows annually to the City of San Diego, Water Department, Meter Shop.

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2. The meter must be properly identifiable with a clearly labeled serial number on the body of the fire hydrant meter. The serial number shall be plainly stamped on the register lid and the main casing. Serial numbers shall be visible from the top of the meter casing and the numbers shall be stamped on the top of the inlet casing flange.
3. All meters shall be locked to the fire hydrant by the Water Department, Meter Section (see Section 4.7).
4. All meters shall be read by the Water Department, Meter Section (see Section 4.7).
5. All meters shall be relocated by the Water Department, Meter Section (see Section 4.7).
6. These meters shall be tested on the anniversary of the original test date and proof of testing will be submitted to the Water Department, Meter Shop, on a yearly basis. If not tested, the meter will not be allowed for use in the City of San Diego.
7. All private fire hydrant meters shall have backflow devices attached when installed.
8. The customer must maintain and repair their own private meters and private backflows.
9. The customer must provide current test and calibration results to the Water Department, Meter Shop after any repairs.
10. When private meters are damaged beyond repair, these private meters will be replaced by City owned fire hydrant meters.

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11. When a private meter malfunctions, the customer will be notified and the meter will be removed by the City and returned to the customer for repairs. Testing and calibration results shall be given to the City prior to any re-installation.
  12. The register shall be hermetically sealed straight reading and shall be readable from the inlet side. Registration shall be in hundred cubic feet.
  13. The outlet shall have a 2 ½ "National Standards Tested (NST) fire hydrant male coupling.
  14. Private fire hydrant meters shall not be transferable from one contracting company to another (i.e. if a company goes out of business or is bought out by another company).
- 4.4 All fire hydrant meters and appurtenances shall be installed, relocated and removed by the City of San Diego, Water Department. All City owned fire hydrant meters and appurtenances shall be maintained by the City of San Diego, Water Department, Meter Services.
- 4.5 If any fire hydrant meter is used in violation of this Department Instruction, the violation will be reported to the Code Compliance Section for investigation and appropriate action. Any customer using a fire hydrant meter in violation of the requirements set forth above is subject to fines or penalties pursuant to the Municipal Code, Section 67.15 and Section 67.37.

**4.6 Conditions and Processes for Issuance of a Fire Hydrant Meter**

Process for Issuance

- a. Fire hydrant meters shall only be used for the following purposes:
  1. Temporary irrigation purposes not to exceed one year.

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2. Construction and maintenance related activities (see Tab 2).
  - b. No customer inside or outside the boundaries of the City of San Diego Water Department shall resell any portion of the water delivered through a fire hydrant by the City of San Diego Water Department.
  - c. The City of San Diego allows for the issuance of a temporary fire hydrant meter for a period not to exceed 12 months (365 days). An extension can only be granted in writing from the Water Department Director for up to 90 additional days. A written request for an extension by the consumer must be submitted at least 30 days prior to the 12 month period ending. No extension shall be granted to any customer with a delinquent account with the Water Department. No further extensions shall be granted.
  - d. Any customer requesting the issuance of a fire hydrant meter shall file an application with the Meter Section. The customer must complete a "Fire Hydrant Meter Application" (Tab 1) which includes the name of the company, the party responsible for payment, Social Security number and/or California ID, requested location of the meter (a detailed map signifying an exact location), local contact person, local phone number, a contractor's license (or a business license), description of specific water use, duration of use at the site and full name and address of the person responsible for payment.
  - e. At the time of the application the customer will pay their fees according to the schedule set forth in the Rate Book of Fees and Charges, located in the City Clerk's Office. All fees must be paid by check, money order or cashiers check, made payable to the City Treasurer. Cash will not be accepted.
  - f. No fire hydrant meters shall be furnished or relocated for any customer with a delinquent account with the Water Department.
  - g. After the fees have been paid and an account has been created, the

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meter shall be installed within 48 hours (by the second business day). For an additional fee, at overtime rates, meters can be installed within 24 hours (within one business day).

**4.7 Relocation of Existing Fire Hydrant Meters**

- a. The customer shall call the Fire Hydrant Meter Hotline (herein referred to as “Hotline”), a minimum of 24 hours in advance, to request the relocation of a meter. A fee will be charged to the existing account, which must be current before a work order is generated for the meter’s relocation.
- b. The customer will supply in writing the address where the meter is to be relocated (map page, cross street, etc). The customer must update the original Fire Hydrant Meter Application with any changes as it applies to the new location.
- c. Fire hydrant meters shall be read on a monthly basis. While fire hydrant meters and backflow devices are in service, commodity, base fee and damage charges, if applicable, will be billed to the customer on a monthly basis. If the account becomes delinquent, the meter will be removed.

**4.8 Disconnection of Fire Hydrant Meter**

- a. After ten (10) months a “Notice of Discontinuation of Service” (Tab 3) will be issued to the site and the address of record to notify the customer of the date of discontinuance of service. An extension can only be granted in writing from the Water Department Director for up to 90 additional days (as stated in Section 4.6C) and a copy of the extension shall be forwarded to the Meter Shop Supervisor. If an extension has not been approved, the meter will be removed after twelve (12) months of use.
- b. Upon completion of the project the customer will notify the Meter Services office via the Hotline to request the removal of the fire hydrant meter and appurtenances. A work order will be generated

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for removal of the meter.

- c. Meter Section staff will remove the meter and backflow prevention assembly and return it to the Meter Shop. Once returned to the Meter Shop the meter and backflow will be tested for accuracy and functionality.
- d. Meter Section Staff will contact and notify Customer Services of the final read and any charges resulting from damages to the meter and backflow or its appurtenance. These charges will be added on the customer's final bill and will be sent to the address of record. Any customer who has an outstanding balance will not receive additional meters.
- e. Outstanding balances due may be deducted from deposits and any balances refunded to the customer. Any outstanding balances will be turned over to the City Treasurer for collection. Outstanding balances may also be transferred to any other existing accounts.

5. **EXCEPTIONS**

- 5.1 Any request for exceptions to this policy shall be presented, in writing, to the Customer Support Deputy Director, or his/her designee for consideration.

6. **MOBILE METER**

- 6.1 Mobile meters will be allowed on a case by case basis. All mobile meters will be protected by an approved backflow assembly and the minimum requirement will be a Reduced Pressure Principal Assembly. The two types of Mobile Meters are vehicle mounted and floating meters. Each style of meters has separate guidelines that shall be followed for the customer to retain service and are described below:

- a) **Vehicle Mounted Meters:** Customer applies for and receives a City owned Fire Hydrant Meter from the Meter Shop. The customer mounts the meter on the vehicle and brings it to the Meter Shop for

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inspection. After installation is approved by the Meter Shop the vehicle and meter shall be brought to the Meter Shop on a monthly basis for meter reading and on a quarterly basis for testing of the backflow assembly. Meters mounted at the owner's expense shall have the one year contract expiration waived and shall have meter or backflow changed if either fails.

b) **Floating Meters:** Floating Meters are meters that are not mounted to a vehicle. **(Note: All floating meters shall have an approved backflow assembly attached.)** The customer shall submit an application and a letter explaining the need for a floating meter to the Meter Shop. The Fire Hydrant Meter Administrator, after a thorough review of the needs of the customer, (i.e. number of jobsites per day, City contract work, lack of mounting area on work vehicle, etc.), may issue a floating meter. At the time of issue, it will be necessary for the customer to complete and sign the "Floating Fire Hydrant Meter Agreement" which states the following:

- 1) The meter will be brought to the Meter Shop at 2797 Caminito Chollas, San Diego on the third week of each month for the monthly read by Meter Shop personnel.
- 2) Every other month the meter will be read and the backflow will be tested. This date will be determined by the start date of the agreement.

If any of the conditions stated above are not met the Meter Shop has the right to cancel the contract for floating meter use and close the account associated with the meter. The Meter Shop will also exercise the right to refuse the issuance of another floating meter to the company in question.

Any Fire Hydrant Meter using reclaimed water shall not be allowed use again with any potable water supply. The customer shall incur the cost of replacing the meter and backflow device in this instance.

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**7. FEE AND DEPOSIT SCHEDULES**

7.1 **Fees and Deposit Schedules:** The fees and deposits, as listed in the Rate Book of Fees and Charges, on file with the Office of the City Clerk, are based on actual reimbursement of costs of services performed, equipment and materials. These deposits and fees will be amended, as needed, based on actual costs. Deposits, will be refunded at the end of the use of the fire hydrant meter, upon return of equipment in good working condition and all outstanding balances on account are paid. Deposits can also be used to cover outstanding balances.

All fees for equipment, installation, testing, relocation and other costs related to this program are subject to change without prior notification. The Mayor and Council will be notified of any future changes.

**8. UNAUTHORIZED USE OF WATER FROM A HYDRANT**

8.1 Use of water from any fire hydrant without a properly issued and installed fire hydrant meter is theft of City property. Customers who use water for unauthorized purposes or without a City of San Diego issued meter will be prosecuted.

8.2 If any unauthorized connection, disconnection or relocation of a fire hydrant meter, or other connection device is made by anyone other than authorized Water Department personnel, the person making the connection will be prosecuted for a violation of San Diego Municipal Code, Section 67.15. In the case of a second offense, the customer's fire hydrant meter shall be confiscated and/or the deposit will be forfeited.

8.3 Unauthorized water use shall be billed to the responsible party. Water use charges shall be based on meter readings, or estimates when meter readings are not available.

8.4 In case of unauthorized water use, the customer shall be billed for all applicable charges as if proper authorization for the water use had been obtained, including but not limited to bi-monthly service charges, installation charges and removal charges.

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- 8.5 If damage occurs to Water Department property (i.e. fire hydrant meter, backflow, various appurtenances), the cost of repairs or replacements will be charged to the customer of record (applicant).

**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>	T.B.	G.B. (CITY USE)
Specific Use of Water:		
Any Return to Sewer or Storm Drain, if so, explain:		
Estimated Duration of Meter Use:	<input type="checkbox"/>	<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. <u>Insures that employees of this Organization understand the proper use of Fire Hydrant Meter</u>			

<b>Fire Hydrant Meter Removal Request</b>	Requested Removal Date:
Provide Current Meter Location if Different from Above:	
Signature:	Title: Date:
Phone: ( )	Pager: ( )

<input type="checkbox"/> City Meter	<input type="checkbox"/> Private Meter
Contract Acct #:	Deposit Amount: <b>\$ 936.00</b> Fees Amount: <b>\$ 62.00</b>
Meter Serial #	Meter Size: <b>05</b> Meter Make and Style: <b>6-7</b>
Backflow #	Backflow 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		<b>Contractor's Name:</b>	
<b>Project Name:</b>		Contractor's Address:	
Work Order No or Job Order No.			
City Purchase Order No.		Contractor's Phone #:	<b>Invoice No.</b>
Resident Engineer (RE):		Contractor's fax #:	<b>Invoice Date:</b>
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	<b>Field Orders</b>				\$ -		\$ -		\$ -	0.00%	\$ -
18					\$ -		\$ -		\$ -	0.00%	\$ -
	<b>CHANGE ORDER No.</b>				\$ -		\$ -		\$ -	0.00%	\$ -
					\$ -		\$ -		\$ -	0.00%	\$ -
					\$ -		\$ -		\$ -	0.00%	\$ -
Total Authorized Amount (including approved Change Order)					\$ -		\$ -		\$ -	<b>Total Billed</b>	\$ -

**SUMMARY**

A. Original Contract Amount	\$ -
B. Approved Change Order #00 Thru #00	\$ -
C. Total Authorized Amount (A+B)	\$ -
D. Total Billed to Date	\$ -
E. Less Total Retention (5% of D )	\$ -
F. Less Total Previous Payments	\$ -
<b>G. Payment Due Less Retention</b>	<b>\$0.00</b>
H. Remaining Authorized Amount	\$0.00

**I certify that the materials  
have been received by me in  
the quality and quantity specified**

\_\_\_\_\_  
Resident Engineer

\_\_\_\_\_  
Construction Engineer

**Retention and/or Escrow Payment Schedule**

Total Retention Required as of this billing (Item E)	\$0.00
Previous Retention Withheld in PO or in Escrow	\$0.00
<b>Add'l Amt to Withhold in PO/Transfer in Escrow:</b>	<b>\$0.00</b>
<b>Amt to Release to Contractor from PO/Escrow:</b>	

Contractor Signature and Date: \_\_\_\_\_

**APPENDIX E**  
**LOCATION MAP**

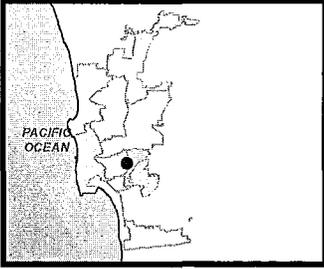
**Park Dela Cruz Community Center & Gym Building**

SENIOR ENGINEER  
Nevien Antoun  
(619) 533-4852

PROJECT MANAGER  
Larry Kuzminsky  
(619) 533-3065

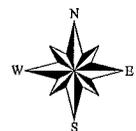
PROJECT DRAFTER  
Susan Griebenow  
(619) 533-3652

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



**Legend**

 Project Location



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**APPENDIX F**  
**ASBESTOS ABATEMENT**



THE CITY OF SAN DIEGO



# ASBESTOS ABATEMENT SPECIFICATION

for

## PARK DE LA CRUZ ADA UPGRADE

### CLEARANCE ACTIVITY

October 19, 2016

Prepared by:

William Blondet

Asbestos & Lead Program Inspector

CA Asbestos SST #99-2689

Reviewed by:

George Katsikaris

Asbestos & Lead Program Inspector

CA Asbestos Consultant #07-4265

City of San Diego  
Environmental Services Department  
Disposal & Environmental Protection  
Asbestos & Lead Management Program  
9601 Ridgeway Court, Ste 320  
San Diego, CA 92123  
Tel: (858) 492-5086  
Fax: (858) 492-5089

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## 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.



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 (%)
7169-08	Ceiling Acoustic on Plaster Ceiling above newer drop ceiling	Room 145B	Good	Chrysotile 3%
7169-35	Thermal System Insulation	Throughout plumbed wall cavities, plumbed crawl spaces, and basement tunnels	Good	Chrysotile 8% Amosite 5%
7169-B-80	Black/Gray Penetration Mastic	High roof over Rm 145	Good	Chrysotile 4%
7169-B-81	Black/Gray Penetration Mastic	High roof over Rm 145	Good	Chrysotile 4%
7169-B-82	Black/Gray Penetration Mastic	Low roof over Rm 107	Good	Chrysotile 4%
7169-B-83	Black/Gray Penetration Mastic	Duct Work on Low roof	Good	Chrysotile 4%
7169-B-84	Black/Gray Penetration Mastic	Duct Work on Low roof	Good	Chrysotile 4%
7169-B-88	Red Linoleum	Room 151 Closet	Good	Chrysotile 10%
7169-B-89	Red Linoleum	Pantry	Good	Chrysotile 10%
7169-B-90	Red Linoleum	Room 150 Janitor Closet	Good	Chrysotile 10%
7169-B-100	Red 9 x 9 Floor Tile (mastic negative)	Room 208	Good	Chrysotile 4%
7169-B-101	Red 9 x 9 Floor Tile (mastic negative)	Room 208	Good	Chrysotile 4%
7169-B-102	Red 9 x 9 Floor Tile (mastic negative)	Room 208	Good	Chrysotile 4%

Sample #	Material	Location	Condition	Asbestos (%)
7169-B-106	Black Mirror Mastic	Room 206	Good	Chrysotile 8%
7169-B-107	Black Mirror Mastic	Room 140	Good	Chrysotile 8%
7169-B-108	Black Mirror Mastic	Room 141	Good	Chrysotile 8%

**APPENDIX G**  
**LEAD ABATEMENT**



THE CITY OF SAN DIEGO



## LEAD CONTAINING MATERIALS

## ABATEMENT SPECIFICATION

for

**PARK DE LA CRUZ**

**ADA UPGRADES**

**October 6, 2016**

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## 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 lead containing materials 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 surrounding areas will not be contaminated with lead containing materials 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 lead containing materials that will be removed under the terms and conditions of the contract and this specification.
4. All paint chips collected must be stored in sealable drum containers (not in bags).
5. Abatement work shall be performed within agreed upon hours submitted prior to project start which will not include designated City holidays.
6. 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

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 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 30 days prior to commencement of any lead abatement activities:

1. Lead 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.
2. Notifications:
  - a) 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.

b) Submit Cal/OSHA pre-Job notification for lead-related construction work per Title 8 CCR 1532.1 subsection (p), "Lead-Work Pre-Job Notification".

c) Permits, notifications, and licenses needed to perform work (including hazardous waste hauler's registration)

d) 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.

e) 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.

f) 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) 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.

b) Identify state licensed transporter, disposal location, and associated permits for all hazardous waste.

c) 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.

d) 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.
- e) 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.
- f) 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. **ACTION LEVEL:** An 8-hour time weighted average (TWA) lead airborne concentration of 30 µg/m<sup>3</sup>.

- 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 form 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/m<sup>3</sup>.
- 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 at the project site or elsewhere, 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. 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.
- KK. 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. The ABATEMENT CONTRACTOR shall visit the project site and verify the location and quantities of the lead containing materials that will be removed under the terms and conditions of the contract and this specification

#### C. GENERAL INFORMATION

##### 1. Potential Hazards

a) The disturbance of lead 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
  - a) 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 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

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 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.

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 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 subcontractors,

3. 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.

4. Federal requirements which govern lead hazard control activities or hauling and disposal of hazardous waste include, but are not limited to, the following:

a) 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.

b) U.S. Department of Transportation (DOT):

- (1) Hazardous Substances, 49CFR, Parts 171 through 180
- c) 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
- d) 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)

5. 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.

6. Local requirements which govern lead hazard control activities include, but are not limited to, the following:

- a) Air Pollution Control District (APCD) - San Diego County
  - (1) APCD Rules and Regulations, Rule 51 (Public Nuisance), Rule 10-11 (permitting of equipment)
- b) 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.

##### 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 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 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) 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.

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 lead 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 lead 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 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.

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 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. 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.
2. Require that workers NOT eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the Work Area.
3. 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.
4. 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.
5. 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.
6. Warning signs for lead shall be posted as per 8CCR, Section 1532.1(m).
7. 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

1. Lead containing materials shall be adequately wetted with water or a removal encapsulant before and during removal process, to reduce dust 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 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.
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. CLEANING

1. Daily cleaning includes removing large and small debris, HEPA vacuuming horizontal surfaces, wet mopping, and then HEPA vacuuming horizontal surfaces, and possible exterior cleaning.

2. 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.
3. 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

1. Prior to leaving the Work Area, HEPA vacuum outer suit completely and remove, turning it inside out while doing so.
2. 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 waste containers.
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. CLEARANCE

1. Clearance must be performed by a California Department of Public Health (CDPH) 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.

2. Environmental Sampling:

a) 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 <sup>2</sup>
(2)	Interior Window Sills	250 µg/ft <sup>2</sup>
(3)	Exterior Horizontal Surfaces	400 µg/ft <sup>2</sup>
(4)	Exterior Soil*	1000 µg/ft <sup>2</sup>
(5)	Soil in Play Areas*	400 µg/ft <sup>2</sup>

b) Re-cleaning, at the Contractor's expense, will be required for surfaces that do not pass clearance criteria.

c) 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 preexisting soil conditions.

N. TRANSPORTATION AND DISPOSAL

1. Waste minimization

a) The ABATEMENT CONTRACTOR is required to make all reasonable efforts to minimize the amount of hazardous waste generated from this project.

2. Waste characterization

a) 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.

3. Pre-transportation requirements
  - a) 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.
  - b) 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.
  - c) 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.
4. 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.
5. 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.
6. 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	ROOM	COMPONENT and SUBSTRATE	COLOR	PBC	UNITS
67	Old Restrooms 117 and 118 (New room is designated 119a)	Ceramic tile on Plaster Walls	Green	25.6	mg/cm <sup>2</sup>
74	Old Restroom and Shower Walls on 2 <sup>nd</sup> floor, Main floor, and lower level	Ceramic tile on Plaster Walls	Blue	8.1	mg/cm <sup>2</sup>
79	Room 202, Staircase	Handrails	White	2.4	mg/cm <sup>2</sup>



## City of San Diego Asbestos Lead Management Program

Old YMCA, Park De La Cruz Recreation Center, 3901 Landis St., San Diego CA



### XRF Assay Results

Reading No	Time	Type	Duration	Mode	Location	Room	Side	Component	COND.	SUBST.	Color	Results	PbC	Units
1	6/30/15 12:00	ShutterCal	102.61										3.34	cps
2	6/30/15 12:02	Paint	20	K & L				CALIB. CHECK			RED	Negative	0.9	mg / cm ^2
3	6/30/15 12:15	Paint	20	K & L				CALIB. CHECK			RED	Negative	0.8	mg / cm ^2
4	6/30/15 12:16	Paint	20	K & L				CALIB. CHECK			RED	Negative	0.9	mg / cm ^2
5	6/30/15 12:19	Paint	1.14	Std.	PARK DE LA CRUZ REC	104	C	DOOR CASING	INTACT	WOOD	BLACK	Negative	0	mg / cm ^2
6	6/30/15 12:20	Paint	1.14	Std.	PARK DE LA CRUZ REC	104	C	DOOR	INTACT	WOOD	WHITE	Negative	0	mg / cm ^2
7	6/30/15 12:20	Paint	1.14	Std.	PARK DE LA CRUZ REC	104	C	DOOR JAMB	INTACT	WOOD	WHITE	Negative	0.04	mg / cm ^2
8	6/30/15 12:21	Paint	1.14	Std.	PARK DE LA CRUZ REC	105	C	DOOR JAMB	INTACT	WOOD	WHITE	Negative	0	mg / cm ^2
9	6/30/15 12:22	Paint	1.14	Std.	PARK DE LA CRUZ REC	106	C	DOOR JAMB	INTACT	WOOD	BLACK	Negative	0.2	mg / cm ^2
10	6/30/15 12:25	Paint	2.63	Std.	PARK DE LA CRUZ REC	140	D	DOOR JAMB	INTACT	WOOD	WHITE	Negative	0	mg / cm ^2
11	6/30/15 12:25	Paint	3.02	Std.	PARK DE LA CRUZ REC	141	D	DOOR JAMB	INTACT	WOOD	BLUE	Negative	0	mg / cm ^2
12	6/30/15 12:32	Paint	1.14	Std.	PARK DE LA CRUZ REC	101	D	SWINGING DOOR	INTACT	WOOD	BROWN	Negative	0	mg / cm ^2
13	6/30/15 12:34	Paint	1.13	Std.	PARK DE LA CRUZ REC	111	B	DOOR	INTACT	METAL	TAN	Negative	0	mg / cm ^2
14	6/30/15 12:35	Paint	1.14	Std.	PARK DE LA CRUZ REC	111	B	DOOR FRAME	INTACT	METAL	BLACK	Negative	0	mg / cm ^2
15	6/30/15 12:42	Paint	3.4	Std.	PARK DE LA CRUZ REC	114	B	DOOR FRAME	INTACT	WOOD	BEIGE	Negative	< LOD	mg / cm ^2
16	6/30/15 12:42	Paint	1.13	Std.	PARK DE LA CRUZ REC	114	B	DOOR	INTACT	WOOD	BEIGE	Negative	0	mg / cm ^2
17	6/30/15 12:44	Paint	1.13	Std.	PARK DE LA CRUZ REC	145a	A	DOOR	INTACT	WOOD	GREEN	Negative	0.01	mg / cm ^2
18	6/30/15 12:44	Paint	1.14	Std.	PARK DE LA CRUZ REC	145a	A	DOOR FRAME	INTACT	WOOD	GREEN	Negative	0.13	mg / cm ^2
19	6/30/15 12:46	Paint	1.14	Std.	PARK DE LA CRUZ REC	145b	B	DOOR FRAME	INTACT	METAL	BLACK	Negative	0.14	mg / cm ^2
20	6/30/15 12:47	Paint	1.14	Std.	PARK DE LA CRUZ REC	145b	B	DOOR	INTACT	WOOD	TAN	Negative	0	mg / cm ^2
21	6/30/15 12:48	Paint	1.14	Std.	PARK DE LA CRUZ REC	146	A	DOOR	INTACT	WOOD	BLUE	Negative	0	mg / cm ^2
22	6/30/15 12:49	Paint	1.14	Std.	PARK DE LA CRUZ REC	146	A	DOOR FRAME	INTACT	METAL	BLUE	Negative	0.03	mg / cm ^2
23	6/30/15 12:50	Paint	1.13	Std.	PARK DE LA CRUZ REC	147	D	SWINGING DOOR	INTACT	WOOD	BROWN	Negative	0	mg / cm ^2
24	6/30/15 12:51	Paint	3.41	Std.	PARK DE LA CRUZ REC	147	D	COLUMN	INTACT	DRYWALL	WHITE	Negative	0	mg / cm ^2
25	6/30/15 12:52	Paint	1.14	Std.	PARK DE LA CRUZ REC	101	D	WALL	INTACT	DRYWALL	WHITETAN	Negative	0	mg / cm ^2
26	6/30/15 12:52	Paint	1.13	Std.	PARK DE LA CRUZ REC	101	B	WALL	INTACT	DRYWALL	WHITETAN	Negative	0	mg / cm ^2
27	6/30/15 12:54	Paint	3.42	Std.	PARK DE LA CRUZ REC	144	D	WALL	INTACT	PLASTER	WHITE	Negative	< LOD	mg / cm ^2
28	6/30/15 12:55	Paint	1.14	Std.	PARK DE LA CRUZ REC	144	B	HANDRAIL	INTACT	METAL	WHITE	Positive	5	mg / cm ^2
29	6/30/15 12:57	Paint	2.63	Std.	PARK DE LA CRUZ REC	146a	D	WALL	INTACT	DRYWALL	MURAL	Negative	0	mg / cm ^2
30	6/30/15 12:58	Paint	1.5	Std.	PARK DE LA CRUZ REC	146a	D	WALL	INTACT	DRYWALL	MURAL	Negative	0	mg / cm ^2
31	6/30/15 12:58	Paint	3.02	Std.	PARK DE LA CRUZ REC	146a	D	WALL	INTACT	DRYWALL	MURAL	Negative	0	mg / cm ^2
32	6/30/15 13:00	Paint	3.02	Std.	PARK DE LA CRUZ REC	147	B	WALL	INTACT	DRYWALL	BLUE	Negative	0	mg / cm ^2
33	6/30/15 13:02	Paint	1.14	Std.	PARK DE LA CRUZ REC	146a	B	CAB DOORS	INTACT	WOOD	BLUE	Negative	0	mg / cm ^2
34	6/30/15 13:08	Paint	1.14	Std.	PARK DE LA CRUZ REC	3	C	DOOR	INTACT	WOOD	BLUE	Negative	0	mg / cm ^2
35	6/30/15 13:08	Paint	1.12	Std.	PARK DE LA CRUZ REC	3	C	DOOR FRAME	INTACT	METAL	BLUE	Negative	0.03	mg / cm ^2
36	6/30/15 13:11	Paint	3.42	Std.	PARK DE LA CRUZ REC	EXTERIOR	A	WALL	INTACT	STUCCO	TAN	Negative	< LOD	mg / cm ^2
37	6/30/15 13:12	Paint	8.3	Std.	PARK DE LA CRUZ REC	EXTERIOR	A	WINDOW	INTACT	METAL	GREEN	Negative	0.25	mg / cm ^2
38	6/30/15 13:16	Paint	20	K & L				CALIB. CHECK			RED	Negative	0.9	mg / cm ^2
39	6/30/15 13:16	Paint	20	K & L				CALIB. CHECK			RED	Negative	0.9	mg / cm ^2
40	6/30/15 13:17	Paint	20	K & L				CALIB. CHECK			RED	Negative	0.8	mg / cm ^2

Inspector: Wm. Brad Blondet  
CDPH Inspector/Assessor # 5464

Niton XLp303A Serial #7902  
Testing for Demolition/Renovation



City of San Diego Asbestos Lead Management Program

Old YMCA, Park De La Cruz Recreation Center, 3901 Landis St., San Diego CA



XRF Assay Results

Reading No	Time	Duration	Mode	Location	Room	Side	Component	Condition	Substrate	Color	Results	PbC	Units
41	10/5/16 10:50	207.04										1.71	cps
42	10/5/16 10:51	20	K & L				CALIB. CHECK			RED	Negative	0.8	mg / cm ^2
43	10/5/16 10:53	20	K & L				CALIB. CHECK			RED	Negative	0.8	mg / cm ^2
44	10/5/16 10:54	20	K & L				CALIB. CHECK			RED	Negative	0.8	mg / cm ^2
45	10/5/16 10:57	3.11	Std.	PDLC	RM 151	A	WALL	INTACT	PLASTER	WHITE	Negative	0.03	mg / cm ^2
46	10/5/16 10:57	2.32	Std.	PDLC	RM 151	B	WALL	INTACT	PLASTER	WHITE	Negative	0	mg / cm ^2
47	10/5/16 10:58	2.9	Std.	PDLC	RM 151	C	WALL	INTACT	PLASTER	WHITE	Negative	0	mg / cm ^2
48	10/5/16 10:58	1.15	Std.	PDLC	RM 151	C	DOOR	INTACT	WOOD	WHITE	Negative	0.05	mg / cm ^2
49	10/5/16 10:59	1.15	Std.	PDLC	RM 151	B	DOOR	INTACT	WOOD	WHITE	Negative	0	mg / cm ^2
50	10/5/16 10:59	1.16	Std.	PDLC	RM 151	B	DOOR FRAME	INTACT	METAL	WHITE	Negative	0	mg / cm ^2
51	10/5/16 11:00	1.36	Std.	PDLC	RM 151	C	DOOR FRAME	INTACT	METAL	BLUE GREEN	Negative	0.07	mg / cm ^2
52	10/5/16 11:01	1.16	Std.	PDLC	RM 150	C	DOOR FRAME	INTACT	METAL	BLUE GREEN	Negative	0.01	mg / cm ^2
53	10/5/16 11:02	1.15	Std.	PDLC	RM 149a	C	DOOR FRAME	INTACT	METAL	BLUE GREEN	Negative	0	mg / cm ^2
54	10/5/16 11:03	1.16	Std.	PDLC	RM 149a	C	DOOR	INTACT	WOOD	BLUE GREEN	Negative	0	mg / cm ^2
55	10/5/16 11:04	2.5	Std.	PDLC	RM 149a	A	WALL	INTACT	DRYWALL	WHITE	Negative	0	mg / cm ^2
56	10/5/16 11:05	2.9	Std.	PDLC	RM 149a	B	WALL	INTACT	DRYWALL	WHITE	Negative	0	mg / cm ^2
57	10/5/16 11:05	2.12	Std.	PDLC	RM 149a	C	WALL	INTACT	DRYWALL	WHITE	Negative	0	mg / cm ^2
58	10/5/16 11:05	1.54	Std.	PDLC	RM 149a	D	WALL	INTACT	DRYWALL	WHITE	Negative	0	mg / cm ^2
59	10/5/16 11:06	1.94	Std.	PDLC	RM 149a	D	BASEBOARD	INTACT	CERAMIC	WHITE	Negative	0.01	mg / cm ^2
60	10/5/16 11:06	1.16	Std.	PDLC	RM 149a	C	BASEBOARD	INTACT	CERAMIC	WHITE	Negative	0	mg / cm ^2
61	10/5/16 11:07	1.16	Std.	PDLC	RM 149a	C	FLOOR	INTACT	CERAMIC	BEIGE	Negative	0	mg / cm ^2
62	10/5/16 11:07	1.16	Std.	PDLC	RM 149b	C	FLOOR	INTACT	CERAMIC	BEIGE	Negative	0	mg / cm ^2
63	10/5/16 11:08	1.16	Std.	PDLC	RM 149b	C	BASEBOARD	INTACT	CERAMIC	WHITE	Negative	0.01	mg / cm ^2
64	10/5/16 11:11	3.67	Std.	PDLC	RM 119a	A	WALL	INTACT	PLASTER	WHITE	Negative	0.05	mg / cm ^2
65	10/5/16 11:12	2.32	Std.	PDLC	RM 119a	B	WALL	INTACT	PLASTER	WHITE	Negative	0.05	mg / cm ^2
66	10/5/16 11:12	3.28	Std.	PDLC	RM 119a	C	WALL	INTACT	PLASTER	WHITE	Negative	0.06	mg / cm ^2
67	10/5/16 11:13	0.39	Std.	PDLC	RM 119a	C	WALL TILE	INTACT	CERAMIC	GREEN	Positive	25.6	mg / cm ^2
68	10/5/16 11:13	3.29	Std.	PDLC	RM 119a	C	FLOOR TILE	INTACT	CERAMIC	TAN	Negative	0	mg / cm ^2
69	10/5/16 11:14	1.16	Std.	PDLC	RM 119a	D	DOOR	INTACT	WOOD	WHITE	Negative	0	mg / cm ^2
70	10/5/16 11:15	1.16	Std.	PDLC	RM 119a	D	DOOR FRAME	INTACT	METAL	BLUE GREEN	Negative	0	mg / cm ^2
71	10/5/16 11:18	1.16	Std.	PDLC	RM 206	C	DOOR FRAME	INTACT	METAL	WHITE	Negative	0.2	mg / cm ^2
72	10/5/16 11:19	1.15	Std.	PDLC	RM 206	C	DOOR	INTACT	WOOD	WHITE	Negative	0	mg / cm ^2
73	10/5/16 11:20	1.15	Std.	PDLC	RM 206	A	LOCKER	INTACT	METAL	BLUE	Negative	0	mg / cm ^2
74	10/5/16 11:20	0.39	Std.	PDLC	RM 206	C	WALL TILE	INTACT	CERAMIC	BLUE	Positive	8.1	mg / cm ^2

Inspector: Wm. Brad Blondet  
CDPH Inspector/Assessor # 5464

Niton XLp303A Serial #7902  
Testing for Demolition/Renovation



## City of San Diego Asbestos Lead Management Program

Old YMCA, Park De La Cruz Recreation Center, 3901 Landis St., San Diego CA



### XRF Assay Results

Reading No	Time	Duration	Mode	Location	Room	Side	Component	Condition	Substrate	Color	Results	PbC	Units
75	10/5/16 11:21	3.28	Std.	PDLC	RM 206	C	FLOOR	INTACT	CERAMIC	GRAY	Negative	0	mg / cm ^2
76	10/5/16 11:22	3.29	Std.	PDLC	RM 206	C	FLOOR	INTACT	CERAMIC	TAN	Negative	0.01	mg / cm ^2
77	10/5/16 11:24	3.28	Std.	PDLC	RM 206b	C	WALL	INTACT	PLASTER	WHITE	Negative	0.14	mg / cm ^2
78	10/5/16 11:24	3.28	Std.	PDLC	RM 206b	C	WALL	INTACT	BRICK	WHITE	Negative	0.15	mg / cm ^2
79	10/5/16 11:26	1.74	Std.	PDLC	RM 202	C	HANDRAIL	INTACT	METAL	WHITE	Positive	2.4	mg / cm ^2
80	10/5/16 11:28	1.93	Std.	PDLC	RM 003	A	WALL	INTACT	PLASTER	WHITE	Negative	0	mg / cm ^2
81	10/5/16 11:29	2.3	Std.	PDLC	RM 003	B	WALL	INTACT	PLASTER	WHITE	Negative	0	mg / cm ^2
82	10/5/16 11:29	2.51	Std.	PDLC	RM 003	C	WALL	INTACT	PLASTER	WHITE	Negative	0	mg / cm ^2
83	10/5/16 11:29	2.53	Std.	PDLC	RM 003	D	WALL	INTACT	PLASTER	WHITE	Negative	0	mg / cm ^2
84	10/5/16 11:30	1.16	Std.	PDLC	RM 003	B	DOOR	INTACT	WOOD	WHITE	Negative	0	mg / cm ^2
85	10/5/16 11:31	1.15	Std.	PDLC	RM 003	B	DOOR FRAME	INTACT	METAL	WHITE	Negative	0.01	mg / cm ^2
86	10/5/16 11:32	1.16	Std.	PDLC	RM 003	A	BASEBOARD	INTACT	CERAMIC	YELLOW	Negative	0.08	mg / cm ^2
87	10/5/16 11:32	1.16	Std.	PDLC	RM 003	A	FLOOR	INTACT	CERAMIC	TAN	Negative	0	mg / cm ^2
88	10/5/16 11:39	20	K & L				CALIB. CHECK			RED	Negative	0.8	mg / cm ^2
89	10/5/16 11:40	20	K & L				CALIB. CHECK			RED	Negative	0.8	mg / cm ^2
90	10/5/16 11:41	20	K & L				CALIB. CHECK			RED	Negative	0.9	mg / cm ^2

Inspector: Wm. Brad Blondet  
CDPH Inspector/Assessor # 5464

Niton XLp303A Serial #7902  
Testing for Demolition/Renovation

Park de La Cruz Neighborhood Recreation Center & Gym  
Appendix G - Lead Abatement

**APPENDIX H**  
**ASBESTOS MATERIAL REPORT**



## ASBESTOS AND LEAD INSPECTION REPORT

### PARK DE LA CRUZ ADA RENOVATIONS

**October 20, 2016**  
**ALMP Project #7169**

Prepared by:

Wm. Brad Blondet  
Asbestos & Lead Program Inspector  
CA Asbestos SST #99-2689  
CDPH IA/PM/S License # I-5464

Reviewed by:

George Katsikaris  
Asbestos & Lead Program Manager, OCA  
CA Asbestos Consultant #07-4265  
CDPH IA/PM/S License # I-20618

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

October 20, 2016

## 1. Overview

The City of San Diego's Asbestos and Lead Management Program (ALMP) was requested to provide inspection services for asbestos, lead, and other hazardous materials for the old YMCA building at Park de la Cruz in San Diego. The inspection was performed between December 2015 and October 2016 to abate hazardous materials ahead of the ADA project's design. Due to an expanded scope of work and materials being damaged during break-ins, further abatement will be needed to accommodate the ADA renovation.

## 2. Summary of Asbestos Containing Materials

Friable asbestos containing material and Category II asbestos containing materials must always be removed by an asbestos abatement contractor prior to demolition and renovation. ALMP recommends removal of all asbestos containing materials prior to any disturbance created by these activities.

This survey may not have included all materials concealed behind walls and hard ceilings. If suspect materials are found during demolition/renovation activities that are not mentioned in this report then work must stop and the ALMP Project Monitor must be notified.

The table below lists materials sampled for asbestos and items that have been abated. Materials that were found positive for asbestos are shaded.

OLD YMCA BUILDING AT 3901 LANDIS ST., SAN DIEGO CA 92105				
Sample #	Material	Location	Condition	% Asbestos
7169-B-01	Exterior Window Putty	South	Good	Not Detected
7169-B-02	Exterior Window Putty	North	Good	Not Detected
7169-B-03	Exterior Window Putty	North	Good	Not Detected
7169-B-04	Plaster Wall	Room 144	Good	Not Detected
7169-B-05	Plaster Wall	Room 104	Good	Not Detected
7169-B-06	Plaster Wall	Room 146	Good	Not Detected
<b>7169-B-07</b>	<b>Acoustic Ceiling</b>	<b>Room 101, 101a, 102, 104</b>	<b>Removed</b>	<b>3% Chrysotile</b>
<b>7169-B-08</b>	<b>Acoustic Ceiling</b>	<b>Room 105, 106, 107, 108, 109, 120</b>	<b>Removed</b>	<b>4% Chrysotile</b>

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<b>7169-B-09</b>	<b>Acoustic Ceiling</b>	<b>Room 147, 145a (145b remains above new ceiling tiles)</b>	<b>Removed except Room 145b</b>	<b>4% Chrysotile</b>
7169-B-10	Acoustic Ceiling	Room 111, 116	Removed	Not Detected
7169-B-11	Acoustic Ceiling	Room 124 (Remains)	Good	Not Detected
7169-B-12	Acoustic Ceiling	Room 128	Good	Not Detected
<b>7169-B-13</b>	<b>Acoustic Ceiling</b>	<b>Room 120</b>	<b>Removed</b>	<b>3% Chrysotile</b>
<b>7169-B-14</b>	<b>9"x9" Red Floor tile/Black Mastic</b>	<b>Room 001</b>	<b>Removed</b>	<b>4% Chrysotile 6% Chrysotile</b>
<b>7169-B-15</b>	<b>9"x9" Red Floor tile/Black Mastic</b>	<b>Room 142</b>	<b>Removed</b>	<b>4% Chrysotile 6% Chrysotile</b>
7169-B-16	12"x12" Gray-Blue Floor tile/Black Mastic	Room 143	Removed	Not Detected
7169-B-17	12"x12" Gray-Blue Floor tile/Black Mastic	Room 147	Removed	Not Detected
7169-B-18	12"x12" Floor tile/Black Mastic	Room 003	Removed	Not Detected
7169-B-19	Red Stair covering	Room 144	Good	Not Detected
7169-B-20	Red Stair covering	Room 143	Good	Not Detected
7169-B-21	Red Stair covering	Room 129	Good	Not Detected
<b>7169-B-22</b>	<b>9"x9" Red Floor tile/Black Mastic</b>	<b>Room 105</b>	<b>Removed</b>	<b>12% Chrysotile 3% Chrysotile</b>
7169-B-23	1'x1' Ceiling tile	Room 148	Good	Not Detected
7169-B-24	1'x1' Ceiling tile	Room 148	Good	Not Detected
7169-B-25	1'x1' Ceiling tile	Room 148	Good	Not Detected
7169-B-26	12"x12" Beige Floor tile/Black Mastic	Room 145 a/b	Good	Not Detected
7169-B-27	12"x12" Beige Floor tile/Black Mastic	Room 145 a/b	Good	Not Detected
7169-B-28	12"x12" Beige Floor tile/Black Mastic	Room 145 a/b	Good	Not Detected
<b>7169-B-29</b>	<b>12"x12" Tan-Green Floor tile/Black Mastic</b>	<b>Room 146</b>	<b>Removed</b>	<b>5% Chrysotile 2% Chrysotile</b>
7169-B-30	12"x12" Tan-Green Floor tile/Black Mastic	Room 146	Removed	Not Detected
7169-B-31	12"x12" Tan-	Room 146	Removed	Not Detected

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	Green Floor tile/Black Mastic			
7169-B-32	Black-Brown Cove base mastic	Throughout	Good	Not Detected
7169-B-33	Black-Brown Cove base mastic	Throughout	Good	Not Detected
7169-B-34	Black-Brown Cove base mastic	Throughout	Good	Not Detected
<b>7169-B-35</b>	<b>Thermal System Insulation</b>	<b>Plumbing Chases, Wall cavities, Tunnels</b>	<b>Damaged</b>	<b>8% Chrysotile 5% Amosite</b>
7169-B-36	Acoustic Ceiling	Room 124 (Remains)	Good	Not Detected
7169-B-37	Acoustic Ceiling	Room 124 (Remains)	Good	Not Detected
7169-B-38	Acoustic Ceiling	Room 124 (Remains)	Good	Not Detected
7169-B-39	Acoustic Ceiling	Room 124 (Remains)	Good	Not Detected
7169-B-40	Acoustic Ceiling	Room 001 (Remains)	Good	Not Detected
7169-B-41	Acoustic Ceiling	Room 001 (Remains)	Good	Not Detected
7169-B-42	Acoustic Ceiling	Room 001 (Remains)	Good	Not Detected
7169-B-43	Acoustic Ceiling	Room 001 (Remains)	Good	Not Detected
7169-B-44	Acoustic Ceiling	Room 001 (Remains)	Good	Not Detected
<b>7169-B-45</b>	<b>9"x9" Red Floor tile/Black Mastic</b>	<b>Jr. Social Room, Room 112</b>	<b>Tile Removed</b>	<b>4% Chrysotile Mastic ND</b>
<b>7169-B-46</b>	<b>9"x9" Red Floor tile/Black Mastic</b>	<b>Jr. Social Room, Room 112</b>	<b>Tile Removed</b>	<b>4% Chrysotile Mastic ND</b>
<b>7169-B-47</b>	<b>9"x9" Red Floor tile/Black Mastic</b>	<b>Jr. Social Room, Room 112</b>	<b>Tile Removed</b>	<b>4% Chrysotile Mastic ND</b>
7169-B-48	12"x12" Beige Floor Tile/Yellow Glue	Lobby, Room 111	Good	Not Detected
7169-B-49	12"x12" Beige Floor Tile/Yellow Glue	Lobby, Room 111	Good	Not Detected
7169-B-50	12"x12" Beige Floor Tile/Yellow Glue	Lobby, Room 111	Good	Not Detected
7169-B-51	Gray Ceiling Panels	Jr. Social Room, Room 112, Pool area	Good	Not Detected
7169-B-52	Gray Ceiling Panels	Jr. Social Room, Room 112, Pool area	Good	Not Detected
7169-B-53	Gray Ceiling Panels	Jr. Social Room, Room 112, Pool area	Good	Not Detected
7169-B-54	12"x12" Tan Floor tile/Black Mastic	Lower Locker Room	Good	Not Detected
7169-B-55	12"x12" Tan Floor	Lower Locker Room	Good	Not Detected

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	tile/Black Mastic			
7169-B-56	12"x12" Tan Floor tile/Black Mastic	Lower Locker Room	Good	Not Detected
<b>7169-B-57</b>	<b>12"x12" Tan Floor tile on Red 9"x9" Floor tile/Black Mastic</b>	<b>Fitness Room, Room 124</b>	<b>Removed</b>	<b>10% Chrysotile 6% Chrysotile</b>
<b>7169-B-58</b>	<b>12"x12" Tan Floor tile on Red 9"x9" Floor tile/Black Mastic</b>	<b>Fitness Room, Room 124</b>	<b>Removed</b>	<b>10% Chrysotile 6% Chrysotile</b>
<b>7169-B-59</b>	<b>12"x12" Tan Floor tile on Red 9"x9" Floor tile/Black Mastic</b>	<b>Fitness Room, Room 124</b>	<b>Removed</b>	<b>10% Chrysotile 6% Chrysotile</b>
<b>7169-B-60</b>	<b>12"x12" Brown Floor tile/Black Mastic</b>	<b>Lounge Day Care Room 148</b>	<b>Removed</b>	<b>8% Chrysotile 6% Chrysotile</b>
<b>7169-B-61</b>	<b>12"x12" Brown Floor tile/Black Mastic</b>	<b>Lounge Day Care Room 148</b>	<b>Removed</b>	<b>8% Chrysotile 6% Chrysotile</b>
<b>7169-B-62</b>	<b>12"x12" Brown Floor tile/Black Mastic</b>	<b>Lounge Day Care Room 148</b>	<b>Removed</b>	<b>8% Chrysotile 6% Chrysotile</b>
		63-74 numbering not used		
7169-B-75	Roof Core	High Roof over Room 140	Good	Not Detected
7169-B-76	Roof Core	High Roof over Room 139 (Pool)	Good	Not Detected
7169-B-77	Roof Core	High Roof over Room 145 Multi-Purpose	Good	Not Detected
7169-B-78	Roof Core	High Roof over Room 112 (Weight Room)	Good	Not Detected
7169-B-79	Roof Core	Low Roof over Room 107 (Offices)	Good	Not Detected
<b>7169-B-80</b>	<b>Black-Gray Roof Mastics</b>	<b>Seams and Penetrations, High Roofs</b>	<b>Good</b>	<b>4% Chrysotile</b>
<b>7169-B-81</b>	<b>Black-Gray Roof Mastics</b>	<b>Seams and Penetrations, High Roofs</b>	<b>Good</b>	<b>4% Chrysotile</b>
<b>7169-B-82</b>	<b>Black-Gray Roof</b>	<b>Seams, Low Roof over</b>	<b>Good</b>	<b>4% Chrysotile</b>

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	<b>Mastics</b>	<b>Room 107 (Offices)</b>		
<b>7169-B-83</b>	<b>Black-Gray Roof Mastics</b>	<b>Duct work on low roof</b>	<b>Good</b>	<b>4% Chrysotile</b>
<b>7169-B-84</b>	<b>Black-Gray Roof Mastics</b>	<b>Duct work on low roof</b>	<b>Good</b>	<b>4% Chrysotile</b>
7169-B-85	Beige-Tan Linoleum	Break Room 151	Good	Not Detected
7169-B-86	Beige-Tan Linoleum	Break Room 151	Good	Not Detected
7169-B-87	Beige-Tan Linoleum	Break Room 151	Good	Not Detected
<b>7169-B-88</b>	<b>Red Linoleum</b>	<b>Closet, Room 151</b>	<b>Good</b>	<b>10% Chrysotile</b>
<b>7169-B-89</b>	<b>Red Linoleum</b>	<b>Pantry, Room 151</b>	<b>Good</b>	<b>10% Chrysotile</b>
<b>7169-B-90</b>	<b>Red Linoleum</b>	<b>Janitor's Closet, Room 150</b>	<b>Good</b>	<b>10% Chrysotile</b>
7169-B-91	Drywall, Tape, Mud	Closet, Room 151	Good	Not Detected
7169-B-92	Drywall, Tape, Mud	Pantry, Room 151	Good	Not Detected
7169-B-93	Drywall, Tape, Mud	Room 149a	Good	Not Detected
7169-B-94	Plaster, Button board	Room 119a	Good	Not Detected
7169-B-95	Plaster, Button board	Room 119a	Good	Not Detected
7169-B-96	Plaster, Button board	Room 119a	Good	Not Detected
7169-B-97	Plaster, Button board	Room 206	Good	Not Detected
7169-B-98	Plaster, Button board	Room 206	Good	Not Detected
7169-B-99	Plaster, Button board	Room 206	Good	Not Detected
7169-B-100	<b>9"x9" Red Floor tile/Black Mastic</b>	<b>Room 208</b>	<b>Good</b>	<b>4% Chrysotile</b> Mastic ND
7169-B-101	<b>9"x9" Red Floor tile/Black Mastic</b>	<b>Room 208</b>	<b>Good</b>	<b>4% Chrysotile</b> Mastic ND
7169-B-102	<b>9"x9" Red Floor tile/Black Mastic</b>	<b>Room 208</b>	<b>Good</b>	<b>4% Chrysotile</b> Mastic ND
7169-B-103	12"x12" Gray Floor Tile/Black Mastic	Landing, Room 201	Good	Not Detected
7169-B-104	12"x12" Gray	Landing, Room 202	Good	Not Detected

October 20, 2016

	Floor Tile/Black Mastic			
7169-B-105	12"x12" Gray Floor Tile/Black Mastic	Landing, Room 202	Good	Not Detected
<b>7169-B-106</b>	<b>Black Mirror Mastic</b>	<b>All Restrooms</b>	<b>Damaged</b>	<b>8% Chrysotile</b>
<b>7169-B-107</b>	<b>Black Mirror Mastic</b>	<b>Room 140</b>	<b>Damaged</b>	<b>8% Chrysotile</b>
<b>7169-B-108</b>	<b>Black Mirror Mastic</b>	<b>Room 141</b>	<b>Damaged</b>	<b>8% Chrysotile</b>

### 3. Summary of Lead Paint

An inspection was performed using an XRF analyzer to determine which deteriorated painted surfaces had levels of lead that may pose a lead exposure risk during demolition. The threshold used was 0.10 mg/cm<sup>2</sup> because it has an established regulatory correlation with 600 ppm, which is the level of lead currently allowed in new paint.

All non-intact (loose, flaking) paint containing over 600 mg/Kg or 0.10 mg/cm<sup>2</sup> must be removed by lead trained employees prior to demolition activities.

All paint chips, regardless of their lead content, must be segregated from other waste and characterized as hazardous or nonhazardous (or assumed to be hazardous) prior to disposal.

The summary below lists the areas of lead containing materials with greater than 1.0 mg/cm<sup>2</sup> concentration. A printout of the entire XRF report is attached.

28: Handrails at Main level to Basement level (Removed)

67: Ceramic Wall Tile at Room 119a (Old Rooms 117, 118)

74: Ceramic Wall Tile at Room 206 (All Colored Restroom wall tile)

79: Handrails at Main level to 2<sup>nd</sup> Floor, Room 202

October 20, 2016

#### 4. Attachments

1. Asbestos Laboratory Reports
2. Lead XRF Report
3. Inspector Certifications

**Attachment # 1**

**ASBESTOS LABORATORY REPORTS**



**H.M. Pitt Labs, Inc.**  
 2434 Southport Way · Suite L · National City, CA 91950

**Lab Number: 143897-189619**  
 Tel: 619-474-8548 · Fax: 619-474-6128

**Company:**  
 City of San Diego Environmental Services  
 Department  
 9601 Ridgehaven Court, Suite 310  
 San Diego, CA 92123

**Date Entered:** 07/07/2015  
**Analyzed By:** Michelle Lavallee

**Date Analyzed:** 07/09/15  
**Customer PO / Claim#:**  
**Contract Number:**

**Job Site:** Project No. 7169

**Date Sampled**      **Who Sampled**  
 06/30/2015      Wm. Brad Blondet

**Lab Notes:** 72 HR TAT

**POLARIZED LIGHT MICROSCOPY (PLM) ANALYSIS REPORT - EPA-600/M4-82-020**

**Analysis Number:** 143897-1  
**Customer Number:** 7169-B-01  
**Classification:**      **Description:** Exterior Window Putty, White, South  
**Results:** Non-Asbestos: Non-Fibrous Tan Window Putty

**Analysis Number:** 143897-2  
**Customer Number:** 7169-B-02  
**Classification:**      **Description:** Exterior Window Putty, White, North  
**Results:** Non-Asbestos: Non-Fibrous Tan Window Putty

**Analysis Number:** 143897-3  
**Customer Number:** 7169-B-03  
**Classification:**      **Description:** Exterior Window Putty, White, North  
**Results:** Non-Asbestos: Non-Fibrous Tan Window Putty

**Analysis Number:** 143897-4  
**Customer Number:** 7169-B-04  
**Classification:**      **Description:** Plaster Wall, White, Room 144  
**Results:** a. Non-Asbestos: Non-Fibrous White Skim Coat  
 b. Non-Asbestos: Non-Fibrous Tan Plaster

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
- These test results relate only to the sample(s) identified above.
- This report may not be used to claim endorsement by NVLAP or any agency of the Federal Government.
- This report shall not be reproduced, except in full, without written approval of H.M. Pitt Labs, Inc.
- Samples are archived for 2 years from date of receipt and will be disposed of properly following this period.
- Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of 1%.

**APPROVED BY:** LELAND S. PITT      **Dated:** 07/09/2015

**REVIEWED BY:** MICHELLE LAVALLEE



# H.M. Pitt Labs, Inc.

2434 Southport Way · Suite L · National City, CA 91950

# Lab Number: 143897-189619

Tel: 619-474-8548 · Fax: 619-474-6128

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 07/07/2015**Analyzed By:** Michelle Lavallee**Date Analyzed:** 07/09/15**Customer PO / Claim#:****Contract Number:****Job Site:** Project No. 7169**Date Sampled****Who Sampled**

06/30/2015

Wm. Brad Blondet

**Lab Notes:** 72 HR TAT

## POLARIZED LIGHT MICROSCOPY (PLM) ANALYSIS REPORT - EPA-600/M4-82-020

**Analysis Number:** 143897-5**Customer Number:** 7169-B-05**Classification:****Description:** Plaster Wall, White, Room 104**Results:**

- a. Non-Asbestos: Non-Fibrous White Skim Coat
- b. Non-Asbestos: Non-Fibrous Tan Plaster

**Analysis Number:** 143897-6**Customer Number:** 7169-B-06**Classification:****Description:** Plaster Wall, White, Room 146**Results:**

- a. Non-Asbestos: Non-Fibrous White Skim Coat
- b. Non-Asbestos: Non-Fibrous Tan Plaster

**Analysis Number:** 143897-7**Customer Number:** 7169-B-07**Classification:****Description:** Acoustic, White, Room 101**Results:**

Asbestos: 3% Chrysotile in White Acoustic Ceiling (2% Cellulose Fibers Also Present)

**Analysis Number:** 143897-8**Customer Number:** 7169-B-08**Classification:****Description:** Acoustic, White, Room 105**Results:**

Asbestos: 4% Chrysotile in White Acoustic Ceiling (2% Cellulose Fibers Also Present)

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
- These test results relate only to the sample(s) identified above.
- This report may not be used to claim endorsement by NVLAP or any agency of the Federal Government.
- This report shall not be reproduced, except in full, without written approval of H.M. Pitt Labs, Inc.
- Samples are archived for 2 years from date of receipt and will be disposed of properly following this period.
- Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of 1%.

**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 07/08/2015**REVIEWED BY:**

Page 2 of 9



# H.M. Pitt Labs, Inc.

2434 Southport Way · Suite L · National City, CA 91950

# Lab Number: 143897-189619

Tel: 619-474-8548 · Fax: 619-474-6128

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 07/07/2015  
**Analyzed By:** Michelle Lavallee

**Date Analyzed:** 07/09/15  
**Customer PO / Claim#:**  
**Contract Number:**

**Job Site:** Project No. 7169

**Date Sampled**      **Who Sampled**  
06/30/2015      Wm. Brad Blondet

**Lab Notes:** 72 HR TAT

## POLARIZED LIGHT MICROSCOPY (PLM) ANALYSIS REPORT - EPA-600/M4-82-020

**Analysis Number:** 143897-9

**Customer Number:** 7169-B-09

**Classification:**

**Description:** Acoustic, White, Room 147

**Results:** Asbestos: 4% Chrysotile in White Acoustic Ceiling (2% Cellulose Fibers Also Present)

**Analysis Number:** 143897-10

**Customer Number:** 7169-B-10

**Classification:**

**Description:** Acoustic, White, Room 111

**Results:** Non-Asbestos: 2% Cellulose Fibers in White Acoustic Ceiling

**Analysis Number:** 143897-11

**Customer Number:** 7169-B-11

**Classification:**

**Description:** Acoustic, White, Room 124

**Results:** Non-Asbestos: 2% Cellulose Fibers in White Acoustic Ceiling

**Analysis Number:** 143897-12

**Customer Number:** 7169-B-12

**Classification:**

**Description:** Acoustic, White, Room 128

**Results:** Non-Asbestos: 2% Cellulose Fibers in White Acoustic Ceiling

**Analysis Number:** 143897-13

**Customer Number:** 7169-B-13

**Classification:**

**Description:** Acoustic, White, Room 120

**Results:** Asbestos: 3% Chrysotile in White Acoustic Ceiling (2% Cellulose Fibers Also Present)

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
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- Samples are archived for 2 years from date of receipt and will be disposed of properly following this period.
- Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of 1%.

**APPROVED BY:**

LELANO S. PITT, CIH

**Dated:** 07/09/2015

**REVIEWED BY:**

Page 3 of 9



# H.M. Pitt Labs, Inc.

2434 Southport Way · Suite L · National City, CA 91950

# Lab Number: 143897-189619

Tel: 619-474-8548 · Fax: 619-474-8128

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 07/07/2015**Analyzed By:** Michelle Lavallee**Date Analyzed:** 07/09/15**Customer PO / Claim#:****Contract Number:****Job Site:** Project No. 7169**Date Sampled****Who Sampled**

06/30/2015

Wm. Brad Blondet

**Lab Notes:** 72 HR TAT

## POLARIZED LIGHT MICROSCOPY (PLM) ANALYSIS REPORT - EPA-600/M4-82-020

**Analysis Number:** 143897-14**Customer Number:** 7169-B-14**Classification:****Description:** 9" x 9" Floor Tile/Mastic, Red, Room 001**Results:**  
a. Asbestos: 4% Chrysotile in Red Floor Tile  
b. Asbestos: 6% Chrysotile in Black Mastic**Analysis Number:** 143897-15**Customer Number:** 7169-B-15**Classification:****Description:** 9" x 9" Floor Tile/Mastic, Red, Room 142**Results:**  
a. Asbestos: 4% Chrysotile in Red Floor Tile  
b. Asbestos: 6% Chrysotile in Black Mastic**Analysis Number:** 143897-16**Customer Number:** 7169-B-16**Classification:****Description:** 12" x 12" Floor Tile/Mastic, Beige/Gray,  
Room 143**Results:**  
a. Non-Asbestos: Non-Fibrous Gray Floor Tile  
b. Non-Asbestos: Non-Fibrous Tan Mastic  
c. Non-Asbestos: Non-Fibrous Blue Floor Tiled  
d. Non-Asbestos: Non-Fibrous Tan/Black Mastic

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
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**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 07/09/2015**REVIEWED BY:**

Page 4 of 9



# H.M. Pitt Labs, Inc.

2434 Southport Way · Suite L · National City, CA 91950

# Lab Number: 143897-189619

Tel: 619-474-8548 · Fax: 619-474-6128

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 07/07/2015**Analyzed By:** Michelle Lavallee**Date Analyzed:** 07/09/15**Customer PO / Claim#:****Contract Number:****Job Site:** Project No. 7169**Date Sampled****Who Sampled**

06/30/2015

Wm. Brad Blondet

**Lab Notes:** 72 HR TAT

## POLARIZED LIGHT MICROSCOPY (PLM) ANALYSIS REPORT - EPA-600/M4-82-020

**Analysis Number:** 143897-17**Customer Number:** 7169-B-17**Classification:****Description:** 12" x 12" Floor Tile/Mastic, Beige/Gray, Room 147**Results:**

- a. Non-Asbestos: Non-Fibrous Gray Floor Tile
- b. Non-Asbestos: Non-Fibrous Tan Mastic
- c. Non-Asbestos: Non-Fibrous Brown Wood
- d. Non-Asbestos: Non-Fibrous Black Mastic

**Analysis Number:** 143897-18**Customer Number:** 7169-B-18**Classification:****Description:** 12" x 12" Floor Tile/Mastic, Gray, Room 003**Results:**

Non-Asbestos: Non-Fibrous Gray Floor Tile

**Analysis Number:** 143897-19**Customer Number:** 7169-B-19**Classification:****Description:** Stair Covering, Red, Room 144**Results:**

Non-Asbestos: Non-Fibrous Red Stair Covering

**Analysis Number:** 143897-20**Customer Number:** 7169-B-20**Classification:****Description:** Stair Covering, Red, Room 143**Results:**

Non-Asbestos: Non-Fibrous Red Stair Covering

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- Samples are archived for 2 years from date of receipt and will be disposed of properly following this period.
- Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of 1%.

**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 07/09/2015**REVIEWED BY:**

Page 5 of 9



# H.M. Pitt Labs, Inc.

2434 Southport Way · Suite L · National City, CA 91950

# Lab Number: 143897-189619

Tel: 619-474-8548 · Fax: 619-474-6128

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 07/07/2015**Analyzed By:** Michelle Lavallee**Date Analyzed:** 07/09/15**Customer PO / Claim#:****Contract Number:****Job Site:** Project No. 7169**Date Sampled****Who Sampled**

06/30/2015

Wm. Brad Blondet

**Lab Notes:** 72 HR TAT

## POLARIZED LIGHT MICROSCOPY (PLM) ANALYSIS REPORT - EPA-600/M4-82-020

**Analysis Number:** 143897-21**Customer Number:** 7169-B-21**Classification:****Description:** Stair Covering, Red, Room 129**Results:** Non-Asbestos: Non-Fibrous Red Stair Covering**Analysis Number:** 143897-22**Customer Number:** 7169-B-22**Classification:****Description:** 9" x 9" Floor Tile/Mastic, Red, Room 105**Results:**  
a. Asbestos: 12% Chrysotile in Red Floor Tile  
b. Asbestos: 3% Chrysotile in Black Mastic**Analysis Number:** 143897-23**Customer Number:** 7169-B-23**Classification:****Description:** 1' x 1' Ceiling Tile, White, Room 148**Results:** Non-Asbestos: 80% Cellulose Fibers in Brown/White Ceiling Tile**Analysis Number:** 143897-24**Customer Number:** 7169-B-24**Classification:****Description:** 1' x 1' Ceiling Tile, White, Room 148**Results:** Non-Asbestos: 80% Cellulose Fibers in Brown/White Ceiling Tile

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
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- Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of 1%.

**APPROVED BY:**  
I. LANO S. PITT, CIH**Dated:** 07/09/2015**REVIEWED BY:**

Page 6 of 9



# H.M. Pitt Labs, Inc.

2434 Southport Way · Suite L · National City, CA 91950

# Lab Number: 143897-189619

Tel: 619-474-8548 · Fax: 619-474-6128

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 07/07/2015

**Analyzed By:** Michelle Lavallee

**Date Analyzed:** 07/09/15

**Customer PO / Claim#:**

**Contract Number:**

**Job Site:** Project No. 7169

**Date Sampled**

**Who Sampled**

**Lab Notes:** 72 HR TAT

06/30/2015

Wm. Brad Blondet

## POLARIZED LIGHT MICROSCOPY (PLM) ANALYSIS REPORT - EPA-600/M4-82-020

**Analysis Number:** 143897-25

**Customer Number:** 7169-B-25

**Classification:**

**Description:** 1' x 1' Ceiling Tile, White, Room 148

**Results:** Non-Asbestos: 80% Cellulose Fibers in Brown/White Ceiling Tile

**Analysis Number:** 143897-26

**Customer Number:** 7169-B-26

**Classification:**

**Description:** 12" x 12" Floor Tile/Mastic, Beige, Room 145a/b

**Results:**  
a. Non-Asbestos: Non-Fibrous Gray Floor Tile  
b. Non-Asbestos: Non-Fibrous Black Mastic

**Analysis Number:** 143897-27

**Customer Number:** 7169-B-27

**Classification:**

**Description:** 12" x 12" Floor Tile/Mastic, Beige, Room 145a/b

**Results:**  
a. Non-Asbestos: Non-Fibrous Gray Floor Tile  
b. Non-Asbestos: Non-Fibrous Black Mastic

**Analysis Number:** 143897-28

**Customer Number:** 7169-B-28

**Classification:**

**Description:** 12" x 12" Floor Tile/Mastic, Beige, Room 145a/b

**Results:**  
a. Non-Asbestos: Non-Fibrous Gray Floor Tile  
b. Non-Asbestos: Non-Fibrous Black Mastic

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**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 07/08/2015

**REVIEWED BY:**



# H.M. Pitt Labs, Inc.

2434 Southport Way · Suite L · National City, CA 91950

# Lab Number: 143897-189619

Tel: 619-474-8548 · Fax: 619-474-6128

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 07/07/2015**Analyzed By:** Michelle Lavallee**Date Analyzed:** 07/09/15**Customer PO / Claim#:****Contract Number:****Job Site:** Project No. 7169**Date Sampled****Who Sampled**

06/30/2015

Wm. Brad Blondet

**Lab Notes:** 72 HR TAT

## POLARIZED LIGHT MICROSCOPY (PLM) ANALYSIS REPORT - EPA-600/M4-82-020

**Analysis Number:** 143897-29**Customer Number:** 7169-B-29**Classification:****Description:** 12" x 12" Floor Tile/Mastic, Green, Room 148**Results:**

- a. Non-Asbestos: Non-Fibrous Tan Floor Tile
- b. Non-Asbestos: Non-Fibrous Tan Mastic
- c. Asbestos: 5% Chrysotile in Green Floor Tile
- d. Asbestos: 2% Chrysotile in Black Mastic

**Analysis Number:** 143897-30**Customer Number:** 7169-B-30**Classification:****Description:** 12" x 12" Floor Tile/Mastic, Green, Room 146**Results:**

- a. Non-Asbestos: Non-Fibrous Tan Floor Tile
- b. Non-Asbestos: Non-Fibrous Tan Mastic
- c. Non-Asbestos: Non-Fibrous Green Floor Tile
- d. Non-Asbestos: Non-Fibrous Black Mastic

**Analysis Number:** 143897-31**Customer Number:** 7169-B-31**Classification:****Description:** 12" x 12" Floor Tile/Mastic, Green, Room 146**Results:**

- a. Non-Asbestos: Non-Fibrous Tan Floor Tile
- b. Non-Asbestos: Non-Fibrous Green Floor Tile
- c. Non-Asbestos: Non-Fibrous Tan Mastic
- d. Non-Asbestos: Non-Fibrous Black Mastic

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**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 07/09/2015**REVIEWED BY:**

Page 8 of 9



# H.M. Pitt Labs, Inc.

2434 Southport Way · Suite L · National City, CA 91950

# Lab Number: 143897-189619

Tel: 619-474-8548 · Fax: 619-474-6128

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 07/07/2015

**Analyzed By:** Michelle Lavallee

**Date Analyzed:** 07/09/15

**Customer PO / Claim#:**

**Contract Number:**

**Job Site:** Project No. 7169

**Date Sampled**

**Who Sampled**

**Lab Notes:** 72 HR TAT

06/30/2015

Wm. Brad Blondet

## POLARIZED LIGHT MICROSCOPY (PLM) ANALYSIS REPORT - EPA-600/M4-82-020

**Analysis Number:** 143897-32

**Customer Number:** 7169-B-32

**Classification:**

**Description:** Cove Base and Mastic, Black, Throughout

**Results:** Non-Asbestos: 3% Wollastonite in Brown Cove Base Mastic

**Analysis Number:** 143897-33

**Customer Number:** 7169-B-33

**Classification:**

**Description:** Cove Base and Mastic, Black, Throughout

**Results:** Non-Asbestos: 3% Wollastonite in Brown Cove Base Mastic

**Analysis Number:** 143897-34

**Customer Number:** 7169-B-34

**Classification:**

**Description:** Cove Base and Mastic, Black, Throughout

**Results:** Non-Asbestos: 3% Wollastonite in Brown Cove Base Mastic

**Analysis Number:** 143897-35

**Customer Number:** 7169-B-35

**Classification:**

**Description:** TSI on Pipes, White, Damaged, Throughout

**Results:** Asbestos: 8% Chrysotile and 6% Amosite in White Pipe Insulation

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
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**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 07/09/2015

**REVIEWED BY:**



**CITY OF SAN DIEGO**  
**Environmental Services Department**  
**ALMP/LSHHP - Laboratory Submittal**

143897



Project # 7169 Submitted by: Wm. Brad Blondet Date: 6 / 30 /2015 Page 1 of 1

LAB SUBMITTED TO: <b>HM Pitt Labs</b>	TURNAROUND TIME: <input type="checkbox"/> 2 HOUR <input type="checkbox"/> 24 HOUR <input type="checkbox"/> 48 HOUR <input checked="" type="checkbox"/> 72 HOUR <input type="checkbox"/> 5 DAY <input type="checkbox"/> OTHER:
--	--

The receiving Laboratory is required to complete the following:

1. All Invoices are to be sent to: *Attn. Alan Johans- City of San Diego – Environmental Services Department, 9601 Ridgehaven Court, Suite 310 San Diego, CA 92123*
2. Lab reports/invoices are to contain the Project Number listed above. Do not include Purchase Order Numbers on Invoices
3. Email report to: WBlondet@sandiego.gov

Lab Number	Sample No.	Location	Media	Time On/Off	Flow	Volume	Analyses Requested
	7169-B-01	Exterior Window Putty, White, South	Bulk	/			PLM
	7169-B-02	Exterior Window Putty, White, North	Bulk	/			PLM
	7169-B-03	Exterior Window Putty, White, North	Bulk	/			PLM
	7169-B-04	Plaster Wall, White, Room 144	Bulk	/			PLM
	7169-B-05	Plaster Wall, White, Room 104	Bulk	/			PLM
	7169-B-06	Plaster Wall, White, Room 146	Bulk	/			PLM
	7169-B-07	Acoustic, White, Room 101	Bulk	/			PLM
	7169-B-08	Acoustic, White, Room 105	Bulk	/			PLM
	7169-B-09	Acoustic, White, Room 147	Bulk	/			PLM
	7169-B-10	Acoustic, White, Room 111	Bulk	/			PLM

NOTES:

Relinquished by: <u>Wm. Brad Blondet</u>	Relinquished by: <u>[Signature]</u>
Date/Time: <u>7-7-2015</u>	Date/Time: <u>7/7/15 1447</u>
Received by: <u>[Signature]</u>	Received by: <u>Derrille Goldstern</u>
Date/Time: <u>7/7/15 1920</u>	Date/Time: <u>7/7/15 @ 2:57</u>



CITY OF SAN DIEGO  
Environmental Services Department  
ALMP/LSHHP - Laboratory Submittal

143897



Project # 7169 Submitted by: Wm. Brad Blondet Date: 7 / 01 / 2015 Page 1 of 1

LAB SUBMITTED TO: <b>HM Pitt Labs</b>	TURNAROUND TIME: <input type="checkbox"/> 2 HOUR <input type="checkbox"/> 24 HOUR <input type="checkbox"/> 48 HOUR <input checked="" type="checkbox"/> 72 HOUR <input type="checkbox"/> 5 DAY <input type="checkbox"/> OTHER:
--	---

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- Lab reports/invoices are to contain the Project Number listed above. Do not include Purchase Order Numbers on Invoices
- Email report to: [WBlondet@sandiego.gov](mailto:WBlondet@sandiego.gov)

Lab Number	Sample No.	Location	Media	Time On/Off	Flow	Volume	Analyses Requested
	7169-B-11	Acoustic, White, Room 124	Bulk	/			PLM
	7169-B-12	Acoustic, White, Room 128	Bulk	/			PLM
	7169-B-13	Acoustic, White, Room 120	Bulk	/			PLM
	7169-B-14	9" x 9" Floor Tile/Mastic, Red, Room 001	Bulk	/			PLM
	7169-B-15	9" x 9" Floor Tile/Mastic, Red, Room 142	Bulk	/			PLM
	7169-B-16	12" x 12" Floor Tile/Mastic, Beige/Gray, Room 143	Bulk	/			PLM
	7169-B-17	12" x 12" Floor Tile/Mastic, Beige/Gray, Room 147	Bulk	/			PLM
	7169-B-18	12" x 12" Floor Tile/Mastic, Gray, Room 003	Bulk	/			PLM
	7169-B-19	Stair Covering, Red, Room 144	Bulk	/			PLM
	7169-B-20	Stair Covering, Red, Room 143	Bulk	/			PLM

NOTES:

Relinquished by: <u>Wm. Brad Blondet</u> Date/Time: <u>7-7-2015</u>	Relinquished by: <u>[Signature]</u> Date/Time: <u>7/7/15 1447</u>
Received by: <u>[Signature]</u> Date/Time: <u>7/7/15 1920</u>	Received by: <u>[Signature]</u> Date/Time: <u>7/7/15 @ 257P</u>



**CITY OF SAN DIEGO**  
**Environmental Services Department**  
**ALMP/LSHHP - Laboratory Submittal**

143897



Project # 7169 Submitted by: Wm. Brad Blondet Date: 7 / 01 / 2015 Page 1 of 1

LAB SUBMITTED TO: <b>HM Pitt Labs</b>	TURNAROUND TIME: <input type="checkbox"/> 2 HOUR <input type="checkbox"/> 24 HOUR <input type="checkbox"/> 48 HOUR <input checked="" type="checkbox"/> 72 HOUR <input type="checkbox"/> 5 DAY <input type="checkbox"/> OTHER:
--	--

The receiving Laboratory is required to complete the following:

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- Lab reports/invoices are to contain the Project Number listed above. Do not include Purchase Order Numbers on Invoices
- Email report to: WBlondet@sandiego.gov

Lab Number	Sample No.	Location	Media	Time On/Off	Flow	Volume	Analyses Requested
	7169-B-21	Stair Covering, Red, Room 129	Bulk	/			PLM
	7169-B-22	9" x 9" Floor Tile/Mastic, Red, Room 105	Bulk	/			PLM
	7169-B-23	1' x 1' Ceiling Tile, White, Room 148	Bulk	/			PLM
	7169-B-24	1' x 1' Ceiling Tile, White, Room 148	Bulk	/			PLM
	7169-B-25	1' x 1' Ceiling Tile, White, Room 148	Bulk	/			PLM
	7169-B-26	12" x 12" Floor Tile/Mastic, Beige, Room 145a/b	Bulk	/			PLM
	7169-B-27	12" x 12" Floor Tile/Mastic, Beige, Room 145a/b	Bulk	/			PLM
	7169-B-28	12" x 12" Floor Tile/Mastic, Beige, Room 145a/b	Bulk	/			PLM
	7169-B-29	12" x 12" Floor Tile/Mastic, Green, Room 146	Bulk	/			PLM
	7169-B-30	12" x 12" Floor Tile/Mastic, Green, Room 146	Bulk	/			PLM

NOTES:

Relinquished by: <u>Wm. Brad Blondet</u> Date/Time: <u>7-7-2015</u>	Relinquished by: <u>[Signature]</u> Date/Time: <u>7/7/15 1447</u>
Received by: <u>[Signature]</u> Date/Time: <u>7/7/15 1400</u>	Received by: <u>[Signature]</u> Date/Time: <u>7/7/15 @ 2:57 PM</u>



**CITY OF SAN DIEGO**  
**Environmental Services Department**  
**ALMP/LSHHP - Laboratory Submittal**

143897



Project # 7169 Submitted by: Wm. Brad Blondet Date: 7 / 01 / 2015 Page 1 of 1

LAB SUBMITTED TO: <b>HM Pitt Labs</b>	TURNAROUND TIME:					
	<input type="checkbox"/> 2 HOUR	<input type="checkbox"/> 24 HOUR	<input type="checkbox"/> 48 HOUR	<input checked="" type="checkbox"/> 72 HOUR	<input type="checkbox"/> 5 DAY	<input type="checkbox"/> OTHER:

The receiving Laboratory is required to complete the following:

- All Invoices are to be sent to: Attn. Alan Johans- City of San Diego – Environmental Services Department, 9601 Ridgehaven Court, Suite 310 San Diego, CA 92123
- Lab reports/invoices are to contain the Project Number listed above. Do not include Purchase Order Numbers on Invoices
- Email report to: WBlondet@sandiego.gov

Lab Number	Sample No.	Location	Media	Time On/Off	Flow	Volume	Analyses Requested
	7169-B-31	12" x 12" Floor Tile/Mastic, Green, Room 146	Bulk	/			PLM
	7169-B-32	Cove Base and Mastic, Black, Throughout	Bulk	/			PLM
	7169-B-33	Cove Base and Mastic, Black, Throughout	Bulk	/			PLM
	7169-B-34	Cove Base and Mastic, Black, Throughout	Bulk	/			PLM
	7169-B-35	TSI on pipes, White, Damaged, Throughout	Bulk	/			PLM
				/			
				/			
				/			
				/			
				/			

NOTES:

Relinquished by: <u>Wm. Brad Blondet</u>	Relinquished by: <u>[Signature]</u>
Date/Time: <u>7-7-2015</u>	Date/Time: <u>7/7/15 1447</u>
Received by: <u>[Signature]</u>	Received by: <u>[Signature]</u>
Date/Time: <u>7/7/15 1420</u>	Date/Time: <u>7/7/15 @ 2:58P</u>



# H.M. Pitt Labs, Inc.

4901 Morena Blvd · Ste 203 · San Diego, CA 92117

# Lab Number: 146550-194138

Tel: 619-474-8548 · Fax: 619-474-8128

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 11/20/2015  
**Analyzed By:** Edina Zakar

**Date Analyzed:** 11/20/15  
**Customer PO / Claim#:**  
**Contract Number:**

**Job Site:** Project #7169

**Date Sampled**      **Who Sampled**  
11/20/2015      Brad Blondet

**Lab Notes:**

---

**POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020**

---

**Analysis Number:** 146550-1

**Customer Number:** 7169-B-36

**Classification:**

**Description:** Rm 124, White Acoustic - Bulk

**Results:** Non-Asbestos: Non-Fibrous White Acoustic Ceiling

**Analysis Number:** 146550-2

**Customer Number:** 7169-B-37

**Classification:**

**Description:** Rm 124, White Acoustic - Bulk

**Results:** Non-Asbestos: Non-Fibrous White Acoustic Ceiling

**Analysis Number:** 146550-3

**Customer Number:** 7169-B-38

**Classification:**

**Description:** Rm 124, White Acoustic - Bulk

**Results:** Non-Asbestos: Non-Fibrous White Acoustic Ceiling

**Analysis Number:** 146550-4

**Customer Number:** 7169-B-39

**Classification:**

**Description:** Rm 124, White Acoustic - Bulk

**Results:** Non-Asbestos: 1% Cellulose Fibers in White Acoustic Ceiling

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
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- Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of <1%.

**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 11/20/2015

**REVIEWED BY:**



# H.M. Pitt Labs, Inc.

4901 Morena Blvd · Ste 203 · San Diego, CA 92117

# Lab Number: 146550-194138

Tel: 619-474-8548 · Fax: 619-474-6128

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 11/20/2015  
**Analyzed By:** Edina Zakar

**Date Analyzed:** 11/20/15  
**Customer PO / Claim#:**  
**Contract Number:**

**Job Site:** Project #7169

**Date Sampled**      **Who Sampled**  
11/20/2015          Brad Blondet

**Lab Notes:**

---

**POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020**

---

**Analysis Number:** 146550-5

**Customer Number:** 7169-B-40

**Classification:**

**Description:** Rm 001, White Acoustic - Bulk

**Results:** Non-Asbestos; Non-Fibrous White Acoustic Ceiling

**Analysis Number:** 146550-6

**Customer Number:** 7169-B-41

**Classification:**

**Description:** Rm 001, White Acoustic - Bulk

**Results:** Non-Asbestos; Non-Fibrous White Acoustic Ceiling

**Analysis Number:** 146550-7

**Customer Number:** 7169-B-42

**Classification:**

**Description:** Rm 001, White Acoustic - Bulk

**Results:** Non-Asbestos; Non-Fibrous White Acoustic Ceiling

**Analysis Number:** 146550-8

**Customer Number:** 7169-B-43

**Classification:**

**Description:** Rm 001, White Acoustic - Bulk

**Results:** Non-Asbestos; Non-Fibrous White Acoustic Ceiling

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
- These test results relate only to the sample(s) identified above.
- This report may not be used to claim endorsement by NVLAP or any agency of the Federal Government.
- This report shall not be reproduced, except in full, without written approval of H.M. Pitt Labs, Inc.
- Samples are archived for 2 years from date of receipt and will be disposed of properly following this period.
- Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of <1%.

**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 11/20/2015

**REVIEWED BY:**



**H.M. Pitt Labs, Inc.**  
4901 Morena Blvd · Ste 203 · San Diego, CA 92117

**Lab Number: 146550-194138**  
Tel: 619-474-8548 · Fax: 619-474-6128

**Company:**  
City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 11/20/2015  
**Analyzed By:** Edina Zakar

**Date Analyzed:** 11/20/15  
**Customer PO / Claim#:**  
**Contract Number:**

**Job Site:** Project #7169

**Date Sampled:** 11/20/2015  
**Who Sampled:** Brad Blondet

**Lab Notes:**

**POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020**

**Analysis Number:** 146550-9

**Customer Number:** 7169-B-44

**Classification:**

**Description:** Rm 001, White Acoustic - Bulk

**Results:** Non-Asbestos: 1% Cellulose Fibers in White Acoustic Ceiling

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
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**APPROVED BY:**

*Leland S. Pitt*

LELAND S. PITT, CIH

**Dated:** 11/20/2015

**REVIEWED BY:**

*Edina Zakar*

Page 3 of 3



# RUSH

CITY OF SAN DIEGO  
 Environmental Services Department  
 ALMP/LSHHP - Laboratory Submittal

146550



Project # 7169 Submitted by: Wm. Brad Blondet Date: 11/20/2015 Page 1 of 1

LAB SUBMITTED TO: <b>HM Pitt Labs</b>	TURNAROUND TIME: <input type="checkbox"/> 2 HOUR <input checked="" type="checkbox"/> 24 HOUR <input type="checkbox"/> 48 HOUR <input type="checkbox"/> 72 HOUR <input type="checkbox"/> 5 DAY <input type="checkbox"/> OTHER:
--	---

- The receiving Laboratory is required to complete the following:
- All Invoices are to be sent to: *Attn. Alan-Johanna- City of San Diego - Environmental Services Department, 9601 Ridgehaven Court, Suite 310 San Diego, CA 92123*
  - Lab reports/invoices are to contain the Project Number listed above. Do not include Purchase Order Numbers on Invoices
  - Email report to: [WBlondet@sandiego.gov](mailto:WBlondet@sandiego.gov)

Lab Number	Sample No.	Location	Media	Time On/Off	Flow	Volume	Analyses Requested
	7169-B-36	Rm 124, white acoustic	Bulk	-, -	-	-	PLM
	7169-B-37	↓, ↓	↓	-, -	-	-	↓
	7169-B-38	↓, ↓	↓	-, -	-	-	↓
	7169-B-39	↓, ↓	↓	-, -	-	-	↓
	7169-B-40	Rm 001, white acoustic	Bulk	,			PLM
	7169-B-41	↓, ↓	↓	,			↓
	7169-B-42	↓, ↓	↓	,			↓
	7169-B-43	↓, ↓	↓	,			↓
	7169-B-44	↓, ↓	↓	,			↓

NOTES:

Relinquished by: <u>Wm. Brad Blondet</u> Date/Time: <u>11-20-15</u>	Relinquished by: <u>Deane Diferest</u> Date/Time: <u>11/20/15 12:26</u>
Received by: _____ Date/Time: _____	Received by: _____ Date/Time: _____



**H.M. Pitt Labs, Inc.**  
 14901 Morena Blvd · Ste 203 · San Diego, CA 92117

**Lab Number: 146646-194351**  
 Tel: 619-474-8548 · Fax: 619-474-6128

**Company:**  
 City of San Diego Environmental Services  
 Department  
 9601 Ridgehaven Court, Suite 310  
 San Diego, CA 92123

**Date Entered:** 11/30/2015  
**Analyzed By:** Edina Zakar  
  
**Date Analyzed:** 12/01/15  
**Customer PO / Claim#:** 7169  
**Contract Number:**

**Job Site:** Jr Social Rm 112 & Lobby 111

**Date Sampled:** 11/30/2015  
**Who Sampled:** Brad Blondet

**Lab Notes:**

**POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020**

**Analysis Number:** 146646-1

**Customer Number:** 7169-B-45

**Classification:**

**Description:** Jr. Social Rm 112, Glue + Red 9"x9"

**Results:**  
 a. Asbestos: 4% Chrysotile In Red Floor Tile  
 b. Non-Asbestos: 1% Cellulose in Black Floor Tile Mastic  
 c. Non-Asbestos: Non-Fibrous Yellow Glue

**Analysis Number:** 146646-2

**Customer Number:** 7169-B-46

**Classification:**

**Description:** Jr. Social Rm 112, Glue + Red 9"x9"

**Results:**  
 a. Asbestos: 4% Chrysotile In Red Floor Tile  
 b. Non-Asbestos: 1% Cellulose in Black Floor Tile Mastic  
 c. Non-Asbestos: Non-Fibrous Yellow Glue

**Analysis Number:** 146646-3

**Customer Number:** 7169-B-47

**Classification:**

**Description:** Jr. Social Rm 112, Glue + Red 9"x9"

**Results:**  
 a. Asbestos: 4% Chrysotile In Red Floor Tile  
 b. Non-Asbestos: 1% Cellulose in Black Floor Tile Mastic  
 c. Non-Asbestos: Non-Fibrous Yellow Glue

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
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- Samples are archived for 2 years from date of receipt and will be disposed of properly following this period.
- Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of <1%.

**APPROVED BY:**

*Leland S. Pitt*  
 LELAND S. PITT, CIH

**Dated:** 12/01/2015

**REVIEWED BY:**

*Edina Zakar*



# H.M. Pitt Labs, Inc.

4901 Morena Blvd · Ste 203 · San Diego, CA 92117

# Lab Number: 146646-194351

Tel: 619-474-8548 · Fax: 619-474-6128

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 11/30/2015

**Analyzed By:** Edina Zakar

**Date Analyzed:** 12/01/15

**Customer PO / Claim#:** 7169

**Contract Number:**

**Job Site:** Jr Social Rm 112 & Lobby 111

**Date Sampled**

11/30/2015

**Who Sampled**

Brad Blondet

**Lab Notes:**

---

**POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020**

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**Analysis Number:** 146646-4

**Customer Number:** 7169-B-48

**Classification:**

**Description:** Lobby III, Glue + Beige 12"x12"

**Results:**

- a. Non-Asbestos: Non-Fibrous White Floor Tile
- b. Non-Asbestos: 1% Cellulose Fibers in Yellow/Gray Floor Tile Mastic

**Analysis Number:** 146646-5

**Customer Number:** 7169-B-49

**Classification:**

**Description:** Lobby III, Glue + Beige 12"x12"

**Results:**

- a. Non-Asbestos: Non-Fibrous White Floor Tile
- b. Non-Asbestos: 1% Cellulose Fibers in Yellow/Gray Floor Tile Mastic

**Analysis Number:** 146646-6

**Customer Number:** 7169-B-50

**Classification:**

**Description:** Lobby III, Glue + Beige 12"x12"

**Results:**

- a. Non-Asbestos: Non-Fibrous White Floor Tile
- b. Non-Asbestos: 1% Cellulose Fibers in Yellow/Gray Floor Tile Mastic

**Analysis Number:** 146646-7

**Customer Number:** 7169-B-51

**Classification:**

**Description:** Jr. Social Rm 112, Ceiling Panels

**Results:**

Non-Asbestos: 80% Cellulose Fibers In White/Brown Ceiling Tile

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
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- Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of <1%.

**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 12/01/2015

**REVIEWED BY:**

Page 2 of 3



# H.M. Pitt Labs, Inc.

4901 Morena Blvd · Ste 203 · San Diego, CA 92117

# Lab Number: 146646-194351

Tel: 619-474-8548 · Fax: 619-474-6128

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 11/30/2015**Analyzed By:** Edina Zakar**Date Analyzed:** 12/01/15**Customer PO / Claim#:** 7169**Contract Number:****Job Site:** Jr Social Rm 112 & Lobby 111**Date Sampled****Who Sampled**

11/30/2015

Brad Blondet

**Lab Notes:**

---

**POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020**

---

**Analysis Number:** 146646-8**Customer Number:** 7169-B-52**Classification:****Description:** Jr. Social Rm 112, Ceiling Panels**Results:** Non-Asbestos: 80% Cellulose Fibers In White/Brown Ceiling Tile**Analysis Number:** 146646-9**Customer Number:** 7169-B-53**Classification:****Description:** Jr. Social Rm 112, Ceiling Panels**Results:** Non-Asbestos: 80% Cellulose Fibers In White/Brown Ceiling Tile

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
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- Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of <1%.

**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 12/01/2015**REVIEWED BY:**

Page 3 of 3



CITY OF SAN DIEGO  
Environmental Services Department  
ALMP/LSHHP - Laboratory Submittal

Lab 146646 **RUSH**



Project # 7169 Submitted by: Wm. Brad Blondet Date: 11/30/2015 Page 1 of 1

LAB SUBMITTED TO: <b>HM Pitt Labs</b>	TURNAROUND TIME: <input type="checkbox"/> 2 HOUR <input checked="" type="checkbox"/> 24 HOUR <input type="checkbox"/> 48 HOUR <input type="checkbox"/> 72 HOUR <input type="checkbox"/> 5 DAY <input type="checkbox"/> OTHER:
--	---

The receiving Laboratory is required to complete the following:

- All invoices are to be sent to: Attn. Alan Johanna- City of San Diego – Environmental Services Department, 9601 Ridgehaven Court, Suite 310 San Diego, CA 92123
- Lab reports/invoices are to contain the Project Number listed above. Do not include Purchase Order Numbers on Invoices
- Email report to: WBlondet@sandiego.gov

Lab Number	Sample No.	Location	Media	Time On/Off	Flow	Volume	Analyses Requested
1	7169-B-45	Jr. Social Rm 112 <del>Exercise Room 124</del> , Glue + Red 9'x9"	Bulk	/			PLM
2	7169-B-46	↓	↓	/			↓
3	7169-B-47	↓	↓	/			↓
4	7169-B-48	Lobby 111, Glue + Beige 12'x12"	Bulk	/			PLM
5	7169-B-49	↓	↓	/			↓
6	7169-B-50	↓	↓	/			↓
7	7169-B-51	Jr. Social Rm 112, Ceiling @ Panels	Bulk	/			PLM
8	7169-B-52	↓	↓	/			↓
9	7169-B-53	↓	↓	/			↓

NOTES:

Relinquished by: <u>Wm. Brad Blondet</u>	Relinquished by: <u>[Signature]</u>
Date/Time: <u>11-30-15</u>	Date/Time: <u>11/30/15, 2:22</u>
Received by: _____	Received by: _____
Date/Time: _____	Date/Time: _____



# H.M. Pitt Labs, Inc.

4901 Morena Blvd · Ste 203 · San Diego, CA 92117

# Lab Number: 146795-194571

Tel: 619-474-8548 · Fax: 858-412-3305

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 12/08/2015  
**Analyzed By:** Edina Zakar

**Date Analyzed:** 12/08/15  
**Customer PO / Claim#:**  
**Contract Number:**

**Job Site:** Project No. 7169

**Date Sampled**      **Who Sampled**  
12/08/2015      Wm. Brad Blondet

**Lab Notes:** 24 HR TAT

## POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

**Analysis Number:** 146795-1

**Customer Number:** 7169-B-54

**Classification:**

**Description:** 12"x12" Tan FT and Mastic Lower Middle Locker Room

**Results:**

- a. Non-Asbestos: Non-Fibrous Tan Floor Tile
- b. Non-Asbestos: 1% Cellulose and 1% Polyethylene Fibers in Yellow/Black Floor Tile Mastic

**Analysis Number:** 146795-2

**Customer Number:** 7169-B-55

**Classification:**

**Description:** 12"x12" Tan FT and Mastic Lower Middle Locker Room

**Results:**

- a. Non-Asbestos: Non-Fibrous Tan Floor Tile
- b. Non-Asbestos: 1% Cellulose and 1% Polyethylene Fibers in Yellow/Black Floor Tile Mastic

**Analysis Number:** 146795-3

**Customer Number:** 7169-B-56

**Classification:**

**Description:** 12"x12" Tan FT and Mastic Lower Middle Locker Room

**Results:**

- a. Non-Asbestos: Non-Fibrous Tan Floor Tile
- b. Non-Asbestos: 1% Cellulose and 1% Polyethylene Fibers in Yellow/Black Floor Tile Mastic

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
- These test results relate only to the sample(s) identified above.
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- This report shall not be reproduced, except in full, without written approval of H.M. Pitt Labs, Inc.
- Samples are archived for 2 years from date of receipt and will be disposed of properly following this period.
- Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of <1%.

**APPROVED BY:**

LELANO S. PITT, CIH

**Dated:** 12/08/2015

**REVIEWED BY:**



CITY OF SAN DIEGO  
Environmental Services Department  
ALMP/LSHHP - Laboratory Submittal

146795 RUSH  
ES ENVIRONMENTAL SERVICES DEPARTMENT

Project # 7169 Submitted by: Wm. Brad Blondet Date: 12/8/2015 Page 1 of 1

LAB SUBMITTED TO: HM Pitt Labs

TURNAROUND TIME:  
 2 HOUR  24 HOUR  48 HOUR  72 HOUR  5 DAY  OTHER

The receiving Laboratory is required to complete the following:

- All invoices are to be sent to: *Attn. Alan Johanna- City of San Diego - Environmental Services Department, 9601 Ridgehaven Court, Suite 310 San Diego, CA 92123*
- Lab reports/invoices are to contain the Project Number listed above. Do not include Purchase Order Numbers on invoices
- Email report to: WBlondet@sandiego.gov

Lab Number	Sample No.	Location	Media	Time On/Off	Flow	Volume	Analyses Requested
	7169-B-54	12x12" Tan FT and Mastie Lower Middle Locker Room	Bulk	- / -	-	-	PLM
	7169-B-55	" "	Bulk	- / -	-	-	↓
	7169-B-56	" "	Bulk	- / -	-	-	↓
				- / -	-	-	
				- / -	-	-	
				- / -	-	-	
				- / -	-	-	
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				- / -	-	-	
				- / -	-	-	
				- / -	-	-	

NOTES:

Relinquished by: Wm. Brad Blondet Date/Time: 12-8-15

Received by: [Signature] Date/Time: 12/8/15 @ 10:21



# H.M. Pitt Labs, Inc.

4901 Morena Blvd · Ste 203 · San Diego, CA 92117

# Lab Number: 152724-204800

Tel: 619-474-8548 · Fax: 858-412-3305

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 10/06/2016

**Analyzed By:** Group

**Date Analyzed:** 10/11/16

**Customer PO / Claim#:**

**Contract Number:**

**Job Site:** Project #7169

**Date Sampled**

**Who Sampled**

10/06/2016

Brad Blondet

**Lab Notes:** 72 HR TAT

## POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

**Analysis Number:** 152724-1

**Customer Number:** 7169-B-075

**Classification:**

**Description:** High Roof Over Rm 140, Core

**Results:**

A: Non-Asbestos: 30% Cellulose Fibers and 20% Glass Fibers in Black Roofing Material

B: Non-Asbestos: 60% Cellulose Fibers in Black Roofing Paper

**Analysis Number:** 152724-2

**Customer Number:** 7169-B-076

**Classification:**

**Description:** High Roof Over Rm 139 (Pool), Core

**Results:**

A: Non-Asbestos: 30% Cellulose Fibers and 20% Glass Fibers in Black Roofing Material

B: Non-Asbestos: 60% Cellulose Fibers in Black Roofing Paper

**Analysis Number:** 152724-3

**Customer Number:** 7169-B-077

**Classification:**

**Description:** High Roof Over Rm 145 (Multi-Purpose),  
Core

**Results:**

A: Non-Asbestos: 30% Cellulose Fibers and 20% Glass Fibers in Black Roofing Material

B: Non-Asbestos: 60% Cellulose Fibers in Black Roofing Paper

**Analysis Number:** 152724-4

**Customer Number:** 7169-B-078

**Classification:**

**Description:** High Roof Over Rm 112 (Weight Room),  
Core

**Results:**

A: Non-Asbestos: 30% Cellulose Fibers and 20% Glass Fibers in Black Roofing Material

B: Non-Asbestos: 60% Cellulose Fibers in Black Roofing Paper

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- Samples are archived for 2 years from date of receipt and will be disposed of properly following this period.
- Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of <1%.

**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 10/11/2016

**REVIEWED BY:**

Page 1 of 10



# H.M. Pitt Labs, Inc.

4901 Morena Blvd · Ste 203 · San Diego, CA 92117

# Lab Number: 152724-204800

Tel: 619-474-8548 · Fax: 858-412-3305

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 10/06/2016

**Analyzed By:** Group

**Date Analyzed:** 10/11/16

**Customer PO / Claim#:**

**Contract Number:**

**Job Site:** Project #7169

**Date Sampled**

**Who Sampled**

10/06/2016

Brad Blondet

**Lab Notes:** 72 HR TAT

## **POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020**

**Analysis Number:** 152724-5

**Customer Number:** 7169-B-079

**Classification:**

**Description:** Low Roof Over Rm 107 (Offices), Core

**Results:** A: Non-Asbestos: 30% Cellulose Fibers and 20% Glass Fibers in Black Roofing Material  
B: Non-Asbestos: 60% Cellulose Fibers in Black Roofing Paper

**Analysis Number:** 152724-6

**Customer Number:** 7169-B-080

**Classification:**

**Description:** Mastic, Seam, High Roof Over Rm 139

**Results:** Asbestos: 4% Chrysotile in Black/Gray Penetration Mastic

**Analysis Number:** 152724-7

**Customer Number:** 7169-B-081

**Classification:**

**Description:** Mastic, Seam, High Roof Over Rm 145

**Results:** Asbestos: 4% Chrysotile in Black/Gray Penetration Mastic

**Analysis Number:** 152724-8

**Customer Number:** 7169-B-082

**Classification:**

**Description:** Mastic, Seam, Low Roof Over Rm 107

**Results:** Asbestos: 4% Chrysotile in Black/Gray Penetration Mastic

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
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- Samples are archived for 2 years from date of receipt and will be disposed of properly following this period.
- Quantitative value is based on PLM CVES (Calibrated Visual Estimates) with a detection limit of <1%.

**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 10/11/2016

**REVIEWED BY:**



# H.M. Pitt Labs, Inc.

4901 Morena Blvd · Ste 203 · San Diego, CA 92117

# Lab Number: 152724-204800

Tel: 619-474-8548 · Fax: 858-412-3305

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

Date Entered: 10/06/2016

Analyzed By: Group

Date Analyzed: 10/11/16

Customer PO / Claim#:

Contract Number:

Job Site: Project #7169

Date Sampled

Who Sampled

Lab Notes: 72 HR TAT

10/06/2016

Brad Blondet

## POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

Analysis Number: 152724-9

Customer Number: 7169-B-083

Classification:

Description: Mastic, Duct Work on Low Roof

Results: Asbestos: 4% Chrysotile In Black/Gray Penetration Mastic

Analysis Number: 152724-10

Customer Number: 7169-B-084

Classification:

Description: Mastic, Duct Work on Low Roof

Results: Asbestos: 4% Chrysotile In Black/Gray Penetration Mastic

Analysis Number: 152724-11

Customer Number: 7169-B-085

Classification:

Description: Beige Linoleum, Rm 151

Results: Non-Asbestos: 25% Cellulose Fibers In Tan Sheet Vinyl

Analysis Number: 152724-12

Customer Number: 7169-B-086

Classification:

Description: Beige Linoleum, Rm 151

Results: Non-Asbestos: 25% Cellulose Fibers In Tan Sheet Vinyl

- All samples tested as submitted to the lab. H.M. PITT LABS, INC. does not assume responsibility for the accuracy of the information submitted with the samples unless done by an employee of H.M. PITT LABS, INC.
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APPROVED BY:

LELAND S. PITT, CIH

Dated: 10/11/2016

REVIEWED BY:



# H.M. Pitt Labs, Inc.

4901 Morena Blvd · Ste 203 · San Diego, CA 92117

# Lab Number: 152724-204800

Tel: 619-474-8548 · Fax: 858-412-3305

**Company:**

City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 10/06/2016**Analyzed By:** Group**Date Analyzed:** 10/11/16**Customer PO / Claim#:****Contract Number:****Job Site:** Project #7169**Date Sampled****Who Sampled**

10/06/2016

Brad Blondet

**Lab Notes:** 72 HR TAT

## POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

**Analysis Number:** 152724-13**Customer Number:** 7169-B-087**Classification:****Description:** Beige Linoleum, Rm 151**Results:** Non-Asbestos: 25% Cellulose Fibers in Tan Sheet Vinyl**Analysis Number:** 152724-14**Customer Number:** 7169-B-088**Classification:****Description:** Red Linoleum, Rm 151, Closet**Results:** Asbestos: 10% Chrysotile in Red/Gray Sheet Vinyl (5% Cellulose Fibers and 2% Synthetic Fibers Also Present)**Analysis Number:** 152724-15**Customer Number:** 7169-B-089**Classification:****Description:** Red Linoleum, Pantry**Results:** Asbestos: 10% Chrysotile in Red/Gray Sheet Vinyl (5% Cellulose Fibers and 2% Synthetic Fibers Also Present)**Analysis Number:** 152724-16**Customer Number:** 7169-B-090**Classification:****Description:** Red Linoleum, Rm 150, Janitor Closet**Results:** Asbestos: 10% Chrysotile in Red/Gray Sheet Vinyl (10% Cellulose Fibers and 2% Synthetic Fibers Also Present)

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**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 10/11/2016**REVIEWED BY:**

Page 4 of 10



# H.M. Pitt Labs, Inc.

4901 Morena Blvd · Ste 203 · San Diego, CA 92117

# Lab Number: 152724-204800

Tel: 619-474-8548 · Fax: 858-412-3305

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9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 10/06/2016**Analyzed By:** Group**Date Analyzed:** 10/11/16**Customer PO / Claim#:****Contract Number:****Job Site:** Project #7169Date SampledWho Sampled

10/06/2016

Brad Blondet

**Lab Notes:** 72 HR TAT

## POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

**Analysis Number:** 152724-17**Customer Number:** 7169-B-091**Classification:****Description:** Drywall, Tape, Mud, Rm 151, Closet**Results:**

A: Non-Asbestos: 1% Cellulose Fibers in Off-White Joint Compound  
B: Non-Asbestos: 90% Cellulose Fibers in Brown/Gray Paper Backing  
C: Non-Asbestos: 1% Cellulose Fibers and 1% Glass Fibers in Brown Drywall

**Analysis Number:** 152724-18**Customer Number:** 7169-B-092**Classification:****Description:** Drywall, Tape, Mud, Rm Pantry**Results:**

A: Non-Asbestos: Non-Fibrous Off-White Joint Compound  
B: Non-Asbestos: 90% Cellulose Fibers in Brown/Gray Paper Backing  
C: Non-Asbestos: 1% Cellulose Fibers and 1% Glass Fibers in Brown Drywall

**Analysis Number:** 152724-19**Customer Number:** 7169-B-093**Classification:****Description:** Drywall, Tape, Mud, Rm 149a**Results:**

A: Non-Asbestos: Non-Fibrous Off-White Joint Compound  
B: Non-Asbestos: 90% Cellulose Fibers in Brown/Gray Paper Backing  
C: Non-Asbestos: 1% Cellulose Fibers and 1% Glass Fibers in Brown Drywall

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**APPROVED BY:**

LELANO S. PITT, CIH

**Dated:** 10/11/2016**REVIEWED BY:**

Page 5 of 10



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9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 10/06/2016

**Analyzed By:** Group

**Date Analyzed:** 10/11/16

**Customer PO / Claim#:**

**Contract Number:**

**Job Site:** Project #7169,

**Date Sampled**     **Who Sampled**

10/06/2016     Brad Blondet

**Lab Notes:** 72 HR TAT

## POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

**Analysis Number:** 152724-20

**Customer Number:** 7169-B-094

**Classification:**

**Description:** Plaster, Button Board, Rm 119a

**Results:**  
A: Non-Asbestos: Non-Fibrous White Color Coat  
B: Non-Asbestos: 1% Cellulose Fibers in Gray Plaster  
C: Non-Asbestos: 90% Cellulose Fibers in Orange Paper Backing

**Analysis Number:** 152724-21

**Customer Number:** 7169-B-095

**Classification:**

**Description:** Plaster, Button Board, Rm 119a

**Results:**  
A: Non-Asbestos: Non-Fibrous White Color Coat  
B: Non-Asbestos: 1% Cellulose Fibers in Gray Plaster  
C: Non-Asbestos: 90% Cellulose Fibers in Brown Paper Backing  
D: Non-Asbestos: 1% Cellulose Fibers in White Drywall

**Analysis Number:** 152724-22

**Customer Number:** 7169-B-096

**Classification:**

**Description:** Plaster, Button Board, Rm 119a

**Results:**  
A: Non-Asbestos: Non-Fibrous White Color Coat  
B: Non-Asbestos: 1% Cellulose Fibers in Gray Plaster  
C: Non-Asbestos: 90% Cellulose Fibers in Brown Paper Backing  
D: Non-Asbestos: 1% Cellulose Fibers in White Drywall

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**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 10/11/2016

**REVIEWED BY:**

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**Date Entered:** 10/06/2016

**Analyzed By:** Group

**Date Analyzed:** 10/11/16

**Customer PO / Claim#:**

**Contract Number:**

**Job Site:** Project #7169

**Date Sampled**

**Who Sampled**

**Lab Notes:** 72 HR TAT

10/06/2016

Brad Blondet

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## POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

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**Analysis Number:** 152724-23

**Customer Number:** 7169-B-097

**Classification:**

**Description:** Plaster, Button Board, Rm 206

**Results:**

A: Non-Asbestos: Non-Fibrous White Color Coat  
B: Non-Asbestos: 1% Cellulose Fibers in Gray Plaster  
C: Non-Asbestos: 90% Cellulose Fibers in Brown Paper Backing  
D: Non-Asbestos: 1% Cellulose Fibers in White Drywall

---

**Analysis Number:** 152724-24

**Customer Number:** 7169-B-098

**Classification:**

**Description:** Plaster, Button Board, Rm 206

**Results:**

A: Non-Asbestos: Non-Fibrous White Color Coat  
B: Non-Asbestos: 1% Cellulose Fibers in Gray Plaster  
C: Non-Asbestos: 90% Cellulose Fibers in Brown Paper Backing  
D: Non-Asbestos: 1% Cellulose Fibers in White Drywall

---

**Analysis Number:** 152724-25

**Customer Number:** 7169-B-099

**Classification:**

**Description:** Plaster, Button Board, Rm 206

**Results:**

A: Non-Asbestos: Non-Fibrous White Color Coat  
B: Non-Asbestos: 1% Cellulose Fibers in Gray Plaster  
C: Non-Asbestos: 90% Cellulose Fibers in Brown Paper Backing  
D: Non-Asbestos: 1% Cellulose Fibers in White Drywall

- 
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**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 10/11/2016

**REVIEWED BY:**



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**Lab Number: 152724-204800**  
 Tel: 619-474-8548 · Fax: 858-412-3305

**Company:**  
 City of San Diego Environmental Services  
 Department  
 9601 Ridgehaven Court, Suite 310  
 San Diego, CA 92123

**Date Entered:** 10/06/2016  
**Analyzed By:** Group

**Date Analyzed:** 10/11/16  
**Customer PO / Claim#:**  
**Contract Number:**

**Job Site:** Project #7169

**Date Sampled**     **Who Sampled**  
 10/06/2016     Brad Blondet

**Lab Notes:** 72 HR TAT

**POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020**

**Analysis Number:** 152724-26  
**Customer Number:** 7169-B-100  
**Classification:** *Description:* Red 9x9 Floor Tile, Black Mastic, Rm 208  
**Results:** A: Asbestos: 4% Chrysotile in Red Floor Tile  
 B: Non-Asbestos: 2% Cellulose Fibers in Black Floor Tile Mastic

**Analysis Number:** 152724-27  
**Customer Number:** 7169-B-101  
**Classification:** *Description:* Red 9x9 Floor Tile, Black Mastic, Rm 208  
**Results:** A: Asbestos: 4% Chrysotile in Red Floor Tile  
 B: Non-Asbestos: 2% Cellulose Fibers in Black Floor Tile Mastic

**Analysis Number:** 152724-28  
**Customer Number:** 7169-B-102  
**Classification:** *Description:* Red 9x9 Floor Tile, Black Mastic, Rm 208  
**Results:** A: Asbestos: 4% Chrysotile in Red Floor Tile  
 B: Non-Asbestos: 2% Cellulose Fibers in Black Floor Tile Mastic

**Analysis Number:** 152724-29  
**Customer Number:** 7169-B-103  
**Classification:** *Description:* Gray 12x12 Floor Tile, Black Mastic, Rm 201  
**Results:** A: Non-Asbestos: Non-Fibrous Gray Floor Tile  
 B: Non-Asbestos: 1% Cellulose Fibers in Brown/Black Floor Tile Mastic

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**APPROVED BY:** Leland S. Pitt  
 LELAND S. PITT, CIH

**Dated:** 10/11/2016

**REVIEWED BY:** Maureen Farrell



# H.M. Pitt Labs, Inc.

4901 Morena Blvd · Ste 203 · San Diego, CA 92117

# Lab Number: 152724-204800

Tel: 619-474-8548 · Fax: 858-412-3305

**Company:**

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Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 10/06/2016

**Analyzed By:** Group

**Date Analyzed:** 10/11/16

**Customer PO / Claim#:**

**Contract Number:**

**Job Site:** Project #7169

**Date Sampled**

**Who Sampled**

10/06/2016

Brad Blondet

**Lab Notes:** 72 HR TAT

## POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020

**Analysis Number:** 152724-30

**Customer Number:** 7169-B-104

**Classification:**

**Description:** Gray 12x12 Floor Tile, Black Mastic, Rm 202

**Results:**

A: Non-Asbestos: Non-Fibrous Gray Floor Tile

B: Non-Asbestos: 1% Cellulose Fibers in Brown/Black Floor Tile Mastic

**Analysis Number:** 152724-31

**Customer Number:** 7169-B-105

**Classification:**

**Description:** Gray 12x12 Floor Tile, Black Mastic, Rm 202

**Results:**

A: Non-Asbestos: Non-Fibrous Gray Floor Tile

B: Non-Asbestos: 1% Cellulose Fibers in Brown/Black Floor Tile Mastic

**Analysis Number:** 152724-32

**Customer Number:** 7169-B-106

**Classification:**

**Description:** Mirror Mastic, Rm 206

**Results:**

Asbestos: 8% Chrysotile in Black Mastic

**Analysis Number:** 152724-33

**Customer Number:** 7169-B-107

**Classification:**

**Description:** Mirror Mastic, Rm 140

**Results:**

Asbestos: 8% Chrysotile in Black Mastic

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**APPROVED BY:**

LELAND S. PITT, CIH

**Dated:** 10/11/2016

**REVIEWED BY:**

Page 9 of 10



**H.M. Pitt Labs, Inc.**  
4901 Morena Blvd · Ste 203 · San Diego, CA 92117

**Lab Number: 152724-204800**  
Tel: 619-474-8548 · Fax: 858-412-3305

**Company:**  
City of San Diego Environmental Services  
Department  
9601 Ridgehaven Court, Suite 310  
San Diego, CA 92123

**Date Entered:** 10/06/2016  
**Analyzed By:** Group

**Date Analyzed:** 10/11/16  
**Customer PO / Claim#:**  
**Contract Number:**

**Job Site:** Project #7169

**Date Sampled**      **Who Sampled**  
10/06/2016      Brad Blondet

**Lab Notes:** 72 HR TAT

**POLARIZED LIGHT MICROSCOPY ANALYSIS REPORT - EPA-600/R-93/116 AND EPA-600/M4-82-020**

**Analysis Number:** 152724-34

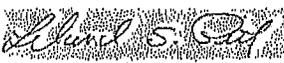
**Customer Number:** 7169-B-108

**Classification:**

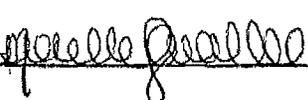
**Description:** Mirror Mastic, Rm 141

**Results:** Asbestos: 8% Chrysotile in Black Mastic

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**APPROVED BY:**   
LELAND S. PITT, CIH

**Dated:** 10/11/2016

**REVIEWED BY:** 



CITY OF SAN DIEGO  
Environmental Services Department  
ALMP/LSHHP - Laboratory Submittal

152724



Project # 7169

Submitted by: Wm. Brad Blondet

Date: 10 / 6 /2016

Page 1 of 1

LAB SUBMITTED TO: <b>HM Pitt Labs</b>	TURNAROUND TIME:					
	<input type="checkbox"/> 2 HOUR	<input type="checkbox"/> 24 HOUR	<input type="checkbox"/> 48 HOUR	<input checked="" type="checkbox"/> 72 HOUR	<input type="checkbox"/> 5 DAY	<input type="checkbox"/> OTHER:

The receiving Laboratory is required to complete the following:

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- Lab reports/invoices are to contain the Project Number listed above. Do not include Purchase Order Numbers on Invoices
- Email report to: WBlondet@sandiego.gov

Lab Number	Sample No.	Location	Media	Time On/Off	Flow	Volume	Analyses Requested
	7169-B-75*	High roof over Rm 140, Core	Bulk	/			PLM
	7169-B-76	High roof over Rm 139 (Pool), Core	Bulk	/			PLM
	7169-B-77	High roof over Rm 145 (Multi-purpose), Core	Bulk	/			PLM
	7169-B-78	High roof over Rm 112 (Weight room), Core	Bulk	/			PLM
	7169-B-79	Low roof over Rm 107 (Offices), Core	Bulk	/			PLM
	7169-B-80	Mastic, Seam, High roof over Rm 139	Bulk	/			PLM
	7169-B-81	Mastic, Seam, High roof over Rm 145	Bulk	/			PLM
	7169-B-82	Mastic, Seam, Low roof over Rm 107	Bulk	/			PLM
	7169-B-83	Mastic, Duct work on low roof	Bulk	/			PLM
	7169-B-84	Mastic, Duct work on low roof	Bulk	/			PLM

NOTES:

\*Numbering continued from previous sampling.

Relinquished by: Wm. Brad Blondet <i>William S. Blondet</i>	Relinquished by: <i>[Signature]</i>
Date/Time: 10/6/2016	Date/Time: 10-6-16 12:47
Received by: <i>[Signature]</i>	Received by: <i>[Signature]</i>
Date/Time: 10-6-16 12:47	Date/Time: 10/6/16 13:00



**CITY OF SAN DIEGO**  
**Environmental Services Department**  
**ALMP/LSHHP - Laboratory Submittal**

152724



Project # 7169 Submitted by: Wm. Brad Blondet Date: 10 / 6 /2016 Page 1 of 1

LAB SUBMITTED TO: <b>HM Pitt Labs</b>	TURNAROUND TIME: <input type="checkbox"/> 2 HOUR <input type="checkbox"/> 24 HOUR <input type="checkbox"/> 48 HOUR <input checked="" type="checkbox"/> 72 HOUR <input type="checkbox"/> 5 DAY <input type="checkbox"/> OTHER
--	---

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3. Email report to: WBlondet@sandiego.gov

Lab Number	Sample No.	Location	Media	Time On/Off	Flow	Volume	Analyses Requested
	7169-B-85	Beige Linoleum, Rm 151	Bulk	/			PLM
	7169-B-86	Beige Linoleum, Rm 151	Bulk	/			PLM
	7169-B-87	Beige Linoleum, Rm 151	Bulk	/			PLM
	7169-B-88	Red Linoleum, Rm 151, Closet	Bulk	/			PLM
	7169-B-89	Red Linoleum, Pantry	Bulk	/			PLM
	7169-B-90	Red Linoleum, Rm 150, Janitor closet	Bulk	/			PLM
	7169-B-91	Drywall, Tape, Mud, Rm 151, Closet	Bulk	/			PLM
	7169-B-92	Drywall, Tape, Mud, Rm Pantry	Bulk	/			PLM
	7169-B-93	Drywall, Tape, Mud, Rm 149a	Bulk	/			PLM
	7169-B-94	Plaster, Button board, Rm 119a	Bulk	/			PLM

Sample # Prefix

NOTES:

Relinquished by: <u>Wm. Brad Blondet</u> <i>William B. Blondet</i>	Relinquished by: <u>Mark [Signature]</u>
Date/Time: <u>10/6/2016</u>	Date/Time: <u>10-6-16 12:47</u>
Received by: <u>Mark [Signature]</u>	Received by: <u>Mark [Signature]</u>
Date/Time: <u>10-6-16 12:47</u>	Date/Time: _____



**CITY OF SAN DIEGO**  
**Environmental Services Department**  
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152724



Project # 7169 Submitted by: Wm. Brad Blondet Date: 10 / 6 /2016 Page 1 of 1

LAB SUBMITTED TO: <b>HM Pitt Labs</b>	TURNAROUND TIME: <input type="checkbox"/> 2 HOUR <input type="checkbox"/> 24 HOUR <input type="checkbox"/> 48 HOUR <input checked="" type="checkbox"/> 72 HOUR <input type="checkbox"/> 5 DAY <input type="checkbox"/> OTHER:
--	--

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  - Email report to: WBlondet@sandiego.gov

Lab Number	Sample No.	Location	Media	Time On/Off	Flow	Volume	Analyses Requested
	7169-B-95	Plaster, Button board, Rm 119a	Bulk	/			PLM
	7169-B-96	Plaster, Button board, Rm 119a	Bulk	/			PLM
	7169-B-97	Plaster, Button board, Rm 206	Bulk	/			PLM
	7169-B-98	Plaster, Button board, Rm 206	Bulk	/			PLM
	7169-B-99	Plaster, Button board, Rm 206	Bulk	/			PLM
	7169-B-100	Red 9x9 floor tile, black mastic, Rm 208	Bulk	/			PLM
	7169-B-101	Red 9x9 floor tile, black mastic, Rm 208	Bulk	/			PLM
	7169-B-102	Red 9x9 floor tile, black mastic, Rm 208	Bulk	/			PLM
	7169-B-103	Gray 12x12 floor tile, black mastic, Rm 201	Bulk	/			PLM
	7169-B-104	Gray 12x12 floor tile, black mastic, Rm 202	Bulk	/			PLM

NOTES:

Relinquished by: <u>Wm. Brad Blondet</u> <i>William B. Blondet</i>	Relinquished by: <u>_____</u> <i>_____</i>
Date/Time: <u>10/6/2016</u>	Date/Time: <u>10-6-16 12:47</u>
Received by: <u>_____</u> <i>_____</i>	Received by: <u>_____</u> <i>_____</i>
Date/Time: <u>10-6-16 12:47</u>	Date/Time: <u>_____</u>



**CITY OF SAN DIEGO**  
**Environmental Services Department**  
**ALMP/LSHP - Laboratory Submittal**

152724



Project # 7169 Submitted by: Wm. Brad Blondet Date: 10 / 6 /2016 Page 1 of 1

LAB SUBMITTED TO: <b>HM Pitt Labs</b>	TURNAROUND TIME:					
	<input type="checkbox"/> 2 HOUR	<input type="checkbox"/> 24 HOUR	<input type="checkbox"/> 48 HOUR	<input checked="" type="checkbox"/> 72 HOUR	<input type="checkbox"/> 5 DAY	<input type="checkbox"/> OTHER:

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- Email report to: WBlondet@sandiego.gov

Lab Number	Sample No.	Location	Media	Time On/Off	Flow	Volume	Analyses Requested
	7169-B-105	Gray 12x12 floor tile, black mastic, Rm 202	Bulk	/			PLM
	7169-B-106	Mirror Mastic, Rm 206	Bulk	/			PLM
	7169-B-107	Mirror Mastic, Rm 140	Bulk	/			PLM
	7169-B-108	Mirror Mastic, Rm 141	Bulk	/			PLM
				/			
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				/			

NOTES:

Relinquished by: <u>Wm. Brad Blondet</u> <i>William B. Blondet</i>	Relinquished by: <u>Matt [Signature]</u>
Date/Time: <u>10/6/2016</u>	Date/Time: <u>10-6-16 12:47</u>
Received by: <u>Matt [Signature]</u>	Received by: <u>Matt [Signature]</u>
Date/Time: <u>10-6-16 12:47</u>	Date/Time: _____

**Attachment # 2**

**LEAD XRF REPORT**



City of San Diego Asbestos Lead Management Program  
 Old YMCA, Park De La Cruz Recreation Center, 3901 Landis St., San Diego CA



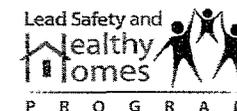
**XRF Assay Results**

Reading No	Time	Type	Duration	Mode	Location	Room	Side	Component	COND.	SUBST.	Color	Results	PbC	Units
1	6/30/15 12:00	ShutterCal	102.61										3.34	cps
2	6/30/15 12:02	Paint	20	K & L				CALIB. CHECK			RED	Negative	0.9	mg / cm ^2
3	6/30/15 12:15	Paint	20	K & L				CALIB. CHECK			RED	Negative	0.8	mg / cm ^2
4	6/30/15 12:16	Paint	20	K & L				CALIB. CHECK			RED	Negative	0.9	mg / cm ^2
5	6/30/15 12:19	Paint	1.14	Std.	PARK DE LA CRUZ REC	104	C	DOOR CASING	INTACT	WOOD	BLACK	Negative	0	mg / cm ^2
6	6/30/15 12:20	Paint	1.14	Std.	PARK DE LA CRUZ REC	104	C	DOOR	INTACT	WOOD	WHITE	Negative	0	mg / cm ^2
7	6/30/15 12:20	Paint	1.14	Std.	PARK DE LA CRUZ REC	104	C	DOOR JAMB	INTACT	WOOD	WHITE	Negative	0.04	mg / cm ^2
8	6/30/15 12:21	Paint	1.14	Std.	PARK DE LA CRUZ REC	105	C	DOOR JAMB	INTACT	WOOD	WHITE	Negative	0	mg / cm ^2
9	6/30/15 12:22	Paint	1.14	Std.	PARK DE LA CRUZ REC	106	C	DOOR JAMB	INTACT	WOOD	BLACK	Negative	0.2	mg / cm ^2
10	6/30/15 12:25	Paint	2.63	Std.	PARK DE LA CRUZ REC	140	D	DOOR JAMB	INTACT	WOOD	WHITE	Negative	0	mg / cm ^2
11	6/30/15 12:25	Paint	3.02	Std.	PARK DE LA CRUZ REC	141	D	DOOR JAMB	INTACT	WOOD	BLUE	Negative	0	mg / cm ^2
12	6/30/15 12:32	Paint	1.14	Std.	PARK DE LA CRUZ REC	101	D	SWINGING DOOR	INTACT	WOOD	BROWN	Negative	0	mg / cm ^2
13	6/30/15 12:34	Paint	1.13	Std.	PARK DE LA CRUZ REC	111	B	DOOR	INTACT	METAL	TAN	Negative	0	mg / cm ^2
14	6/30/15 12:35	Paint	1.14	Std.	PARK DE LA CRUZ REC	111	B	DOOR FRAME	INTACT	METAL	BLACK	Negative	0	mg / cm ^2
15	6/30/15 12:42	Paint	3.4	Std.	PARK DE LA CRUZ REC	114	B	DOOR FRAME	INTACT	WOOD	BEIGE	Negative	< LOD	mg / cm ^2
16	6/30/15 12:42	Paint	1.13	Std.	PARK DE LA CRUZ REC	114	B	DOOR	INTACT	WOOD	BEIGE	Negative	0	mg / cm ^2
17	6/30/15 12:44	Paint	1.13	Std.	PARK DE LA CRUZ REC	145a	A	DOOR	INTACT	WOOD	GREEN	Negative	0.01	mg / cm ^2
18	6/30/15 12:44	Paint	1.14	Std.	PARK DE LA CRUZ REC	145a	A	DOOR FRAME	INTACT	WOOD	GREEN	Negative	0.13	mg / cm ^2
19	6/30/15 12:46	Paint	1.14	Std.	PARK DE LA CRUZ REC	145b	B	DOOR FRAME	INTACT	METAL	BLACK	Negative	0.14	mg / cm ^2
20	6/30/15 12:47	Paint	1.14	Std.	PARK DE LA CRUZ REC	145b	B	DOOR	INTACT	WOOD	TAN	Negative	0	mg / cm ^2
21	6/30/15 12:48	Paint	1.14	Std.	PARK DE LA CRUZ REC	146	A	DOOR	INTACT	WOOD	BLUE	Negative	0	mg / cm ^2
22	6/30/15 12:49	Paint	1.14	Std.	PARK DE LA CRUZ REC	146	A	DOOR FRAME	INTACT	METAL	BLUE	Negative	0.03	mg / cm ^2
23	6/30/15 12:50	Paint	1.13	Std.	PARK DE LA CRUZ REC	147	D	SWINGING DOOR	INTACT	WOOD	BROWN	Negative	0	mg / cm ^2
24	6/30/15 12:51	Paint	3.41	Std.	PARK DE LA CRUZ REC	147	D	COLUMN	INTACT	DRYWALL	WHITE	Negative	0	mg / cm ^2
25	6/30/15 12:52	Paint	1.14	Std.	PARK DE LA CRUZ REC	101	D	WALL	INTACT	DRYWALL	WHITETAN	Negative	0	mg / cm ^2
26	6/30/15 12:52	Paint	1.13	Std.	PARK DE LA CRUZ REC	101	B	WALL	INTACT	DRYWALL	WHITETAN	Negative	0	mg / cm ^2
27	6/30/15 12:54	Paint	3.42	Std.	PARK DE LA CRUZ REC	144	D	WALL	INTACT	PLASTER	WHITE	Negative	< LOD	mg / cm ^2
28	6/30/15 12:55	Paint	1.14	Std.	PARK DE LA CRUZ REC	144	B	HANDRAIL	INTACT	METAL	WHITE	Positive	5	mg / cm ^2
29	6/30/15 12:57	Paint	2.63	Std.	PARK DE LA CRUZ REC	146a	D	WALL	INTACT	DRYWALL	MURAL	Negative	0	mg / cm ^2
30	6/30/15 12:58	Paint	1.5	Std.	PARK DE LA CRUZ REC	146a	D	WALL	INTACT	DRYWALL	MURAL	Negative	0	mg / cm ^2
31	6/30/15 12:58	Paint	3.02	Std.	PARK DE LA CRUZ REC	146a	D	WALL	INTACT	DRYWALL	MURAL	Negative	0	mg / cm ^2
32	6/30/15 13:00	Paint	3.02	Std.	PARK DE LA CRUZ REC	147	B	WALL	INTACT	DRYWALL	BLUE	Negative	0	mg / cm ^2
33	6/30/15 13:02	Paint	1.14	Std.	PARK DE LA CRUZ REC	146a	B	CAB DOORS	INTACT	WOOD	BLUE	Negative	0	mg / cm ^2
34	6/30/15 13:08	Paint	1.14	Std.	PARK DE LA CRUZ REC	3	C	DOOR	INTACT	WOOD	BLUE	Negative	0	mg / cm ^2
35	6/30/15 13:08	Paint	1.12	Std.	PARK DE LA CRUZ REC	3	C	DOOR FRAME	INTACT	METAL	BLUE	Negative	0.03	mg / cm ^2
36	6/30/15 13:11	Paint	3.42	Std.	PARK DE LA CRUZ REC	EXTERIOR	A	WALL	INTACT	STUCCO	TAN	Negative	< LOD	mg / cm ^2
37	6/30/15 13:12	Paint	8.3	Std.	PARK DE LA CRUZ REC	EXTERIOR	A	WINDOW	INTACT	METAL	GREEN	Negative	0.25	mg / cm ^2
38	6/30/15 13:16	Paint	20	K & L				CALIB. CHECK			RED	Negative	0.9	mg / cm ^2
39	6/30/15 13:16	Paint	20	K & L				CALIB. CHECK			RED	Negative	0.9	mg / cm ^2
40	6/30/15 13:17	Paint	20	K & L				CALIB. CHECK			RED	Negative	0.8	mg / cm ^2



# City of San Diego Asbestos Lead Management Program

Old YMCA, Park De La Cruz Recreation Center, 3901 Landis St., San Diego CA



## XRF Assay Results

Reading No	Time	Duration	Mode	Location	Room	Side	Component	Condition	Substrate	Color	Results	PbC	Units
41	10/5/16 10:50	207.04										1.71	cps
42	10/5/16 10:51	20	K & L				CALIB. CHECK			RED	Negative	0.8	mg / cm ^2
43	10/5/16 10:53	20	K & L				CALIB. CHECK			RED	Negative	0.8	mg / cm ^2
44	10/5/16 10:54	20	K & L				CALIB. CHECK			RED	Negative	0.8	mg / cm ^2
45	10/5/16 10:57	3.11	Std.	PDLC	RM 151	A	WALL	INTACT	PLASTER	WHITE	Negative	0.03	mg / cm ^2
46	10/5/16 10:57	2.32	Std.	PDLC	RM 151	B	WALL	INTACT	PLASTER	WHITE	Negative	0	mg / cm ^2
47	10/5/16 10:58	2.9	Std.	PDLC	RM 151	C	WALL	INTACT	PLASTER	WHITE	Negative	0	mg / cm ^2
48	10/5/16 10:58	1.15	Std.	PDLC	RM 151	C	DOOR	INTACT	WOOD	WHITE	Negative	0.05	mg / cm ^2
49	10/5/16 10:59	1.15	Std.	PDLC	RM 151	B	DOOR	INTACT	WOOD	WHITE	Negative	0	mg / cm ^2
50	10/5/16 10:59	1.16	Std.	PDLC	RM 151	B	DOOR FRAME	INTACT	METAL	WHITE	Negative	0	mg / cm ^2
51	10/5/16 11:00	1.36	Std.	PDLC	RM 151	C	DOOR FRAME	INTACT	METAL	BLUE GREEN	Negative	0.07	mg / cm ^2
52	10/5/16 11:01	1.16	Std.	PDLC	RM 150	C	DOOR FRAME	INTACT	METAL	BLUE GREEN	Negative	0.01	mg / cm ^2
53	10/5/16 11:02	1.15	Std.	PDLC	RM 149a	C	DOOR FRAME	INTACT	METAL	BLUE GREEN	Negative	0	mg / cm ^2
54	10/5/16 11:03	1.16	Std.	PDLC	RM 149a	C	DOOR	INTACT	WOOD	BLUE GREEN	Negative	0	mg / cm ^2
55	10/5/16 11:04	2.5	Std.	PDLC	RM 149a	A	WALL	INTACT	DRYWALL	WHITE	Negative	0	mg / cm ^2
56	10/5/16 11:05	2.9	Std.	PDLC	RM 149a	B	WALL	INTACT	DRYWALL	WHITE	Negative	0	mg / cm ^2
57	10/5/16 11:05	2.12	Std.	PDLC	RM 149a	C	WALL	INTACT	DRYWALL	WHITE	Negative	0	mg / cm ^2
58	10/5/16 11:05	1.54	Std.	PDLC	RM 149a	D	WALL	INTACT	DRYWALL	WHITE	Negative	0	mg / cm ^2
59	10/5/16 11:06	1.94	Std.	PDLC	RM 149a	D	BASEBOARD	INTACT	CERAMIC	WHITE	Negative	0.01	mg / cm ^2
60	10/5/16 11:06	1.16	Std.	PDLC	RM 149a	C	BASEBOARD	INTACT	CERAMIC	WHITE	Negative	0	mg / cm ^2
61	10/5/16 11:07	1.16	Std.	PDLC	RM 149a	C	FLOOR	INTACT	CERAMIC	BEIGE	Negative	0	mg / cm ^2
62	10/5/16 11:07	1.16	Std.	PDLC	RM 149b	C	FLOOR	INTACT	CERAMIC	BEIGE	Negative	0	mg / cm ^2
63	10/5/16 11:08	1.16	Std.	PDLC	RM 149b	C	BASEBOARD	INTACT	CERAMIC	WHITE	Negative	0.01	mg / cm ^2
64	10/5/16 11:11	3.67	Std.	PDLC	RM 119a	A	WALL	INTACT	PLASTER	WHITE	Negative	0.05	mg / cm ^2
65	10/5/16 11:12	2.32	Std.	PDLC	RM 119a	B	WALL	INTACT	PLASTER	WHITE	Negative	0.05	mg / cm ^2
66	10/5/16 11:12	3.28	Std.	PDLC	RM 119a	C	WALL	INTACT	PLASTER	WHITE	Negative	0.06	mg / cm ^2
67	10/5/16 11:13	0.39	Std.	PDLC	RM 119a	C	WALL TILE	INTACT	CERAMIC	GREEN	Positive	25.6	mg / cm ^2
68	10/5/16 11:13	3.29	Std.	PDLC	RM 119a	C	FLOOR TILE	INTACT	CERAMIC	TAN	Negative	0	mg / cm ^2
69	10/5/16 11:14	1.16	Std.	PDLC	RM 119a	D	DOOR	INTACT	WOOD	WHITE	Negative	0	mg / cm ^2
70	10/5/16 11:15	1.16	Std.	PDLC	RM 119a	D	DOOR FRAME	INTACT	METAL	BLUE GREEN	Negative	0	mg / cm ^2
71	10/5/16 11:18	1.16	Std.	PDLC	RM 206	C	DOOR FRAME	INTACT	METAL	WHITE	Negative	0.2	mg / cm ^2
72	10/5/16 11:19	1.15	Std.	PDLC	RM 206	C	DOOR	INTACT	WOOD	WHITE	Negative	0	mg / cm ^2
73	10/5/16 11:20	1.15	Std.	PDLC	RM 206	A	LOCKER	INTACT	METAL	BLUE	Negative	0	mg / cm ^2
74	10/5/16 11:20	0.39	Std.	PDLC	RM 206	C	WALL TILE	INTACT	CERAMIC	BLUE	Positive	8.1	mg / cm ^2

Inspector: Wm. Brad Blondet  
CDPH Inspector/Assessor # 5464

Niton XLP303A Serial #7902  
Testing for Demolition/Renovation



City of San Diego Asbestos Lead Management Program

Old YMCA, Park De La Cruz Recreation Center, 3901 Landis St., San Diego CA



XRF Assay Results

Reading No	Time	Duration	Mode	Location	Room	Side	Component	Condition	Substrate	Color	Results	PbC	Units
75	10/5/16 11:21	3.28	Std.	PDLC	RM 206	C	FLOOR	INTACT	CERAMIC	GRAY	Negative	0	mg / cm ^2
76	10/5/16 11:22	3.29	Std.	PDLC	RM 206	C	FLOOR	INTACT	CERAMIC	TAN	Negative	0.01	mg / cm ^2
77	10/5/16 11:24	3.28	Std.	PDLC	RM 206b	C	WALL	INTACT	PLASTER	WHITE	Negative	0.14	mg / cm ^2
78	10/5/16 11:24	3.28	Std.	PDLC	RM 206b	C	WALL	INTACT	BRICK	WHITE	Negative	0.15	mg / cm ^2
79	10/5/16 11:26	1.74	Std.	PDLC	RM 202	C	HANDRAIL	INTACT	METAL	WHITE	Positive	2.4	mg / cm ^2
80	10/5/16 11:28	1.93	Std.	PDLC	RM 003	A	WALL	INTACT	PLASTER	WHITE	Negative	0	mg / cm ^2
81	10/5/16 11:29	2.3	Std.	PDLC	RM 003	B	WALL	INTACT	PLASTER	WHITE	Negative	0	mg / cm ^2
82	10/5/16 11:29	2.51	Std.	PDLC	RM 003	C	WALL	INTACT	PLASTER	WHITE	Negative	0	mg / cm ^2
83	10/5/16 11:29	2.53	Std.	PDLC	RM 003	D	WALL	INTACT	PLASTER	WHITE	Negative	0	mg / cm ^2
84	10/5/16 11:30	1.16	Std.	PDLC	RM 003	B	DOOR	INTACT	WOOD	WHITE	Negative	0	mg / cm ^2
85	10/5/16 11:31	1.15	Std.	PDLC	RM 003	B	DOOR FRAME	INTACT	METAL	WHITE	Negative	0.01	mg / cm ^2
86	10/5/16 11:32	1.16	Std.	PDLC	RM 003	A	BASEBOARD	INTACT	CERAMIC	YELLOW	Negative	0.08	mg / cm ^2
87	10/5/16 11:32	1.16	Std.	PDLC	RM 003	A	FLOOR	INTACT	CERAMIC	TAN	Negative	0	mg / cm ^2
88	10/5/16 11:39	20	K & L				CALIB. CHECK			RED	Negative	0.8	mg / cm ^2
89	10/5/16 11:40	20	K & L				CALIB. CHECK			RED	Negative	0.8	mg / cm ^2
90	10/5/16 11:41	20	K & L				CALIB. CHECK			RED	Negative	0.9	mg / cm ^2

**Attachment # 3**

**INSPECTOR CERTIFICATIONS**

State of California  
Division of Occupational Safety and Health  
Certified Site Surveillance Technician

**William Bradley Blondet**



Name

Certification No. 99-2689

Expires on 12/10/16

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.

Lead-Related  
Construction  
Certificate

Certificate  
Type

Expiration  
Date



Inspector/Assessor	07/01/2017
Supervisor	07/01/2017
Project Monitor	07/01/2017

William B. Blondet ID# 5464

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# THE ASBESTOS INSTITUTE

Certifies that

## William Blondet

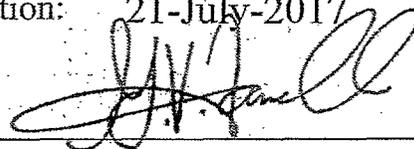
has attended the EPA approved course  
AHERA Contractor/Supervisor Refresher  
Approval Code: CA-089-04  
July 21, 2016  
and successfully passed the competency exam.

Date of Examination: 21-July-2016

Date of Expiration: 21-July-2017



William T. Cavness  
Director



Approved Instructor

THE ASBESTOS INSTITUTE  
20033 N. 19th Avenue  
Building #6  
Phoenix, AZ 85027  
602-864-6564

*This training meets all requirements for asbestos accreditation under Toxic Substance Control Act Title II and California OSHA.*

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# THE ASBESTOS INSTITUTE

Certifies that

## William Blondet

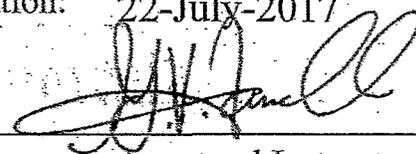
has attended the EPA approved course  
**AHERA Building Inspector Refresher**  
Approval Code: CA-089-06  
July 22, 2016  
and successfully passed the competency exam.

Date of Examination: 22-July-2016

Date of Expiration: 22-July-2017



William T. Cavness  
Director



Approved Instructor

THE ASBESTOS INSTITUTE  
20033 N. 19th Avenue  
Building #6  
Phoenix, AZ 85027  
602-864-6564

*This training meets all requirements for asbestos accreditation under Toxic Substance Control Act Title II and California OSHA.*

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# THE ASBESTOS INSTITUTE

Certifies that

## William Blondet

has attended the EPA approved course

**AHERA Management/Planner Refresher**

**Approval Code: CA-089-08**

**July 22, 2016**

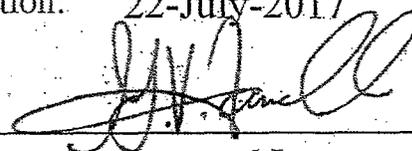
and successfully passed the competency exam.

Date of Examination: 22-July-2016

Date of Expiration: 22-July-2017



William T. Cavness  
Director



Approved Instructor

**THE ASBESTOS INSTITUTE**

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Phoenix, AZ 85027

602-864-6564

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**APPENDIX I**  
**HAZARDOUS LABEL/FORMS**

# HAZARDOUS WASTE

**STATE AND FEDERAL LAW PROHIBITS IMPROPER DISPOSAL  
IF FOUND, CONTACT THE NEAREST POLICE, OR PUBLIC SAFETY  
AUTHORITY, OR THE U.S. ENVIRONMENTAL PROTECTION AGENCY  
OR THE CALIFORNIA DEPARTMENT OF HEALTH SERVICES**

GENERATOR NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_ 24 HR. PHONE ( ) \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

EPA ID NO. \_\_\_\_\_ MANIFEST DOCUMENT NO. \_\_\_\_\_

EPA WASTE NO. \_\_\_\_\_ CA WASTE NO. \_\_\_\_\_ ACCUMULATION START DATE \_\_\_\_\_ / \_\_\_\_ / \_\_\_\_

CONTENTS, COMPOSITION \_\_\_\_\_

PROPER DOT SHIPPING NAME \_\_\_\_\_

TECHNICAL NAME (S) \_\_\_\_\_

UN/NA NO. WITH PREFIX \_\_\_\_\_

PHYSICAL STATE    HAZARDOUS PROPERTIES     FLAMMABLE     TOXIC  
 SOLID    LIQUID   |    CORROSIVE     REACTIVE     OTHER \_\_\_\_\_

## HANDLE WITH CARE!

CONTAINS HAZARDOUS OR TOXIC WASTES

# INCIDENT/RELEASE ASSESSMENT FORM <sup>1</sup>

## If you have an emergency, Call 911

Handlers of hazardous materials are required to report releases. The following is a tool to be used for assessing if a release is reportable. Additionally, a non-reportable release incident form is provided to document why a release is not reported (see back).

### Questions for Incident Assessment:

- |   | YES                      | NO                       |
|---|--------------------------|--------------------------|
| 1. Was anyone killed or injured, or did they require medical care or admitted to a hospital for observation?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Did anyone, other than employees in the immediate area of the release, evacuate?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Did the release cause off-site damage to public or private property?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Is the release greater than or equal to a reportable quantity (RQ)?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Was there an uncontrolled or unpermitted release to the air?   | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Did an uncontrolled or unpermitted release escape secondary containment, or extend into any sewers, storm water conveyance systems, utility vaults and conduits, wetlands, waterways, public roads, or off site?               | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Will control, containment, decontamination, and/or clean up require the assistance of federal, state, county, or municipal response elements?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Was the release or threatened release involving an unknown material or contains an unknown hazardous constituent?  | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Is the incident a threatened release (a condition creating a substantial probability of harm that requires immediate action to prevent, reduce, or mitigate damages to persons, property, or the environment)?                 | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Is there an increased potential for secondary effects including fire, explosion, line rupture, equipment failure, or other outcomes that may endanger or cause exposure to employees, the general public, or the environment? | <input type="checkbox"/> | <input type="checkbox"/> |

If the answer is YES to any of the above questions – report the release to the California Office of Emergency Services at 800-852-7550 and the local CUPA daytime: (619) 338-2284, after hours: (858) 565-5255. Note: other state and federal agencies may require notification depending on the circumstances.

\*Call 911 in an emergency\*

If all answers are NO, complete a Non Reportable Release Incident Form (page 2 of 2) and keep readily available. Documenting why a “no” response was made to each question will serve useful in the event questions are asked in the future, and to justify not reporting to an outside regulatory agency.

If in doubt, report the release.

<sup>1</sup> This document is a guide for accessing when hazardous materials release reporting is required by Chapter 6.95 of the California Health and Safety Code. It does not replace good judgment, Chapter 6.95, or other state or federal release reporting requirements.

## NON REPORTABLE RELEASE INCIDENT FORM

### 1. RELEASE AND RESPONSE DESCRIPTION

Incident # \_\_\_\_\_

Date/Time Discovered	Date/Time Discharge	Discharge Stopped <input type="checkbox"/> Yes <input type="checkbox"/> No
Incident Date / Time:		
Incident Business / Site Name:		
Incident Address:		
Other Locators (Bldg, Room, Oil Field, Lease, Well #, GIS)		
Please describe the incident and indicate specific causes and area affected. Photos Attached?: <input type="checkbox"/> Yes <input type="checkbox"/> No		
Indicate actions to be taken to prevent similar releases from occurring in the future.		

### 2. ADMINISTRATIVE INFORMATION

Supervisor in charge at time of incident:	Phone:
Contact Person:	Phone:

### 3. CHEMICAL INFORMATION

Chemical	Quantity <input type="checkbox"/> GAL <input type="checkbox"/> LBS <input type="checkbox"/> FT <sup>3</sup>
Chemical	Quantity <input type="checkbox"/> GAL <input type="checkbox"/> LBS <input type="checkbox"/> FT <sup>3</sup>
Chemical	Quantity <input type="checkbox"/> GAL <input type="checkbox"/> LBS <input type="checkbox"/> FT <sup>3</sup>
Clean-Up Procedures & Timeline:	
Completed By:	Phone:
Print Name:	Title:

## EMERGENCY RELEASE FOLLOW - UP NOTICE REPORTING FORM

A	BUSINESS NAME	FACILITY EMERGENCY CONTACT & PHONE NUMBER (   )   -	
B	INCIDENT DATE MO DAY YR	TIME NOTIFIED OES (use 24 hr time)	OES CONTROL NO.
C	INCIDENT ADDRESS LOCATION	CITY / COMMUNITY	COUNTY ZIP
D	CHEMICAL OR TRADE NAME (print or type)		CAS Number
E	CHECK IF CHEMICAL IS LISTED IN 40 CFR 355, APPENDIX A <input type="checkbox"/>	CHECK IF RELEASE REQUIRES NOTIFICATION UNDER 42 U.S.C. Section 9603 (a) <input type="checkbox"/>	
F	PHYSICAL STATE CONTAINED <input type="checkbox"/> SOLID <input type="checkbox"/> LIQUID <input type="checkbox"/> GAS	PHYSICAL STATE RELEASED <input type="checkbox"/> SOLID <input type="checkbox"/> LIQUID <input type="checkbox"/> GAS	QUANTITY RELEASED
G	ENVIRONMENTAL CONTAMINATION <input type="checkbox"/> AIR <input type="checkbox"/> WATER <input type="checkbox"/> GROUND <input type="checkbox"/> OTHER	TIME OF RELEASE	DURATION OF RELEASE — DAYS — HOURS — MINUTES
H	ACTIONS TAKEN		
I	KNOWN OR ANTICIPATED HEALTH EFFECTS (Use the comments section for addition information)		
J	<input type="checkbox"/> ACUTE OR IMMEDIATE (explain) _____ <input type="checkbox"/> CHRONIC OR DELAYED (explain) _____ <input type="checkbox"/> NOTKNOWN (explain) _____		
K	ADVICE REGARDING MEDICAL ATTENTION NECESSARY FOR EXPOSED INDIVIDUALS		
L	COMMENTS (INDICATE SECTION (A - G) AND ITEM WITH COMMENTS OR ADDITIONAL INFORMATION)		
M	CERTIFICATION: I certify under penalty of law that I have personally examined and I am familiar with the information submitted and believe the submitted information is true, accurate, and complete. REPORTING FACILITY REPRESENTATIVE (print or type) _____ SIGNATURE OF REPORTING FACILITY REPRESENTATIVE _____ DATE: _____		

## **EMERGENCY RELEASE FOLLOW-UP NOTICE REPORTING FORM INSTRUCTIONS**

### **GENERAL INFORMATION:**

Chapter 6.95 of Division 20 of the California Health and Safety Code requires that written emergency release follow-up notices prepared pursuant to 42 U.S.C. § 11004, be submitted using this reporting form. Non-permitted releases of reportable quantities of Extremely Hazardous Substances (listed in 40 CFR 355, appendix A) or of chemicals that require release reporting under section 103(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 [42 U.S.C. § 9603(a)] must be reported on the form, as soon as practicable, but no later than 30 days, following a release. The written follow-up report is required in addition to the verbal notification.

### **BASIC INSTRUCTIONS:**

- The form, when filled out, reports follow-up information required by 42 U.S.C § 11004. Ensure that all information requested by the form is provided as completely as possible.
- If the incident involves reportable releases of more than one chemical, prepare one report form for each chemical released.
- If the incident involves a series of separate releases of chemical(s) at different times, the releases should be reported on separate reporting forms.

### **SPECIFIC INSTRUCTIONS:**

**Block A:** Enter the name of the business and the name and phone number of a contact person who can provide detailed facility information concerning the release.

**Block B:** Enter the date of the incident and the time that verbal notification was made to OES. The OES control number is provided to the caller by OES at the time verbal notification is made. Enter this control number in the space provided.

**Block C:** Provide information pertaining to the location where the release occurred. Include the street address, the city or community, the county and the zip code.

**Block D:** Provide information concerning the specific chemical that was released. Include the chemical or trade name and the Chemical Abstract Service (CAS) number. Check all categories that apply. Provide best available information on quantity, time and duration of the release.

**Block E:** Indicate all actions taken to respond to and contain the release as specified in 42 U.S.C. § 11004(c).

**Block F:** Check the categories that apply to the health effects that occurred or could result from the release. Provide an explanation or description of the effects in the space provided. Use Block H for additional comments/information if necessary to meet requirements specified in 42 U.S.C. § 11004(c).

**Block G:** Include information on the type of medical attention required for exposure to the chemical released. Indicate when and how this information was made available to individuals exposed and to medical personnel, if appropriate for the incident, as specified in 42 U.S.C. § 11004(c).

**Block H:** List any additional pertinent information.

**Block I:** Print or type the name of the facility representative submitting the report. Include the official signature and the date that the form was prepared.

### **MAIL THE COMPLETED REPORT TO:**

**State Emergency Response Commission (SERC)  
Attn: Section 304 Reports  
Hazardous Materials Unit  
3650 Schriever Avenue  
Mather, CA 95655**

**NOTE:** Authority cited: Sections 25503, 25503.1 and 25507.1, Health and Safety Code. Reference: Sections 25503(b)(4), 25503.1, 25507.1, 25518 and 25520, Health and Safety Code.

**APPENDIX J**

**SAMPLE OF PUBLIC NOTICE**

# FOR SAMPLE REFERENCE ONLY



## CONSTRUCTION NOTICE

### PROJECT TITLE

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

**The work will consist of:**

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

**How your neighborhood may be impacted:**

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

**Hours and Days of Operation:**

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

**City of San Diego Contractor:**

Company Name, XXX-XXX-XXXX



## CONSTRUCTION NOTICE

### PROJECT TITLE

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

**The work will consist of:**

- Saw-cutting and trench work on Ingulf Street from Morena Boulevard to Galveston Street to install new water mains, water laterals and fire hydrants.
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- Cars parked in violation of signs will be TOWED.

**Hours and Days of Operation:**

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

**City of San Diego Contractor:**

Company Name, XXX-XXX-XXXX

To contact the City of San Diego: Public Works  
619-533-4207 | [engineering@sandiego.gov](mailto:engineering@sandiego.gov) | [sandiego.gov/CIP](http://sandiego.gov/CIP)

To contact the City of San Diego: Public Works  
619-533-4207 | [engineering@sandiego.gov](mailto:engineering@sandiego.gov) | [sandiego.gov/CIP](http://sandiego.gov/CIP)

**APPENDIX K**

**ADVANCED METERING INFRASTRUCTURE (AMI) DEVICE PROTECTION**

## **Protecting AMI Devices in Meter Boxes and on Street Lights**

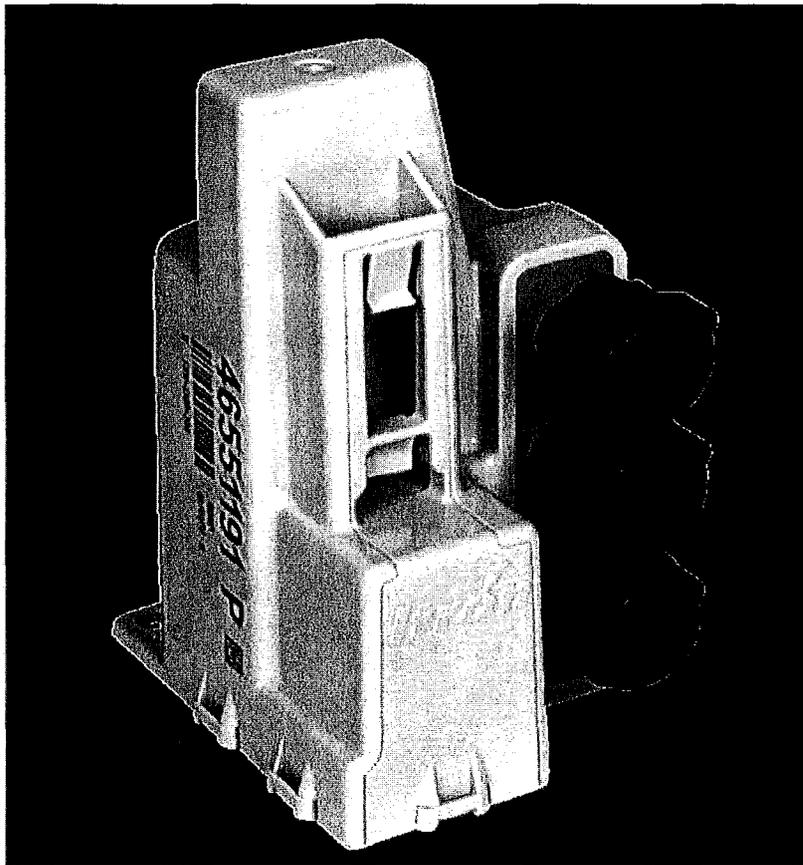
The Public Utilities Department (PUD) has begun the installation of the Advanced Metering Infrastructure (AMI) technology as a new tool to enhance water meter reading accuracy and efficiency, customer service and billing, and to be used by individual accounts to better manage the efficient use of water. **All AMI devices shall be protected per Section 5-2, "Protection", of the 2015 Whitebook.**

AMI technology allows water meters to be read electronically rather than through direct visual inspection by PUD field staff. This will assist PUD staff and customers in managing unusual consumption patterns which could indicate leaks or meter tampering on a customer's property.

Three of the main components of an AMI system are the:

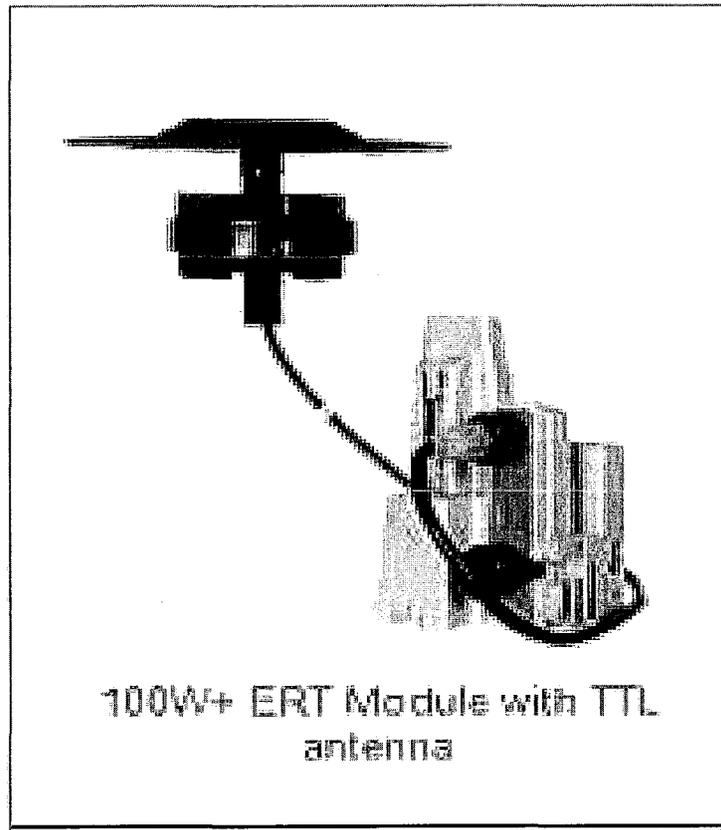
- A. Endpoints, see Photo 1:

**Photo 1**



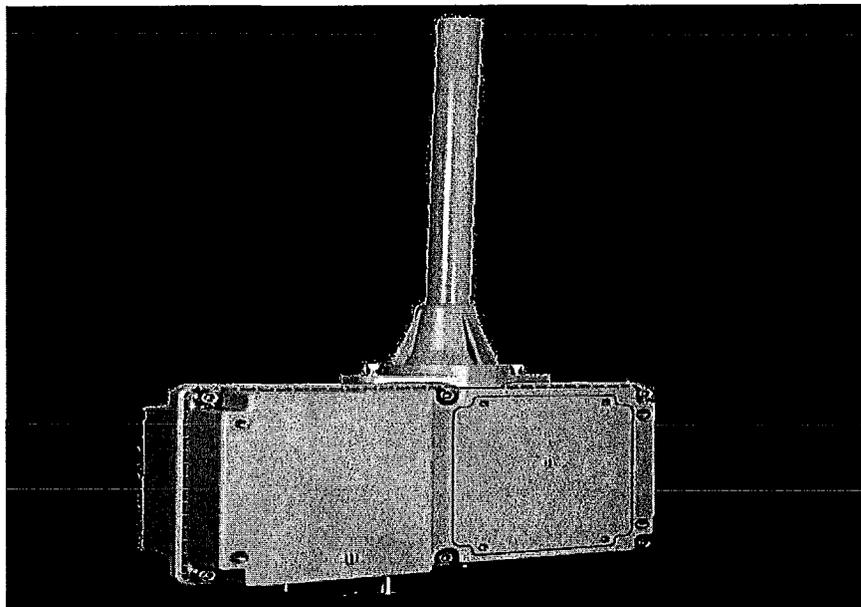
- B. AMI Antenna attached to Endpoint (antenna not always required), see Photo 2:

**Photo 2**



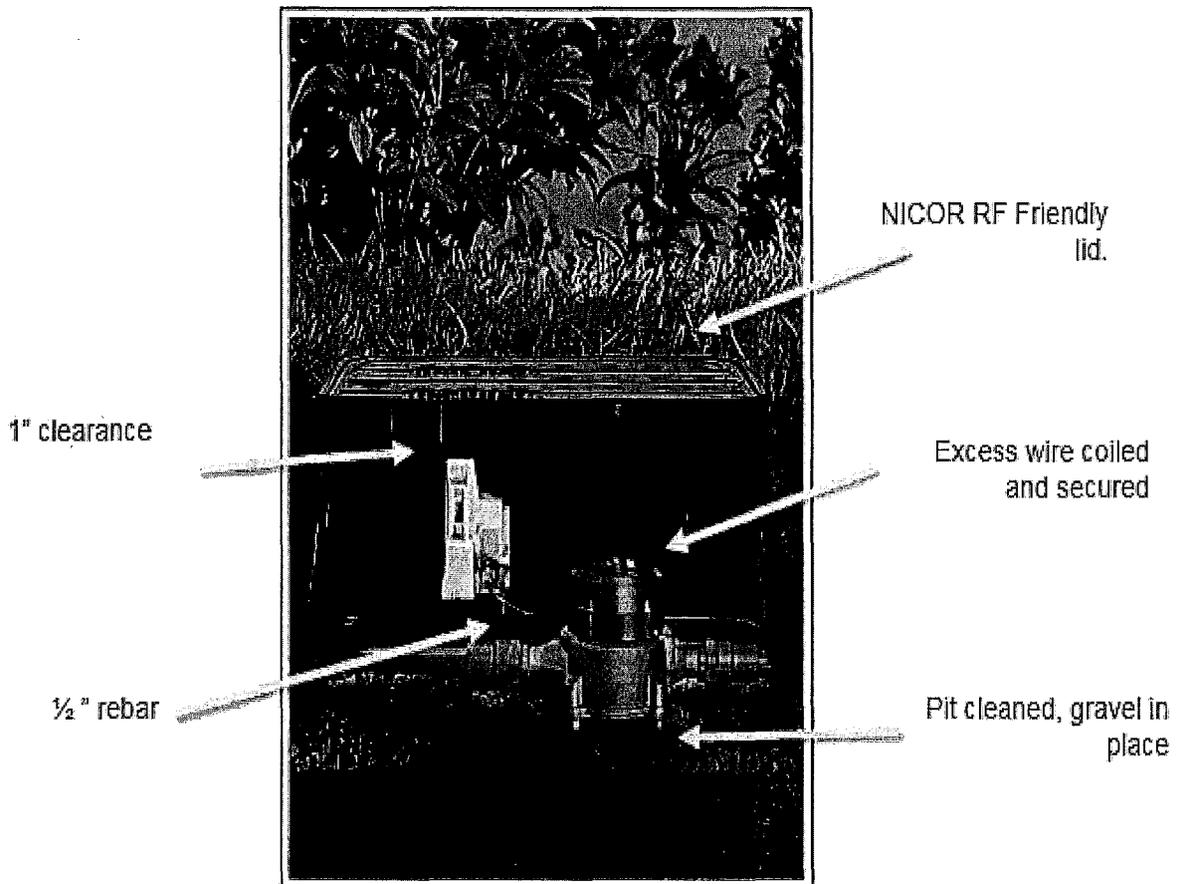
Network Devices, see Photo 3:

**Photo 3**



AMI endpoints transmit meter information to the AMI system and will soon be on the vast majority of meters in San Diego. These AMI devices provide interval consumption data to the PUD's Customer Support Division. If these devices are damaged or communication is interrupted, this Division will be alerted of the situation. The endpoints are installed in water meter boxes, coffins, and vaults adjacent to the meter. A separate flat round antenna may also be installed through the meter box lid. This antenna is connected to the endpoint via cable. The following proper installation shall be implemented when removing the lid to avoid damaging the antenna, cable, and/or endpoint. Photo 4 below demonstrates a diagram of the connection:

**Photo 4**



The AMI device ERT/Endpoint/Transmitter shall be positioned and installed as discussed in this Appendix. If the ERT/Endpoint/Transmitter is disturbed, it shall be re-installed and returned to its original installation with the end points pointed upwards as shown below in Photo 5.

**The PUD's code compliance staff will issue citations and invoices to you for any damaged AMI devices that are not re-installed as discussed in the Contract Document**

Photo 5 below shows a typical installation of an AMI endpoint on a water meter.

**Photo 5**

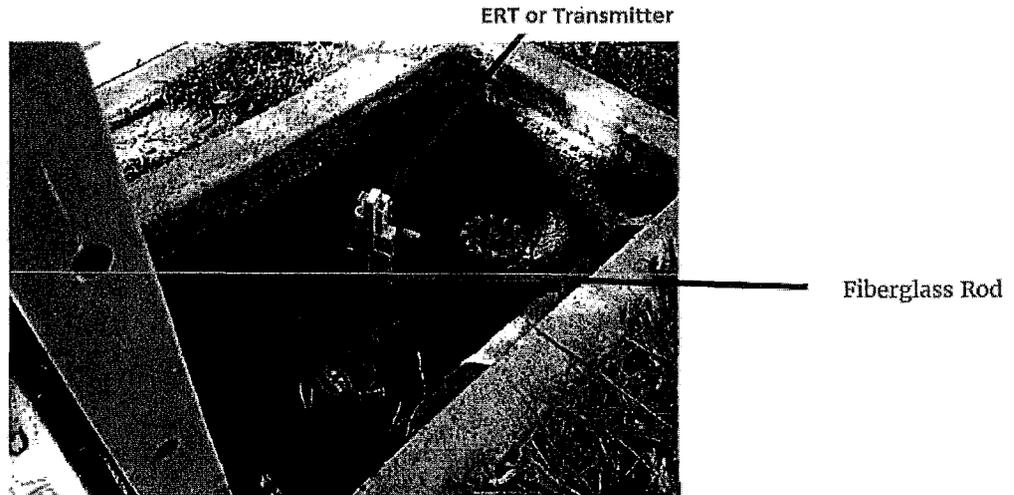
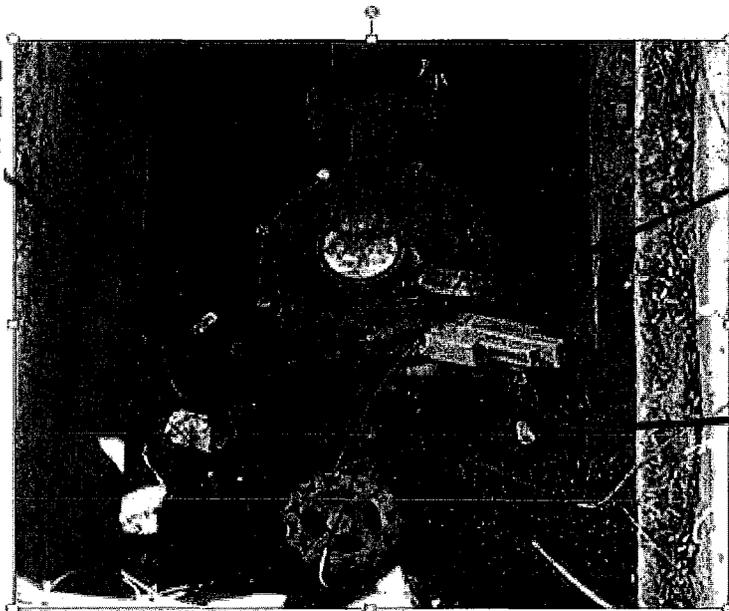


Photo 6 below is an example of disturbance that shall be avoided:

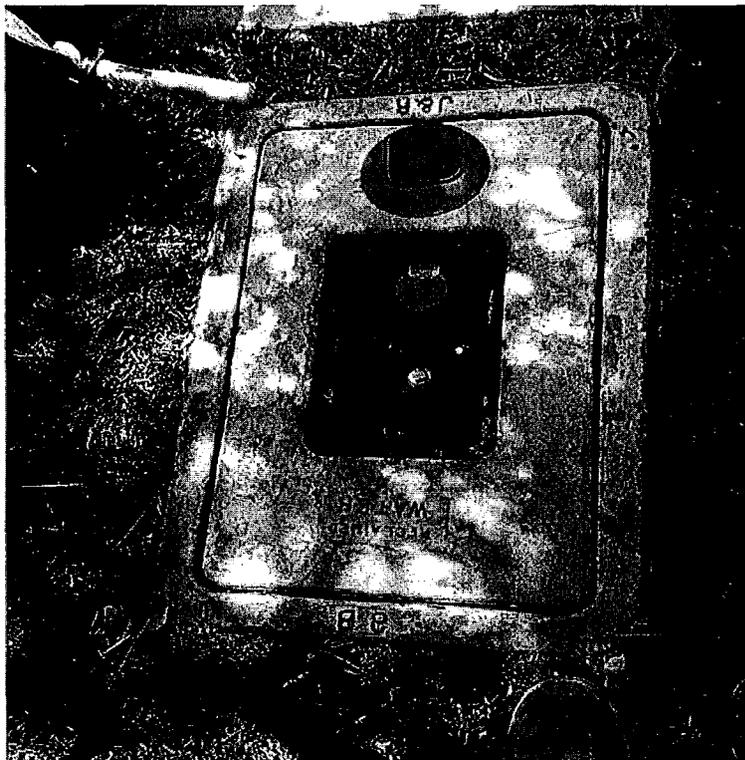
**Photo 6**

The antenna was drilled into the lid and now it is removed



**You are responsible when working in and around meter boxes.** If you encounter these endpoints, use proper care and do not disconnect them from the registers on top of the water meter. If the lid has an antenna drilled through, do not change or tamper with the lid and inform the Resident Engineer immediately about the location of that lid. Refer to Photo 7 below:

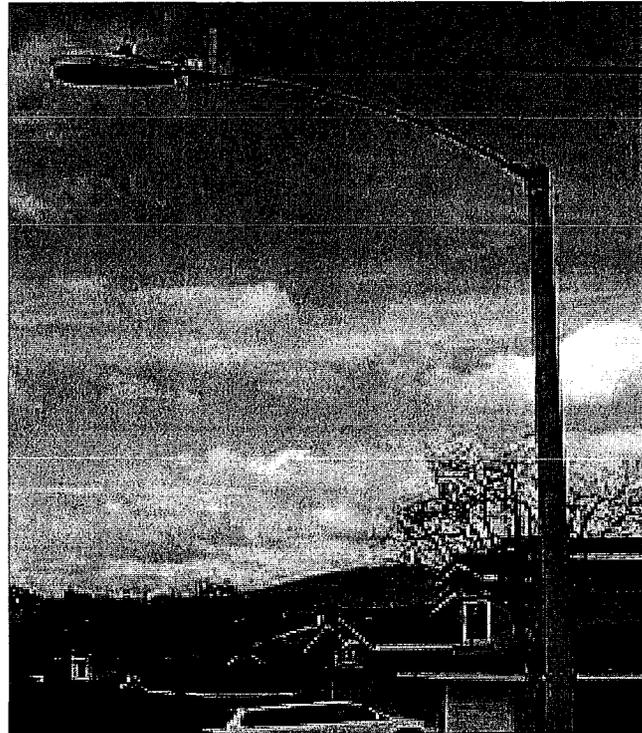
**Photo 7**



Another component of the AMI system are the Network Devices. The Network Devices are strategically placed units (mainly on street light poles) that collect interval meter reading data from multiple meters for transmission to the Department Control Computer. **If you come across any of these devices on street lights that will be removed or replaced (refer to Photos 8 and 9 below), notify AMI Project Manager Arwa Sayed at (619) 362-0121 immediately.**

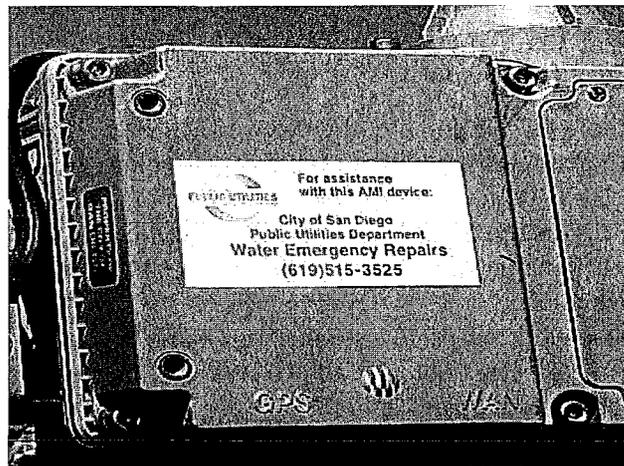
Photo 8 shows an installed network device on a street light. On the back of each Network Device is a sticker with contact information. See Photo 9. **Call PUD Water Emergency Repairs at 619-515-3525 if your work will impact these street lights.** These are assets that belong to the City of San Diego and you shall be responsible for any costs of disruption of this network.

**Photo 8**



**Network Device**

**Photo 9**



**If you encounter any bad installations, disconnected/broken/buried endpoints, or inadvertently damage any AMI devices or cables, notify the Resident Engineer immediately. The Resident Engineer will then immediately contact the AMI Project Manager, Arwa Sayed, at (619) 362-0121.**

**ATTACHMENT F**  
**INTENTIONALLY LEFT BLANK**

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

## CONTRACT AGREEMENT

---

### CONSTRUCTION CONTRACT

This contract is made and entered into between THE CITY OF SAN DIEGO, a municipal corporation, herein called "City", and USS Cal Builders Inc., herein called "Contractor" for construction of **Park de La Cruz Neighborhood Recreation Center & Gym**; Bid No. **K-17-1539-DBB-3**; in the amount of **Seven Million Seven Hundred Eighty-Eight Thousand Dollars and Zero Cents (\$7,788,000.00)**, which is comprised of the Base Bid plus/minus Additive/Deductive Alternates (Phase 1A through Phase 2G).

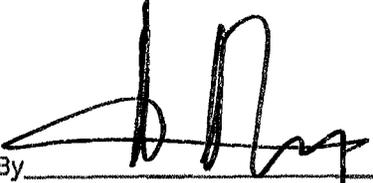
IN CONSIDERATION of the payments to be made hereunder and the mutual undertakings of the parties hereto, City and Contractor agree as follows:

1. The following are incorporated into this contract as though fully set forth herein:
  - (a) The attached Faithful Performance and Payment Bonds.
  - (b) The attached Proposal included in the Bid documents by the Contractor.
  - (c) Reference Standards listed in the Instruction to Bidders and the Supplementary Special Provisions (SSP).
  - (d) Phased Funding Schedule Agreement.
  - (e) That certain documents entitled **Park de La Cruz Neighborhood Recreation Center & Gym**, on file in the office of the Public Works Department as Document No. **5-16059**, 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 **Park de La Cruz Neighborhood Recreation Center & Gym**, Bid Number **K-17-1539-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

By   
Print Name: Albert P. Rehaney  
Deputy Director  
Public Works Department

Date: 7/19/17

APPROVED AS TO FORM

Mara W. Elliott, City Attorney

By   
Print Name: Bonny Hsu  
Deputy City Attorney

Date: 7/21/17

CONTRACTOR

By   
Print Name: Eric Othman

Title: Secretary

Date: June 14, 2017

City of San Diego License No.: B2012001473

State Contractor's License No.: 654454

DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) REGISTRATION NUMBER: 1000003215

**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.

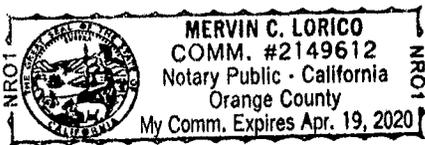
State of California )  
County of ORANGE )

On 06/22/2017 before me, MERVIN C. LORICO, NOTARY PUBLIC,  
Date Here Insert Name and Title of the Officer  
personally appeared ERIC OTHMAN  
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

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

WITNESS my hand and official seal.



Signature [Handwritten Signature]  
Signature of Notary Public

Place Notary Seal Above

**OPTIONAL**

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

**Description of Attached Document**

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

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

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

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

## **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.

**CONTRACTOR CERTIFICATION**

---

**Equal Benefits Ordinance Certification**

I declare under penalty of perjury that I am familiar with the requirements of and in compliance with the City of San Diego Municipal Code § 22.4300 regarding Equal Benefits Ordinance.

**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:

**PARK DE LA CRUZ NEIGHBORHOOD RECREATION CENTER & GYM**

(Name of Project)

as particularly described in said contract and identified as Bid No. **K-17-1539-DBB-3**; SAP No. (WBS/IO/CC) **S-16059**; 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

**LIST OF SUBCONTRACTORS**

**\*\*\* PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY \*\*\* TO BE SUBMITTED IN ELECTRONIC FORMAT ONLY \*\*\* SEE INSTRUCTIONS TO BIDDERS, FOR FURTHER INFORMATION**

In accordance with the requirements of the "Subletting and Subcontracting Fair Practices Act", Section 4100, of the California Public Contract Code (PCC), the Bidder is to list below the name, address and license number of each Subcontractor who will perform work, labor, render services or specially fabricate and install a portion [type] of the work or improvement, in an amount of or in excess of 0.5% of the Contractor's total Bid. Failure to comply with this requirement may result in the Bid being rejected as non-responsive. The Contractor is to list only one Subcontractor for each portion of the Work. The Bidder's attention is directed to the Special Provisions - General; Paragraph 2-3 Subcontracts, which stipulates the percentage of the Work to be performed with the Bidder's own forces. The Bidder is to also list all SLBE, ELBE, DBE, DVBE, MBE, WBE, OBE, SDB, WoSB, HUBZone, and SDVOSB Subcontractors for which the Bidders are seeking recognition towards achieving any mandatory, voluntary, or both subcontracting participation percentages.

<b>NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR</b>	<b>CONSTRUCTOR OR DESIGNER</b>	<b>SUBCONTRACTOR LICENSE NUMBER</b>	<b>TYPE OF WORK</b>	<b>DOLLAR VALUE OF SUBCONTRACT</b>	<b>MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB<sup>ⓐ</sup></b>	<b>WHERE CERTIFIED<sup>ⓑ</sup></b>	<b>CHECK IF JOINT VENTURE PARTNERSHIP</b>
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							

<sup>ⓐ</sup> As appropriate, Bidder shall identify Subcontractor as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):

Certified Minority Business Enterprise	MBE	Certified Woman Business Enterprise	WBE
Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
Certified Small Local Business Enterprise	SLBE	Small Disadvantaged Business	SDB
Woman-Owned Small Business	WoSB	HUBZone Business	HUBZone
Service-Disabled Veteran Owned Small Business	SDVOSB		

<sup>ⓑ</sup> As appropriate, Bidder shall indicate if Subcontractor is certified by:

City of San Diego	CITY	State of California Department of Transportation	CALTRANS
California Public Utilities Commission	CPUC		
State of California's Department of General Services	CADoGS	City of Los Angeles	LA
State of California	CA	U.S. Small Business Administration	SBA

**The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.**

**NAMED EQUIPMENT/MATERIAL SUPPLIER LIST**

\*\*\* PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY \*\*\* TO BE SUBMITTED IN ELECTRONIC FORMAT ONLY \*\*\* SEE INSTRUCTIONS TO BIDDERS FOR FURTHER INFORMATION

NAME, ADDRESS AND TELEPHONE NUMBER OF VENDOR/SUPPLIER	MATERIALS OR SUPPLIES	DOLLAR VALUE OF MATERIAL OR SUPPLIES	SUPPLIER (Yes/No)	MANUFACTURER (Yes/No)	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB <sup>①</sup>	WHERE CERTIFIED <sup>②</sup>
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____						
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____						

- ① As appropriate, Bidder shall identify Vendor/Supplier as one of the following and shall include a valid proof of certification (except for OBE,SLBE and ELBE):
- |   |        |  |         |
|---|--------|--|---------|
| Certified Minority Business Enterprise        | MBE    | Certified Woman Business Enterprise            | WBE     |
| Certified Disadvantaged Business Enterprise   | DBE    | Certified Disabled Veteran Business Enterprise | DVBE    |
| Other Business Enterprise                     | OBE    | Certified Emerging Local Business Enterprise   | ELBE    |
| Certified Small Local Business Enterprise     | SLBE   | Small Disadvantaged Business                   | SDB     |
| Woman-Owned Small Business                    | WoSB   | HUBZone Business                               | HUBZone |
| Service-Disabled Veteran Owned Small Business | SDVOSB |  |         |
- ② As appropriate, Bidder shall indicate if Vendor/Supplier is certified by:
- |  |        |  |          |
|--|--------|--|----------|
| City of San Diego                                    | CITY   | State of California Department of Transportation | CALTRANS |
| California Public Utilities Commission               | CPUC   |  |          |
| State of California's Department of General Services | CADoGS | City of Los Angeles                              | LA       |
| State of California                                  | CA     | U.S. Small Business Administration               | SBA      |

**The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.**

**SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)**

**ALTERNATE A**

ADDITIVE/ DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB <sup>①</sup>	WHERE CERTIFIED <sup>②</sup>	CHECK IF JOINT VENTURE PARTNERSHIP
ADDITIVE	Name: BRADSHAW ENGINEERING CORP Address: 8645 ARGENT STREET City: SANTEE State: CA Zip: 92071 Phone: 619-448-4300 Email: moe@bradshaweng.com	CONSTRUCTOR	383330	FIRE SPRINKLER	\$94,800	OBE (SBE)	CADoGS	
	Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							

<sup>①</sup> As appropriate, Bidder shall identify Subcontractor as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):

Certified Minority Business Enterprise	MBE	Certified Woman Business Enterprise	WBE
Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
Certified Small Local Business Enterprise	SLBE	Small Disadvantaged Business	SDB
Woman-Owned Small Business	WoSB	HUBZone Business	HUBZone
Service-Disabled Veteran Owned Small Business	SDVOSB		

<sup>②</sup> As appropriate, Bidder shall indicate if Subcontractor is certified by:

City of San Diego	CITY	State of California Department of Transportation	CALTRANS
California Public Utilities Commission	CPUC	State of California Department of General Services	CADoGS
City of Los Angeles	LA	State of California	CA
U.S. Small Business Administration	SBA		

**The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.**

**SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)**

**ALTERNATE B**

ADDITIVE/ DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB <sup>ⓐ</sup>	WHERE CERTIFIED <sup>ⓑ</sup>	CHECK IF JOINT VENTURE PARTNERSHIP
ADDITIVE	Name: <u>TL SHIELD &amp; ASSOCIATES INC</u> Address: <u>P O BOX 6845</u> City: <u>THOUSAND OAKS</u> State: <u>CA</u> Zip: <u>91359</u> Phone: <u>818-509-8228</u> Email: <u>tom@tlshield.com</u>	CONSTRUCTOR	605460	ELEVATOR	\$208,834.14	N/A	N/A	
	Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							

ⓐ As appropriate, Bidder shall identify Subcontractor as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):

- |   |        |  |         |
|---|--------|--|---------|
| Certified Minority Business Enterprise        | MBE    | Certified Woman Business Enterprise            | WBE     |
| Certified Disadvantaged Business Enterprise   | DBE    | Certified Disabled Veteran Business Enterprise | DVBE    |
| Other Business Enterprise                     | OBE    | Certified Emerging Local Business Enterprise   | ELBE    |
| Certified Small Local Business Enterprise     | SLBE   | Small Disadvantaged Business                   | SDB     |
| Woman-Owned Small Business                    | WoSB   | HUBZone Business                               | HUBZone |
| Service-Disabled Veteran Owned Small Business | SDVOSB |  |         |

ⓑ As appropriate, Bidder shall indicate if Subcontractor is certified by:

- |  |      |  |          |
|--|------|--|----------|
| City of San Diego                      | CITY | State of California Department of Transportation   | CALTRANS |
| California Public Utilities Commission | CPUC | State of California Department of General Services | CADoGS   |
| City of Los Angeles                    | LA   | State of California                                | CA       |
| U.S. Small Business Administration     | SBA  |  |          |

**The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.**

**SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)**

**ALTERNATE C - NOT USED**

ADDITIVE/ DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB <sup>①</sup>	WHERE CERTIFIED ②	CHECK IF JOINT VENTURE PARTNERSHIP
	Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							
	Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							

① As appropriate, Bidder shall identify Subcontractor as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):

Certified Minority Business Enterprise	MBE	Certified Woman Business Enterprise	WBE
Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
Certified Small Local Business Enterprise	SLBE	Small Disadvantaged Business	SDB
Woman-Owned Small Business	WoSB	HUBZone Business	HUBZone
Service-Disabled Veteran Owned Small Business	SDVOSB		

② As appropriate, Bidder shall indicate if Subcontractor is certified by:

City of San Diego	CITY	State of California Department of Transportation	CALTRANS
California Public Utilities Commission	CPUC	State of California Department of General Services	CADoGS
City of Los Angeles	LA	State of California	CA
U.S. Small Business Administration	SBA		

**The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.**

**SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)**

**ALTERNATE D**

ADDITIVE/ DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB <sup>ⓐ</sup>	WHERE CERTIFIED <sup>ⓑ</sup>	CHECK IF JOINT VENTURE PARTNERSHIP
ADDITIVE	Name: <u>SOCAL DEMOLITION CO</u> Address: <u>45 3RD AVENUE SUITE 204</u> City: <u>CHULA VISTA</u> State: <u>CA</u> Zip: <u>91910</u> Phone: <u>619-240-3001</u> Email: <u>esther@socaldemolitionco.com</u>	CONSTRUCTOR	1015989	DEMOLITION (PARTIAL)	\$22,200	N/A	N/A	
	Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							

ⓐ As appropriate, Bidder shall identify Subcontractor as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):

Certified Minority Business Enterprise	MBE	Certified Woman Business Enterprise	WBE
Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
Certified Small Local Business Enterprise	SLBE	Small Disadvantaged Business	SDB
Woman-Owned Small Business	WoSB	HUBZone Business	HUBZone
Service-Disabled Veteran Owned Small Business	SDVOSB		

ⓑ As appropriate, Bidder shall indicate if Subcontractor is certified by:

City of San Diego	CITY	State of California Department of Transportation	CALTRANS
California Public Utilities Commission	CPUC	State of California Department of General Services	CADoGS
City of Los Angeles	LA	State of California	CA
U.S. Small Business Administration	SBA		

**The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.**

**SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)**

**ALTERNATE E**

ADDITIVE/ DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB <sup>①</sup>	WHERE CERTIFIED <sup>②</sup>	CHECK IF JOINT VENTURE PARTNERSHIP
ADDITIVE	Name: <u>E L HOBBS INC</u> Address: <u>PO BOX 966</u> City: <u>EL CAJON</u> State: <u>CA</u> Zip: <u>92022</u> Phone: <u>619-401-1708</u> Email: <u>shobbs@elhobbsinc.com</u>	CONSTRUCTOR	777073	PLASTER & DRYWALL (PARTIAL)	\$77,000	N/A	N/A	
	Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							

<sup>①</sup> As appropriate, Bidder shall identify Subcontractor as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):

Certified Minority Business Enterprise	MBE	Certified Woman Business Enterprise	WBE
Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
Certified Small Local Business Enterprise	SLBE	Small Disadvantaged Business	SDB
Woman-Owned Small Business	WoSB	HUBZone Business	HUBZone
Service-Disabled Veteran Owned Small Business	SDVOSB		

<sup>②</sup> As appropriate, Bidder shall indicate if Subcontractor is certified by:

City of San Diego	CITY	State of California Department of Transportation	CALTRANS
California Public Utilities Commission	CPUC	State of California Department of General Services	CADoGS
City of Los Angeles	LA	State of California	CA
U.S. Small Business Administration	SBA		

**The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.**

**SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)**

**ALTERNATE F**

ADDITIVE/ DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB <sup>ⓐ</sup>	WHERE CERTIFIED <sup>ⓑ</sup>	CHECK IF JOINT VENTURE PARTNERSHIP
ADDITIVE	Name: <u>STANTON UTILITIES INC</u> Address: <u>8220 KATELLA AVE STE E</u> City: <u>STANTON</u> State: <u>CA</u> Zip: <u>90680</u> Phone: <u>714-761-1617</u> Email: <u>lisa@stantonutilities.com</u>	CONSTRUCTOR	967030	ELECTRICAL (PARTIAL)	\$5,000	N/A	N/A	
	Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							

ⓐ As appropriate, Bidder shall identify Subcontractor as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):

- |   |        |  |         |
|---|--------|--|---------|
| Certified Minority Business Enterprise        | MBE    | Certified Woman Business Enterprise            | WBE     |
| Certified Disadvantaged Business Enterprise   | DBE    | Certified Disabled Veteran Business Enterprise | DVBE    |
| Other Business Enterprise                     | OBE    | Certified Emerging Local Business Enterprise   | ELBE    |
| Certified Small Local Business Enterprise     | SLBE   | Small Disadvantaged Business                   | SDB     |
| Woman-Owned Small Business                    | WoSB   | HUBZone Business                               | HUBZone |
| Service-Disabled Veteran Owned Small Business | SDVOSB |  |         |

ⓑ As appropriate, Bidder shall indicate if Subcontractor is certified by:

- |  |      |  |          |
|--|------|--|----------|
| City of San Diego                      | CITY | State of California Department of Transportation   | CALTRANS |
| California Public Utilities Commission | CPUC | State of California Department of General Services | CADoGS   |
| City of Los Angeles                    | LA   | State of California                                | CA       |
| U.S. Small Business Administration     | SBA  |  |          |

**The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.**

**SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)**

**ALTERNATE G**

ADDITIVE/ DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB®	WHERE CERTIFIED ®	CHECK IF JOINT VENTURE PARTNERSHIP
ADDITIVE	Name: <u>E L HOBBS INC</u> Address: <u>PO BOX 966</u> City: <u>EL CAJON</u> State: <u>CA</u> Zip: <u>92022</u> Phone: <u>619-401-1708</u> Email: <u>shobbs@elhobbsinc.com</u>	CONSTRUCTOR	777073	CEILING & WALL TREATMENTS (PARTIAL)	\$15,000	N/A	N/A	
	Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							

① As appropriate, Bidder shall identify Subcontractor as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):

Certified Minority Business Enterprise	MBE	Certified Woman Business Enterprise	WBE
Certified Disadvantaged Business Enterprise	DBE	Certified Disabled Veteran Business Enterprise	DVBE
Other Business Enterprise	OBE	Certified Emerging Local Business Enterprise	ELBE
Certified Small Local Business Enterprise	SLBE	Small Disadvantaged Business	SDB
Woman-Owned Small Business	WoSB	HUBZone Business	HUBZone
Service-Disabled Veteran Owned Small Business	SDVOSB		

② As appropriate, Bidder shall indicate if Subcontractor is certified by:

City of San Diego	CITY	State of California Department of Transportation	CALTRANS
California Public Utilities Commission	CPUC	State of California Department of General Services	CADoGS
City of Los Angeles	LA	State of California	CA
U.S. Small Business Administration	SBA		

**The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.**

## **ELECTRONICALLY SUBMITTED FORMS**

### **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. LOBBY PROHIBITION, CERTIFICATION AND DISCLOSURE**

**Bids will not be accepted until ALL the above-named 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 USS CAL BUILDERS, INC. as Principal, and  
ARCH 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

PARK DE LA CRUZ NEIGHBORHOOD RECREATION CENTER & GYM

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 8TH day of MAY, 2017

USS CAL BUILDERS, INC. (SEAL)  
(Principal)

ARCH INSURANCE COMPANY (SEAL)  
(Surety)

By:   
(Signature) **ERIC OTHMAN**

By:   
(Signature)  
PHILIP E. VEGA ATTORNEY-in-FACT

(SEAL AND NOTARIAL ACKNOWLEDGEMENT OF SURETY)

**THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON BLUE BACKGROUND.**

***This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated. Not valid for Mortgage, Note, Loan, Letter of Credit, Bank Deposit, Currency Rate, Interest Rate or Residential Value Guarantees.***

**POWER OF ATTORNEY**

Know All Persons By These Presents:

That the Arch Insurance Company, a corporation organized and existing under the laws of the State of Missouri, having its principal administrative office in Jersey City, New Jersey (hereinafter referred to as the "Company") does hereby appoint:

Britton Christansen, Jadon H. Smith, Kevin Vega, Myrna Smith and Philip E. Vega of Covina, CA (EACH)

its true and lawful Attorney(s) in-Fact, to make, execute, seal, and deliver from the date of issuance of this power for and on its behalf as surety, and as its act and deed:

Any and all bonds, undertakings, recognizances and other surety obligations, in the penal sum not exceeding Ninety Million Dollars (\$90,000,000.00)

This authority does not permit the same obligation to be split into two or more bonds in order to bring each such bond within the dollar limit of authority as set forth herein.

The execution of such bonds, undertakings, recognizances and other surety obligations in pursuance of these presents shall be as binding upon the said Company as fully and amply to all intents and purposes, as if the same had been duly executed and acknowledged by its regularly elected officers at its principal administrative office in Jersey City, New Jersey.

This Power of Attorney is executed by authority of resolutions adopted by unanimous consent of the Board of Directors of the Company on September 15, 2011, true and accurate copies of which are hereinafter set forth and are hereby certified to by the undersigned Secretary as being in full force and effect:

"VOTED, That the Chairman of the Board, the President, or the Executive Vice President, or any Senior Vice President, of the Surety Business Division, or their appointees designated in writing and filed with the Secretary, or the Secretary shall have the power and authority to appoint agents and attorneys-in-fact, and to authorize them subject to the limitations set forth in their respective powers of attorney, to execute on behalf of the Company, and attach the seal of the Company thereto, bonds, undertakings, recognizances and other surety obligations obligatory in the nature thereof, and any such officers of the Company may appoint agents for acceptance of process."

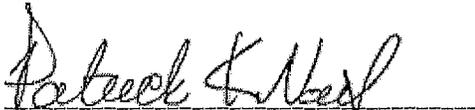
This Power of Attorney is signed, sealed and certified by facsimile under and by authority of the following resolution adopted by the unanimous consent of the Board of Directors of the Company on September 15, 2011:

VOTED, That the signature of the Chairman of the Board, the President, or the Executive Vice President, or any Senior Vice President, of the Surety Business Division, or their appointees designated in writing and filed with the Secretary, and the signature of the Secretary, the seal of the Company, and certifications by the Secretary, may be affixed by facsimile on any power of attorney or bond executed pursuant to the resolution adopted by the Board of Directors on September 15, 2011, and any such power so executed, sealed and certified with respect to any bond or undertaking to which it is attached, shall continue to be valid and binding upon the Company.

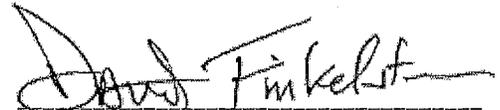
In Testimony Whereof, the Company has caused this instrument to be signed and its corporate seal to be affixed by their authorized officers, this 29<sup>th</sup> day of September, 2016.

Attested and Certified

Arch Insurance Company

  
Patrick K. Nails, Secretary

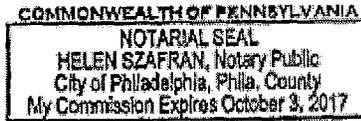


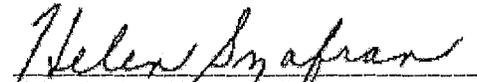
  
David M. Finkelstein, Executive Vice President

STATE OF PENNSYLVANIA SS

COUNTY OF PHILADELPHIA SS

I, Helen Szafran, a Notary Public, do hereby certify that Patrick K. Nails and David M. Finkelstein personally known to me to be the same persons whose names are respectively as Secretary and Executive Vice President of the Arch Insurance Company, a Corporation organized and existing under the laws of the State of Missouri, subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that they being thereunto duly authorized signed, sealed with the corporate seal and delivered the said instrument as the free and voluntary act of said corporation and as their own free and voluntary acts for the uses and purposes therein set forth.

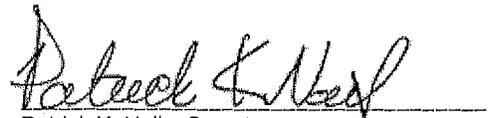


  
Helen Szafran, Notary Public  
My commission expires 10/03/2017

CERTIFICATION

I, Patrick K. Nails, Secretary of the Arch Insurance Company, do hereby certify that the attached Power of Attorney dated September 29, 2016 on behalf of the person(s) as listed above is a true and correct copy and that the same has been in full force and effect since the date thereof and is in full force and effect on the date of this certificate; and I do further certify that the said David M. Finkelstein, who executed the Power of Attorney as Executive Vice President, was on the date of execution of the attached Power of Attorney the duly elected Executive Vice President of the Arch Insurance Company.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the Arch Insurance Company on this 8<sup>th</sup> day of May, 2017.

  
Patrick K. Nails, Secretary

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

**PLEASE SEND ALL CLAIM INQUIRIES RELATING TO THIS BOND TO THE FOLLOWING ADDRESS:**

Arch Insurance – Surety Division  
3 Parkway, Suite 1500  
Philadelphia, PA 19102



**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 ORANGE )  
On MAY 08 2017 before me, Monica Blaisdell, Notary Public  
*Date Here Insert Name and Title of the Officer*  
personally appeared Philip E. Vega  
*Name(s) of Signer(s)*

who proved to me on the basis of satisfactory evidence to be the person~~(s)~~ whose name~~(s)~~ is/~~are~~  
subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in  
his/~~her/their~~ authorized capacity~~(ies)~~, and that by his/~~her/their~~ signature~~(s)~~ on the instrument the person~~(s)~~,  
or the entity upon behalf of which the person~~(s)~~ acted, executed the instrument.

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

WITNESS my hand and official seal.



Signature   
*Signature of Notary Public*

**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 ORANGE )

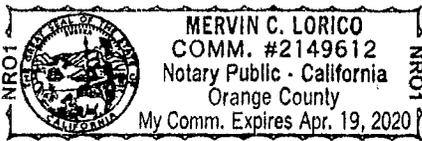
On 05/22/2017 before me, MERVIN C. LORICO, NOTARY PUBLIC  
Date Here Insert Name and Title of the Officer

personally appeared ERIC OTHMAN  
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

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

WITNESS my hand and official seal.



Signature [Signature]  
Signature of Notary Public

Place Notary Seal Above

**OPTIONAL**

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

**Description of Attached Document**

Title or Type of Document: BID BOND - PARK DE LA CRUZ

Document Date: 05/08/2017 Number of Pages: 1

Signer(s) Other Than Named Above: \_\_\_\_\_

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

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

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

Partner —  Limited  General

Individual  Attorney in Fact

Trustee  Guardian or Conservator

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

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

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

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

Partner —  Limited  General

Individual  Attorney in Fact

Trustee  Guardian or Conservator

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

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

**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.

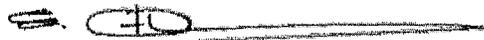
- The undersigned certifies that within the past 10 years the Bidder has NOT been the subject of a complaint or pending action in a legal administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers.
  
- The undersigned certifies that within 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
		NOT APPLICABLE			

Contractor Name: USS CAL BUILDERS, INC.

Certified By ERIC OTHMAN Title SECRETARY

Name



Signature

Date 05/10/2017

**USE ADDITIONAL FORMS AS NECESSARY**

## LOBBY PROHIBITION, CERTIFICATION AND DISCLOSURE

In acknowledgment that funds received under this agreement have been provided pursuant to a Federal grant, recipient hereby recognizes the prohibitions against lobbying the Federal government with any of these funds. Recipient agrees that it shall comply with the laws set forth at 31 U.S.C. § 1352 (1989) and 24 C.F.R. part 87, to wit:

### A. Conditions on use of funds

Recipient shall not expend any funds received pursuant to this agreement to pay any person to influence an officer or employee of Federal agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with any of the following Covered Federal actions:

- (1) The awarding of any federal contract
- (2) The making of any Federal grant
- (3) The making of any Federal Loan
- (4) The entering into of any cooperative agreement
- (5) The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

For purposes of defining the terms of this part of the agreement, the definitions set forth in 24 C.F.R. § 87.105 are hereby adopted and incorporated herein by reference.

### B. Certification and Disclosure

Each recipient at every tier under this agreement shall file a certification regarding lobbying, and a Disclosure Form-LLL, where required by 24 C.F.R. § 87.110. The certification form and Disclosure Form-LLL are attached to this agreement.

### C. Certifications must be filed:

- (1) By any person upon each submission that initiates agency consideration for an award of a Federal contract, grant, or cooperative agreement exceeding \$100,000, or a Federal loan or loan guarantee exceeding \$150,000.
- (2) Upon receipt by any person of a Federal contract, grant, or cooperative agreement exceeding \$100,000, or upon receipt of a Federal loan or loan guarantee exceeding \$150,000.
- (3) By any person who requests or receives from a person referred to in subsections 1 and 2 of this paragraph:
  - a. A subcontract exceeding \$100,000 at any tier under a Federal contract;
  - b. A subgrant, contract or subcontract exceeding \$100,000 at any tier under a Federal grant;
  - c. A contract or subcontract exceeding \$100,000 at any tier under a Federal loan exceeding \$150,000;
  - d. A contract or subcontract exceeding \$100,000 at any tier under a Federal cooperative agreement.

D. Disclosure Forms-LLL must be filed in every instance when a person applies for, requests, or receives Federal appropriations exceeding \$100,000 pursuant to a contract, subcontract, grant, subgrant, loan, or cooperative agreement when such person has paid or expects to pay any sum, in cash or in kind, to influence or attempt to influence any officer or employee of an agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress. Further, Disclosure Form-LLL must be filed by recipients at any tier at the end of each calendar quarter in which there occurs any event that requires disclosure or materially affects information submitted in prior disclosures. Such events include:

- (1) 1. An increase of \$25,000 in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action;
- (2) 2. A change in the person(s) influencing or attempting to influence a covered action;
- (3) 3. A change in the officer(s), employee(s), or member(s) contacted to influence a covered action.

All disclosure Forms-LLL, but not certifications, shall be forwarded from tier to tier until received by the principal recipient, which in turn will file them with the appropriate Federal agency.

## INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Use the SF-LLLA Continuation Sheet for additional information if the space on the form is inadequate. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.
2. Identify the status of the covered Federal action.
3. Identify the appropriate classification of this report. If this is a follow up report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.
4. Enter the full name, address, city, State and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.
5. If the organization filing this report in Item 4 checks "Subawardee," then enter the full name, address, city, State and zip code of the prime Federal recipient. Include Congressional District, if known.
6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.
7. Enter the Federal program name or description for the covered Federal action (Item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.
8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitation for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."
9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in Item 4 or 5.
10. (a) Enter the full name, address, city, State and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influence the covered Federal action.  
(b) Enter the full names of the individual(s) performing services, and include full address if different from 10 (a). Enter Last Name, First Name, and Middle Initial (MI).
11. Enter the amount of compensation paid or reasonably expected to be paid by the reporting entity (Item 4) to the lobbying entity (Item 10). Indicate whether the payment has been made (actual) or will be made (planned). Check all boxes that apply. If this is a material change report, enter the cumulative amount of payment made or planned to be made.
12. Check the appropriate box(es). Check all boxes that apply. If payment is made through an in-kind contribution, specify the nature and value of the in-kind payment.
13. Check the appropriate box(es). Check all boxes that apply. If other, specify nature.
14. Provide a specific and detailed description of the services that the lobbyist has performed, or will be expected to perform, and the date(s) of any services rendered. Include all preparatory and related activity, not just time spent in actual contact with Federal officials. Identify the Federal official(s) or employee(s) contacted or the officer(s), employee(s), or Member(s) of Congress that were contacted.
15. Check whether or not a SF-LLLA Continuation Sheet(s) is attached.
16. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

According to the Paperwork Reduction Act, as amended, no persons are required to respond to a collection of information unless it displays a valid OMB Control Number. The valid OMB control number for this information collection is OMB No. 0348-0046. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, DC 20503.



**DISCLOSURE OF LOBBYING ACTIVITIES** Approved by  
**CONTINUATION SHEET**

OMB0348-0046

Reporting Entity: \_\_\_\_\_ Page \_\_\_\_\_ of \_\_\_\_\_

NOT APPLICABLE

Authorized for Local Reproduction  
Standard Form - LLL-A

# City of San Diego

CITY CONTACT: Angelica Gil, Contract Specialist, Email: AngelicaG@sandiego.gov  
Phone No. (619) 533-3622, Fax No. (619) 533-3633

## ADDENDUM B



**FOR**

## **PARK DE LA CRUZ NEIGHBORHOOD RECREATION CENTER & GYM**

BID NO.: K-17-1539-DBB-3  
SAP NO. (WBS/IO/CC): S-16059  
CLIENT DEPARTMENT: 1714  
COUNCIL DISTRICT: 9  
PROJECT TYPE: GB  
CDBG #: B-16-MC-06-0542

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### **BID DUE DATE:**

**2:00 PM**

**MAY 23, 2017**

**CITY OF SAN DIEGO**

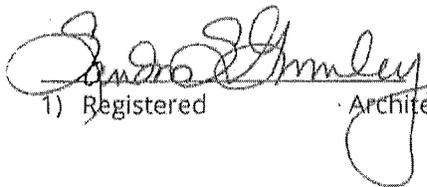
**PUBLIC WORKS CONTRACTS**

**1010 SECOND AVENUE, 14<sup>th</sup> FLOOR, MS 614C**

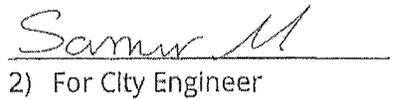
**SAN DIEGO, CA 92101**

# ENGINEER OF WORK

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

  
1) Registered Architect      5/10/2017      Date      Seal:



  
2) For City Engineer      5/10/17      Date      Seal:



**A. CHANGES TO CONTRACT DOCUMENTS**

The following changes to the Contract Documents are hereby made effective as though originally issued with the bid package. Bidders are reminded that all previous requirements to this solicitation remain in full force and effect.

THE SUBMITTAL DATE FOR THIS PROJECT HAS BEEN **EXTENDED AS STATED ON THE COVER PAGE.**

**B. BIDDER'S QUESTIONS**

- Q1. Is there a Division 230900 specification for HVAC Controls?
- A1. There is no Division 230900 specification, wireless controls for HVAC and lighting are covered under specification 260943 (Network Lighting, HVAC and Energy Management)
- Q2. What is the preferred manufacturer/brand for wireless HVAC controls? Viconics?
- A2. Daintree is the basis of the bid documents.
- Q3. Since this scope is covered across two buildings, is one wireless gateway required for each building? Please provide a wireless network architecture for each building (Gymnasium and Recreation Center).
- A3. Wireless network architecture is provided on sheet E-506. Contractor is required to submit shop drawings based on proposed manufacturer.
- Q4. What is the requirement for low voltage control wiring? Is plenum-rated cable acceptable? Or is all control wiring to be enclosed in conduit?
- A4. All low voltage control wiring to be enclosed in conduit.
- Q5. Detail 3 on sheet M-703 states that control of EF-3 thru EF-6 must be by time-of-day schedule. Please explain how this will be done with wireless HVAC controls. Is Division 23 responsible for this?
- A5. A wireless adapter is to be used for this application, refer to sheet E-506.

- Q6. Is an operator workstation computer with graphics required to be provided for this project? Do we need to provide server software on the computer? Does this control system need to be integrated to another server located off site?
- A6. No operator workstation computer with graphics is required.  
No server software is required to be provided.  
Not under this scope of work. Control system not required to be integrated to another server located off site.
- Q7. Finish schedule calls for flooring R for the GYM FINISH SCHEDULE, the specs do not have a flooring R, Please clarify
- A7. See updated A-603 Finish Schedule. RAF-1 at Lobby and Offices. CT-1A at Women's Restroom. CT-1B at Men's Restroom.
- Q8. Finish schedule for rooms 143 & 206 show different flooring material. Please provide where the break is for the different flooring.
- A8. See Finish Plans for flooring layouts.
- Q9. Finish legend calls for RAF - 1 & 2, are these the same flooring material just a different color. Please clarify
- A9. RAF-1 & RAF-2 are to be the same product with different colors. See A-603 Finish Schedule.
- Q10. Finish legend calls for WOM for room 010 stair on lower floor room finish schedule, no specification or material called out for WOM. Please clarify what WOM is or what floor goes in these locations.
- A10. WOM is an abbreviation for Walk-Off Mat per Finish Schedule. WOM product information located in Specification 096813 Tile Carpeting.
- Q11. Bid form "Disdvantaged Business Enterprise (DBE) Good Faith Effort List of Subcontractors Solicited" has a column for "Task Description". Please clarify if the listed "task" should be the scope of work solicited to be performed or is it regarding further explanation of the method of locating and contacting DVBE's?
- A11. The "task description" section of form "Disadvantaged Business Enterprise (DBE) Good Faith Effort List of Subcontractors Solicited" should be the scope of work.

- Q12. Line Item #21 for pricing is to include "Exterior Façade Improvements". Should pricing include the Gymnasium exterior façade in the pricing? If so, please provide elevations and scope of work for the gymnasium exteriors
- A12. Line Item #21 Alternate E: Exterior Façade Improvements (Alternate Items Phase 2 E) is for Rec Center (Community Center) only. See plans for scope – this includes Alternate Key Notes on A-201. Exterior improvements at Gymnasium include prep and paint the entire exterior per General Note #2 on A-121 (1 field color and 3 accent colors similar to Rec Center). This scope is part of Phase 1 Base Bid Line Item #2 (Renovation of Community Center Per Plans and Specifications). Additional exterior improvements at Gymnasium are included in Phase 2 Base Bid Line Item #13 (HVAC System for Gymnasium) as listed and indicated on plans. Note Gymnasium roofing is included in Line Item #14 (Replace Community Center and Gym Roofing).
- Q13. Keynote 3 of A-201 Exterior Elevations – Rec Center states, "Patch, prime and paint stucco finish. Typ. for building. This contradicts Line Item #21 which states, "Exterior Façade Improvements including new stucco color coat, custom angled gutter system at sloped eaves, and bronze anodized aluminum gutters and downspouts." Please clarify scope of work to be completed at the exterior of the Rec Center.
- A13. Note Line Item #21 is an ALTERNATE. Keynote #3 on A-201 is included in Phase 1 Base Bid Line Item #2 (Renovation of Community Center Per Plans and Specifications). Alternate Key Note #E4 indicates to provide a new stucco finish color coat in lieu of patch, prime, and paint existing stucco finish.
- Q14. Please confirm the costs for general conditions, general requirements, insurance and fees are to spread out proportionately amongst the Lump Sum line items. If not, please provide preferred method or revised Line Items for pricing.
- A14. Confirmed. General conditions, general requirements, insurance and fees not specifically listed in Bid Schedule to be included proportionally across scope Line Items. Keep in mind some Line Items are ALTERNATES and may not become part of construction scope or contract.

- Q15. The HVAC piping in the tunnel is to be removed. Please provide the length of the tunnel. It is not clearly marked on the plans.
- A15. Tunnel layout and dimensions can be found on As-Built drawings provided at Pre-Bid Walk or can be provided by request. Tunnel (Pipe Trench/Tunnel per As-Built) is approximately 84 feet in length between Pipe Area below Natatorium deck and Tunnel below Corridor 147. Note Tunnel below Corridor 147 is approximately 76 feet in length.
- Q16. Plan Sheet ED-202, General Note 1 states "All data and security cabinets, devices, and associated conduits and cables to remain." The floor plan on ED-202 indicates data outlets being deleted and the floor plan on E-202 indicates new data outlet locations to be provided. Please confirm there is no data/security scope of work or if Contractor is to provide outlets per the plans.
- A16. Contractor to provide data outlet boxes with blank cover plate per plans with conduits back to MDF room. No scope for security.
- Q17. If new data/security devices and cabling are to be provided by Contractor, please confirm requirements e.g. jack count (2 per faceplate), cable type (Cat5e, Cat6), etc. for each outlet or device.
- A17. Contractor to provide data outlet boxes with blank cover plate and conduit only. Cables and jack counts to be provided and installed by the City of San Diego.
- Q18. Plan Sheet E-202, Keynote 35 states "Provide 1" C.O. from exterior Area of Assisted Rescue to upper floor Elevator Lobby Hall 202." No spec was provided for an Assisted Rescue system. Please confirm if City or Contractor is to provide. If Contractor provided, please provide system specifications and requirements.
- A18. Please refer to A-111 and A-112 for information of Assisted Rescue System.
- Q19. Plan Sheet E-204, Keynote 1 states "Provide junction box for speaker. Provide 1" C to head end unit located in Data Room on main floor." If speaker is under Contractor's scope, please provide information on type of head end to be connected to, speaker type, etc.
- A19. Contractor to provide junction box and raceway only

- Q20. Is all Fire Alarm system wire/cable required to be run in conduit?
- A20. Yes, it is required to have all fire alarm cables to be run in a raceway.
- Q21. Spec Section 283110, Section 3.2 "Equipment Installation," Part A on p.12 states "Furnish and install a complete Fire Alarm System as described herein and as shown on the plans." Contract drawings include an FA system design. For bidding purposes is the FA system design approved as indicated on plans, or will a "design-build" effort that includes submittal/approval by SDFD required?
- A21. The Fire Alarm system plans are approved as indicated.
- Q22. Bid alternate "B" for the modular elevator, please clarify what items are part of the alternate and what is part of the base bid? Example: is the excavation, underpinning, slab, footings, cast in place walls, waterproffing, electrical runs, fire alarm and conduit runs, part of the alternate or part of base bid. What parts of demo are part of alternate "B" and which are part of base bid? Example: is demo of the existing walls, staris and new floor framing, wall openings, doors, etc. part of base bid or alternate "B". Please clarify all items included in the alternate "B".
- A22. Any work associated with the installation and construction of the modular elevator is to be included in Line Item for 'Alternate Items Phase 1 B Modular Elevator'. This includes portions of scope listed in question and demolition that would be required for installation and construction of the modular elevator. Reminder that the modular elevator is a design-build deferred submittal.
- Q23. "Bid alternate "D" is the demo of boilers and pool equipment but looks like it includes demo of chain link fence, asphalt paving, roofing and CMU wall infill, all of which is not mentioned in the narrative on T-001. Item #7 on A-102 is the demo of existing windows, item #24 on A-201 is CMU infill at existing openings. Please clarify if the demo of windows is part of alternate D. Please clarify what items are part of bid alternate D and what will be part of base bid if alternate D is not taken.
- A23. Confirmed. Alternate D does include related scope as indicated on A-001 and A-201. 'Alternate Bid Items' list on T-001 is intended for reference and is not a comprehensive list of work included in each

Alternate. Removal of 3 exterior windows at Filters 002 is included in Alternate D.

- Q24. Bid alternate "E" is the exterior façade improvements, general note on A-122 "Replace all metal gutters and downspouts" but E1 on A-115 calls for it to be part of alternate. Please clarify what items are part of alternate E and what will be part of base bid if alternate E is not taken.
- A24. Replacement of all gutters and downspouts is included in Roofing work. See Details on A-501. Alternate E includes providing anodized fascia flashing, rake flashing, gutters, and downspouts in lieu of painted metal. See A-201 and Details on A-530. Refer to plans and RFI #12 for additional scope included in Alternate E.
- Q25. Item D1 on A-001 to remove equipment from behind the fence. Please provide what that equipment is.
- A25. See MD-202. Specific list of equipment, etc. is not available. This area was observed on Pre-Bid Site Walk.
- Q26. Bid alternate "P", item P3 on A-121, replace 4 existing louvers, see mechanical. Sheet MD-204 item #2 intake louvers to remain. Key note on MD-204 states the spec 239999 supersede notes on the drawings. 239999 calls for louvers and fans to be removed and wall patched. Please clarify what the wall material is for infill and patching, i.e. CMU, steel studs, metal siding, gypsum board on interior or acoustic panels."
- A26. Spec 239999 supersedes notes on drawings as stated. Infill wall to match existing structure and finishes. Wood framing with Grade A plywood at interior and 26 GA metal corrugated panel at exterior. Verify in field.
- Q27. Detail 7/S-501 calls for the elevator pit foundation per manufacturer. The modular elevator manufacturers are not providing foundation design.
- Please provide an elevator pit and foundation bases of design so everyone can bid the same thing.
- A27. The modular elevator included in Line Item 'Alternate Items Phase 1 B Modular Elevator' is a design-build deferred submittal. Elevator pit and foundation requirements are to be determined by selection of modular elevator that meets Specification 142400 'Modular Hydraulic Elevator – Alternate B', plans, and codes referenced on G-001 'GENERAL NOTES &

SHEET INDEX'. Elevator pit and foundation dimensions and design are dependent on modular elevator system that is submitted for review and are to be included in deferred submittal drawings. Refer to plans for additional general information and standards for the modular elevator on this project.

Q28. Under section 7 of the Notice Inviting Bids "Subcontracting Participation Percentages" please clarify if the prime contractor meets one of the required goals as an example is women-owned small business, will that fulfill the subcontracting participation for that goal.

A28. Achievement of goals identified in Notice of Inviting Bids, Section 7.5, are not mandatory as these are considered fair share objectives. The Bidder is required to make a good faith effort to include certified small businesses identified and shall submit supporting documentation as indicated in Attachment D, Funding Agency Provisions.

Q29. On the Good Faith Effort for DBE the Small Business Admin phone number provided is for San Francisco and they do not support San Diego or Los Angeles areas.

The Pro-Net database does not exist and the web address provided does not exist. The Phoenix Opportunity Database also does not exist.

Please provide clarification on how to achieve the GFE for this project as the information provided is inaccurate.

A29. Attachment D language has been updated as part of this Addendum.

### 3. ATTACHMENTS

1. To Attachment D, Community Development Block Grant (CDBG) Housing Urban Development (HUD) Funding Agency Provisions, page 31, Section 3, STANDARD FEDERAL EQUAL EMPLOYMENT SPECIFICATIONS, Item 3.2., sub-item 5, **DELETE** in its entirety and **SUBSTITUTE** with the following:

5. Develop on-the-job training opportunities, participate in training programs for the area, or both which expressly include minorities and women, including upgrading programs and apprenticeship

and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under item 2 of section 3.2 above.

2. To Attachment D, Community Development Block Grant (CDBG) Housing Urban Development (HUD) Funding Agency Provisions, page 64 through 68, Section 11, FEDERAL LABOR STANDARDS PROVISIONS, **DELETE** in its entirety and **SUBSTITUTE** with pages 16 of 24 of this Addendum.
3. To Attachment D, Community Development Block Grant (CDBG) Housing Urban Development (HUD) Funding Agency Provisions, pages 69 through 71, Section 13, DBE POTENTIAL RESOURCES CENTERS, **DELETE** in its entirety and **SUBSTITUTE** with the following:

**13. DBE POTENTIAL RESOURCES CENTERS:**

- 13.1.** Utilization of US Small Business Administration and Minority Business Development Agency (MBDA) resources is available at no cost. These agencies offer several services, including Internet access to databases of DBEs.
- 13.2.** For additional assistance, the recipient or contractor can telephone the local offices of both agencies in their area (SBA Minority Enterprise Development Offices and DOC MBDA Regional Centers). The Internet web sites also include names, addresses, and phone or fax numbers of local SBA and MBDA centers. Do not write to these sources
- 13.3.** The Contractor shall provide documentation that the local SBA/MBDA offices or web sites were notified of the contracting bid opportunity at least 15 Working Days prior to Bid opening and solicitation to DBE subcontractors at least 10 Working Days prior to Bid opening. Documentation shall not only include the efforts to contact the information sources and list the

Contract opportunity, but also the solicitation and response to the bid request.

- 13.4.** Include qualified DBEs on solicitation lists and record the information on Form AA63. Solicitation shall be as broad as possible.
- 13.5.** If DBE sources are not located, explain why and describe the efforts made.
- 13.6.** The Contractor shall send invitations to at least 3 (or all, if less than 3) DBE vendors for each item of work referred by sources contacted. The invitations shall adequately specify the items for which bids are requested. The record of "good faith" efforts shall indicate a real desire for a positive response, such as a certified mail receipt or a documented telephone conversation.
- 13.7.** A regular letter or an unanswered telephone call is not an adequate "good faith" effort. A list of all sub-bidders, including the bidders not selected and non DBE Subcontractors, and bid amount for each item of the Work shall be submitted on Form AA62. If a low bid was not accepted, an explanation shall be provided.
- 13.8.** Federal Agencies (must be contacted and solicitations posted on their websites):

Name and Address	Telephone and Web Site
<b>U.S. Small Business Administration</b>	(415) 744-6820 Extension 0
455 Market Street, Suite 600	Dynamic Small Business Search: <a href="http://dsbs.sba.gov/dsbs/search/dsp_dsbs.cfm">http://dsbs.sba.gov/dsbs/search/dsp_dsbs.cfm</a> <sup>1</sup>
San Francisco, CA 94105	Bid Notification: <a href="https://eweb1.sba.gov/subnet/common/dsp_login.cfm">https://eweb1.sba.gov/subnet/common/dsp_login.cfm</a> <sup>2</sup>
RE: Minority Enterprise Development Offices	
<b>U.S. Department of Commerce</b>	(415) 704-7415

Minority Business Development Agency	Website:
555 Montgomery Street	<a href="http://www.mbda.gov/">http://www.mbda.gov/</a> <sup>3</sup>
San Francisco, CA 94111	RE: Business Development Centers

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

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

Notes:

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

4. To Attachment D, Community Development Block Grant (CDBG) Housing Urban Development (HUD) Funding Agency Provisions, page 72, Section 15, FORMS, Item 15.2., **DELETE** in its entirety and **SUBSTITUTE** with the following:

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

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

#### **B. SUPPLEMENTARY SPECIAL PROVISIONS**

1. To Attachment E, Technicals, Section 081416 – Flush Wood Doors, Part 2 Products, Page 241, Subsection 2.3, **DELETE** title “VENEER-FACED DOORS FOR TRANSPARENT FINISH” and **SUBSTITUTE** with the following:

“VENEER-FACED DOORS FOR STAINED FINISH”

2. To Attachment E, Technicals, Section 081416 – Flush Wood Doors, Part 2 Products, Page 242, Subsection 2.7.C, **DELETE** title “Transparent Finish” and **SUBSTITUTE** with the following:

“Stained Finish”

3. To Attachment E, Technicals, Section 081416 – Flush Wood Doors, Part 2 Products, Page 242, Subsection 2.7.C Item 3, **DELETE** in its entirety and **SUBSTITUTE** with the following:

“Staining: Selection per Resident Engineer as recommended by Architect.”

4. To Attachment E, Technicals, Section 087100 Door Hardware, Part 3 Execution, Pages 307-312, Section 3.5 Schedule of Finish Hardware, SET 3, 3.1, 4, 13, 14, and 15, **DELETE** "Exit Device 2308 X M4908A CD 630AM PR" in its entirety and **SUBSTITUTE** with the following:

"Exit Device 2308 X M4908D CD 630AM PR"

### C. ADDENDUM

1. To Addendum A, PLANS, Drawing number 39752- 1 -D, 39752- 17 -D **DELETE** in its entirety and **REPLACE** with pages 55 and 60 of this Addendum B.
2. To Addendum A, ATTACHMENTS, Page 3, Sub-item 2, **DELETE** in its entirety and **SUBSTITUTE** with the following:
  2. To Attachment D, Community Development Block Grant (CDBG) Housing Urban Development (HUD) Funding Agency Provisions, pages 36 through 62, Section 9, WAGE RATES, **DELETE** in its entirety and **SUBSTITUTE** with pages 25 through 54 of this Addendum B.

### D. PLANS

1. To Drawings numbered:

39752- 02 -D;	39752- 20 -D;
39752- 10 -D;	39752- 36 -D;
39752- 11 -D;	39752- 38 -D;
39752- 14 -D;	39752 -40 -D;
39752- 18 -D;	39752- 42 -D;
39752- 19 -D;	and 39752- 46 -D,

**DELETE** in their entirety and **REPLACE** with pages 56 through 59 and 61 through 68 of this Addendum.

2. **ADD** the following sheets with pages 69 through 72 of this Addendum :  
**39752- 154 -D:** I-111 ALTERNATE LOBBY PLAN & RCP  
**39752- 155 -D:** I-221 ALTERNATE LOBBY ELEVATIONS & DETAILS  
**39752- 156 -D:** I-601 MAIN FLOOR FINISH PLAN  
**39752- 157 -D:** I-602 LOWER AND UPPER FLOOR FINISH PLANS

James Nagelvoort, Director  
Public Works Department

Dated: *May 11, 2017*  
San Diego, California

JN/RWB/mlw

## 11. FEDERAL LABOR STANDARDS PROVISIONS:

**APPLICABILITY:** The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions (Office of the Secretary of Labor 29 CFR 5) are included in this Contract pursuant to the provisions applicable to such Federal assistance.

### SECTION A.

#### 1. Minimum Wages.

- (i) All laborers and mechanics employed or working upon the site of the work, (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project) will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

- (ii) (a) Any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The Federal Agency or its designee shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

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

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

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

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

- (iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
- (iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

**2. Withholding.**

The Federal Agency or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, the Federal Agency or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

**3. Payrolls and Basic Records.**

- (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of 3 years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section I(b)(2)(B) of the Davis-bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section I(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.
- (ii) (a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Federal Agency or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to the Federal Agency or its designee. The payrolls submitted shall set out accurately and completely all

of the information required to be maintained under 29 CFR 5.5(a)(3)(i) except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired.

Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <https://www.dol.gov/whd/forms/wh347.pdf> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the Federal Agency or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to the Federal Agency, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, sponsor, or, owner).

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

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

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

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

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

#### 4. Apprentices and Trainees.

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

Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage

determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (ii) **Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (iii) **Equal Employment Opportunity.** The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

**5. Compliance With Copeland Act Requirements.**

The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract.

**6. Subcontracts.**

The contractor or subcontractor will insert in any subcontracts the clauses contained in 29 CFR 5.59(a)(1) through (10 and such other clauses as the Federal Agency may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause

requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

**7. Contract Termination; Debarment.**

A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8. Compliance with Davis-Bacon and Related Act Requirements.**

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

**9. Disputes Concerning Labor Standards.**

Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

**10. Certification of Eligibility.**

- (i) Certification of Eligibility. By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- (ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- (iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

**SECTION B.** The provisions of this section B are applicable where the amount of the prime contract exceeds \$100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

**1. Contract Work Hours and Safety Standards Act.**

- (i) **Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.
- (ii) **Violation; Liability For Unpaid Wages; Liquidated Damages.** In the event of any violation of the clause set forth in subparagraph (B)(1)(i) of this section, the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such

contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (B)(1)(i) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in subparagraph (B)(1)(i) of this section.

(iii) **Withholding For Unpaid Wages And Liquidated Damages.** The Federal Agency or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (B)(1)(ii) of this section.

(iv) **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraphs (B)(1)(i) through (B)(1)(iv) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (B)(1)(i) through (B)(1)(iv) of this section.

2. In addition to the clauses contained in Section B, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Agency Head shall cause or require the contracting officer to insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Agency Head shall cause or require the contracting officer to insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

## SECTION C.

### 1. Compliance Verification.

(i) The Recipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors

are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. Use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from the funding agency upon request.

- (ii) The Recipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, the Recipient should conduct interviews with a representative group of covered employees within two weeks of each contractor or subcontractor's submission of its initial weekly payroll data and two weeks prior to the estimated completion date for the contract or subcontract. The Recipient must conduct more frequent interviews if the initial interviews or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB. The Recipient shall immediately conduct necessary interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence.
- (iii) The Recipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The Recipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable the Recipient shall spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract. The Recipient must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB. In addition, during the examinations the Recipient shall verify evidence of fringe benefit plans and payments thereunder by contractors and subcontractors who claim credit for fringe benefit contributions.
- (iv) The Recipient shall periodically review contractors and subcontractors use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in subsection (ii) and (iii) above.
- (v) The Recipient must immediately report potential violations of the DB prevailing wage requirements to the funding agency DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at <http://www.dol.gov/whd/america2.htm>.

General Decision Number: CA170001 05/05/2017 CA1

Superseded General Decision Number: CA20160001

State: California

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

County: San Diego County in California.

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

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.20 for calendar year 2017 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.20 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Modification Number	Publication Date
0	01/06/2017
1	01/27/2017
2	02/17/2017
3	02/24/2017
4	03/03/2017
5	03/10/2017
6	03/24/2017
7	05/05/2017

ASBE0005-002 07/04/2016

	Rates	Fringes
Asbestos Workers/Insulator (Includes the application of all insulating materials, protective coverings, coatings, and finishes to all types of mechanical systems).....	\$ 38.37	20.13

Fire Stop Technician  
 (Application of Firestopping  
 Materials for wall openings  
 and penetrations in walls,  
 floors, ceilings and curtain  
 walls).....\$ 26.15      17.31

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 ASBE0005-004 07/04/2016

Rates      Fringes

Asbestos Removal  
 worker/hazardous material  
 handler (Includes  
 preparation, wetting,  
 stripping, removal,  
 scrapping, vacuuming, bagging  
 and disposing of all  
 insulation materials from  
 mechanical systems, whether  
 they contain asbestos or not)....\$ 18.38      10.82

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 BOIL0092-003 10/01/2012

Rates      Fringes

BOILERMAKER.....\$ 41.17      28.27

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 BRCA0004-008 11/01/2016

Rates      Fringes

BRICKLAYER; MARBLE SETTER.....\$ 35.30      17.35

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 BRCA0018-004 06/01/2016

Rates      Fringes

MARBLE FINISHER.....\$ 29.20      12.93  
 TILE FINISHER.....\$ 24.53      11.08  
 TILE LAYER.....\$ 35.89      16.24

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 BRCA0018-010 09/01/2016

Rates      Fringes

TERRAZZO FINISHER.....\$ 28.53      12.27  
 TERRAZZO WORKER/SETTER.....\$ 35.57      13.14

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 CARP0409-002 07/01/2008

	Rates	Fringes
Diver		
(1) Wet.....	\$ 663.68	9.82
(2) Standby.....	\$ 331.84	9.82
(3) Tender.....	\$ 323.84	9.82
(4) Assistant Tender.....	\$ 299.84	9.82

Amounts in "Rates" column are per day

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 CARP0409-008 08/01/2010

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

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 CARP0547-001 07/01/2016

	Rates	Fringes
CARPENTER		
(1) Bridge.....	\$ 37.28	10.58
(2) Commercial Building....	\$ 32.30	10.58
(3) Heavy & Highway.....	\$ 37.15	10.58
(4) Residential Carpenter..	\$ 25.84	10.58
(5) Residential Insulation Installer.....	\$ 18.00	8.16
MILLWRIGHT.....	\$ 40.70	17.03
PILEDRIVERMAN.....	\$ 37.28	10.58

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 CARP0547-002 07/01/2009

	Rates	Fringes
Drywall		
(1) Work on wood framed construction of single family residences, apartments or condominiums under four stories Drywall Installer/Lather...	\$ 21.00	8.58
Drywall Stocker/Scrapper...	\$ 11.00	6.67
(2) All other work Drywall Installer/Lather...	\$ 27.35	9.58
Drywall Stocker/Scrapper...	\$ 11.00	6.67

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 ELEC0569-001 10/01/2016

Rates	Fringes
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Electricians (Tunnel Work)		
Cable Splicer.....	\$ 47.72	3%+12.63
Electrician.....	\$ 46.97	3%+12.63
Electricians: (All Other Work, Including 4 Stories Residential)		
Cable Splicer.....	\$ 42.50	3%+12.63
Electrician.....	\$ 41.75	3%+12.63

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 ELEC0569-004 06/01/2015

	Rates	Fringes
ELECTRICIAN (Sound & Communications Sound Technician).....		
	\$ 29.55	11.92
SOUND TECHNICIAN: Terminating, operating and performing final check-out		

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 ELEC0569-005 06/06/2016

	Rates	Fringes
Sound & Communications		
Sound Technician.....	\$ 30.22	12.21
SOUND TECHNICIAN: Terminating, operating and performing final check-out		

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 \* ELEC0569-006 02/27/2017

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

	Rates	Fringes
Traffic signal, street light and underground work		
Utility Technician #1.....	\$ 30.48	3%+7.70
Utility Technician #2.....	\$ 25.45	3%+7.70

STREET LIGHT & TRAFFIC SIGNAL WORK:

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

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

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 ELEC0569-008 06/06/2016

	Rates	Fringes
ELECTRICIAN (Residential, 1-3 Stories).....	\$ 31.69	3%+6.61

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 ELEC1245-001 06/01/2015

	Rates	Fringes
LINE CONSTRUCTION		
(1) Lineman; Cable splicer..	\$ 52.85	15.53
(2) Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), overhead & underground distribution line equipment).....	\$ 42.21	14.32
(3) Groundman.....	\$ 32.28	14.03
(4) Powderman.....	\$ 47.19	14.60

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

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 ELEV0018-001 01/01/2017

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 52.21	31.585

FOOTNOTE:

PAID VACATION: Employer contributes 8% of regular hourly rate as vacation pay credit for employees with more than 5 years of service, and 6% for 6 months to 5 years of service.

PAID HOLIDAYS: New Years Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Friday after Thanksgiving, and Christmas Day.

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 ENGI0012-003 07/01/2016

Rates Fringes

OPERATOR: Power Equipment

(All Other Work)

GROUP 1.....	\$ 39.95	23.35
GROUP 2.....	\$ 40.73	23.35
GROUP 3.....	\$ 41.02	23.35
GROUP 4.....	\$ 42.51	23.35
GROUP 5.....	\$ 41.86	23.35
GROUP 6.....	\$ 41.83	23.35
GROUP 8.....	\$ 42.84	23.35
GROUP 9.....	\$ 42.19	23.35
GROUP 10.....	\$ 42.96	23.35
GROUP 11.....	\$ 42.31	23.35
GROUP 12.....	\$ 43.13	23.35
GROUP 13.....	\$ 43.23	23.35
GROUP 14.....	\$ 43.26	23.35
GROUP 15.....	\$ 43.34	23.35
GROUP 16.....	\$ 43.46	23.35
GROUP 17.....	\$ 43.63	23.35
GROUP 18.....	\$ 43.73	23.35
GROUP 19.....	\$ 43.84	23.35
GROUP 20.....	\$ 43.96	23.35
GROUP 21.....	\$ 44.13	23.35
GROUP 22.....	\$ 44.23	23.35
GROUP 23.....	\$ 44.34	23.35
GROUP 24.....	\$ 44.46	23.35
GROUP 25.....	\$ 44.63	23.35

OPERATOR: Power Equipment

(Cranes, Piledriving & Hoisting)

GROUP 1.....	\$ 43.20	22.15
GROUP 2.....	\$ 43.98	22.15
GROUP 3.....	\$ 44.27	22.15
GROUP 4.....	\$ 44.41	22.15
GROUP 5.....	\$ 44.63	22.15
GROUP 6.....	\$ 44.74	22.15
GROUP 7.....	\$ 44.86	22.15
GROUP 8.....	\$ 45.03	22.15
GROUP 9.....	\$ 45.20	22.15
GROUP 10.....	\$ 46.20	22.15
GROUP 11.....	\$ 47.20	22.15
GROUP 12.....	\$ 48.20	22.15
GROUP 13.....	\$ 49.20	22.15

OPERATOR: Power Equipment  
(Tunnel Work)

GROUP 1.....	\$ 41.80	23.35
GROUP 2.....	\$ 42.58	23.35
GROUP 3.....	\$ 42.87	23.35
GROUP 4.....	\$ 43.01	23.35
GROUP 5.....	\$ 43.23	23.35
GROUP 6.....	\$ 43.34	23.35
GROUP 7.....	\$ 43.46	23.35

PREMIUM PAY:

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

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

SEE ZONE DEFINITIONS AFTER CLASSIFICATIONS

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

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

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

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

GROUP 4: Asphalt plant fireman; Backhoe operator (mini-max or similar type); Boring machine operator; Boxman or mixerman (asphalt or concrete); Chip spreading machine operator; Concrete cleaning decontamination machine operator; Concrete Pump Operator (small portable); Drilling machine operator, small auger types (Texoma super economic or similar types - Hughes 100 or 200 or similar types - drilling depth of 30' maximum); Equipment greaser (grease truck); Guard rail post driver operator; Highline cableway signalman; Hydra-hammer-aero stomper; Micro Tunneling (above ground tunnel); Power concrete curing machine operator; Power concrete saw operator; Power-driven jumbo form setter operator; Power sweeper operator; Rock Wheel Saw/Trencher; Roller operator (compacting); Screed operator (asphalt or concrete); Trenching machine operator (up to 6 ft.); Vacuum or much truck

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

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

GROUP 8: Asphalt or concrete spreading operator (tamping or finishing); Asphalt paving machine operator (Barber Greene or similar type); Asphalt-rubber distribution operator; Backhoe operator (up to and including 3/4 yd.), small ford, Case or similar; Cast-in-place pipe laying machine operator; Combination mixer and compressor operator (gunite work); Compactor operator (self-propelled); Concrete mixer operator (paving); Crushing plant operator; Drill Doctor; Drilling machine operator, Bucket or auger types (Calweld 150 bucket or similar types - Watson 1500, 2000 2500 auger or similar types - Texoma 700, 800 auger or similar types - drilling depth of 60' maximum); Elevating grader operator; Grade checker; Gradall operator; Grouting machine operator; Heavy-duty repairman; Heavy equipment robotics operator; Kalamazoo balliste regulator or similar type; Kolman belt loader and similar type; Le Tourneau blob compactor or similar type; Loader operator (Athey, Euclid, Sierra and similar types); Mobark Chipper or similar; Ozzie padder or similar types; P.C. slot saw; Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pumpcrete gun operator; Rock Drill or similar types; Rotary drill operator (excluding caisson type); Rubber-tired earth-moving equipment operator (single engine, caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator (multiple engine up to and including 25 yds. struck); Rubber-tired scraper operator (self-loading paddle wheel type-John Deere, 1040 and similar single unit); Self-propelled curb and gutter machine operator; Shuttle buggy; Skiploader operator (crawler and wheel type over 1-1/2 yds. up to and including 6-1/2 yds.); Soil remediation plant operator; Surface heaters and planer operator; Tractor compressor drill combination operator; Tractor operator (any type larger than D-5 - 100 flywheel h.p. and over, or similar-bulldozer, tamper, scraper and push tractor single engine); Tractor operator (boom attachments), Traveling pipe wrapping, cleaning and bending machine operator; Trenching machine operator (over 6 ft. depth capacity, manufacturer's rating); trenching Machine with Road Miner attachment (over 6 ft depth capacity); Ultra high pressure waterjet cutting tool system mechanic; Water pull (compaction) operator

GROUP 9: Heavy Duty Repairman

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

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

GROUP 12: Auto grader operator; Automatic slip form operator; Drilling machine operator, bucket or auger types (Calweld, auger 200 CA or similar types - Watson, auger 6000 or similar types - Hughes Super Duty, auger 200 or similar types - drilling depth of 175' maximum); Hoe ram or similar with compressor; Mass excavator operator less tha 750 cu. yards; Mechanical finishing machine operator; Mobile form traveler operator; Motor patrol operator (multi-engine); Pipe mobile machine operator; Rubber-tired earth- moving equipment operator (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck); Rubber-tired self- loading scraper operator (paddle-wheel-auger type self-loading - two (2) or more units)

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

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

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

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

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

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

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

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

GROUP 20: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

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

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

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

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

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

#### CRANES, PILEDIVING AND HOISTING EQUIPMENT CLASSIFICATIONS

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

GROUP 2: Truck crane oiler

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

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

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

GROUP 6: Bridge crane operator; Cretor crane operator; Hoist operator (Chicago boom and similar type); Lift mobile operator; Lift slab machine operator (Vagtborg and similar types); Material hoist and/or manlift operator; Polar gantry crane operator; Self Climbing scaffold (or similar type); Shovel, backhoe, dragline, clamshell operator (over 3/4 yd. and up to 5 cu. yds. mrc); Tugger hoist operator

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

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

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

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

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

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

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

#### TUNNEL CLASSIFICATIONS

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

GROUP 2: Power-driven jumbo form setter operator

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

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

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

GROUP 6: Heavy Duty Repairman

GROUP 7: Tunnel mole boring machine operator

#### ENGINEERS ZONES

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

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

Continue S to SW corner of T9N, R7W, SBM. Continue E along south boundary of T9N, SBM to SW corner of T9N, R1E, SBM. Continue S along west boundary of R1E, SMB to Riverside County line at the SW corner of T1S, R1E, SBM. Continue E along south boundary of T1s, SBM (Riverside County Line) to SW corner of T1S, R10E, SBM. Continue S along west boundary of R10E, SBM to Imperial County line at the SW corner of T8S, R10E, SBM. Continue W along Imperial and Riverside county line to NW corner of T9S, R9E, SBM. Continue S along the boundary between Imperial and San Diego Counties, along the west edge of R9E, SBM to the south boundary of Imperial County/California state line. Follow the California state line west to Arizona state line, then north to Nevada state line, then continuing NW back to start at the point which is the NW corner of Section 1, T17N, R14E, SBM

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

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

County. Continue West along the Monterey County and San Luis Obispo County boundary to the beginning point at the NW corner of T25S, R16E, MDM.

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

That area within the following Boundary: Begin at the intersection of the northern boundary of Mono County and the California state line at the point which is the center of Section 17, T10N, R22E, Mt. Diablo Meridian. Continue S then SE along the entire western boundary of Mono County, until it reaches Inyo County at the point which is the NE corner of the Western half of the NW quarter of Section 2, T8S, R29E, MDM. Continue SSE along the entire western boundary of Inyo County, until the intersection with Kern County at the point which is the SW corner of the SE 1/4 of Section 32, T24S, R37E, MDM. Continue E along the Inyo and Kern County boundary until the intersection with San Bernardino County at that point which is the SE corner of section 34, T24S, R40E, MDM. Continue E along the Inyo and San Bernardino County boundary until the point which is the NE corner of the Western half of the NW quarter of Section 6, T25S, R42E, MDM. Continue S to that point which is the SW corner of the NW quarter of Section 6, T27S, R42E, MDM. Continue E in a straight line to the California and Nevada state border at the point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Then continue NW along the state line to the starting point, which is the center of Section 18, T10N, R22E, MDM.

REMAINING AREA NOT DEFINED ABOVE RECIEVES BASE RATE

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 ENGI0012-004 08/01/2015

Rates Fringes

OPERATOR: Power Equipment  
 (DREDGING)

(1) Leverman.....	\$ 49.50	23.60
(2) Dredge dozer.....	\$ 43.53	23.60
(3) Deckmate.....	\$ 43.42	23.60
(4) Winch operator (stern winch on dredge).....	\$ 42.87	23.60
(5) Fireman-Oiler, Deckhand, Bargeman, Leveehand.....	\$ 42.33	23.60
(6) Barge Mate.....	\$ 42.94	23.60

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IRON0377-002 07/01/2016

	Rates	Fringes
Ironworkers:		
Fence Erector.....	\$ 28.33	20.64
Ornamental, Reinforcing and Structural.....	\$ 34.75	29.20

PREMIUM PAY:

\$6.00 additional per hour at the following locations:

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

\$4.00 additional per hour at the following locations:

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

\$2.00 additional per hour at the following locations:

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

LABO0089-001 07/18/2016

	Rates	Fringes
LABORER (BUILDING and all other Residential Construction)		
Group 1.....	\$ 29.42	19.78
Group 2.....	\$ 30.10	19.78
Group 3.....	\$ 30.81	19.78
Group 4.....	\$ 31.61	19.78
Group 5.....	\$ 33.54	19.78

LABORER (RESIDENTIAL CONSTRUCTION - See definition below)

(1) Laborer.....	\$ 27.32	18.11
(2) Cleanup, Landscape, Fencing (Chain Link & Wood).	\$ 26.03	18.11

RESIDENTIAL DEFINITION: Wood or metal frame construction of single family residences, apartments and condominiums - excluding (a) projects that exceed three stories over a

garage level, (b) any utility work such as telephone, gas, water, sewer and other utilities and (c) any fine grading work, utility work or paving work in the future street and public right-of-way; but including all rough grading work at the job site behind the existing right of way

#### LABORER CLASSIFICATIONS

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

GROUP 2: Asphalt Shoveler; Cement Dumper (on 1 yard or larger mixer and handling bulk cement); Cesspool digger and installer; Chucktender; Chute man, pouring concrete, the handling of the cute from ready mix trucks, such as walls, slabs, decks, floors, foundations, footings, curbs, gutters and sidewalks; Concrete curer-impervious membrane and form oiler; Cutting torch operator (demoliton); Guinea chaser; Headboard man-asphalt; Laborer, packing rod steel and pans; membrane vapor barrier installer; Power broom sweepers (small); Riiprap, stonepaver, placing stone or wet sacked concrete; Roto scraper and tiller; Tank sealer and cleaner; Tree climber, faller, chain saw operator, Pittsburgh Chipper and similar type brush shredders; Underground laborers, including caisson bellower

GROUP 3: Buggymobile; Concrete cutting torch; Concrete cutting torch; Concrete pile cutter; Driller, jackhammer, 2 1/2 feet drill steel or longer; Dri Pak-it machine; High sealer (including drilling of same); Hydro seeder and similar type; Impact wrench, mult-plate; Kettlemen, potmen and mean applying asphalt, lay-kold, creosote, line caustic and similar type materials (applying means applying, dipping, brushing or handling of such materials for pipe wrapping and waterproofing); Operators of pneumatic, gas, electric tools, vibratring machines, pavement breakers, air

blasting, come-along, and similar mechanical tools not separately classified herein; Pipelayers back up man coating, grouting, making of joints, sealing, caulking, diapering and including rubber gasket joints, pointing and any and all other services; Rotary Scarifier or multiple head concrete chipping scarifier; Steel header board man and guideline setter; Tampers, Barko, Wacker and similar type; Trenching machine, handpropelled

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

GROUP 5: Blasters Powderman-All work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Driller-all power drills, excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and any and all other types of mechanical drills without regard to the form of motive power.

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LABO0089-002 11/01/2016

	Rates	Fringes
LABORER (MASON TENDER).....	\$ 29.62	15.89

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LABO0089-004 07/03/2016

HEAVY AND HIGHWAY CONSTRUCTION

Rates Fringes

Laborers:

Group 1.....	\$ 30.54	17.89
Group 2.....	\$ 31.00	17.89
Group 3.....	\$ 31.41	17.89
Group 4.....	\$ 32.25	17.89
Group 5.....	\$ 36.37	17.89

LABORER CLASSIFICATIONS

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

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

Septic tank digger/installer; Tamper/wacker operator; Tank scaler & cleaner; Tar man & mortar man; Tree climber/faller, chain saw operator, Pittsburgh chipper & similar type brush shredders.

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

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

GROUP 5: Blasters Powderman-All work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Horizontal directional driller, Boring system, Electronic tracking. Driller: all power drills excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and all other types of mechanical drills without regard to form of motive power. Environmental remediation,

Monitoring well, Toxic waste and Geotechnical driller,  
 Toxic waste removal. Welding in connection with Laborer's  
 work.

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LABO0300-005 01/01/2017

	Rates	Fringes
Asbestos Removal Laborer.....	\$ 31.88	16.82

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

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LABO1184-001 07/04/2016

	Rates	Fringes
Laborers: (HORIZONTAL DIRECTIONAL DRILLING)		
(1) Drilling Crew Laborer...	\$ 33.65	13.95
(2) Vehicle Operator/Hauler.	\$ 33.82	13.95
(3) Horizontal Directional Drill Operator.....	\$ 35.67	13.95
(4) Electronic Tracking Locator.....	\$ 37.67	13.95
Laborers: (STRIPING/SLURRY SEAL)		
GROUP 1.....	\$ 34.86	17.03
GROUP 2.....	\$ 36.16	17.03
GROUP 3.....	\$ 38.17	17.03
GROUP 4.....	\$ 39.91	17.03

LABORERS - STRIPING CLASSIFICATIONS

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

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

conventional and moving lane closures; operation of all related machinery and equipment

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

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

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LABO1414-003 08/03/2016

Rates Fringes

LABORER

PLASTER CLEAN-UP LABORER....	\$ 31.60	19.28
PLASTER TENDER.....	\$ 34.15	19.28

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

Work at Military Bases - \$3.00 additional per hour:

Coronado Naval Amphibious Base, Fort Irwin, Marine Corps Air Station-29 Palms, Imperial Beach Naval Air Station, Marine Corps Logistics Supply Base, Marine Corps Pickle Meadows, Mountain Warfare Training Center, Naval Air Facility-Seeley, North Island Naval Air Station, Vandenberg AFB.

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PAIN0036-001 08/01/2016

Rates Fringes

Painters: (Including Lead Abatement)

(1) Repaint (excludes San Diego County).....	\$ 27.59	13.24
(2) All Other Work.....	\$ 31.12	13.24

REPAINT of any previously painted structure. Exceptions: work involving the aerospace industry, breweries,

commercial recreational facilities, hotels which operate commercial establishments as part of hotel service, and sports facilities.

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PAIN0036-010 10/01/2015

	Rates	Fringes
DRYWALL FINISHER/TAPER		
(1) Building & Heavy Construction.....	\$ 27.84	15.20
(2) Residential Construction (Wood frame apartments, single family homes and multi-duplexes up to and including four stories).....	\$ 21.00	13.91

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PAIN0036-012 10/01/2016

	Rates	Fringes
GLAZIER.....	\$ 41.55	11.93

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PAIN0036-019 01/01/2017

	Rates	Fringes
SOFT FLOOR LAYER.....	\$ 28.77	13.31

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PLAS0200-005 08/06/2015

	Rates	Fringes
PLASTERER.....	\$ 38.44	13.77

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

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PLAS0500-001 07/01/2016

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER		
GROUP 1.....	\$ 23.84	21.17
GROUP 2.....	\$ 25.49	21.17
GROUP 3.....	\$ 27.57	21.17

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

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

GROUP 2: Work classified as type I and II construction

GROUP 3: All other work

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PLUM0016-006 07/01/2016

	Rates	Fringes
PLUMBER, PIPEFITTER, STEAMFITTER		
Camp Pendleton.....	\$ 51.69	21.41
Plumber and Pipefitter All other work except work on new additions and remodeling of bars, restaurant, stores and commercial buildings not to exceed 5,000 sq. ft. of floor space and work on strip malls, light commercial, tenant improvement and remodel work.....	\$ 47.19	21.41
Work ONLY on new additions and remodeling of commercial buildings, bars, restaurants, and stores not to exceed 5,000 sq. ft. of floor space.....	\$ 45.73	20.43
Work ONLY on strip malls, light commercial, tenant improvement and remodel work.....	\$ 35.69	18.76

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PLUM0016-011 07/01/2016

	Rates	Fringes
PLUMBER/PIPEFITTER		
Residential.....	\$ 38.17	17.33

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PLUM0345-001 07/01/2014

	Rates	Fringes
PLUMBER		
Landscape/Irrigation Fitter.....	\$ 29.27	19.75
Sewer & Storm Drain Work.....	\$ 33.24	17.13

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ROOF0045-001 07/01/2014

	Rates	Fringes
ROOFER.....	\$ 27.73	8.12

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SFCA0669-001 04/01/2016

	Rates	Fringes
SPRINKLER FITTER.....	\$ 37.67	19.56

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SHEE0206-001 07/01/2015

	Rates	Fringes
SHEET METAL WORKER		
Camp Pendleton.....	\$ 37.55	23.23
Except Camp Pendleton.....	\$ 35.33	23.23
Sheet Metal Technician.....	\$ 25.22	6.69

SHEET METAL TECHNICIAN - SCOPE:

- a. Existing residential buildings, both single and multi-family, where each unit is heated and/or cooled by a separate system
- b. New single family residential buildings including tracts.
- c. New multi-family residential buildings, not exceeding five stories of living space in height, provided each unit is heated or cooled by a separate system. Hotels and motels are excluded.
- d. LIGHT COMMERCIAL WORK: Any sheet metal, heating and air conditioning work performed on a project where the total construction cost, excluding land, is under \$1,000,000
- e. TENANT IMPROVEMENT WORK: Any work necessary to finish interior spaces to conform to the occupants of commercial buildings, after completion of the building shell

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TEAM0036-001 07/04/2016

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 15.90	30.69
GROUP 2.....	\$ 23.49	30.69
GROUP 3.....	\$ 23.69	30.69
GROUP 4.....	\$ 23.89	30.69
GROUP 5.....	\$ 24.09	30.69

GROUP 6.....\$ 24.59      30.69  
GROUP 7.....\$ 26.09      30.69

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

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Fuel Man, Swamper

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

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

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

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

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

GROUP 7: Repairman

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

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide

employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

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

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

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

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

## Survey Rate Identifiers

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

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

## Union Average Rate Identifiers

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

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

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## WAGE DETERMINATION APPEALS PROCESS

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

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter

\* a conformance (additional classification and rate) ruling

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

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

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

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

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

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

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

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

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

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END OF GENERAL DECISION

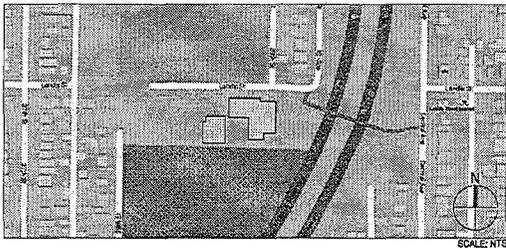
# PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS

3901 LANDIS STREET, SAN DIEGO, CA 92105

## LOCATION MAP



## VICINITY MAP



## PARK CONSTRUCTION INSPECTION STAGES AND INSPECTION TEAM

### PARK INSPECTION TEAM

- A. SITE SUPERINTENDENT (CONTRACTOR/DEVELOPERS REPRESENTATIVE)
- B. CONTRACTOR
- C. RESIDENT ENGINEER FROM CONSTRUCTION MANAGEMENT & FIELD SERVICES
- D. CITY PROJECT MANAGER
- E. DESIGN CONSULTANT
- F. PARK AND RECREATION DISTRICT MANAGER
- G. PARK AND RECREATION ASSET MANAGER

### PARK CONSTRUCTION INSPECTION STAGES (MINIMUM DEPENDING ON PROJECT)

1. PRE-CONSTRUCTION MEETING.
2. ROUGH GRADING AND DRAINAGE.
3. IRRIGATION MAINLINE PRESSURE TEST.
4. IRRIGATION LATERAL LINE PRESSURE TESTS.
5. WIRING PRIOR TO BACKFILLING TRENCHES.
6. HARDSCAPE AT TIME OF FINISHED STAKING AND LAYOUT.
7. FINISH GRADING AND SOIL PREPARATION.
8. IRRIGATION COVERAGE TEST.
9. PLANT MATERIAL (WHEN DELIVERED) AND PLACEMENT APPROVAL.
10. PROJECT CONSTRUCTION 90 PERCENT COMPLETE (DEVELOP PUNCH LIST AND SUBMIT)
11. 90-DAY PLANT ESTABLISHMENT PERIOD (THIS INSPECTION IS TO BE HELD WHEN THE PUNCH LIST ITEMS ARE COMPLETE IF TURF AREA IS PLANTED FROM SEED OR STOLONS; THE PLANT MAINTENANCE PERIOD SHALL BE 90-DAYS).
12. FINAL WALK-THROUGH, ACCEPTANCE BY THE CITY, CONTRACTOR TO SUBMIT FINAL APPROVED AS-BUILT DRAWINGS TO THE CITY.

## UNDERGROUND UTILITIES

BEFORE EXCAVATING, VERIFY THE LOCATION OF UNDERGROUND UTILITIES. AT LEAST THREE (3) WORKING DAYS PRIOR TO EXCAVATION, THE CONTRACTOR SHALL REQUEST A MARKOUT OF UNDERGROUND UTILITIES BY CALLING THE BELOW LISTED REGIONAL NOTIFICATION CENTER FOR AN INQUIRY IDENTIFICATION NUMBER:

UNDERGROUND SERVICE ALERT (GAS, ELECTRIC, TELEPHONE, WATER, SEWER, LIGHTING & TV)	800-422-4133
CITY IRRIGATION SYSTEMS & WIRING	618-633-6783
CITY FACILITIES MAINTENANCE DIVISION	619-225-6500

## LEGAL DESCRIPTION

ASSESSORS PARCEL NUMBER: 447-660-03  
 PARK DE LA CRUZ OF CITY HEIGHTS, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO AMENDED MAP THEREOF NO. 1297, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, OCTOBER 3, 1980.

EXCEPT THEREFROM THAT PORTION DECEDED TO THE STATE OF CALIFORNIA IN GRANT DEED RECORDED MARCH 28, 1996 AS INSTRUMENT NO. 96-0135187 OF OFFICIAL RECORDS.

ALSO, EXCEPT THEREFROM THAT PORTION DECEDED TO THE STATE OF CALIFORNIA IN GRANT DEED RECORDED APRIL 8, 2011 AS INSTRUMENT NO. 2011-021129 OF OFFICIAL RECORDS.

## PROJECT DIRECTORY

### CLIENT/LEGAL OWNER

CITY OF SAN DIEGO  
 PUBLIC WORKS DEPARTMENT  
 ENGINEERING & CAPITAL PROJECTS  
 525 B STREET SUITE 750 MS #008A  
 SAN DIEGO, CA 92101-2066  
 PHONE: (619) 535-7525  
 ALEXANDRA CORES, PROJECT MANAGER

### LEAD CONSULTANT

SCHMIDT DESIGN GROUP  
 1111 6TH AVENUE, SUITE 500  
 SAN DIEGO, CA 92101  
 PHONE: (619) 238-1642  
 JEFF JUSTUS, PROJECT MANAGER

### ARCHITECT

PLATT/WHITELAW ARCHITECTS, INC.  
 4034 30TH STREET  
 SAN DIEGO, CA 92104  
 PH: (619) 548-4326  
 FAX: (619) 548-4320  
 SANDRA GRAMLEY, PROJECT ARCHITECT

### STRUCTURAL ENGINEER

AARX ENGINEERING, INC.  
 1870 CORDELL COURT, SUITE 202  
 SAN DIEGO, CA 92108  
 PH: (619) 312-6338  
 FAX: (619) 312-6560  
 DANIEL GRANT

### MECHANICAL/ELECTRICAL/PLUMBING ENGINEER

BSE ENGINEERING  
 10680 TRIGONA STREET,  
 SUITE 150  
 SAN DIEGO, CA 92131  
 PH: (858) 279-2000  
 FAX: (858) 279-2628  
 TAMARA BADKER/HAHMAN-GANEV

## CITY OF SAN DIEGO POLICY COMPLIANCE

1. BACKFLOW DEVICE IS EXISTING AND SHALL BE PROTECTED AS PART OF THIS PROJECT, UNLESS OTHERWISE NOTED.
2. COMPLY WITH HAZARDOUS MATERIALS PER CITY OF SAN DIEGO BULLETIN #18
3. COMPLY WITH CONSTRUCTION AND DEMOLITION DEBRIS PER CITY BULLETIN #19
4. COMPLY WITH STORM WATER REQUIREMENTS PER CITY OF SAN DIEGO STORM WATER MANAGEMENT PLAN AS DETERMINED BY FORM DS-650. PROJECT DOES NOT DISTURB MORE THAN 1 ACRE AND CREATES LESS THAN 500 S.F. OF IMPERVIOUS SURFACE. PROJECT DOES NOT REQUIRE A M.P.D.E.R. PERMIT. PROJECT WILL REQUIRE CONSTRUCTION B.M.P. PER SECTION IV OF THE CITY OF SAN DIEGO'S STORM WATER STANDARDS MANUAL.

## RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ARCHITECT OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED REASONABLE CARE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF SAN DIEGO IS CONFIRMED TO A REVIEW ONLY AND DOES NOT RELIEVE ME AS ARCHITECT OR ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

*Sandra Gramley*

SANDRA GRAMLEY | C-21073 | FEBRUARY 15, 2017  
 PLATT/WHITELAW ARCHITECTS, INC.

## DESCRIPTION OF WORK

COMPLETE BUILDING REMODEL INCLUDES REVISED FLOOR LAYOUT, NEW FINISHES, ACCESSIBILITY BARRIER REMOVALS, ENVELOPE UPGRADES, NEW WINDOWS, NEW DOORS, NEW ELEVATOR, AND UPGRADED OR REPLACED MECHANICAL/ELECTRICAL/PLUMBING/FIRE ALARM SYSTEMS. ALSO INCLUDES HAZARDOUS MATERIALS ABATEMENT AND RENOVATION WORK AT GYMNASIUM.

APPROXIMATE AREA OF REMODEL AT COMMUNITY CENTER: 20,336 SF  
 APPROXIMATE AREA OF RENOVATION AT GYMNASIUM: 5,359 SF

## MONUMENTATION/SURVEY NOTES

THE CONTRACTOR SHALL BE RESPONSIBLE FOR SURVEY MONUMENTS AND/OR VERTICAL CONTROL BENCHMARKS WHICH ARE DISTURBED OR DESTROYED BY CONSTRUCTION. A LICENSED LAND SURVEYOR OR LICENSED CIVIL ENGINEER AUTHORIZED TO PRACTICE LAND SURVEYING IN THE STATE OF CALIFORNIA SHALL FIELD LOCATE, REFERENCE, AND/OR PRESERVE ALL HISTORICAL OR CONTROLLING MONUMENTS PRIOR ANY EARTHWORK, DEMOLITION OR SURFACE IMPROVEMENTS. IF DESTROYED, A LICENSED LAND SURVEYOR SHALL REPLACE SUCH MONUMENT(S) WITH APPROPRIATE MONUMENTS. WHEN SETTING SURVEY MONUMENTS USED FOR THE ESTABLISHMENT OF THE DISTURBED CONTROLLING SURVEY MONUMENTS AS REQUIRED BY SECTIONS 6730.2 AND 6774 OF THE BUSINESS AND PROFESSIONS CODE OF THE STATE OF CALIFORNIA, A CORNER RECORD OR RECORD OF SURVEY, AS APPROPRIATE, SHALL BE FILLED WITH THE COUNTY SURVEYOR. IF ANY VERTICAL CONTROL IS TO BE DISTURBED OR DESTROYED, THE CITY OF SAN DIEGO FIELD SURVEY SECTION SHALL BE NOTIFIED IN WRITING AT LEAST 7 DAYS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF REPLACING AND VERTICAL CONTROL BENCHMARKS DESTROYED BY THE CONSTRUCTION.

## ALTERNATE BID ITEMS

SEE BID SCHEDULE IN BID DOCUMENTS. THE FOLLOWING KEY NOTES HAVE BEEN USED ON THE PLANS TO DENOTE ALTERNATE BID ITEMS. CONSTRUCTION WILL BE COMPLETED IN A SINGLE PHASE, ANY REFERENCE TO PHASE 2 BIDS AND ALTERNATES 5 BY REFERENCE TO PHASING OF PROJECT FINISHING.

- PHASE 1 BIDS BID
  - ALTERNATE A - FIRE SUPPRESSION SYSTEM AT REC CENTER. DEFERRED SUBMITTAL. (NOT NOTED ON PLANS)
  - ALTERNATE B - MODULAR ELEVATOR. DEFERRED SUBMITTAL. (NOT NOTED ON PLANS)
- PHASE 2 BIDS BID - HVAC SYSTEM AT GYM AND BUILDING ENVELOPE UPGRADES. GYM HVAC'S DEFERRED SUBMITTAL. ALTERNATE BID C - NOT USED.
- ALTERNATE BID D - DEMOLITION OF BOILER AND POOL EQUIPMENT
- ALTERNATE BID E - EXTERIOR FACADE IMPROVEMENTS
- ALTERNATE BID F - LIGHTING MOVEMENTS. DEFERRED SUBMITTAL.
- ALTERNATE BID G - LOBBY UPGRADES. DEFERRED USEION.

## DEFERRED SUBMITTAL ITEMS

1. PLANS FOR DEFERRED SUBMITTAL ITEMS SHALL BE SUBMITTED BY CONTRACTOR TO THE CITY OF SAN DIEGO FOR REVIEW AND APPROVAL:
  - FIRE SPRINKLER SYSTEM (SPEC 211300 & 211300.01)
  - MODULAR ELEVATOR (SPEC 14240)
  - GYM HVAC SYSTEM (SPEC 232699)
2. IT IS UNDERSTOOD THAT PLANS FOR THE PROJECT HAVE, AT THIS TIME, BEEN REVIEWED FOR COMPLIANCE WITH ALL APPLICABLE GRATE AND CITY REGULATIONS, AND THAT THE PROJECT AS A WHOLE HAS BEEN APPROVED BY THE CITY, WITH THE EXCEPTION OF THE DEFERRED ITEMS LISTED.
3. BIDS UNDERSTAND THAT I AM NOT BE AUTHORIZED FOR ANY INSPECTION OF THE DEFERRED ITEMS PRIOR TO THE SUBMITTAL AND APPROVAL OF PLANS AND/OR CALCULATIONS FOR THOSE DEFERRED ITEMS.
4. COMPLETE PLANS AND SPECIFICATIONS FOR ALL FIRE EXTINGUISHING SYSTEMS, INCLUDING AUTOMATIC SPRINKLER AND STANDPIPE SYSTEMS AND OTHER SPECIAL FIRE EXTINGUISHING SYSTEMS AND RELATED APPLIANCE SHALL BE SUBMITTED TO THE CITY OF SAN DIEGO FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.

## OCCUPANCIES & TYPE OF CONSTRUCTION

NO CHANGE OF OCCUPANCIES OR TYPE OF CONSTRUCTION PROPOSED.

BUILDING OCCUPANCIES INCLUDE R, AS, AND S2.

TYPE OF CONSTRUCTION IS I-A.

SEE SHEET G-403 FOR COMPLETE CODE ANALYSIS.

T-001

CONSTRUCTION CHANGE / ADDENDUM		APPROVAL NO.	WARNING
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	
A	4/26/17	4,8,9,17,36,38,44,46,47,48,50,51,52,73,74,95,96,149	
B	5/4/17	2,15,11,14,17,18,19,20,30,38,40,42,46,154,155,156,157	

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.



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CONSULTANT

SCHMIDT DESIGN GROUP, INC.  
 1111 6TH AVENUE, SUITE 500  
 SAN DIEGO, CA 92101  
 (619) 238-1642 FAX (619) 238-1640

**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS**

**COVER SHEET**

SPEC. NO. 1539

CITY OF SAN DIEGO, CALIFORNIA  
 PUBLIC WORKS DEPARTMENT  
 SHEET 1 OF 157 SHEETS

WBS S-18059

DESCRIPTION	BY	APPROVED	DATE	FILED	PROJECT ENGINEER
ORIGINAL	PWA		7/24/17		212-1735
ADDENDUM A	PWA		5/25/17		1852-6297
ADDENDUM B	PWA		5/4/17		1852-6297

CONTRACTOR DATE STAMPED DATE COMPLETED  
 39752-1-D

PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL

**GENERAL NOTES**

1. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ENFORCING ALL SAFETY MEASURES, CONFORM TO ALL LOCAL, STATE AND FEDERAL SAFETY AND HEALTH STANDARDS, LAWS, AND REGULATIONS. ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY.
2. THE INTEREST OF THESE DOCUMENTS IS TO INCLUDE ALL LABOR, MATERIALS, AND SERVICES NECESSARY FOR THE COMPLETION OF ALL WORK SHOWN, PRESCRIBED OR REASONABLY IMPLIED, BUT NOT LIMITED TO THAT EXPLICITLY INDICATED IN THE DOCUMENTS.
3. GENERAL BUILDING PERMIT WILL BE FURNISHED BY OWNER.
4. ALL WORK AND MATERIALS SHALL CONFORM TO THE CALIFORNIA BUILDING CODE, 2013 EDITION AND CURRENT ADOPTED EDITIONS OF THE CALIFORNIA FIRE CODE, NFPA LIFE SAFETY CODE, CALIFORNIA ELECTRICAL CODE, AMERICANS WITH DISABILITIES ACT REGULATIONS, AND ALL ASH, ASTM AND OTHER STANDARDS.
5. VERIFY ALL DIMENSIONS BEFORE STARTING WORK. NOTIFY THE RESIDENT ENGINEER IMMEDIATELY OF ANY DISCREPANCIES FOUND.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SCHEDULING AND COORDINATION.
7. VERIFY WITH RESIDENT ENGINEER WHETHER THESE NOTES OR SPECIFIC NOTES ON DRAWINGS SHALL TAKE PRECEDENCE IN CASE OF CONFLICT.
8. WHERE NO CONSTRUCTION DETAILS ARE SHOWN OR NOTED FOR ANY PART OF THE WORK, SUCH DETAILS SHALL BE THE SAME AS FOR SIMILAR WORK SHOWN ON THE DRAWINGS. VERIFY WITH RESIDENT ENGINEER.
9. PROVIDE DOUBLE BACK-TO-BACK WOOD STUDS AT 48" O.C. IN ELECTRICAL SWITCHGEAR ROOM WALLS FOR EQUIPMENT SUPPORTS AND WHERE REQUIRED FOR STEEL LOADERS AND EQUIPMENT RACKING, UNLESS OTHERWISE NOTED.
10. CONTRACTOR SHALL VERIFY PAINT LOCATIONS AND COLORS OF PAINTS AND STAINS WITH ARCHITECT BEFORE APPLICATION.
11. EGRESS REPORT NUMBERS WHERE SHOWN ON DRAWINGS AND IN THE SPECIFICATIONS ARE SHOWN ONLY TO INDICATE THE REQUIREMENTS BY THE LOCAL BUILDING DEPARTMENT. OTHER PRODUCTS WITH APPROVED REPORT NUMBERS MAY BE USED IF SUBMITTED TO AND APPROVED BY ARCHITECT, THE RESIDENT ENGINEER, AND THE BUILDING DEPARTMENT PRIOR TO INSTALLATION.
12. PROVIDE WOOD BACKING TO RECEIVE WALL MOUNTED DOOR STOPS TYPICALLY AT HINGE SIDE OF ALL DOORS AND HORIZONTAL BRACING BETWEEN STUDS. LENGTH TO BE 3" MINIMUM FROM JAMB SPANNING THREE STUDS MINIMUM.
13. DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS SHALL GOVERN.
14. INTERIOR WALL AND CEILING FINISH FRAME-SPREAD RAFTERS SHALL BE CLASS A AS REQUIRED BY CBC CHAPTER 901.1 AND TABLE 901.1.
15. FIRE AND/OR SMOKE DAMPER ASSEMBLIES, INCLUDING SLEEVES, AND INSTALLATION SHALL BE APPROVED BY BUILDING INSPECTOR PRIOR TO INSTALLATION.
16. ELECTRICAL PANELS SHALL NOT BE LOCATED WITHIN FIRE-RATED CORRIDORS.
17. IF THE BUILDING INSPECTOR DETERMINES NONCOMPLIANCE WITH ANY CURRENT ACCESSIBILITY PROVISIONS OF THE LAW, HE/SHE SHALL REQUIRE SUBMITTAL OF COMPLETE AND DETAILED PLANS TO THE PLAN REVIEW DIVISION OF THE DEVELOPMENT SERVICES DEPARTMENT FOR FURTHER REVIEW. PLANS MUST CLEARLY SHOW ALL EXISTING NONCOMPLIANCE CONDITIONS AFFECTED BY THE REVISIONS, INCLUDING SITE PLAN, FLOOR PLANS, DETAILS, ETC.) AND PROPOSED MODIFICATIONS TO MEET CURRENT ACCESSIBILITY PROVISIONS. THE PLANS WILL BE STAMPED BY THE FIELD INSPECTOR PRIOR TO SUBMITTAL FOR PLAN REVIEW.
18. BUILDINGS UNDERGOING CONSTRUCTION, ALTERATION, OR DEMOLITION SHALL CONFORM TO CFC CHAPTER 32, WELDING, CUTTING, AND OTHER HOT WORK SHALL BE IN CONFORMANCE WITH CFC CHAPTER 33.
19. DECORATIVE MATERIALS SHALL BE MAINTAINED IN A FLAME-RETARDANT CONDITION. (19.3.08, 3.21)
20. LOCATIONS AND CLASSIFICATIONS OF EXTINGUISHERS SHALL BE IN ACCORDANCE WITH CFC 906 AND CALIFORNIA CODE OF REGULATIONS (CCR) TITLE 19.
21. INSTALLATION OF FIRE ALARM SYSTEMS SHALL BE IN ACCORDANCE WITH CFC 1027.
22. PLANS FOR ALL FIXED FIRE PROTECTION EQUIPMENT SUCH AS STANPIPES, SPRINKLER SYSTEM AND FIRE ALARM SYSTEM MUST BE SUBMITTED TO, AND APPROVED BY, THE LOCAL FIRE AUTHORITY HAVING JURISDICTION BEFORE THIS EQUIPMENT IS INSTALLED.
23. ALL EXISTING DOORS SHALL BE OPERABLE FROM THE INSIDE WITHOUT THE USE OF A KEY OR ANY SPECIAL KNOWLEDGE OR EFFORT. NO DEAD BOLTS OR SLIDING BOLTS ARE PERMITTED PER UBC, SEC. 330A(4), & UBC, SEC. 12.10(4)(B). NO LATCH OR LOCKING DEVICE EXCEPT PANIC HARDWARE IS PERMITTED UBC, SEC. 330A(4), 3317(2), 3319(A), AND UBC SEC. 12.10.
24. THE CONTRACTOR SHALL PROVIDE AN APPROPRIATE NUMBER OF PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NOT LESS THAN A60BC FOR PROTECTION DURING CONSTRUCTION.
25. DOORS IN THE MEANS OF EGRESS SYSTEM TO BE OPERABLE FROM THE INSIDE WITHOUT USE OF ANY SPECIAL KNOWLEDGE OR EFFORT.
26. STATE HEALTH & SAFETY CODE SECTION 130218 BANS THE USE OF CHLORINATED POLYVINYL CHLORIDE (CPVC) FOR INTERIOR WATER-SUPPLY PIPING.
27. INFORMATION SHOWN BY CONSULTANTS OR DISCIPLINE DOCUMENTS IS NOT MEANT TO DEFINE SCOPE OF WORK OF SUBCONTRACTOR RESPONSIBILITY. IT SHALL BE THE GENERAL CONTRACTOR'S RESPONSIBILITY TO DETERMINE SCOPE OF WORK AMONG THE SUBCONTRACTORS DURING THE GOODING PROCESS.
28. ARRANGE FOR THE PREMISES TO BE MAINTAINED IN AN ORDERLY MANNER THROUGHOUT THE COURSE OF WORK. PROVIDE AND MAINTAIN TEMPORARY BARREADES AND FACILITIES AS REQUIRED TO PREVENT THE PUBLIC DURING THE PERIOD OF CONSTRUCTION. BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING STRUCTURES OR EQUIPMENT. SUCH DAMAGE SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AND TO THE SATISFACTION OF THE ARCHITECT.
29. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE UNDERGROUND UTILITIES INSTALLATION WITH THE UTILITY COMPANIES. UTILITY INSTALLATION SHOULD OCCUR PRIOR TO STREET PAVING OPERATIONS. CAUTION: BEFORE EXCAVATING, VERIFY THE LOCATION OF UNDERGROUND UTILITIES. MINIMUM OF 2 DAYS AND MAXIMUM OF 14 DAYS PRIOR TO EXCAVATION CONTACT FOR MARK-OUT SERVICES - 435-229-3000.

30. DURING CONSTRUCTION, AT LEAST ONE EXTINGUISHER SHALL BE PROVIDED ON EACH FLOOR LEVEL AT EACH STAIRWAY, IN ALL STORAGE AND CONSTRUCTION AREAS. IN LOCATIONS WHERE FLAMMABLE OR COMBUSTIBLE LIQUIDS ARE STORED OR USED, AND WHERE OTHER SPECIAL HAZARDS ARE PRESENT PER CFC SECTION 3316.1.
31. IN BUILDINGS THAT REQUIRE STANPIPES, STANPIPES SHALL BE PROVIDED DURING CONSTRUCTION WHEN THE HEIGHT REACHES 46 FEET ABOVE THE LOWEST LEVEL OF FIRE DEPARTMENT VEHICLE ACCESS. A FIRE DEPARTMENT CONNECTION SHALL BE NO MORE THAN 100 FEET FROM AVAILABLE FIRE DEPARTMENT VEHICLE ACCESS ROADWAYS. CFC SECTIONS 5310, 5311.
32. ADDRESS IDENTIFICATION SHALL BE PROVIDED FOR ALL NEW AND EXISTING BUILDINGS IN A LOCATION THAT IS PLAINLY VISIBLE AND LEGIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY, WHERE ACCESS IS BY WAY OF A PRIVATE ROAD AND THE BUILDING ADDRESS CANNOT BE VIEWED FROM THE PUBLIC HIGHWAY, AN APPROVED SIGN OR MEANS SHALL BE USED TO IDENTIFY THE STRUCTURE. PREMISES IDENTIFICATION SHALL CONFORM TO CBC SECTION 501.2.
33. WALL, FLOOR AND CEILING FINISHES AND MATERIALS SHALL NOT EXCEED THE INTERIOR FINISH CLASSIFICATION IN CBC TABLE 903.1 AND SHALL MEET THE FLAME PROPAGATION PERFORMANCE CRITERIA OF THE CALIFORNIA CODE OF REGULATIONS, TITLE 19, DIVISION 1. DECORATIVE MATERIALS SHALL BE PROPERLY TREATED BY A PRODUCT OR PROCESS APPROVED BY THE STATE FIRE MARSHAL WITH APPROPRIATE DOCUMENTATION PROVIDED TO THE CITY OF SAN DIEGO.
34. KEY BOXES SHALL BE PROVIDED FOR ALL HIGH-RISE BUILDINGS, POOL ENCLOSURES, GATES IN THE PATH OF FIREFIGHTER TRAVEL, TO STRUCTURES, SECURED PARKING LEVELS, DOORS GIVING ACCESS TO ALARM PANELS AND/OR ANNUNCIATORS, AND ANY OTHER STRUCTURES OR AREAS WHERE ACCESS TO AN AREA IS RESTRICTED.
35. DUMPSTERS AND TRASH CONTAINERS EXCEEDING 1.5 CUBIC YARDS SHALL NOT BE STORED IN BUILDINGS OR PLACED WITHIN 5 FEET OF COMBUSTIBLE WALLS, OPENINGS OR COMBUSTIBLE ROOF EAVE LINES UNLESS PROTECTED BY AN APPROVED SPRINKLER SYSTEM OR LOCATED IN A TIE-UP OR IN A STRUCTURE SEPARATED BY 10 FEET FROM OTHER STRUCTURES. CONTAINERS LARGER THAN 1 CUBIC YARD SHALL BE OF NON-OR LIMITED-COMBUSTIBLE MATERIALS OR SIMILARLY PROTECTED OR SEPARATED.
36. EXITS, EXIT SIGNS, FIRE ALARM PANELS, HOSE CABINETS, FIRE EXTINGUISHER LOCATIONS, AND STANDPIPE CONNECTIONS SHALL NOT BE CONCEALED BY CURTAINS, MIRRORS, OR OTHER DECORATIVE MATERIAL.
37. OPEN FLAMES, FIRE, AND BURNING ON ALL PREMISES IS PROHIBITED EXCEPT AS SPECIFICALLY PERMITTED BY THE CITY OF SAN DIEGO AND CFC 301.
38. THE EGRESS PATH SHALL REMAIN FREE AND CLEAR OF ALL OBSTRUCTIONS AT ALL TIMES. NO STORAGE IS PERMITTED IN ANY EGRESS PATHS.
39. ADHESIVES, SEALANTS, CALKES, ADHESIVES AND SEALANTS USED ON THE PROJECT SHALL MEET THE REQUIREMENTS OF THE FOLLOWING STANDARDS: SECTION 5.504.1.1 OF CAL. GREEN ADHESIVES, ADHESIVE BONDING PRIMERS, ADHESIVE PRIMERS, SEALANT PRIMERS, AND SEALANTS SHALL COMPLY WITH LOCAL OR REGIONAL AIR POLLUTION CONTROL OR AIR QUALITY MANAGEMENT DISTRICT RULES WHERE APPLICABLE, OR SCANDM RULE 1189 YOC LIMITS, AS SHOWN IN TABLES 5.504.1.1 AND 5.504.1.2 OF CALGREEN (SEC. 5.504.1.1)
40. A LETTER FROM THE CONTRACTOR AND/OR THE BUILDING OWNER CERTIFYING WHAT MATERIAL HAS BEEN USED AND ITS COMPLIANCE WITH THE CODE MUST BE SUBMITTED TO THE BUILDING INSPECTOR.
41. ADHESIVE, SEALANT, AND SMALLER UNIT SIZES OF ADHESIVES, AND SEALANT OR CALKING COMPOUNDS (IN UNITS OF PRODUCT, LESS PACKAGING, WHICH DO NOT WEIGH MORE THAN ONE POUND AND DO NOT CONSIST OF MORE THAN 16 FLOZ OUNCES) SHALL COMPLY WITH STATEWIDE VOC STANDARDS AND OTHER REQUIREMENTS, INCLUDING PROHIBITIONS ON USE OF CERTAIN TOXIC COMPOUNDS, OF CALIFORNIA CODE OF REGULATIONS, TITLE 17, COMMENDING WITH SECTION 9407.
42. ARCHITECTURAL PAINTS AND COATINGS SHALL COMPLY WITH TABLE 5.504.2.1 UNLESS MORE STRINGENT LOCAL LIMITS APPLY.
43. AEROSOL PAINTS AND COATINGS, AEROSOL PAINTS AND COATINGS SHALL MEET THE PRODUCT HEAVY METAL LIMITS FOR ROOF IN SECTION 9426(2)(A) AND OTHER REQUIREMENTS, INCLUDING PROHIBITIONS ON USE OF CERTAIN TOXIC COMPOUNDS AND OZONE DEPLETING SUBSTANCES (CCR, TITLE 17, SECTION 9420 (E) 2.1), SECTION 5.504.4.3.1 OF CALGREEN.
44. A LETTER FROM THE CONTRACTOR AND/OR THE BUILDING OWNER CERTIFYING WHAT PAINT HAS BEEN USED AND ITS COMPLIANCE WITH THE CODE MUST BE SUBMITTED TO THE BUILDING INSPECTOR.
45. ALL CARPET INSTALLED IN THE BUILDING INTERIOR SHALL MEET AT LEAST ONE OF THE FOLLOWING TESTING AND PRODUCT REQUIREMENTS WHICH ARE LISTED IN TABLE 5.504.4.4 OF CALGREEN:
  - a) CARPET AND RUG INSTITUTES GREEN LABEL PLUS PROGRAM
  - b) COMPLIANT WITH THE VOC EMISSION LIMITS AND TESTING REQUIREMENTS SPECIFIED IN THE CALIFORNIA DEPARTMENT OF PUBLIC HEALTH STANDARD METHOD OF TESTING AND EVALUATION OF VOLATILE ORGANIC CHEMICAL EMISSIONS FROM INDOOR SOURCES USING ENVIRONMENTAL CHAMBERS, VERSION 1.1, FEBRUARY 2010. ALSO KNOWN AS COPRA STANDARD METHOD V1.1 OR SPECIFICATION 91309
  - c) MEANS 140 AT THE GOLD LEVEL, OR HIGHER
  - d) SPECIFIC CERTIFICATION SYSTEMS SUSTAINABLE CHOICE
  - e) COMPLIANCE WITH THE CALIFORNIA COLLABORATIVE FOR HIGH PERFORMANCE SCHOOLS (CA-CHPS) CRITERIA INTERPRETATION FOR EG 2.2 DATED JULY 2012 AND LISTED IN THE CHPS HIGH PERFORMANCE PRODUCT DATABASE.
46. ALL CARPET CUSHION INSTALLED IN THE BUILDING INTERIOR SHALL MEET THE REQUIREMENTS OF THE CARPET AND RUG INSTITUTES GREEN LABEL PROGRAM. ALL CARPET ADHESIVE SHALL MEET THE REQUIREMENTS OF TABLE 504.4.1.1. LETTER FROM THE INSTALLER CERTIFYING COMPLIANCE MUST BE SUBMITTED TO THE BUILDING INSPECTOR.
47. AT LEAST 90% OF THE FLOOR AREA RECEIVING RESILIENT FLOORING SHALL MEET ONE OF THE FOLLOWING CRITERIA:
  - a) CERTIFIED UNDER THE RESILIENT FLOOR COVERING INSTITUTE (RFC) FLOORSCORING PROGRAM
  - b) COMPLIANT WITH THE VOC EMISSION LIMITS AND TESTING REQUIREMENTS SPECIFIED IN THE CALIFORNIA DEPARTMENT OF PUBLIC HEALTH'S 2010 STANDARD METHOD FOR THE TESTING AND EVALUATION OF VOLATILE ORGANIC CHEMICAL EMISSIONS, 11, FEBRUARY 2010.
  - c) COMPLIANT WITH THE CALIFORNIA COLLABORATIVE FOR HIGH PERFORMANCE SCHOOLS (CA-CHPS) CRITERIA INTERPRETATION FOR EG 2.2 DATED JULY 2012 AND LISTED IN THE CHPS HIGH PERFORMANCE PRODUCT DATABASE
  - d) COMPLIANT WITH COPRA CRITERIA AS CERTIFIED UNDER THE GREENGUARD CHILDREN'S & SCHOOL PROGRAM.
48. IF THE BUILDING INSPECTOR SUSPECTS FILL, EXPANSIVE SOILS, OR ANY GEOLOGIC INSTABILITY BASED UPON OBSERVATION OF THE FOUNDATION EXCAVATION, A SOILS OR GEOLOGIC REPORT, AND RESUBMITTAL OF PLANS TO PLAN CHECK TO VERIFY THAT REPORT RECOMMENDATIONS HAVE BEEN INCORPORATED, MAY BE REQUIRED.
49. INSULATION MATERIALS SHALL MEET THE CALIFORNIA QUALITY STANDARDS PER SECTION 140.8 ENERGY EFFICIENCY STANDARDS (E.E.S.)
50. DOORS AND WINDOWS SHALL MEET THE MINIMUM INFILTRATION REQUIREMENTS PER SECTIONS 110.8 AND 110.7 E.E.R.

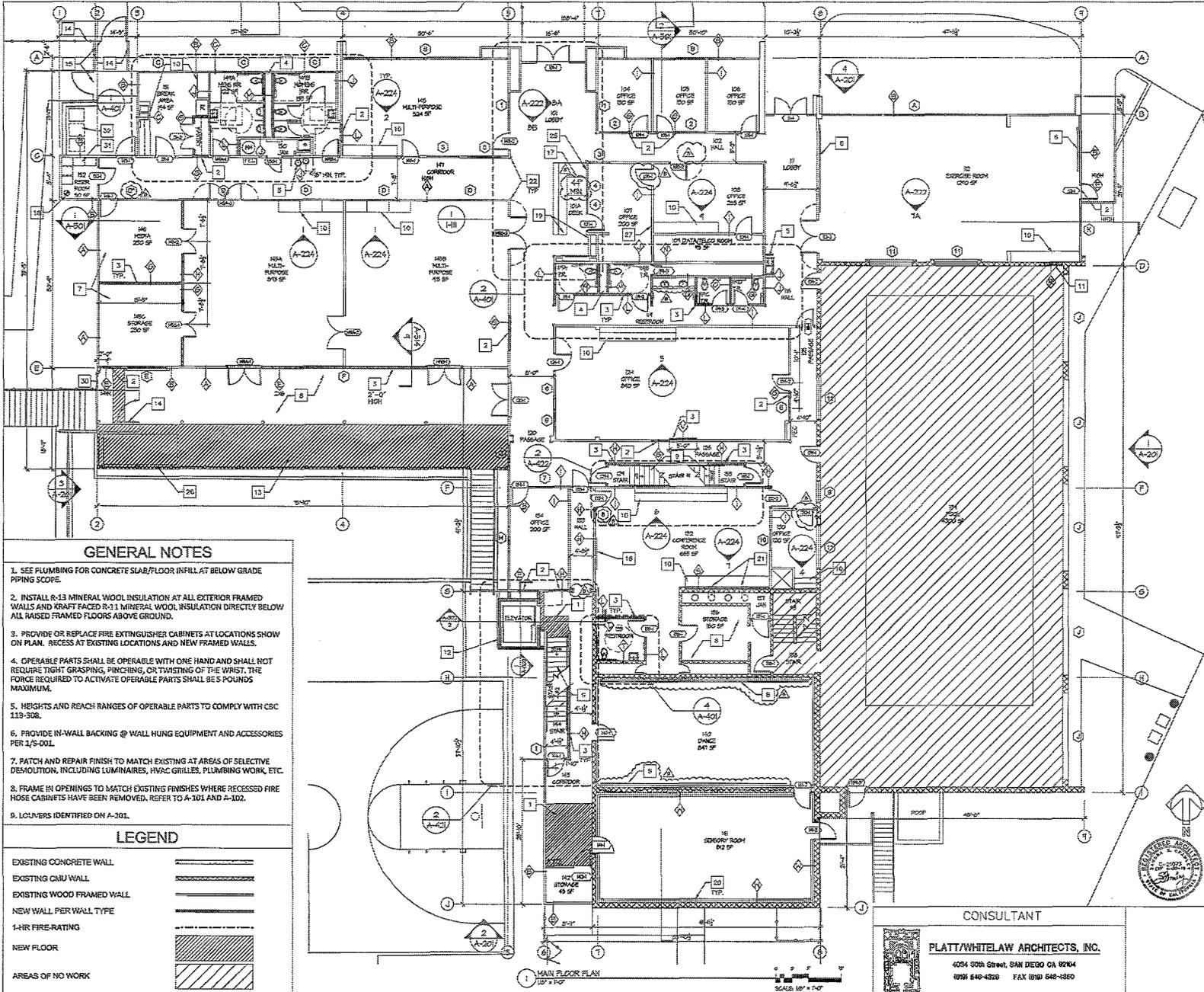
**GOVERNING CODES**

- THE CONSTRUCTION OF PROJECT SHALL BE IN CONFORMANCE WITH THE CURRENT ADOPTED EDITIONS OF THE FOLLOWING CODES:
- 2013 BUILDING STANDARDS ADMIN CODE, PART 1, TITLE 24 C.C.R., CALIFORNIA CODE OF REGULATIONS
  - 2013 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 C.C.R., 0121 REVISED, 02-28-2013 CA AMENDMENTS
  - 2013 CALIFORNIA ELECTRICAL CODE (CEC), PART 1, TITLE 24 C.C.R., 2011 REC. & 2013 CA AMENDMENTS
  - 2013 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 C.C.R., 2012 UMC & 2013 CA AMENDMENTS
  - 2013 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 C.C.R., 2012 UPC & 2013 CA AMENDMENTS
  - 2013 CALIFORNIA ENERGY CODE (CEC), PART 6, TITLE 24 C.C.R.
  - 2013 CALIFORNIA FIRE CODE (CFC), PART 7, TITLE 24 C.C.R., 2012 IFCA & 2013 CA AMENDMENTS
  - 2013 CALIFORNIA GREEN BUILDING CODE (GBC), PART 9, TITLE 24 C.C.R.
  - 2013 CALIFORNIA GREEN BUILDING STANDARDS, PART 11, TITLE 24 C.C.R.
  - 2013 CALIFORNIA REFERENCED STANDARDS, PART 12, TITLE 24 C.C.R.
  - TITLE 19 C.C.R., PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS
  - 2007 ASME A17.1 (W) A17.1 JCSA 8446-68 ADDENDUM SAFETY CODE FOR ELEVATORS AND ESCALATORS
  - 2010 ADA STANDARDS 28 CFR 36.101
  - 2015 CITY OF SAN DIEGO STANDARD DRAWINGS
  - 2015 STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (THE "GREENBOOK")
  - 2015 THE "WHITEBOOK" (CITY OF SAN DIEGO SUPPLEMENT TO THE "GREENBOOK")

- PARTIAL LIST OF APPLICABLE STANDARDS:**
- NFPA 13 AUTOMATIC SPRINKLER SYSTEMS 2013 EDITION
  - NFPA 14 STANPIPES SYSTEMS 2013 EDITION
  - NFPA 17 DRY CHEMICAL EXTINGUISHING SYSTEMS 2013 EDITION
  - NFPA 17A WET CHEMICAL SYSTEMS 2013 EDITION
  - NFPA 20 STATIONARY PUMPS, 2013 EDITION
  - NFPA 24 PRIVATE FIRE ARMS, 2013 EDITION
  - NFPA 72 NATIONAL FIRE ALARM CODE, 2013 EDITION (NOTE: SEE LIST 1874 FOR VISUAL DEVICES)
  - NFPA 80, FIRE DOORS AND OTHER OPENING PROTECTIVES, 2013 EDITION
  - NFPA 92 STANDARD FOR SMOKE CONTROL SYSTEMS, 2013 EDITION
  - NFPA 203, CRITICAL RADIANT FLUX OF FLOOR COVERING SYSTEMS, 2006 EDITION
  - NFPA 2011 CLEAN AGENT FIRE EXTINGUISHING SYSTEMS, 2012 EDITION
  - REFERENCE CODE SECTION FOR NFPA STANDARDS-2013 CFC (8FM) CHAPTER 36. SEE CHAPTER 18 FOR STATE OF CALIFORNIA AMENDMENTS TO NFPA STANDARDS.

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	90. M-035 MECHANICAL SCHEDULES
	91. M-036 MECHANICAL SCHEDULES
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**KEY NOTES** NOT ALL KEY NOTES MAY BE USED ON THIS SHEET

- 1 FRAME IN FLOOR OPENING. SEE STRUCTURAL DETAILS @ S-502. SHEATH AND FINISH TO MATCH EXISTING ADJACENT CEILING & FLOOR FINISHES.
- 2 FRAME IN OPENING TO MATCH ADJACENT INTERIOR & EXTERIOR WALL FINISHES.
- 3 WOOD FRAMED WALL. SEE WALL TYPES FOR CONSTRUCTION.
- 4 WOOD FRAMED CHASE WALL. SEE WALL TYPES FOR CONSTRUCTION.
- 5 H/L/D DRINKING FOUNTAIN PER PLUMBING. INSTALL WITH CAME DETECTION RAILS PER SDM-108 AND 8/A-518
- 6 PROVIDE 48"X72" LOW-IRON FRAMELESS SAFETY MIRRORS TO EXTENTS INDICATED. INSTALL WITH PL 520 ADHESIVE OR EQUAL @ 18" A.F.F.
- 7 PATCH AND REPAIR EXISTING FLOOR SHEATHING AT ROOMS 145C AND 145
- 8 LEVEL AND REPAIR EXISTING SLOPED CONCRETE SLAB/FLOOR
- 9 FRAME STAIRCASE AND INSTALL HANDRAILS
- 10 CASEWORK. SEE INTERIOR ELEVATIONS AND DETAILS
- 11 CMU WALL INFILL AT EXISTING OPENING
- 12 MODULAR ELEVATOR
- 13 POUR CONCRETE CONCRETE SLAB PER STRUCTURAL MEDIUM BROOM FINISH.
- 14 PROTECT IN PLACE EXISTING CHAIN LINK FENCE AND GATE. PAINT POSTS AND GATE BLACK. PROVIDE NEW CHAIN LINK FABRIC.
- 15 NEW CHAIN LINK FENCE & GATE. PROVIDE PANIC HARDWARE AT GATES PER HARDWARE SCHEDULE.
- 16 INSTALL SMARTBOARD @ 40" A.F.F. SMART KAPP 110, 65" OR EQUAL. PROVIDE BACKING.
- 17 PROVIDE (2) ASSISTIVE LISTENING DEVICE KITS AT RECEPTION.
- 18 FIRE SPRINKLER RISER
- 19 REPLACE LAMINATE AT RECEPTION DESK AND CABINETS
- 20 PROVIDE WALL PADDING AT ALL WALLS OF SENSORY 141 AND QUIET ROOM 009A
- 21 PROVIDE TUBULAR SKYLIGHT AT 6'-0" A.F.F. PER DETAILS ON A-505
- 22 PROVIDE WALL PROTECTION WHERE INDICATED @ CORNERS
- 23 POUR CONCRETE STAIR. INSTALL NEW HANDRAILS
- 24 POUR CONCRETE SLAB AT TRENCH. SEE DETAIL 6/S-002
- 25 PROVIDE BULLETIN BOARD WITH BUILDING DIRECTORY
- 26 EXTERIOR AREA OF ASSISTED RESCUE. PROVIDE POLE MOUNTED SIGNAGE AND BATH CALL BOX 2100-0565PM OR EQUAL FOR TWO-WAY COMMUNICATION TO BASE STATION AT OFFICE 107. COMPLY WITH CBC 1007.7 THRU 1007.11. SEE E-202.
- 27 PROVIDE RECESSED BATH BASE STATION 2500-205FM AND BATH POWER SUPPLY 2300-PWR24 OR EQUAL FOR EXTERIOR AREA OF ASSISTED RESCUE TWO-WAY COMMUNICATION. FRAME IN OPENING FOR BASE STATION. INCLUDE AUTO DIAL OUT TO AN APPROVED MONITORING LOCATION. SEE E-202.
- 28 FINISH OPENING WHERE EXISTING DOOR/FRAME IS REMOVED
- 29 EXISTING LADDER TO REMAIN
- 30 PROVIDE FIRSTSTOPPING AT ALL PENETRATIONS.
- 31 RECYCLING AREA. PROVIDE RECEPTACLES FOR PAPER, CARDBOARD, GLASS, PLASTICS, AND METAL.
- 32 EXTERIOR TRASH AND RECYCLING AREA FOR FINAL COLLECTION.

**GENERAL NOTES**

1. SEE PLUMBING FOR CONCRETE SLAB/FLOOR INFILL AT BELOW GRADE PIPING SCOPE.
2. INSTALL R-13 MINERAL WOOL INSULATION AT ALL EXTERIOR FRAMED WALLS AND KRAFT FACED R-11 MINERAL WOOL INSULATION DIRECTLY BELOW ALL RAISED FRAMED FLOORS ABOVE GROUND.
3. PROVIDE OR REPLACE FIRE EXTINGUISHER CABINETS AT LOCATIONS SHOWN ON PLAN. RECESS AT EXISTING LOCATIONS AND NEW FRAMED WALLS.
4. OPERABLE PARTS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE OPERABLE PARTS SHALL BE 5 POUNDS MAXIMUM.
5. HEIGHTS AND REACH RANGES OF OPERABLE PARTS TO COMPLY WITH CBC 119-308.
6. PROVIDE IN-WALL BACKING @ WALL HUNG EQUIPMENT AND ACCESSORIES PER 1/S-001.
7. PATCH AND REPAIR FINISH TO MATCH EXISTING AT AREAS OF SELECTIVE DEMOLITION, INCLUDING LUMINAIRES, HVAC GRILLES, PLUMBING WORK, ETC.
8. FRAME IN OPENINGS TO MATCH EXISTING FINISHES WHERE RECESSED FIRE HOSE CABINETS HAVE BEEN REMOVED. REFER TO A-101 AND A-102.
9. LOUVERS IDENTIFIED ON A-201.

**LEGEND**

EXISTING CONCRETE WALL	
EXISTING CMU WALL	
EXISTING WOOD FRAMED WALL	
NEW WALL PER WALL TYPE	
1-HR FIRE-RATING	
NEW FLOOR	
AREAS OF NO WORK	

**ADD ALTERNATE KEY NOTES**

- 33 CMU WALL INFILL AT EXISTING EQUIPMENT OPENINGS.

A-111

**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS  
REC CENTER MAIN FLOOR PLAN**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 100F 153 SHEETS

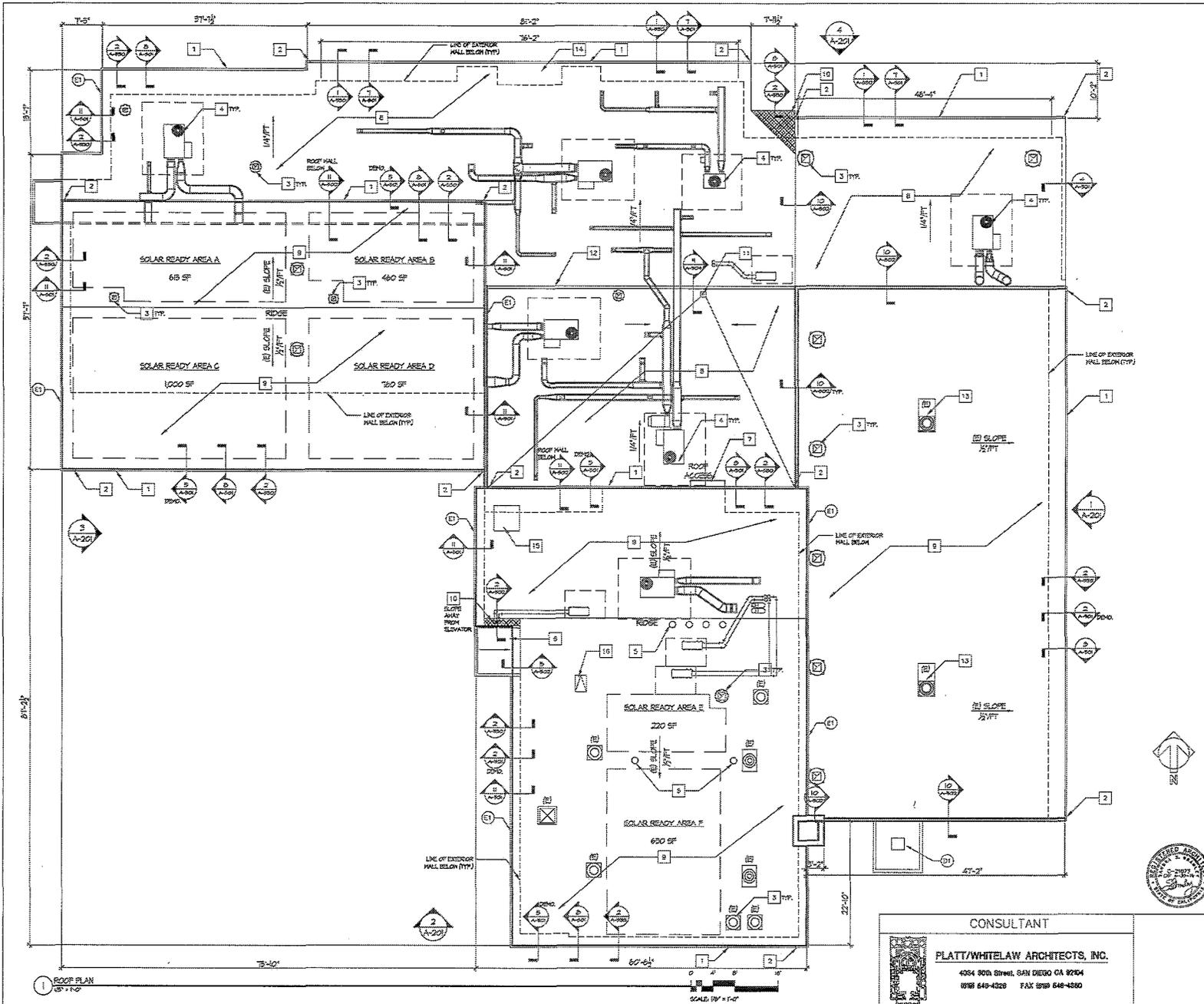
DATE: 7/26/17	NO: 372617	ISSUE NO: 73711	ISSUED TO: ALEXANDRA CORSE
FOR USE SOURCE: SAVER MANUALS	DATE: 7/27/17	ISSUE NO: 73711	PROJECT MANAGER: TRACY PETERSON
DESCRIPTION: ORIGINAL	BY: PWA	APPROVED: [Signature]	DATE: 7/27/17
DESCRIPTION: ADDENDUM B	BY: PWA	APPROVED: [Signature]	DATE: 7/27/17
CONTRACTOR: [Blank]	DATE STARTED: [Blank]	DATE COMPLETED: [Blank]	PROJECT NUMBER: 212-1735
INSPECTOR: [Blank]	DATE STARTED: [Blank]	DATE COMPLETED: [Blank]	CHECK COORDINATOR: 1852-6297
APPROVED: DOOR SWINGS, WINDOW TAGS, ETC. REVERSED	DATE STARTED: [Blank]	DATE COMPLETED: [Blank]	CHECK COORDINATOR: 39752-10-0

**CONSULTANT**

**PLATT/WHITELAW ARCHITECTS, INC.**  
4024 09th Street, SAN DIEGO CA 92104  
619 540-4350 FAX 619 540-4350

PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL





- ### KEY NOTES
- 1 GUTTER
  - 2 DOWNSPOUT
  - 3 EXISTING OR PROPOSED MECHANICAL EXHAUST FAN OR GRAVITY VENT. FLASHING PER 4/A-504. SEE M-203 FOR (E) AND PROPOSED LOCATIONS. REMOVE (E) UNITS, STORE AND REINSTALL AFTER RE-ROOFING.
  - 4 EXISTING OR PROPOSED MECHANICAL EQUIPMENT CURB. FLASHING PER 5/A-504. SEE M-203 FOR (E) AND PROPOSED LOCATIONS. REMOVE (E) UNITS, STORE AND REINSTALL AFTER RE-ROOFING.
  - 5 TUBULAR SKYLIGHT PER 7/A-505
  - 6 ELEVATOR TOWER
  - 7 PENTHOUSE ROOF EXTENSION ABOVE ROOF ACCESS DOOR. PROVIDE NEW FRAMED WALLS AND ROOF FRAMING. SEE 2/A-530.
  - 8 TAPERED INSULATION ADDED TO LOWER ROOFS TO INCREASE EXISTING 1/8" PER FOOT SLOPE TO 1/4" PER FOOT SLOPE
  - 9 PROVIDE R-30 RIGID INSULATION ABOVE EXISTING SHEATHING ON HIGH ROOFS TO BE MAINTAINED
  - 10 ROOF CRICKET - FINAL CRICKET CONFIGURATION TO BE PROVIDED BY ROOFING MANUFACTURERS RECOMMENDATIONS
  - 11 ROOF DRAIN. SEE 9/A-504
  - 12 REBUILD ROOF CURB. SEE 9/A-504
  - 13 EXHAUST FAN. SEE 4/A-504 FOR CURB DETAIL
  - 14 MAIN ENTRANCE OVERHANG
  - 15 EXISTING FALSE CHIMNEY TO REMAIN
  - 16 EXISTING ROOF HATCH TO REMAIN

- ### ALTERNATE KEY NOTES
- (E) ADD ALTERNATE - FLASHING PROFILE AT RAKES. SEE 2/A-530. ALL GUTTERS, DOWNSPOUTS, AND DRIP EDGES TO BE ANODIZED ALUMINUM IN PROPOSED ALTERNATE E.
- (D1) ADD ALTERNATE - ROOF INFILL AT EQUIPMENT REMOVAL

- ### GENERAL NOTES
1. REMOVE EXISTING ROOFING AND GUTTER SYSTEM AND DOWNSPOUTS. REPLACE WITH SBS MODIFIED BITUMEN ROOFING SYSTEM - ICC-ESR #1274.
  2. REPAIR EXISTING CURBS, CRICKETS, FLASHING, SEALANT & SHEATHING AS NEEDED. EVALUATE IN FIELD.
  3. COORDINATE EQUIPMENT PAD & CURB LOCATIONS WITH MECHANICAL DRAWINGS. PROVIDE CRICKET AT EVERY CURB, PAD OR ROOF PENETRATION OVER 24" IN WIDTH PERPENDICULAR TO ROOF SLOPE.
  4. SEE PLUMBING, MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL ROOF TOP EQUIPMENT AND PIPING.

### SOLAR READY AREA

TOTAL ROOF AREA	20,449 SF
15% OF TOTAL ROOF AREA PROVIDED	3,128 SF
	3,885 SF

A-115

### PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS

#### REC CENTER ROOF PLAN

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 140F 153 SHEETS

WBS S-16059

DATE: 2/28/23	PROJECT: ALEXANDRA CORDO
FOR CITY ENGINEER: SCARLE MAHARAJ	PROJECT NUMBER: 75711
PROJECT NAME: 212-1735	DESIGNER: COSEY COOPERATIVE
DESCRIPTION: PWA	PROJECT ENGINEER: 1852-6237
ADDENDUM B: PWA	USGS EQUIPMENT: 39752-14-D
CONTRACTOR: DATE STARTED: 3/7/23	INSPECTOR: DATE COMPLETED: 3/7/23

KEYNOTE #7 REVISED, GENERAL NOTE #3 REVISED

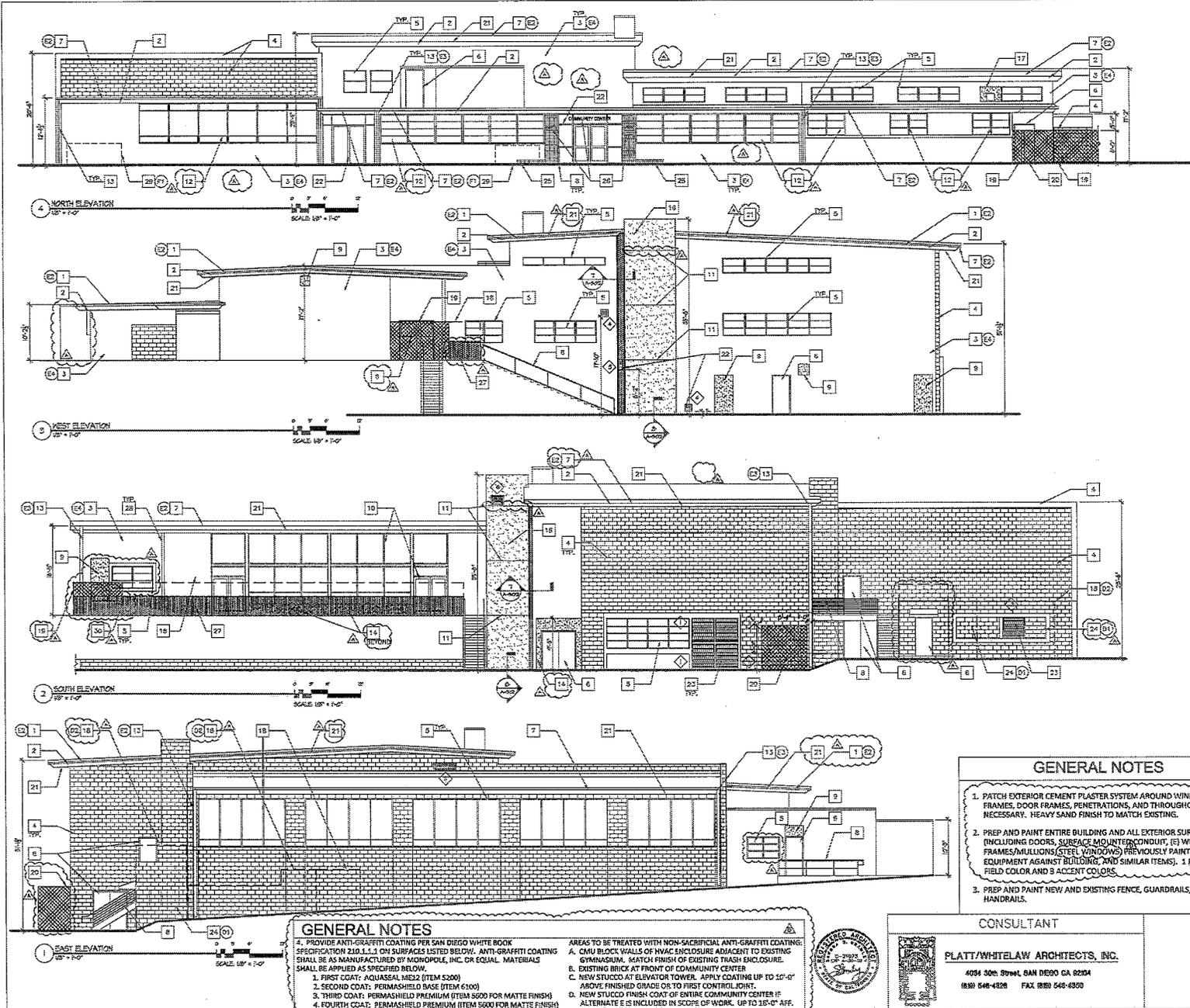
CONSULTANT

**PLATT/WHITELAW ARCHITECTS, INC.**

4054 80th Street, SAN DIEGO CA 92164  
 (619) 649-4328 FAX (619) 648-4320



PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL



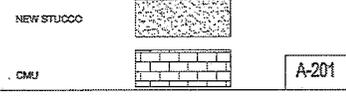
**KEY NOTES**

- 1 PATCH, PRIME AND PAINT WOOD EAVE MOLDING. REPLACE METAL DRIP EDGE AND PAINT. TYP. FOR BUILDING.
- 2 PATCH, PRIME AND PAINT ALL STUCCO OVERHANGS.
- 3 PATCH, PRIME AND PAINT STUCCO FINISH & TRIM. TYP. FOR BLDG.
- 4 PATCH, PRIME AND PAINT CONCRETE MASONRY BLOCK & TRIM. TYPICAL FOR BUILDING.
- 5 REPLACE EXISTING WINDOWS. TYP. FOR BUILDING U.O.I.N.
- 6 HOLLOW METAL DOOR PER DOOR SCHEDULE.
- 7 PATCH, PRIME AND PAINT WOOD EAVE MOLDING W.O. REPLACE METAL GUTTER AND PAINT. TYP. FOR BUILDING.
- 8 SAND, PATCH, PRIME AND PAINT EXISTING RAILING.
- 9 REMOVE FRAMES, DOORS, LOUVERS, AND WINDOWS. INFILL EXISTING OPENING W/ WOOD FRAMING AND PROVIDE CEMENT STUCCO SYSTEM TO MATCH EXISTING FINISH. SEE DETAIL 12/A-516.
- 10 REMOVE WINDOWS AT PATIO AND PROVIDE ALUMINUM STOREFRONT SYSTEM.
- 11 HORIZONTAL REVEALS. SEE 12/A-502.
- 12 EXISTING STEEL WINDOW FRAMES TO REMAIN. SEE A-602.
- 13 REPLACE METAL DOWNSPOUT AND PAINT. SEE 10.11/A-504. TYP. FOR BUILDING.
- 14 PROVIDE WOOD FRAMED WALL. MATCH EXISTING STUCCO FINISH.
- 15 NOT USED.
- 16 ELEVATOR TOWER. FIRE SAND FINISH STUCCO. SECTIONS ON A-302.
- 17 FRAME IN SECTION OF WINDOW TO RUN MECHANICAL DUCT. INFILL OPENING AROUND MECHANICAL EQUIPMENT AND PROVIDE CEMENT STUCCO SYSTEM TO MATCH EXISTING FINISH.
- 18 REMOVE CHAIN LINK FENCE.
- 19 PAINT EXISTING CHAIN LINK FENCE AND GATE TO REMAIN.
- 20 EXISTING CHAIN LINK FENCE ENCLOSURE AND GATE.
- 21 INFILL OVERHANG STRIP VENT. SEE 9/A-501.
- 22 (E) STOREFRONT SYSTEM TO REMAIN.
- 23 REMOVE AND REPLACE LOUVERS.
- 24 NEW CMU WALL INFILL AT EXISTING OPENING.
- 25 CLEAN, REPAIR, & REPOINT BRICK AT ENTRANCE (INT. & EXT.).
- 26 DIMENSIONAL SIGNAGE.
- 27 GUARDRAIL. SEE DETAIL 9/A-516.
- 28 PREP, PRIME, AND PAINT METAL POLES.
- 29 MONUMENT SIGN.
- 30 REMOVE STEEL FRAMED STAIR AND RAILING.

**ALTERNATE KEYNOTES**

- (D1) ADD ALTERNATE - CMU INFILL AT EXISTING OPENINGS.
- (D2) ADD ALTERNATE - REMOVE CHAIN LINK FENCE.
- (D3) ADD ALTERNATE - PROVIDE DARK ANODIZED FASCIA FLASHING, RAKE FLASHING, AND GUTTERS W.O. SEE 12/A-530.
- (D4) ADD ALTERNATE - DARK ANODIZED DOWNSPOUTS. SEE 10.11/A-530.
- (D5) ADD ALTERNATE - APPLY NEW STUCCO FINISH COLOR COAT. HEAVY SAND FINISH TO MATCH EXISTING. PROVIDE IN LIEU OF PAINTING STUCCO. ENTIRE BUILDING.
- (D6) MONUMENT SIGN.

**LEGEND**



**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - REC CENTER EXTERIOR ELEVATIONS - REC CENTER**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS  
SHEET 1706-153 SHEETS

WBS S-16059

DATE: 2/24/17	DATE: 2/27/17	PROJECT: 212-1735	PROJECT MANAGER: CHERYL OBERDIERE
FOR CITY ENGINEER: SANDY MARINELA	DATE: 2/27/17	PROJECT: 1852-6297	LOCAL COORDINATOR:
DESCRIPTION: IF: APPROVED: DATE: PLANNED: PROJECT ENGINEER:	ORIGINAL: PWA: 2/28/17	ADDENDUM A: PWA: 2/28/17	ADDENDUM B: PWA: 2/28/17
FOR CONTRACTOR: DATE STARTED: 3/9/17	DATE COMPLETED: 3/9/17	PROJECT NO: 39752-17	ADDENDUM B

**GENERAL NOTES**

1. PATCH EXTERIOR CEMENT PLASTER SYSTEM AROUND WINDOW FRAMES, DOOR FRAMES, PENETRATIONS, AND THROUGHOUT AS NECESSARY. HEAVY SAND FINISH TO MATCH EXISTING.
2. PREP AND PAINT ENTIRE BUILDING AND ALL EXTERIOR SURFACES (INCLUDING DOORS, SURFACE MOUNTED CONDUIT, (E) WINDOW FRAMES/MULLIONS (STEEL WINDOWS) PREVIOUSLY PAINTED EQUIPMENT AGAINST BUILDING, AND SIMILAR ITEMS). 1 PRIMARY FIELD COLOR AND 3 ACCENT COLORS.
3. PREP AND PAINT NEW AND EXISTING FENCE, GUARDRAILS, AND HANDRAILS.

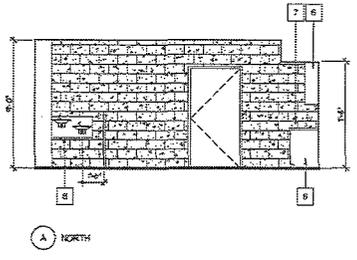
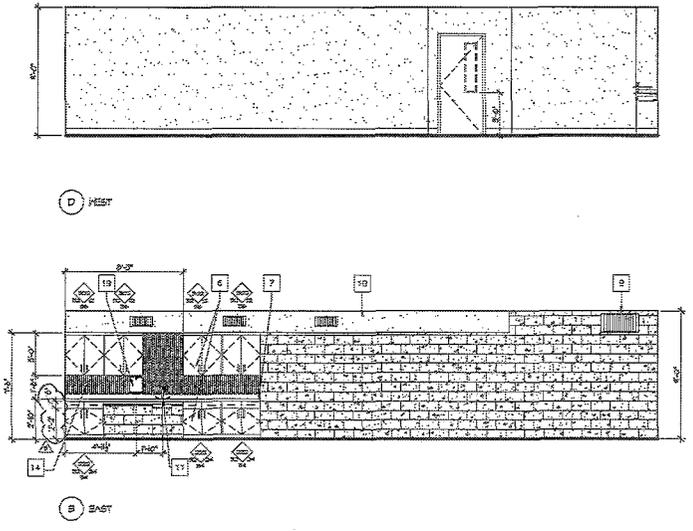
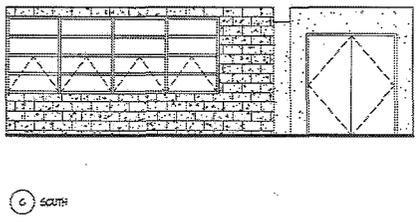
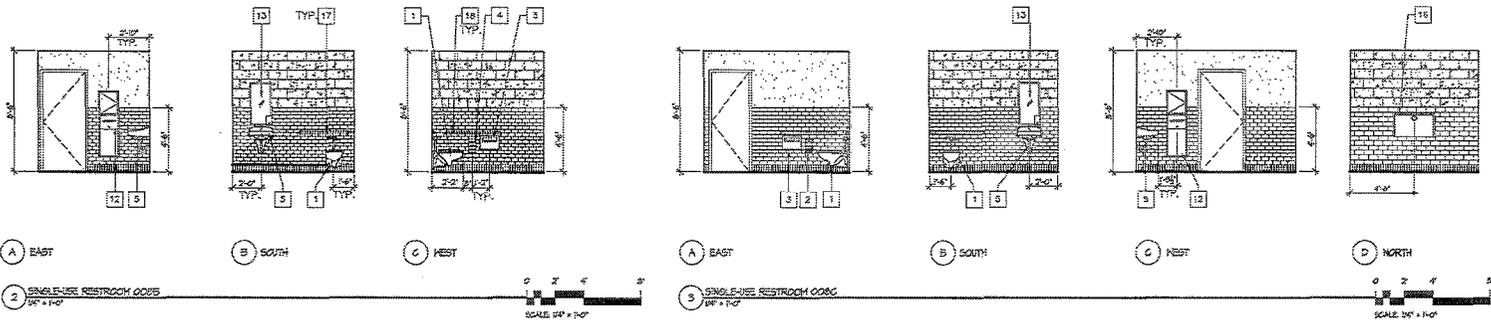
**GENERAL NOTES**

4. PROVIDE ANTI-GRAFFITI COATING PER SAN DIEGO WHITE BOOK SPECIFICATION 210.1.1.3 ON SURFACES LISTED BELOW. ANTI-GRAFFITI COATING SHALL BE AS MANUFACTURED BY MONOPOLE, INC. OR EQUAL. MATERIALS SHALL BE APPLIED AS SPECIFIED BELOW.
    1. FIRST COAT: AQUASIELD HES2 (ITEM 5200)
    2. SECOND COAT: PERMAshield BASE (ITEM 6100)
    3. THIRD COAT: PERMAshield PREMIUM (ITEM 5000 FOR MATTE FINISH)
    4. FOURTH COAT: PERMAshield PREMIUM (ITEM 5000 FOR MATTE FINISH)
- AREAS TO BE TREATED WITH NON-SACRIFICIAL ANTI-GRAFFITI COATING:
- A. CMU BLOCK WALLS OF HVAC ENCLOSURE ADJACENT TO EXISTING GYMNASIUM. MATCH FINISH OF EXISTING TRASH ENCLOSURE.
  - B. EXISTING BRICK AT FRONT OF COMMUNITY CENTER.
  - C. NEW STUCCO AT ELEVATOR TOWER. APPLY COATING UP TO 10" OF ABOVE FINISHED GRADE OR TO FIRST CONTROL JOINT.
  - D. NEW STUCCO FINISH COAT OF ENTIRE COMMUNITY CENTER IF ALTERNATE E IS INCLUDED IN SCOPE OF WORK. UP TO 18'-0" AFF.

**CONSULTANT**

**PLATT/WHITELAW ARCHITECTS, INC.**  
4034 50th Street, SAN DIEGO CA 92104  
(619) 548-4328 FAX: (619) 548-4300

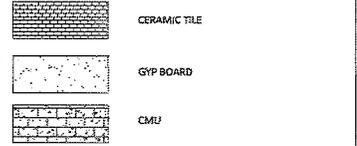




**KEY NOTES**

- 1 ACCESSIBLE TOILET
- 2 RECESSED TOILET TISSUE DISPENSER
- 3 TOILET SEAT COVER DISPENSER
- 4 2 SINGLE ROLL TOILET TISSUE DISPENSERS
- 5 ACCESSIBLE LAVATORY
- 6 PLASTIC LAMINATE CABINETS, 2 SHELVES PER CABINET U.Q.M. LOWER CABINETS TO HAVE A FIXED SHELF AT MIN. 15" AFF.
- 7 SOLID SURFACE COUNTERTOP W/ 4" BACK SPLASH
- 8 NEW 316/O DRINKING FOUNTAIN WITH CANE DETECTION RAIL PER SDM-103 AND 8/A-528
- 9 EXHAUST GRILL PER MECHANICAL
- 10 SOFFIT PER PLANS
- 11 HAND SINK PER PLUMBING
- 12 RECESSED COMBO UNIT HAND DRYER/ PAPER TOWEL DISPENSER WITH WASTE RECEPTACLE
- 13 MIRROR WITH SOAP DISPENSER
- 14 2" HEXAGONAL PORCELAIN TILE
- 15 NOT USED
- 16 DIAPER CHANGING STATION
- 17 42" GRAB BAR
- 18 48" GRAB BAR
- 19 PAPER TOWEL DISPENSER

**LEGEND**



**GENERAL NOTES**

- 1. SEE G-004 FOR PLUMBING FIXTURES & ACCESSORY MTS. HEIGHTS
- 2. FIXTURES AND ACCESSORIES SHOWN MAY VARY FROM SPECIFIED.
- 3. ATTACH WIREMOLD FOR UNDERCABINET LIGHTING TO UNDERSIDE OF CABINET. NO WIRING ON FACE OF TILE.

A-221

**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS**  
**INTERIOR ELEVATIONS**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 18 OF 153 SHEETS

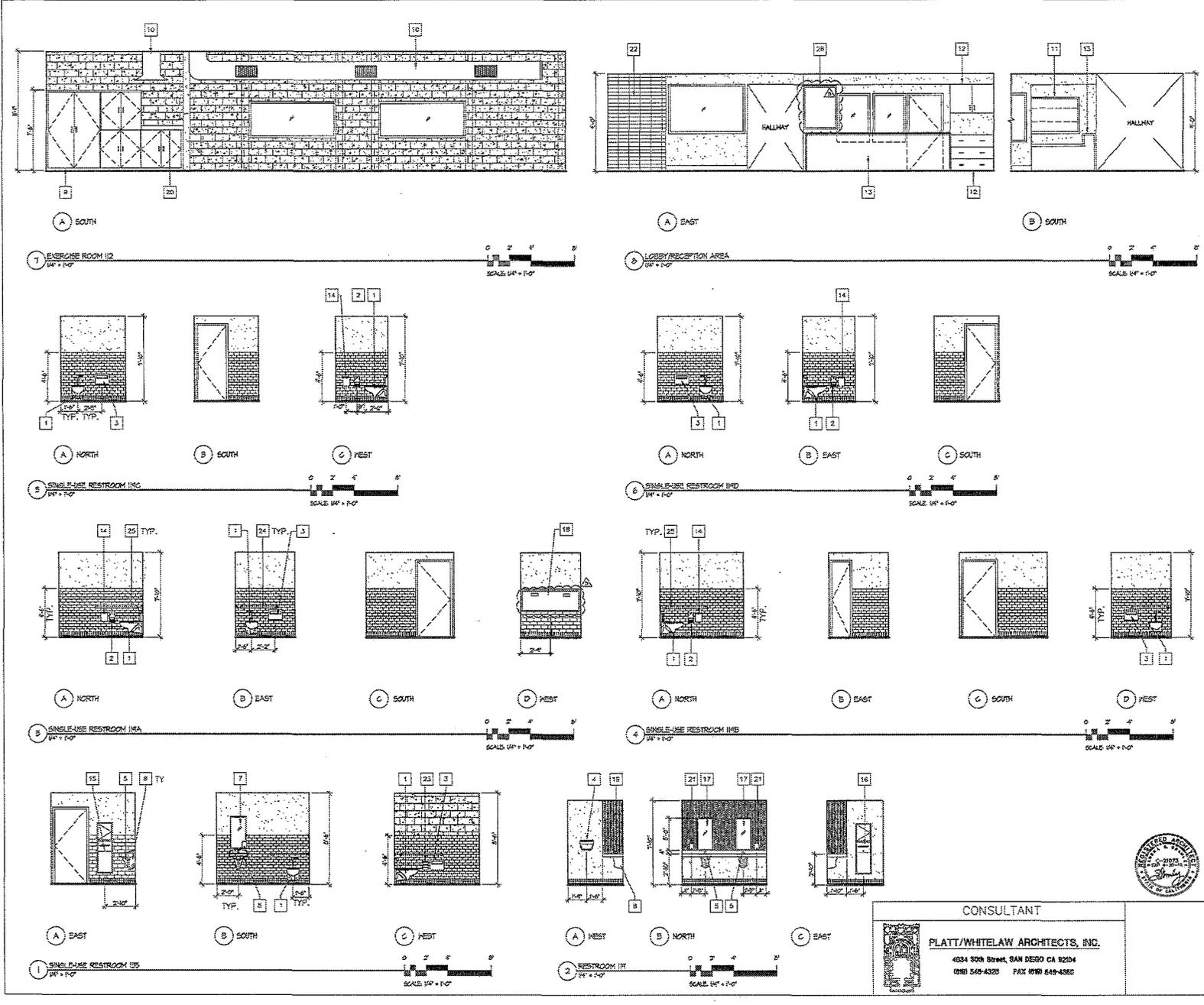
DATE: 2/24/17	WBS: S-16059
FOR CITY ENGINEER: NAME: MAINT/MALS	DISTRICT: ALEXANDRA CORSE
PROJECT ENGINEER: DATE: 2/24/17	PROJECT MANAGER: "PROJECT" MANAGER
DESCRIPTION: PER	PERNOVA
BY: PER	PROJECT ENGINEER: 2/12-1735
APPROVED: PER	COSBY COORDINATOR: 1852-6297
DATE: 2/24/17	ISSUES COORDINATOR: 39752-18-0
DATE: 2/24/17	DATE COMPLETED: 39752-18-0
CASEWORK REVISIONS	ADDENDUM B

**CONSULTANT**

**PLATT/WHITELEW ARCHITECTS, INC.**

4034 50th Street, SAN DIEGO, CA 92104  
 (619) 540-4300 FAX (619) 640-4360

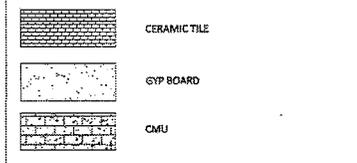




**KEY NOTES**

- 1 TOILET
- 2 RECESSED TOILET TISSUE DISPENSER
- 3 TOILET SEAT COVER DISPENSER
- 4 HAND DRYER
- 5 ACCESSIBLE LAVATORY
- 6 HAND SINK PER PLUMBING
- 7 MIRROR W/ SOAP DISPENSER
- 8 SLEEVE FOR PIPES
- 9 PLASTIC LAMINATE CABINET, SEE 3/A-224
- 10 HVAC SYSTEM PER MECHANICAL
- 11 DISPLAY CASE
- 12 EXISTING CASEWORK, PROVIDE NEW LAMINATE.
- 13 EXISTING RECEPTION DESK, PROVIDE NEW LAMINATE.
- 14 RECESSED SANITARY NAPKIN DISPOSAL
- 15 COMBO UNIT, HAND DRYER / PAPER TOWEL DISPENSER WITH WASTE RECEPTACLE
- 16 PT DISPENSER WITH WASTE RECEPTACLE
- 17 MIRROR
- 18 ADULT CHANGING STATION, PROVIDE FOUNDATIONS MODEL 100-SS-R OR EQUAL
- 19 2" HEXAGONAL PORCELAIN TILE
- 20 SOLID SURFACE COUNTERTOP W/ 4" BACK SPLASH
- 21 SOAP DISPENSER
- 22 PAINT EXISTING BRICK
- 23 2 SINGLE ROLL TOILET TISSUE DISPENSERS
- 24 42" GRAB BAR
- 25 48" GRAB BAR
- 26 BULLETIN BOARD

**LEGEND**



**GENERAL NOTES**

- 1. SEE G-004 FOR PLUMBING FIXTURES & ACCESSORY MTG. HEIGHTS
- 2. FIXTURES AND ACCESSORIES SHOWN MAY VARY FROM SPECIFIED.

A-222

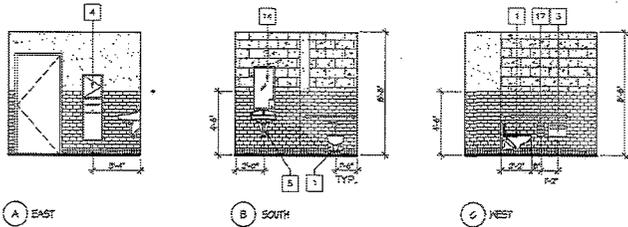
**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS  
INTERIOR ELEVATIONS**

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 190F 153 SHEETS				WBS S-16055
PROJECT NO.	37477	DATE	3/27/17	PROJECT MANAGER
FOR CITY ENGINEER	SAHER MAMMARI	DATE	3/27/17	COSM COORDINATOR
PERIT NAME	TRACY	DATE	3/27/17	PROJECT ENGINEER
DESCRIPTION	BY	APPROVED	DATE	PROJECT ENGINEER
ORIGINAL	FWB			212-1735
AGGENDUM B	FWB		5/4/17	1852-6297
CONTRACTOR		DATE STARTED		05333 EXPONENTIAL
INSPECTOR		DATE COMPLETED		39752-19-D
26 BULLETIN BOARD, CHANGING STATION, NO. 218 & 228				APPENDIX B Page 6 of 7

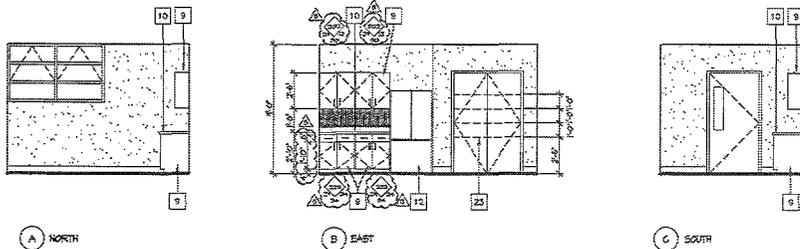
**CONSULTANT**

**PLATT/WHITELAW ARCHITECTS, INC.**

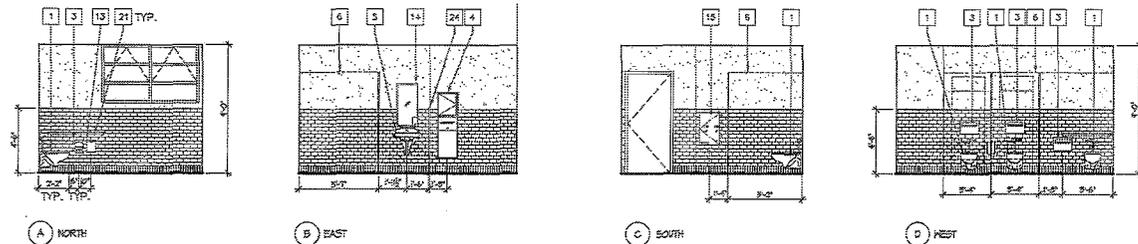
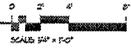
4034 30th Street, SAN DIEGO CA 92104  
(619) 545-4320 FAX (619) 648-4560



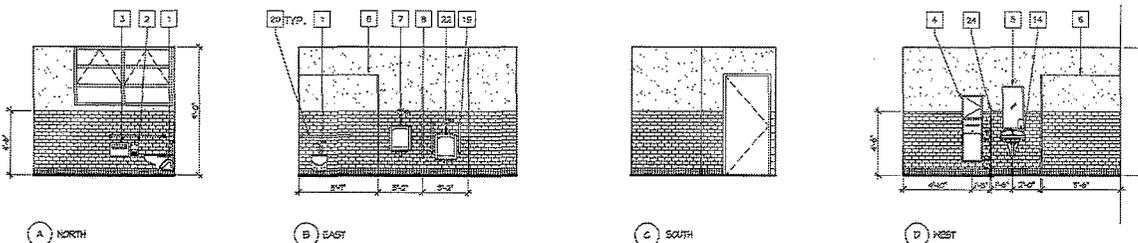
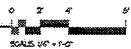
4 SINGLE-USE RESTROOM 200  
1/4" = 1'-0"



5 BREAK ROOM 18  
1/4" = 1'-0"



2 MEN'S RESTROOM 142B  
1/4" = 1'-0"



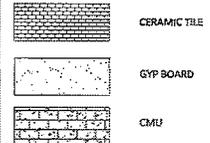
1 MEN'S RESTROOM 142A  
1/4" = 1'-0"



KEY NOTES

- 1 TOILET
- 2 RECESSED TOILET TISSUE DISPENSER
- 3 TOILET SEAT COVER DISPENSER
- 4 RECESSED COMBO UNIT, HAND DRYER/PAPER TOWEL DISPENSER WITH WASTE RECEPTACLE
- 5 ACCESSIBLE LAVATORY
- 6 TOILET PARTITION
- 7 URINAL
- 8 WALL MOUNTED URINAL SCREEN
- 9 PLASTIC LAMINATE CABINETS, 2 SHELVES PER CABINET U.O.M. LOWER CABINETS TO HAVE 1 FIXED SHELF AT MIN. 15" AFF.
- 10 SOLID SURFACE COUNTERTOP
- 11 HAND SINK PER PLUMBING
- 12 FRENCH DOOR REFRIGERATOR
- 13 SANITARY NAPKIN DISPOSAL
- 14 MIRROR WITH SOAP DISPENSER
- 15 SANITARY NAPKIN VENDOR
- 16 PARTITION MOUNTED SANITARY NAPKIN DISPOSAL AND TOILET TISSUE DISPENSER
- 17 2 SINGLE ROLL TOILET TISSUE DISPENSERS
- 18 ACCESSIBLE URINAL
- 19 24" GRAB BAR
- 20 42" GRAB BAR
- 21 48" GRAB BAR
- 22 ACCESSIBLE URINAL
- 23 3/4" PLYWOOD SHELVING WITH PLASTIC LAMINATE CLADDING AND METAL BRACKETS. PROVIDE BACKING.
- 24 WALL-MOUNTED EDGE PROTECTION PARTITION

LEGEND



GENERAL NOTES

- 1. SEE G-004 FOR PLUMBING FIXTURES & ACCESSORY MTG. HEIGHTS
- 2. FIXTURES AND ACCESSORIES SHOWN MAY VARY FROM SPECIFIED.

A-223

PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS  
INTERIOR ELEVATIONS

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 200P 153 SHEETS

WBS S-16059

DATE: 2/24/17	BY: 73711	PROJECT NO: ALEXANDRA CORSE
POSTED BY: SAUER, MARIALY	DATE: 2/24/17	PROJECT MANAGER: 73711
DESCRIPTION: PARK	APPROVED: [Signature]	DATE FILED: 2/24/17
PROJECT ENGINEER: 212-1735	PROJECT COORDINATOR: 1852-6297	CHECK COORDINATOR: 39752-23 -D
CONTRACTOR: [Blank]	DATE STARTED: [Blank]	DATE COMPLETED: [Blank]
INSPECTOR: [Blank]	DATE STARTED: [Blank]	DATE COMPLETED: [Blank]

CONSULTANT

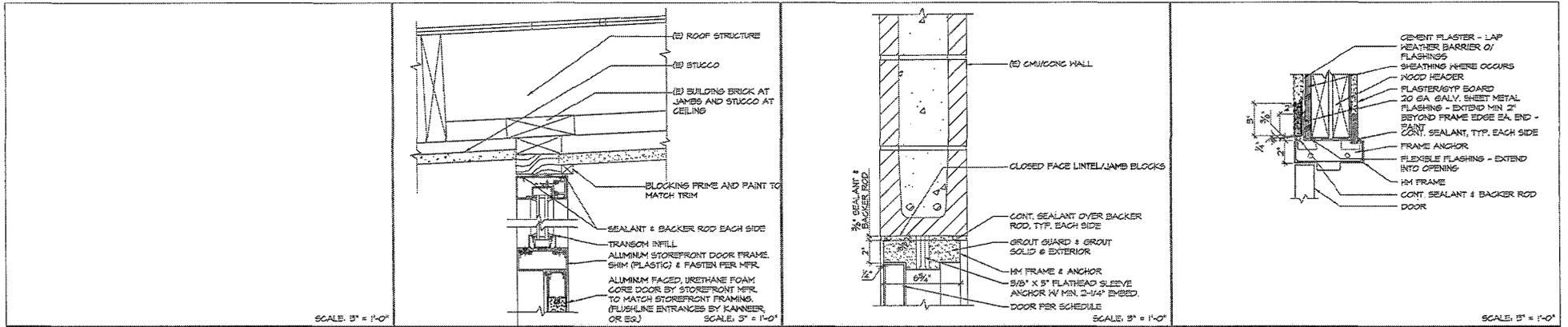


PLATT/WHITELAW ARCHITECTS, INC.

4054 50th Street, SAN DIEGO, CA 92104  
619 546-4320 FAX 619 546-4360



PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL

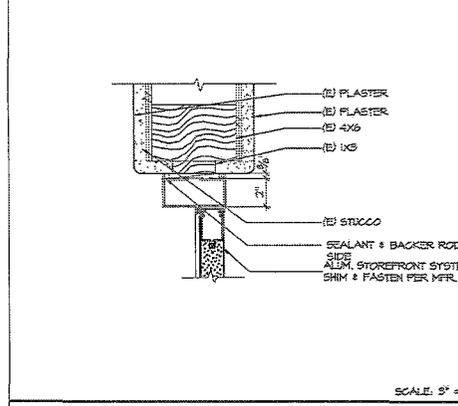


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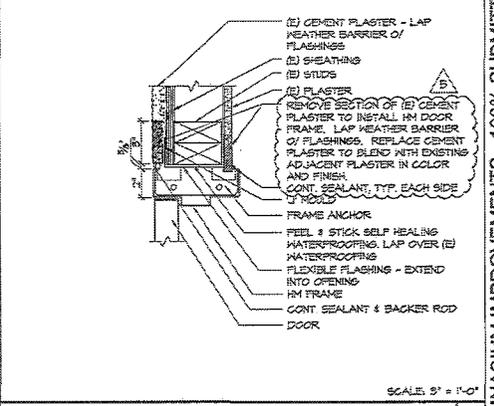
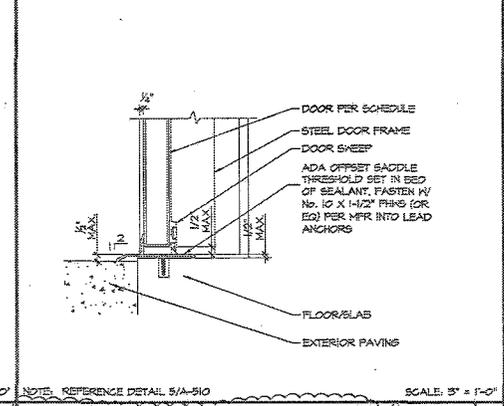
10 DOOR TRANSOM/HEAD DETAIL

7 HOLLOW METAL DOOR HEAD/JAMB @ CMU

4 DOOR HEAD DETAIL



NOT USED

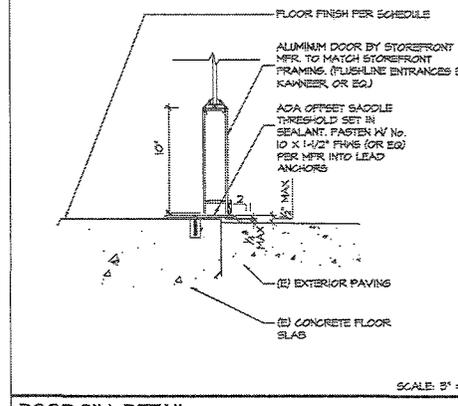


DOOR JAMB DETAIL

11 NOT USED

8 EXTERIOR OFFSET DOOR SILL DETAIL

5 DOOR JAMB DETAIL



NOT USED

9

A-512

**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS**  
**DOOR DETAILS**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 3607 153 SHEETS

WBS S-16059

PROJECT NO. 124512 FOR CITY ENGINEER SAHR MAMMALA DATE 7/27/11 SHEET NO. 3607	DRAWN BY ALEXANDRA CORSI CHECKED/MANAGED BY [Signature] PROJECT ENGINEER 212-1735 DESIGN COORDINATOR 1852-6287 CHECK ENGINEER [Signature]
DESCRIPTION BY APPROVED DATE FILED ORIGINAL PWA 2/24/11 2/24/11 ADDENDUM # PWA 5/24/11 5/24/11	PROJECT ENGINEER 212-1735 DESIGN COORDINATOR 1852-6287 CHECK ENGINEER [Signature]

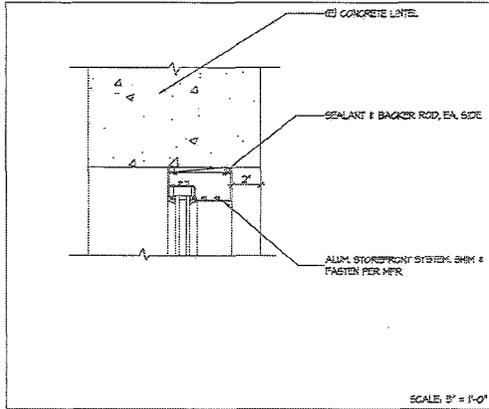
CONTRACTOR: DATE STARTED: PROJECT NO.:  
 INSPECTOR: DATE COMPLETED: SHEET NO.:  
 SPECIAL REVISIONS

CONSULTANT  
**PLATT/WHITELAW ARCHITECTS, INC.**  
 4264 50th Street, SAN DIEGO CA 92104  
 (619) 540-4320 FAX (619) 648-4360

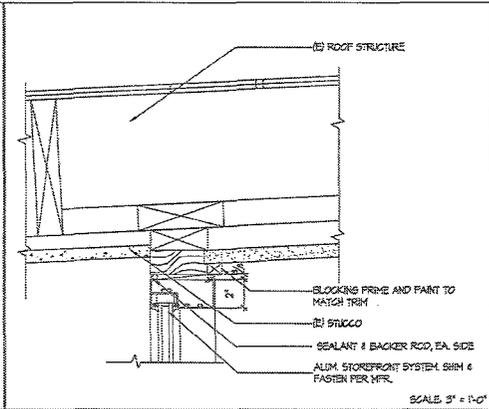
DOOR SILL DETAIL

12 NOT USED

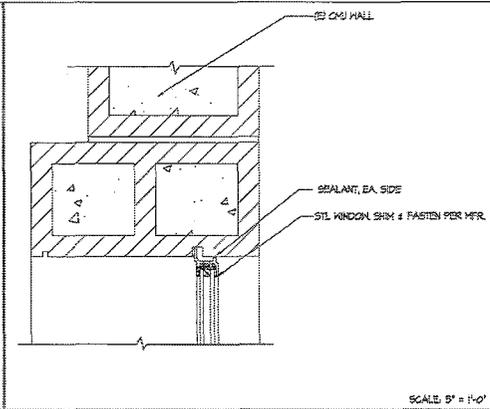
9



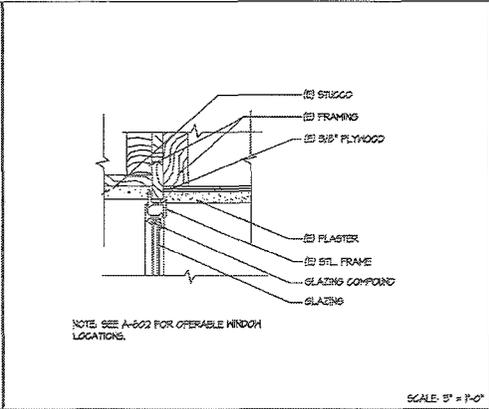
WINDOW HEAD DETAIL 10



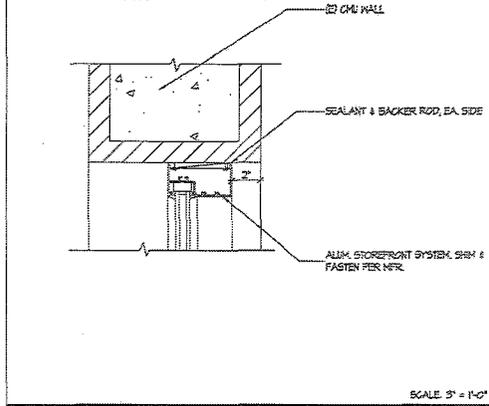
WINDOW HEAD DETAIL 7



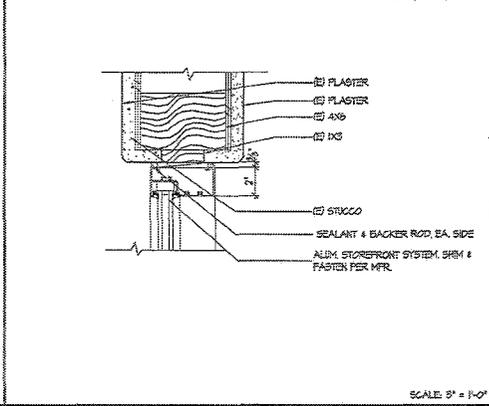
WINDOW HEAD DETAIL 4



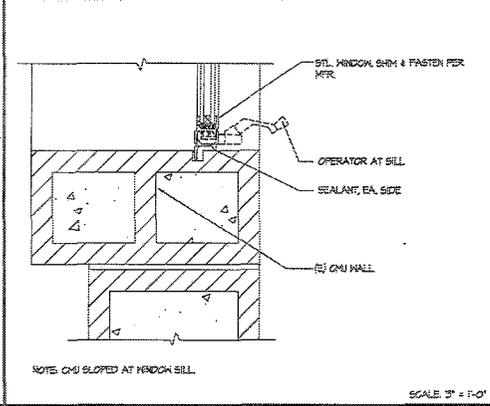
WINDOW JAMB DETAIL 1



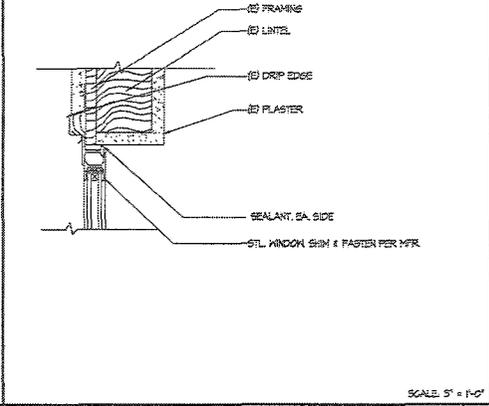
WINDOW JAMB DETAILS 11



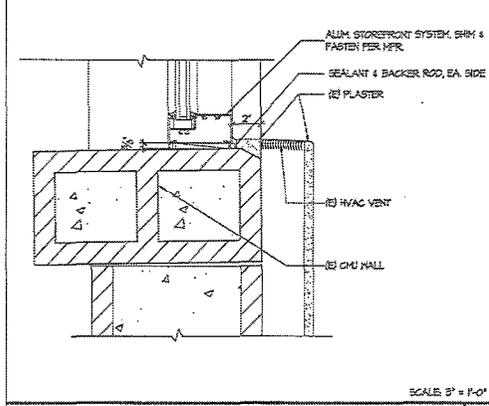
WINDOW JAMB DETAIL 8



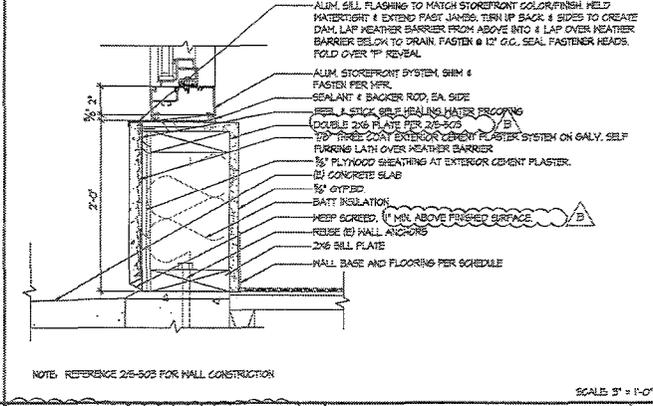
WINDOW JAMB/SILL DETAIL 5



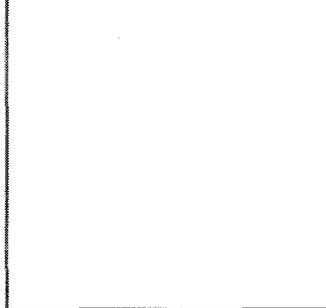
WINDOW HEAD DETAIL 2



WINDOW SILL DETAIL 12



EXTERIOR PONY WALL DETAIL 9



WINDOW HEAD DETAIL 5

CONSULTANT

PLATT/WHITELAW ARCHITECTS, INC.  
4034 50th Street, SAN DIEGO CA 92104  
1878 348-4320 FAX 1878 640-4350

A-514

PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS  
WINDOW DETAILS

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 38 OF 153 SHEETS

WBS 5-160559

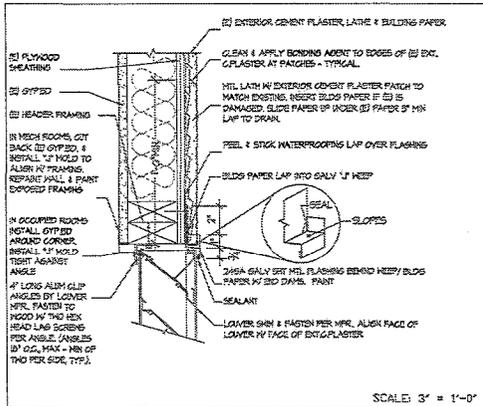
APPROVED: 3/26/17 DATE: 3/26/17  
FOR CITY ENGINEER: SAMIR MAHALLI DATE: 7/3/17  
PROJECT NAME: NEW

DESIGNER: PWA BY: PWA APPROVED: DATE: FILED: PROJECT ENGINEER: ALEXANDRA CORSE PROJECT MANAGER: 212-1735  
CONTRACTOR: A ADDENDUM 8 PWA DATE: 5/4/17 COST COORDINATOR: 1852-6297  
CONTRACTOR SUPERVISOR: DATE STARTED: 39752--38--0  
DATE COMPLETED: 39752--38--0

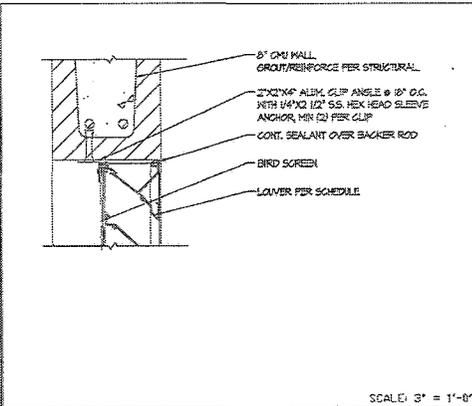
DETAIL 9/A-514 REVISION

ADDENDUM B  
Page 104 of 121

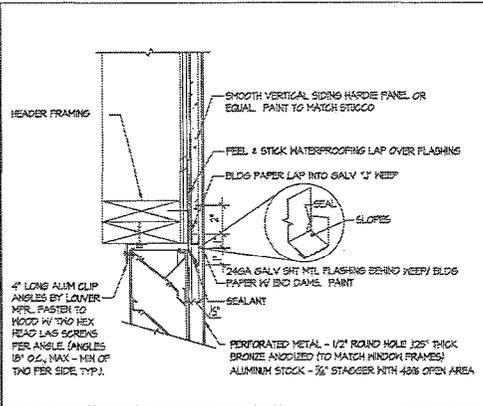
PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL



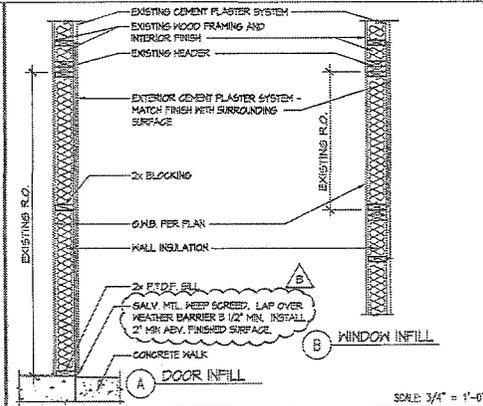
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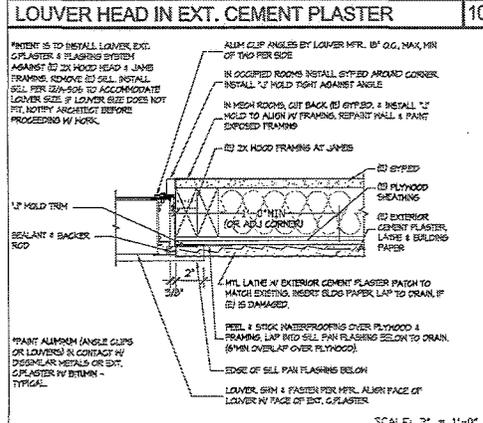
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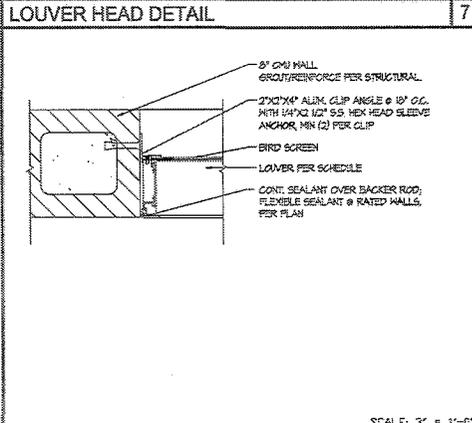
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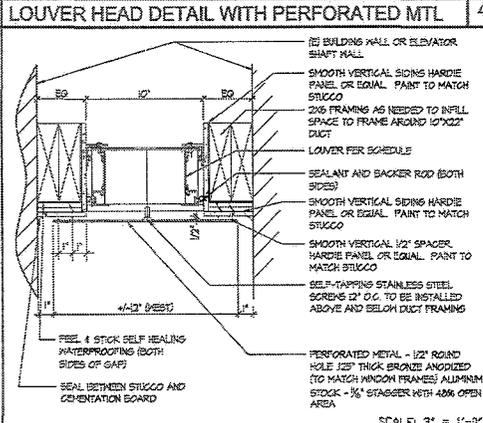
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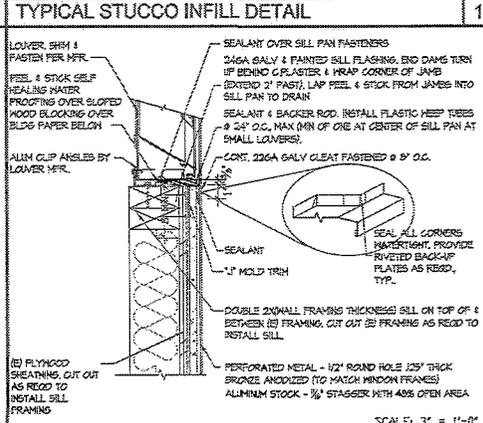
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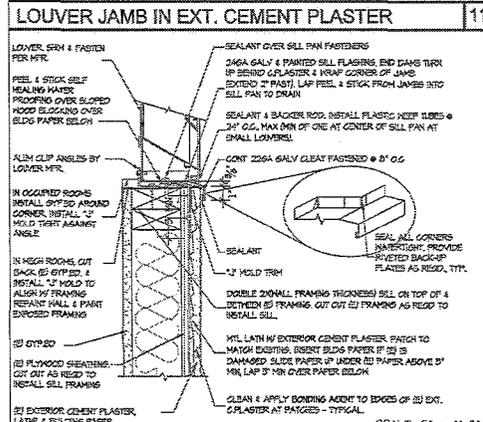
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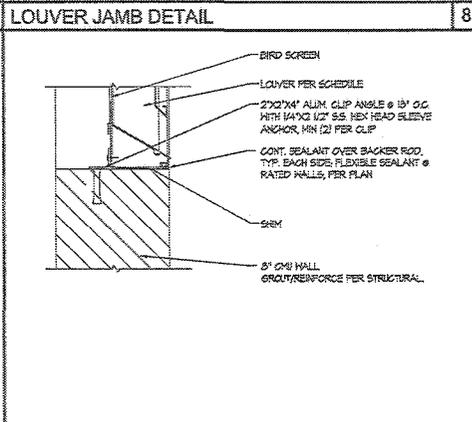
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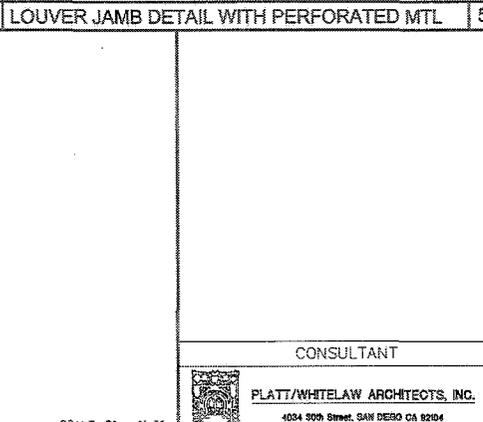
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A-516

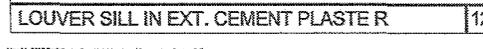
**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS**  
**LOUVER & STUCCO DETAILS**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 102 OF 103 SHEETS

WBS 5-16059

PROJECT NO.	3725/17	PROJECT MANAGER	ALEXANDRA COSE
FOR CITY ENGINEER	DATE 7/31/11	PROJECT ENGINEER	212-1735
DESIGNER	PKA	DATE FILED	5/4/12
APP. ADDENDUM #	PKA	DATE	1/8/13
CONTRACTOR	DATE STARTED	DATE COMPLETED	3/9/12 - 4/0 - D

CONSULTANT  
**PLATT/WHITELAW ARCHITECTS, INC.**  
4034 30th Street, SAN DIEGO CA 92104  
(619) 540-4320 FAX (619) 540-4350



SCALE: 3\"/>



SCALE: 3\"/>

PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL



**MAIN FLOOR ROOM FINISH SCHEDULE**

ROOM #	ROOM NAME	FLR	WALLS						CEILING	NOTES
			N	S	E	W	BASE			
101	LOBBY	PT-2	-	-	-	-	PT-2	PS/PS	SOUND ABSORBING HALL UNITS, NOM-1	
101A	DESK	PT-2	-	-	-	-	PT-2	ACT		
102	HALL	PT-2	P4	P4	P1	P1	PT-2	PS	SOUND ABSORBING HALL UNITS	
103	-	-	-	-	-	-	-	-	NOT A ROOM	
104	OFFICE	PT-2	P4	P4	P1	P1	RS	PS/PS		
105	OFFICE	PT-2	P6	P6	P1	P1	RS	PS/PS		
106	OFFICE	PT-2	P1	P1	P1	P1	RS	PS/PS		
107	OFFICE	PT-2	P1	P1	P1	P1	RS	ACT		
108	OFFICE	PT-2	P1	P1	P1	P1	RS	ACT		
109	DATA	L	P2	P2	P2	P2	RS	PS		
111	LOBBY	PT-2	P4	P4	P1	P1	RS	PS/PS	SOUND ABSORBING HALL UNITS, NOM-1	
112	EXERCISE	RAF-2	P2	P2	P2	P2	RS	PS/PS	PAINT EXPOSED DUCTWORK, WALL MIRRORS, NOM-2	
113	HALL	PT-2	-	-	-	-	RS	PS/PS	SOUND ABSORBING HALL UNITS	
114	-	-	-	-	-	-	-	-	NOT A ROOM	
114	RESTROOM	PT-1A	P2	P2	P2	P2	PT-1B	PS	PT-3 ABOVE SINK COUNTER	
114A	TOILET ROOM	PT-1B	P4	P4	P4	P4	PT-1B	PS	TILE WALLS TO 54" AFF, PAINTED GYP ABOVE	
114B	TOILET ROOM	PT-1B	P4	P4	P4	P4	PT-1B	PS	TILE WALLS TO 54" AFF, PAINTED GYP ABOVE	
115	TOILET ROOM	PT-1B	P4	P4	P4	P4	PT-1B	PS	TILE WALLS TO 54" AFF, PAINTED GYP ABOVE	
116	TOILET ROOM	PT-1B	P4	P4	P4	P4	PT-1B	PS	TILE WALLS TO 54" AFF, PAINTED GYP ABOVE	
120	PASSAGE	L	P4	P4	P4	P4	RS	PS	SOUND ABSORBING HALL UNITS, NOM-1	
124	OFFICE	PT-2	P6	P6	P1	P1	RS	PS		
125	PASSAGE	L	P4	P4	P4	P4	RS	PS/PS	SOUND ABSORBING HALL UNITS	
126	PASSAGE	L	P4	P4	P4	P4	RS	PS/PS	SOUND ABSORBING HALL UNITS	
127	-	-	-	-	-	-	-	-	NOT A ROOM	
128	-	-	-	-	-	-	-	-	NOT A ROOM	
128	STAIR	RV	P2	P2	P2	P2	RS	PS		
130	OFFICE	PT-2	P1	P1	P1	P1	RS	PS/PS		
132	CONFERENCE ROOM	PT-2	P1	P1	P1	P1	RS	PS		
133	HALL	L	P4	P4	P4	P4	RS	PS	SOUND ABSORBING HALL UNITS	
134	OFFICE	PT-2	P6	P6	P1	P1	RS	PS/PS		
136	RESTROOM	PT-1B	P4	P4	P4	P4	PT-1B	PS	TILE WALLS TO 54" AFF, PAINTED GYP ABOVE	
136	STORAGE	L	P2	P2	P2	P2	RS	-		
137	JANITORS	-	-	-	-	-	-	-		
138	STAIR	-	-	-	-	-	-	-	NC	
139	TOOL	-	-	-	-	-	-	-	NC	
140	DANCE	(S)	P1	P1	P6	P1	RS	(S)	REPAIR (S) CLS GRID BY NEW TILE, SOLAR STRIPS, WALL MIRRORS, REFINISH (S) WOOD FLOOR	
141	SEMINARY	RAF-2	P2	P2	P2	P2	RS	(S)	REPAIR (S) CLS GRID BY NEW TILE, WALL PADS	
142	STORAGE	L	P2	P2	P2	P2	RS	PS		
143	CORRIDOR	L	P4	P4	P4	P4	RS	PS	SOUND ABSORBING HALL UNITS	
144	STAIR	L	P2	P2	P2	P2	RS	PS		
145A	MULTIPURPOSE	L	P4	P4	P2	P2	RS	PS	SOUND ABSORBING CEILING UNITS + WALL UNITS, NOM-2	
145B	MULTIPURPOSE	PT-1A	P4	P4	P2	P2	RS	PS	SOUND ABSORBING CEILING + WALL UNITS, PAINT EXPOSED DUCTWORK, NOM-2	
146	STORAGE	L	P2	P2	P2	P2	RS	PS	PAINT EXPOSED DUCTWORK	
147	CORRIDOR	L	P4	P4	P4	P4	RS	PS	SOUND ABSORBING HALL UNITS, NOM-1	
148	MULTIPURPOSE	PT-2	P2	P2	P2	P2	RS	PS		
149A	RESTROOM	PT-1A	P4	P4	P4	P4	PT-1A	PS	TILE WALLS TO 54" AFF, PAINTED GYP ABOVE	
149B	RESTROOM	PT-1B	P4	P4	P4	P4	PT-1B	PS	TILE WALLS TO 54" AFF, PAINTED GYP ABOVE	
151	BREAK	PT-1C	P4	P4	P4	P4	RS	PS		
152	STORAGE	L	P2	P2	P2	P2	RS	PS		
153	STAIR	L	P2	P2	P2	P2	RS	PS		

**FINISH LEGEND:**

ACT = ACROUSTIC CEILING TILE  
 CS = CONCRETE SEALER  
 CT-1A = 3x6 WALL CERAMIC TILE  
 CT-1B = 3x6 WALL CERAMIC TILE  
 GPT-1 = 10x10 CARPET TILE  
 GPT-2 = 20x20 CARPET TILE  
 EP = EPOXY FLOOR FINISH  
 ED = EXISTING - NO WORK  
 FRP = FIBERGLASS REINFORCED PLASTIC  
 L = 10x10 LINOLEUM  
 LVT = 10x10 LUXURY VINYL TILE  
 P = PAINT  
 RP = REPERFORATED GYP

PT-1A = 2x2 PORCELAIN TILE  
 PT-1B = 2x2 PORCELAIN TILE  
 PT-1C = 2x2 PORCELAIN TILE  
 PT-2 = 12x24 PORCELAIN TILE  
 PT-3A = 2" HEX. PORCELAIN TILE  
 PT-3B = 2" HEX. PORCELAIN TILE  
 RA = GRAY BOARD PAINT  
 RAF-1 = RUBBER ATHLETIC FLOORING  
 RAF-2 = RUBBER ATHLETIC FLOORING  
 RB = RESILIENT BASE  
 RS = RUBBER STAIR FLOORING  
 NOM-1 = WALK-OFF MAT  
 NOM-2 = WALK-OFF MAT

- GENERAL NOTES:**
- PAINT ALL EXPOSED INTERIOR DUCTWORK.
  - PAINT ALL EXPOSED WRECKOLD TO MATCH WALL/CILING.
  - PROVIDE CONTRASTING STRIPE AT ALL TOP AND BOTTOM STAIR TREADS.
  - SEE FINISH PLANS FOR FLOORING LAYOUT AND ADDITIONAL COLOR PERCENTAGES INFORMATION.
  - SEE COLOR/MATERIAL LEGEND FOR ADDITIONAL INFORMATION.

**LOWER FLOOR ROOM FINISH SCHEDULE**

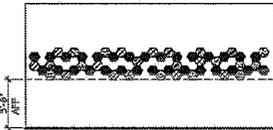
ROOM #	ROOM NAME	FLR	WALLS						CEILING	NOTES
			N	S	E	W	BASE			
201	-	-	-	-	-	-	-	-		
202	FILTERS	-	-	-	-	-	-	-		
203	MECHANICAL	-	-	-	-	-	-	-		
204	MULTIPURPOSE ROOM	LVT	P1	P1	P1	P1	RS	PS		
205	-	-	-	-	-	-	-	-	NOT A ROOM	
206	STAIR	-	-	-	-	-	-	-	NC	
207	STORAGE	L	P2	P2	P2	P2	RS	PS		
208	CORRIDOR	L	P4	P4	P4	P4	RS	PS		
208A	MACHINE ROOM	L	P	P	P	P	RS	-		
208B	RESTROOM	PT-1A	P4	P4	P4	P4	PT-1A	PS	TILE WALLS TO 54" AFF, PAINTED GYP ABOVE	
208C	RESTROOM	PT-1A	P4	P4	P4	P4	PT-1A	PS	TILE WALLS TO 54" AFF, PAINTED GYP ABOVE	
209	MULTI-PURPOSE	L	PC	PC	PC	PC	RS	PS		
209A	GREY ROOM	RAF-2	P2	P2	P2	P2	RS	PS	SOUND ABSORBING HALL UNITS	
209B	STORAGE	L	P2	P2	P2	P2	RS	PS		
210	STAIR	NOM-2	PT	PT	PT	PT	RS	PS	NOT A ROOM	
211	-	-	-	-	-	-	-	-		
212	HALL	L	P4	P4	P4	P4	RS	PS		
213	STAIR	L	P2	P2	P2	P2	RS	PS		

**UPPER FLOOR ROOM FINISH SCHEDULE**

ROOM #	ROOM NAME	FLR	WALLS						CEILING	NOTES
			N	S	E	W	BASE			
201	STAIR	L	P2	P2	P2	P2	RS	PS		
202	HALL	L	P4	P4	P4	P4	RS	PS		
203	STAIR	-	-	-	-	-	-	-	NC	
204	MECHANICAL ROOM	L	P2	P2	P2	P2	RS	PS		
205	STORAGE	L	P2	P2	P2	P2	RS	PS		
206	MULTIPURPOSE	PT-1	P1	P1	P1	P1	RS	PS		
207	CLOSET	L	P2	P2	P2	P2	RS	-		
208	STORAGE	L	P2	P2	P2	P2	RS	PS		
209	RESTROOM	PT-1A	P4	P4	P4	P4	PT-1A	PS	TILE WALLS TO 54" AFF, PAINTED GYP ABOVE	
210	JANITOR	L	P2	P2	P2	P2	RS	PS		

**GYM FINISH SCHEDULE**

ROOM #	ROOM NAME	FLR	WALLS						CEILING	NOTES
			N	S	E	W	BASE			
301	LOBBY	RAF-1	P2	P2	P2	P2	RS	ACT	NEW LAMINATE @ RECEPTION DESK, NOM-1 20x20	
301A	OFFICE	RAF-1	P2	P2	P2	P2	RS	ACT		
301B	STORAGE	RAF-1	P2	P2	P2	P2	RS	ACT		
302	OFFICE	RAF-1	P2	P2	P2	P2	RS	ACT		
303	WOMEN RESTROOM	PT-1B	P4	P4	P4	P4	PT-1B	PS		
304	MEN RESTROOM	PT-1A	P4	P4	P4	P4	PT-1A	PS		
305	STORAGE	RB	-	-	-	-	-	-	NC	
306	GYM	(S)	P2/P4	P2/P4	P2/P4	P2/P4	-	PS	P4 TO TOP OF BLOCK, P2 TO CEILING	
307	STORAGE	(S)	-	-	-	-	-	-	NC	

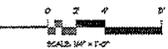


- ELEVATION NOTES:**
- START PATTERN FROM LEFT TO RIGHT AT EDGE OF WALL.
  - IF OPENINGS, TERMINATE PATTERN AND RESUME AT OTHER SIDE OF OPENING. DO NOT CUT TILES.
  - BOTTOM OF LOWEST PANEL @ 42" AFF.
  - REPEAT PATTERN WITH NO GAP AS NECESSARY.

**ELEVATION LEGEND:**

[Pattern]	KIRE ECHOPANEL OR EQUAL - COLOR "01"
[Pattern]	KIRE ECHOPANEL OR EQUAL - COLOR "20"
[Pattern]	KIRE ECHOPANEL OR EQUAL - COLOR "50"
[Pattern]	KIRE ECHOPANEL OR EQUAL - COLOR "50"

1 SOUND ABSORBING HALL UNITS  
 1/2" = 1/2"



**COLOR/MATERIAL LEGEND**

CODE	MATERIAL NAME	MANUFACTURER	PRODUCT	COLOR	SIZE	NOTES
CT-1A	WALL CERAMIC TILE	DALTILE	SEMI GLOSS/MATTE	10% "ARTIC WHITE" 10% "CHALKBOARD" 5% "OCEAN BLUE" 5% "AQUA GLOW" 5% "ORANGE BLOSS" 5% "CITRUS BLOOM"	5x6	COLORS MAY BE SPECIAL ORDER AND REQUIRE LONGER LEADTIME
CT-1B	WALL CERAMIC TILE	DALTILE	SEMI GLOSS/MATTE	10% "ARTIC WHITE" 10% "ICE GRAY" 5% "OCEAN BLUE" 5% "AQUA GLOW" 5% "CITRUS BLOOM"	5x6	COLORS MAY BE SPECIAL ORDER AND REQUIRE LONGER LEADTIME
PT-1A	PORCELAIN TILE	DALTILE	KEYSTONE	50% "CASTLEROCK" 50% "OCEAN BLUE" 5% "LIME SHERBERT"	2x2	SOME COLOR SELECTIONS FROM GROUPS 3-4. PORCELAIN COVE BASE TO BE "CASTLEROCK"
PT-1B	PORCELAIN TILE	DALTILE	KEYSTONE	50% "CASTLEROCK" 50% "OCEAN BLUE" 5% "LIME SHERBERT"	2x2	SOME COLOR SELECTIONS FROM GROUPS 3-4. PORCELAIN COVE BASE TO BE "CASTLEROCK"
PT-1C	PORCELAIN TILE	DALTILE	KEYSTONE	50% "CASTLEROCK" 50% "OCEAN BLUE" 5% "LIME SHERBERT"	2x2	SOME COLOR SELECTIONS FROM GROUPS 3-4. PORCELAIN COVE BASE TO BE "CASTLEROCK"
PT-2	PORCELAIN TILE	RAPPORT	GLAZED PORCELAIN	80% "COMFORTABLE" 20% "CORDIAL GRAY"	12x24	
PT-3A	PORCELAIN TILE	DALTILE	2" HEXAGONAL KEYSTONE	50% "BRIGHT" 25% "SILVER GRAY" 25% "MINT ICE"	2"	SOME COLOR SELECTIONS FROM GROUPS 3-4
PT-3B	PORCELAIN TILE	DALTILE	2" HEXAGONAL KEYSTONE	50% "BRIGHT" 25% "SILVER GRAY" 25% "DESERT GRAY"	2"	SOME COLOR SELECTIONS FROM GROUPS 3-4
L	LINOLEUM	PERGO FLOORING SYSTEMS	MARMOLEUM	GR = "GRANITE" E = "ESSEX" SR = "SERRAVALLO" CH = "CHARTRISSE" AD = "ADRIATICA" LA = "LAGUNA"	10x10	SEE PLANS FOR COLOR/PERCENTAGE LOCATION. ALL STORAGE/LAN ROOMS, RM TO BE 50% GR. ALL CORRIDORS TO BE 50% GR, 50% E. WACCENT COLORS PER FINISH PLAN.
P	PAIN	SHERAN WILLIAMS		P1 = "POPULAR GRAY" P2 = "REFLECTION" P3 = "PURE WHITE" P4 = "STARBOARD" P5 = "SLATE TILE" P6 = "TULIP GRY" P7 = "CHARTRISSE" P8 = "TANGERINE" P9 = "DEEP SEA DIVER" P10 = "INTERESTING AQUA" P11 = "REFLECTING POOL" P12 = "TROPIC"	-	
GPT-1	GARRET TILE	INTERFACE	WALK THE PLANK	80% "OFFICE" 20% "SPRICE"	10x10	
GPT-2	GARRET TILE	INTERFACE	MONOCHROME	80% "OFFICE" 20% "SPRICE"	20x30	SEE PLANS FOR COLOR/PERCENTAGE LOCATION
NOM-1	CARPET WALK-OFF MAT	INTERFACE		GRY = "GRZY"	VARIABLES	SEE PLANS FOR SIZES
NOM-2	CARPET WALK-OFF MAT	INTERFACE		ME = "MEDITERRANEAN"	VARIABLES	SEE PLANS FOR SIZES
RAF-1	RUBBER ATHLETIC FLOORING	DINOFLEX		MS = "MOON BEAM"	36x36	
RAF-2	RUBBER ATHLETIC FLOORING	DINOFLEX		SA = "SMOKEY ADIRE"	36x36	



**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS**  
**FINISH SCHEDULES**

CITY OF SAN DIEGO, CALIFORNIA  
 PUBLIC WORKS DEPARTMENT  
 SHEET 460F 153 SHEETS

DATE: 2/23/17  
 PROJECT MANAGER: ALEXANDRA CORU  
 PROJECT NUMBER: 212-1733  
 SHEET NUMBER: 460F 153

DESCRIPTION	BY	APPROVED	DATE	FILED	PROJECT ENGINEER
ORIGINAL	PKW	[Signature]	2/23/17	[Signature]	ALEXANDRA CORU
ADDENDUM #	PKW	[Signature]	3/14/17	[Signature]	ALEXANDRA CORU

CONTRACTOR: DATE STAMPED: 3/7/17  
 REVISIONS: DATE STAMPED: 3/7/17  
 REVISED FINISHES, ADD LEGEND AND ELEVATION

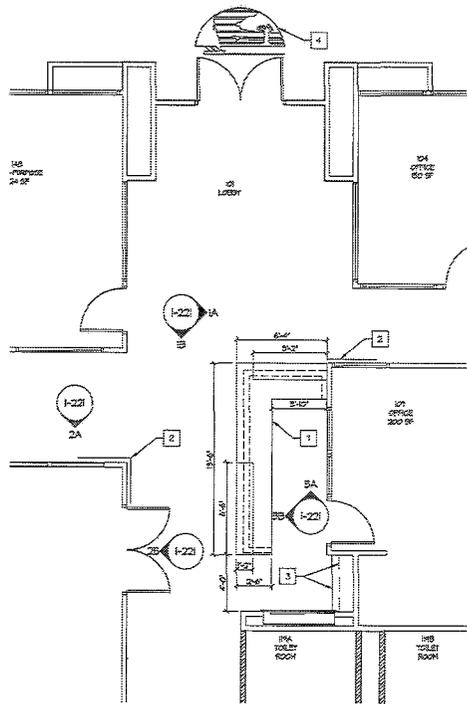
**CONSULTANT**

**PLATT/WHITELAW ARCHITECTS, INC.**

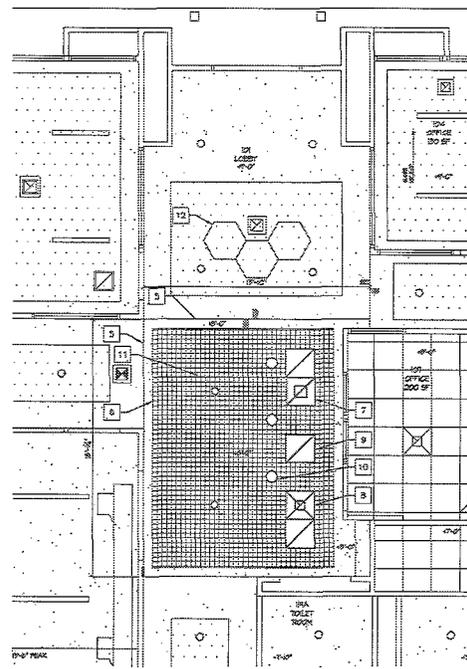
4334 80th Street, SAN DIEGO CA 92104  
 (619) 540-4320 FAX (619) 540-4350



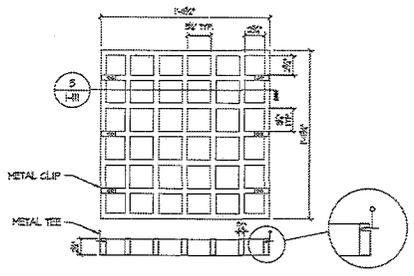
PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL



1 LOBBY FLOOR PLAN  
SCALE: 1/4" = 1'-0"



2 LOBBY ELEV PLAN  
SCALE: 1/4" = 1'-0"



3 CEILING GRID DETAILS  
SCALE: 1/2" = 1'-0"

### KEY NOTES

- 1 RECEPTION DESK. SEE I-221.
- 2 SOUNDS ABSORBING WALL UNITS. SEE I-221.
- 3 PLASTIC LAMINATE CABINETS. SEE I-221.
- 4 SANDBLASTED ARTWORK AT EXISTING CONCRETE. ARTWORK TO BE DETERMINED. APPROXIMATE DIMENSIONS ARE 7' X 5'.
- 6 SUSPENDED GYP BOARD SOFFIT TO BE FLUSH WITH EXISTING ADJACENT CEILINGS AT 8'-0" AFF.
- 6 SUSPENDED MDF W/WOOD VENEER OPEN CELL CEILING GRID SYSTEM BY MADRID INC. OR EQUAL. VENEER TO MATCH RECEPTION DESK PANEL. SEE TYPICAL DETAILS ON A-506. COMPRESSION STRUT MIN. 4" O.C. SEE DETAIL 3/1-111.
- 7 HVAC RETURN REGISTER. RELOCATED FROM PHASE 1 BASE BID.
- 8 HVAC SUPPLY DIFFUSER. RELOCATED FROM PHASE 1 BASE BID.
- 9 TYPE H 2' X 2' RECESSED LED LUMINAIRE. RELOCATED FROM PHASE 1 BASE BID.
- 10 TYPE C PENDANT LED LUMINAIRE. RELOCATED FROM PHASE 1 BASE BID.
- 11 TYPE D LED DOWNLIGHT. RELOCATED FROM PHASE 1 BASE BID.
- 12 SOUND ABSORBING CEILING UNITS. SEE A-506. 8'-0" AFF.

### GENERAL NOTES

1. WORK INDICATED IS INCLUDED IN 'ALTERNATE G' SCOPE U.O.N. AND IS IN ADDITION OR IN LIEU OF BASE BID WORK. REFER TO ARCHITECTURAL SHEETS FOR WORK NOT INDICATED.
2. LIGHTING INDICATED PER LUMINAIRE SCHEDULE ON E-010.
3. LIGHTING AND MECHANICAL WORK RELOCATED AS INDICATED AT LOBBY ONLY.

### LEGEND

- INSTALL PERFORATED ACOUSTIC GYP BOARD. CENTER PANELS IN ROOM.
- INSTALL 24x24 SUSPENDED ACOUSTICAL CEILING PANELS AND GRID.
- INSTALL GYP BOARD CEILING.
- INSTALL WOOD OPEN CELL CEILING GRID.
- WALL PER ARCHITECTURAL SHEETS.

1-111

## PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS ALTERNATE LOBBY PLANS

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 104 OF 157 SHEETS		WBS S-16058
OWNER: CITY OF SAN DIEGO	DATE: 5/9/17	DRAWN BY: ALEXANDRA CORSE
FOR CITY EXPRESS: NAME: MARSHALL	DATE: 7/31/17	PROJECT NUMBER: 13713
PROJECT NAME:	ROLE:	DRAWN BY:
DESCRIPTION:	BY:	APPROVED:
ORIGINAL:	DATE:	DATE:
	DATE:	DATE:
	DATE:	DATE:
	DATE:	DATE:
CONTRACTOR:	DATE STARTED:	PROJECT ENGINEER:
INSPECTOR:	DATE COMPLETED:	212-1735
		CS27 CONCRETE
		1852-6297
		CS28 GEOMETRY
		39752-454-D

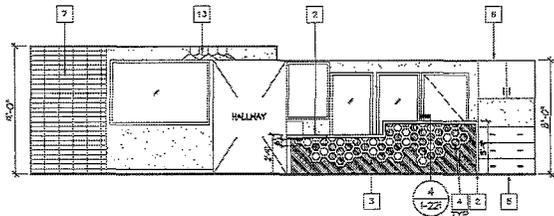
CONSULTANT

**PLATT/WHITELEW ARCHITECTS, INC.**

404 90th Street, SAN DIEGO CA 92104  
 (619) 540-4328 FAX (619) 540-4380

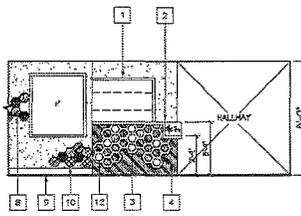


PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL



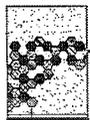
A EAST

1 LOBBY RECEPTION DESK  
8'4" x 10'

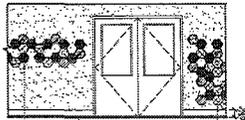


B SOUTH

SCALE: 1/4" = 1'-0"



10



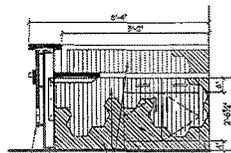
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A SOUTH

B WEST

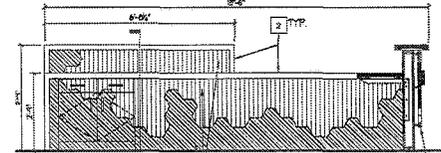
2 LOBBY - SOUND ABSORBING WALL UNITS  
8'4" x 10'

SCALE: 1/4" = 1'-0"



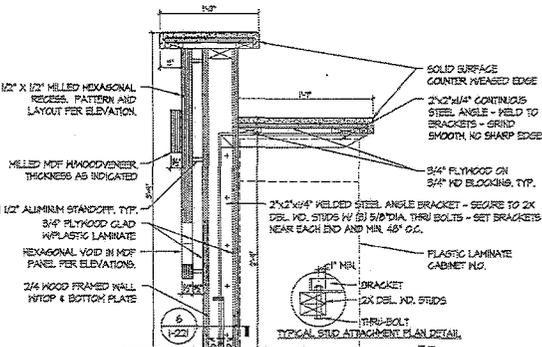
A NORTH

3 RECEPTION DESK - INTERIOR SIDE  
12' x 10'



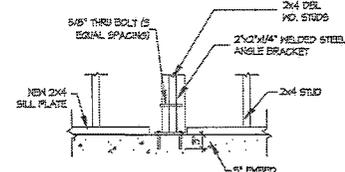
B WEST

SCALE: 1/4" = 1'-0"

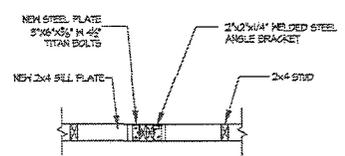


4 RECEPTION DESK SECTION  
12' x 10'

NOTE: PROVIDE MIN. 32" CLEAR WIDTH BETWEEN BRACKETS TO PROVIDE UNIMPEDED WHEELCHAIR CLEARANCE



5 RECEPTION DESK WALL  
7' x 10'



6 RECEPTION DESK WALL  
8' x 10'

KEY NOTES

- 1 DISPLAY CASE. INCLUDED IN PHASE 1 BASE BID WORK.
- 2 SOLID SURFACE COUNTERTOP WITH BASED EDGE
- 3 MDF PANEL W/WOOD VENEER. SEE DETAIL 3 & 4 THIS SHEET. VENEER PER ARCHITECT TO MATCH OPEN CELL GRID CEILING.
- 4 PLASTIC LAMINATE CLAD WOOD FRAMED WALL.
- 5 PLASTIC LAMINATE DRAWERS WITH SOLID SURFACE COUNTERTOP. 2 SHELVES PER CABINET U.O.N. SEE A-521 FOR TYPICAL DETAILS.
- 6 PLASTIC LAMINATE CABINET. 2 SHELVES PER CABINET U.O.N. SEE A-521 FOR TYPICAL DETAILS.
- 7 EXISTING BRICK WALL
- 8 SOUND ABSORBING WALL UNITS. LAYOUT PER ELEVATION OR A-503. INCLUDED IN PHASE 1 BASE BID WORK.
- 9 6" PORCELAIN TILE WALL BASE. INCLUDED IN PHASE 1 BASE BID WORK.
- 10 SOUND ABSORBING WALL UNITS. LAYOUT AT SHOWN. ALIGN UNITS WITH ADJACENT WALL AT CORNER.
- 11 4" RESILIENT BASE. INCLUDED IN PHASE 1 BASE BID WORK.
- 12 MILLED HEXAGONAL RECESS. TYPICAL. SEE DETAIL 4/A-221.
- 13 SOUND ABSORBING CEILING UNIT. KIREI ECHOSTAR OR EQUAL.

LEGEND

SOUND ABSORBING WALL UNIT KIREI ECHOPANEL OR EQUAL	
	COLOR "101"
	COLOR "295"
	COLOR "551"
	COLOR "381"
	GYP BOARD
	RAISED MDF PANEL W/WOOD VENEER
	PLASTIC LAMINATE 1
	PLASTIC LAMINATE 2

GENERAL NOTES

- 1. WORK INDICATED IS INCLUDED IN 'ALTERNATE G' SCOPE U.O.N. AND IS IN ADDITION OR IN LIEU OF BASE BID WORK. REFER TO ARCHITECTURAL SHEETS FOR WORK NOT INDICATED.
- 2. DEMO EXISTING RECEPTION DESK, SOFFIT, AND CABINETS.

I-221

PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS  
ALTERNATE LOBBY ELEVATIONS AND DETAILS

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 156 OF 157 SHEETS

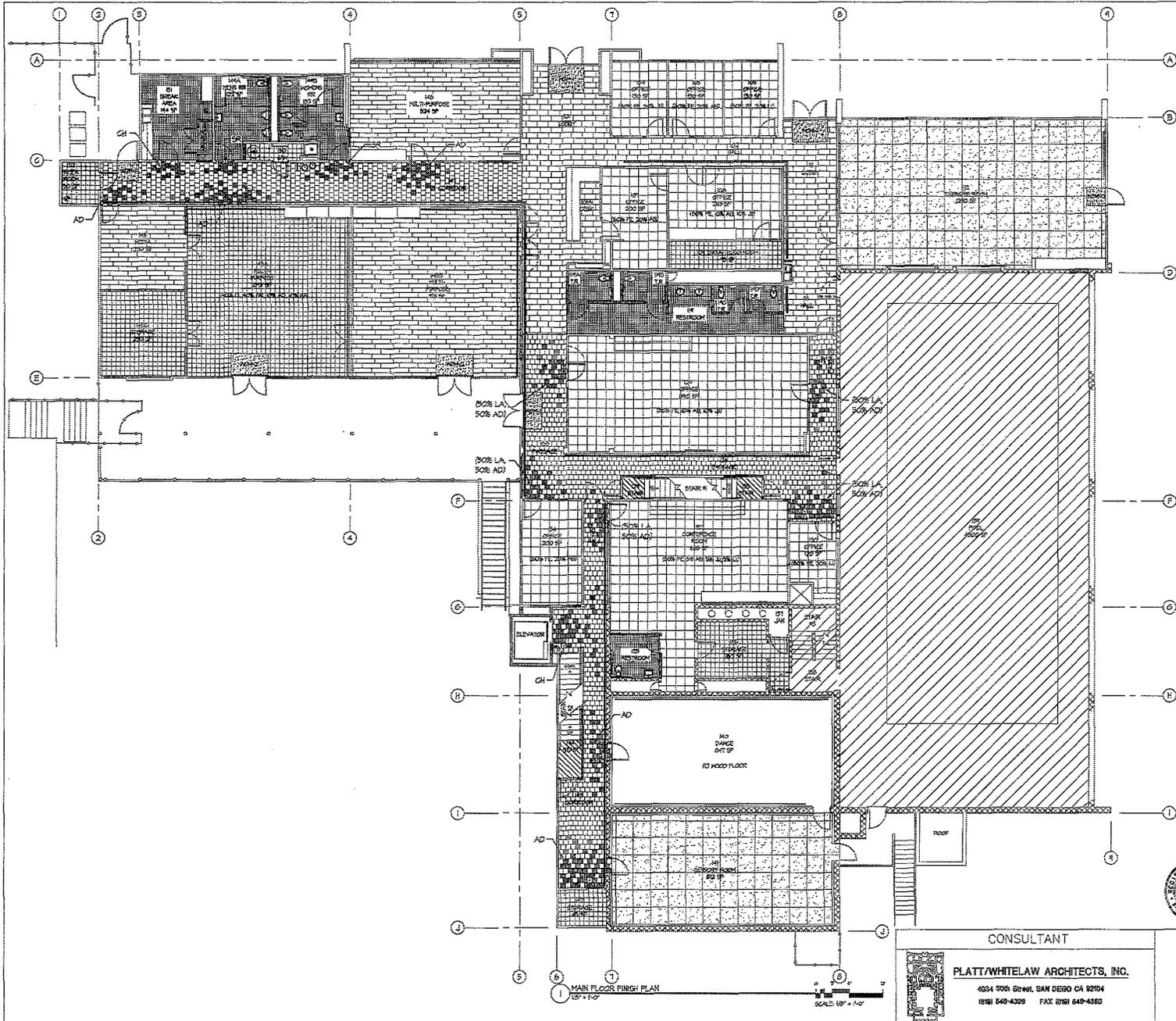
DESIGNED BY	DATE	PROJECT NUMBER		
FOR CITY ENGINEER	DATE	PROJECT NUMBER		
SAVED AVAILABLE	REV	REV		
DESCRIPTION	BY	APPROVED	DATE	FILED
ORIGINAL	FWA			
			212-1735	
			3531	
			1852-6297	
			39752-165-0	
CONTRACTOR	DATE STARTED			
INSPECTOR	DATE COMPLETED			

CONSULTANT

**PLATT/WHITELAW ARCHITECTS, INC.**

4034 90th Street, SAN DIEGO CA 92104  
 (619) 540-4328 FAX (619) 540-4350





**GENERAL NOTES**

1. CENTER FLOORING LAYOUT IN ROOM U.O.R.

**LEGEND**

- L - 10X10 LINOLEUM GRID PATTERN  
COLORS  
GR = "GRAPHITE"  
BI = "EISER"  
SR = "STUCCO ROSSO"  
CH = "CHARTREUSE"  
AD = "ADRIATICA"  
LA = "LAGUNA"
- L - 10X10 LINOLEUM STAGGERED PATTERN  
SEE COLORS ABOVE
- RAF-1 OR RAF-2 - 36X36 RUBBER ATHLETIC FLOORING
- CPT-1 - 10X40 CARPET TILE
- CPT-2 - 20X20 CARPET TILE  
COLORS:  
AB = "ANTIQUE BLUE"  
FE = "FELT"  
JU = "JUNIPER"  
LI = "LIME"
- WOM-1 OR WOM-2 - WALK-OFF MAT
- PT-1 - 2X2 PORCELAIN TILE
- PT-2 - 12X24 PORCELAIN TILE
- LVT - 10X60 LUXURY VINYL TILE
- RU - RUBBER STAIR FLOORING
- SOUND ABSORBING WALL UNITS. SEE A-603 FINISH SCHEDULE FOR INTERIOR ELEVATION.
- NOT IN SCOPE

1-601

**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS**  
**REC CENTER MAIN FLOOR FINISH PLAN**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 155 OF 157 SHEETS

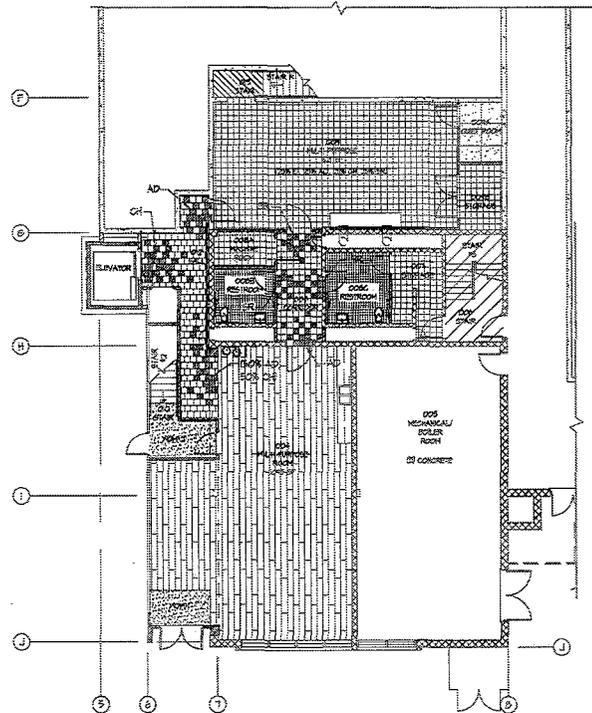
DATE: 5/4/17	SCALE: 3/32" = 1'-0"	DESIGNED BY: ALEXANDRA CORSE
PROJECT NO: 23711		PROJECT MANAGER: TERRY PA
DESCRIPTION: SAVER MANTONIA FLOORING	BY: PNA	APPROVED: DATE: 5/17/17
		PROJECT ENGINEER: 212-1735
		CHECK/COORDINATE: 1852-6297
		DESIGN COORDINATOR: 38752-155-07

**CONSULTANT**

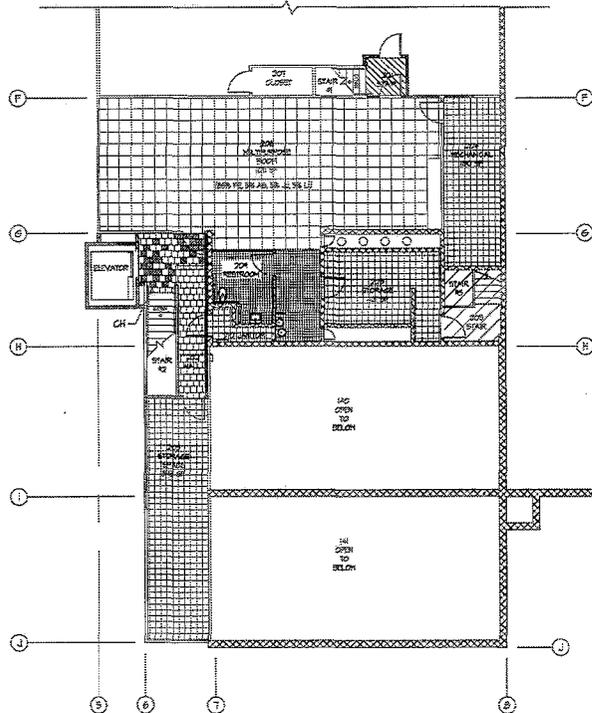
**PLATT/WHITELAW ARCHITECTS, INC.**  
4034 90th Street, SAN DIEGO CA 92124  
619 540-4320 FAX 619 640-4382



PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL



1 LOWER FLOOR FINISH PLAN  
1/8" = 1'-0"



2 UPPER FLOOR FINISH PLAN  
1/8" = 1'-0"



**GENERAL NOTES**

1. CENTER FLOORING LAYOUT IN ROOM U.O.N.

**LEGEND**

- L - 10X10 LINOLEUM GRID PATTERN  
COLORS:  
GR = "GRAPHITE"  
EI = "EKREP"  
SR = "STUCCO ROSSO"  
CH = "CHARTRUSE"  
AD = "ADRIATICA"  
LA = "LAGUNA"
- L - 10X10 LINOLEUM STAGGERED PATTERN  
SEE COLORS ABOVE
- RAF-1 OR RAF-2 - 30X30 RUBBER ATHLETIC FLOORING
- CPT-1 - 10X40 CARPET TILE
- CPT-2 - 20X30 CARPET TILE  
COLORS:  
AB = "ANTIQUE BLUE"  
FE = "FELT"  
JU = "JUNIPER"  
LI = "LIME"
- WOM-1 OR WOM-2 - WALK-OFF MAT
- PT-1 - 2X2 PORCELAIN TILE
- PT-2 - 12X24 PORCELAIN TILE
- LVT - 10X60 LUXURY VINYL TILE
- RU - RUBBER STAIR FLOORING
- SOUND ABSORBING WALL UNITS, SEE A-603 FINISH SCHEDULE FOR INTERIOR ELEVATION.
- NOT IN SCOPE

I-602

**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS  
REC CENTER LOWER & UPPER FLOOR  
FINISH PLANS**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 157 OF 157 SHEETS

WBS S-16059

DATE: 5/8/17	DATE: 7/27/17	PROJECT ENGINEER: 212-1735
FOR CITY ENGINEER: TAMER MANSOUR	DATE: 7/27/17	PROJECT MANAGER: 1852-6297
DESCRIPTION:	BY:	APPROVED:
ORIGINAL:	PKM	
CONTRACTOR:	DATE STARTED:	DATE COMPLETED:
INSPECTOR:		

**CONSULTANT**



**PLATT/WHITELAW ARCHITECTS, INC.**

4084 30th Street, SAN DIEGO CA 92104  
(619) 648-4328 FAX (619) 648-4360





# ENGINEER OF WORK

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

*Sandra S. Gramley*      5/2/2017      Seal:  
1) Registered      Architect      Date



*Samir Mahanji*      5/2/2017      Seal:  
2) For City Engineer      Date



## A. CHANGES TO CONTRACT DOCUMENTS

The following changes to the Contract Documents are hereby made effective as though originally issued with the bid package. Bidders are reminded that all previous requirements to this solicitation remain in full force and effect.

## B. BIDDER'S QUESTIONS

Q1. There are several spec sections that have a LEED requirement for Regional Materials to be extracted, harvested or recovered as well as manufactured within 100 miles of the project.

Anything made of wood won't meet that requirement and most items on this project won't meet this requirement for San Diego. Please clarify this requirement can be waived.

A1. The LEED requirements that are in the specs will be based on which credits the Contractor chooses to pursue for the project, so the Regional Materials requirement can be waived.

## C. ATTACHMENTS

1. To Attachment B, Phased Funding Provisions, pages 25 through 26, **DELETE** in its entirety and **SUBSTITUTE** with pages 6 through 7 of this Addendum.
2. To Attachment D, Community Development Block Grant (CDBG) Housing Urban Development (HUD) Funding Agency Provisions, pages 36 through 62, Section 9, WAGE RATES, **DELETE** in its entirety and **SUBSTITUTE** with pages 8 through 34 of this Addendum.

## D. SUPPLEMENTARY SPECIAL PROVISIONS

1. To Attachment E, SECTION 2 – SCOPE AND CONTROL OF WORK, Subsection 2-3.2, Self Performance, page 78, **DELETE** Item 1 in its entirety.

2. To Attachment E, SECTION 7 - RESPONSIBILITIES OF THE CONTRACTOR, Subsection 7-3.2, Types of Insurance, page 85, **ADD** the following:

**7-3.2.3 Contractors Pollution Liability Insurance.**

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.

1. 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.
2. 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.
3. 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.
4. 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.

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.

#### **E. PLANS**

1. To Drawing numbers 39752-1-D; 39752-4-D; 39752-8-D; 39752-9-D; 39752-17-D; 39752-30-D; 39752-39-D; 39752-44-D; 39752-45-D; 39752-47-D through 39752-50-D; 39752-91-D through 39752-96-D; and 39752-149-D, **DELETE** in their entirety and **REPLACE** with pages 35 through 54 of this Addendum.

James Nagelvoort, Director  
Public Works Department

Dated: *May 3, 2017*  
San Diego, California

JN/RWB/mlw

## PHASED FUNDING PROVISIONS

### 1. PRE-AWARD

- 1.1. Within 10 Working Days after the Bid Opening date, the Apparent Low Bidder must contact the Project Manager to discuss fund availability for each phase and shall also submit the following:
  - 1.1.1. Construction Cost Loaded Schedule in accordance with 6-1, "CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK" and 9-3, "PAYMENT."
- 1.2. Your failure to perform any of the following may result cancelling your award of the Contract:
  - 1.2.1. Meeting with the City's Project Manager to discuss the Phased Funding Schedule.
  - 1.2.2. Agreeing to a Phased Funding Schedule within 22 Working Days after meeting with the City's Project Manager.

### 2. POST-AWARD

- 2.1. Do not start any construction activities for the next phase until the NTP has been issued by the Engineer. The City will issue separate Notice to Proceed (NTP) documents for each phase.
- 2.2. If requested, the Engineer may issue the NTP for the next phase before the end of the current approved phase.

## 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 Construction Cost Loaded Schedule submitted to and approved by the City.

**BID NUMBER:** \_\_\_\_\_

**CONTRACT OR TASK TITLE:** \_\_\_\_\_

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

Funding Phase	Phase Description	Phase Start	Phase Finish	Not-to-Exceed Amount
1				\$
2	<u>All Additional phases to be added</u>			
	<u>to this form as necessary.</u>			
Contract Total				\$

Notes:

- 1) WHITEBOOK section 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 1 - PRICES.
- 3) This PHASED FUNDING SCHEDULE AGREEMENT will be incorporated into the CONTRACT and shall only be revised by written modifications to the CONTRACT.

**CITY OF SAN DIEGO**

**CONTRACTOR**

PRINT NAME: \_\_\_\_\_  
**Construction Manager**

PRINT NAME: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

PRINT NAME: \_\_\_\_\_  
**Project Manager**

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

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

- CA17001 03/10/2017
- 5
- 3/10/2017

The required wage information may be accessed and downloaded from:  
<http://www.wdol.gov/>

General Decision Number: CA170001 03/24/2017 CA1

Superseded General Decision Number: CA20160001

State: California

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

County: San Diego County in California.

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

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.20 for calendar year 2017 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.20 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Modification Number	Publication Date
0	01/06/2017
1	01/27/2017
2	02/17/2017
3	02/24/2017
4	03/03/2017
5	03/10/2017
6	03/24/2017

ASBE0005-002 07/04/2016

Rates Fringes

Asbestos Workers/Insulator

(Includes the application of all insulating materials, protective coverings, coatings, and finishes to all types of mechanical systems).....\$ 38.37 20.13  
 Fire Stop Technician  
 (Application of Firestopping Materials for wall openings and penetrations in walls, floors, ceilings and curtain walls).....\$ 26.15 17.31

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 ASBE0005-004 07/04/2016

	Rates	Fringes
Asbestos Removal worker/hazardous material handler (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from mechanical systems, whether they contain asbestos or not)....\$ 18.38	18.38	10.82

-----  
 BOIL0092-003 10/01/2012

	Rates	Fringes
BOILERMAKER.....\$ 41.17	41.17	28.27

-----  
 BRCA0004-008 11/01/2016

	Rates	Fringes
BRICKLAYER; MARBLE SETTER.....\$ 35.30	35.30	17.35

\* BRCA0018-004 06/01/2016

	Rates	Fringes
MARBLE FINISHER.....\$ 29.20	29.20	12.93
TILE FINISHER.....\$ 24.53	24.53	11.08
TILE LAYER.....\$ 35.89	35.89	16.24

-----  
 BRCA0018-010 09/01/2016

	Rates	Fringes
TERRAZZO FINISHER.....\$ 28.53	28.53	12.27
TERRAZZO WORKER/SETTER.....\$ 35.57	35.57	13.14

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 CARP0409-002 07/01/2008

	Rates	Fringes
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Diver

(1) Wet.....	\$ 663.68	9.82
(2) Standby.....	\$ 331.84	9.82
(3) Tender.....	\$ 323.84	9.82
(4) Assistant Tender.....	\$ 299.84	9.82

Amounts in "Rates" column are per day

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 CARP0409-008 08/01/2010

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

-----  
 CARP0547-001 07/01/2016

	Rates	Fringes
CARPENTER		
(1) Bridge.....	\$ 37.28	10.58
(2) Commercial Building....	\$ 32.30	10.58
(3) Heavy & Highway.....	\$ 37.15	10.58
(4) Residential Carpenter..	\$ 25.84	10.58
(5) Residential Insulation Installer.....	\$ 18.00	8.16
MILLWRIGHT.....	\$ 40.70	17.03
PILEDRIVERMAN.....	\$ 37.28	10.58

-----  
 CARP0547-002 07/01/2009

	Rates	Fringes
Drywall		
(1) Work on wood framed construction of single family residences, apartments or condominiums under four stories		
Drywall Installer/Lather...	\$ 21.00	8.58
Drywall Stocker/Scrapper...	\$ 11.00	6.67
(2) All other work		
Drywall Installer/Lather...	\$ 27.35	9.58
Drywall Stocker/Scrapper...	\$ 11.00	6.67

-----  
 ELEC0569-001 10/01/2016

	Rates	Fringes
Electricians (Tunnel Work)		
Cable Splicer.....	\$ 47.72	3%+12.63
Electrician.....	\$ 46.97	3%+12.63
Electricians: (All Other Work, Including 4 Stories Residential)		
Cable Splicer.....	\$ 42.50	3%+12.63
Electrician.....	\$ 41.75	3%+12.63

-----  
ELEC0569-004 06/01/2015

	Rates	Fringes
ELECTRICIAN (Sound & Communications Sound Technician).....	\$ 29.55	11.92
SOUND TECHNICIAN: Terminating, operating and performing final check-out		

-----

ELEC0569-005 06/06/2016

	Rates	Fringes
Sound & Communications Sound Technician.....	\$ 30.22	12.21
SOUND TECHNICIAN: Terminating, operating and performing final check-out		

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ELEC0569-006 10/01/2016

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

	Rates	Fringes
Traffic signal, street light and underground work		
Utility Technician #1.....	\$ 29.50	3%+7.42
Utility Technician #2.....	\$ 24.65	3%+7.42

**STREET LIGHT & TRAFFIC SIGNAL WORK:**

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

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

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ELEC0569-008 06/06/2016

	Rates	Fringes
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ELECTRICIAN (Residential, 1-3  
 Stories).....\$ 31.69 3%+6.61

-----  
 ELEC1245-001 06/01/2015

	Rates	Fringes
LINE CONSTRUCTION		
(1) Lineman; Cable splicer..	\$ 52.85	15.53
(2) Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), overhead & underground distribution line equipment).....	\$ 42.21	14.32
(3) Groundman.....	\$ 32.28	14.03
(4) Powderman.....	\$ 47.19	14.60

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

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 ELEV0018-001 01/01/2017

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 52.21	31.585

FOOTNOTE:

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

-----  
 ENGI0012-003 07/01/2016

	Rates	Fringes
OPERATOR: Power Equipment (All Other Work)		
GROUP 1.....	\$ 39.95	23.35
GROUP 2.....	\$ 40.73	23.35
GROUP 3.....	\$ 41.02	23.35
GROUP 4.....	\$ 42.51	23.35
GROUP 5.....	\$ 41.86	23.35
GROUP 6.....	\$ 41.83	23.35
GROUP 8.....	\$ 42.84	23.35
GROUP 9.....	\$ 42.19	23.35
GROUP 10.....	\$ 42.96	23.35
GROUP 11.....	\$ 42.31	23.35
GROUP 12.....	\$ 43.13	23.35

GROUP 13.....	\$ 43.23	23.35
GROUP 14.....	\$ 43.26	23.35
GROUP 15.....	\$ 43.34	23.35
GROUP 16.....	\$ 43.46	23.35
GROUP 17.....	\$ 43.63	23.35
GROUP 18.....	\$ 43.73	23.35
GROUP 19.....	\$ 43.84	23.35
GROUP 20.....	\$ 43.96	23.35
GROUP 21.....	\$ 44.13	23.35
GROUP 22.....	\$ 44.23	23.35
GROUP 23.....	\$ 44.34	23.35
GROUP 24.....	\$ 44.46	23.35
GROUP 25.....	\$ 44.63	23.35
OPERATOR: Power Equipment (Cranes, Piledriving & Hoisting)		
GROUP 1.....	\$ 43.20	22.15
GROUP 2.....	\$ 43.98	22.15
GROUP 3.....	\$ 44.27	22.15
GROUP 4.....	\$ 44.41	22.15
GROUP 5.....	\$ 44.63	22.15
GROUP 6.....	\$ 44.74	22.15
GROUP 7.....	\$ 44.86	22.15
GROUP 8.....	\$ 45.03	22.15
GROUP 9.....	\$ 45.20	22.15
GROUP 10.....	\$ 46.20	22.15
GROUP 11.....	\$ 47.20	22.15
GROUP 12.....	\$ 48.20	22.15
GROUP 13.....	\$ 49.20	22.15
OPERATOR: Power Equipment (Tunnel Work)		
GROUP 1.....	\$ 41.80	23.35
GROUP 2.....	\$ 42.58	23.35
GROUP 3.....	\$ 42.87	23.35
GROUP 4.....	\$ 43.01	23.35
GROUP 5.....	\$ 43.23	23.35
GROUP 6.....	\$ 43.34	23.35
GROUP 7.....	\$ 43.46	23.35

PREMIUM PAY:

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

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

SEE ZONE DEFINITIONS AFTER CLASSIFICATIONS

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Bargeman; Brakeman; Compressor operator; Ditch

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

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

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

GROUP 4: Asphalt plant fireman; Backhoe operator (mini-max or similar type); Boring machine operator; Boxman or mixerman (asphalt or concrete); Chip spreading machine operator; Concrete cleaning decontamination machine operator; Concrete Pump Operator (small portable); Drilling machine operator, small auger types (Texoma super economatic or similar types - Hughes 100 or 200 or similar types - drilling depth of 30' maximum); Equipment greaser (grease truck); Guard rail post driver operator; Highline cableway signalman; Hydra-hammer-aero stomper; Micro Tunneling (above ground tunnel); Power concrete curing machine operator; Power concrete saw operator; Power-driven jumbo form setter operator; Power sweeper operator; Rock Wheel Saw/Trencher; Roller operator (compacting); Screed operator (asphalt or concrete); Trenching machine operator (up to 6 ft.); Vacuum or much truck

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

GROUP 6: Articulating material hauler; Asphalt plant engineer; Batch plant operator; Bit sharpener; Concrete joint machine operator (canal and similar type); Concrete planer operator; Dandy digger; Deck engine operator; Derrickman (oilfield type); Drilling machine operator, bucket or auger types (Calweld 100 bucket or similar types - Watson 1000 auger or similar types - Texoma 330, 500 or 600 auger or similar types - drilling depth of 45' maximum); Drilling machine operator; Hydrographic seeder machine operator (straw, pulp or seed), Jackson track maintainer, or similar type; Kalamazoo Switch tamper, or similar type; Machine tool operator; Maginnis internal full slab vibrator, Mechanical berm, curb or gutter (concrete or asphalt); Mechanical finisher operator (concrete, Clary-Johnson-Bidwell or similar); Micro tunnel system (below ground); Pavement breaker operator (truck mounted); Road oil mixing machine operator; Roller operator (asphalt

or finish), rubber-tired earth moving equipment (single engine, up to and including 25 yds. struck); Self-propelled tar pipelining machine operator; Skiploader operator (crawler and wheel type, over 3/4 yd. and up to and including 1-1/2 yds.); Slip form pump operator (power driven hydraulic lifting device for concrete forms); Tractor operator-bulldozer, tamper-scraper (single engine, up to 100 h.p. flywheel and similar types, up to and including D-5 and similar types); Tugger hoist operator (1 drum); Ultra high pressure waterjet cutting tool system operator; Vacuum blasting machine operator

GROUP 8: Asphalt or concrete spreading operator (tamping or finishing); Asphalt paving machine operator (Barber Greene or similar type); Asphalt-rubber distribution operator; Backhoe operator (up to and including 3/4 yd.), small ford, Case or similar; Cast-in-place pipe laying machine operator; Combination mixer and compressor operator (gunite work); Compactor operator (self-propelled); Concrete mixer operator (paving); Crushing plant operator; Drill Doctor; Drilling machine operator, Bucket or auger types (Calweld 150 bucket or similar types - Watson 1500, 2000 2500 auger or similar types - Texoma 700, 800 auger or similar types - drilling depth of 60' maximum); Elevating grader operator; Grade checker; Gradall operator; Grouting machine operator; Heavy-duty repairman; Heavy equipment robotics operator; Kalamazoo balliste regulator or similar type; Kolman belt loader and similar type; Le Tourneau blob compactor or similar type; Loader operator (Athey, Euclid, Sierra and similar types); Mobark Chipper or similar; Ozzie padder or similar types; P.C. slot saw; Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pumpcrete gun operator; Rock Drill or similar types; Rotary drill operator (excluding caisson type); Rubber-tired earth-moving equipment operator (single engine, caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator (multiple engine up to and including 25 yds. struck); Rubber-tired scraper operator (self-loading paddle wheel type-John Deere, 1040 and similar single unit); Self-propelled curb and gutter machine operator; Shuttle buggy; Skiploader operator (crawler and wheel type over 1-1/2 yds. up to and including 6-1/2 yds.); Soil remediation plant operator; Surface heaters and planer operator; Tractor compressor drill combination operator; Tractor operator (any type larger than D-5 - 100 flywheel h.p. and over, or similar-bulldozer, tamper, scraper and push tractor single engine); Tractor operator (boom attachments), Traveling pipe wrapping, cleaning and bending machine operator; Trenching machine operator (over 6 ft. depth capacity, manufacturer's rating); trenching Machine with Road Miner attachment (over 6 ft depth capacity): Ultra high pressure waterjet cutting tool system mechanic; Water pull (compaction) operator

GROUP 9: Heavy Duty Repairman

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

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

GROUP 12: Auto grader operator; Automatic slip form operator; Drilling machine operator, bucket or auger types (Calweld, auger 200 CA or similar types - Watson, auger 6000 or similar types - Hughes Super Duty, auger 200 or similar types - drilling depth of 175' maximum); Hoe ram or similar with compressor; Mass excavator operator less than 750 cu. yards; Mechanical finishing machine operator; Mobile form traveler operator; Motor patrol operator (multi-engine); Pipe mobile machine operator; Rubber-tired earth-moving equipment operator (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck); Rubber-tired self-loading scraper operator (paddle-wheel-auger type self-loading - two (2) or more units)

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

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

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

GROUP 16: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment

operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

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

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

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

GROUP 20: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

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

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

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

GROUP 24: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system

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

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

#### CRANES, PILEDIVING AND HOISTING EQUIPMENT CLASSIFICATIONS

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

GROUP 2: Truck crane oiler

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

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

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

GROUP 6: Bridge crane operator; Cretor crane operator; Hoist operator (Chicago boom and similar type); Lift mobile operator; Lift slab machine operator (Vagtborg and similar types); Material hoist and/or manlift operator; Polar gantry crane operator; Self Climbing scaffold (or similar type); Shovel, backhoe, dragline, clamshell operator (over 3/4 yd. and up to 5 cu. yds. mrc); Tugger hoist operator

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

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

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

GROUP 10: Crane operator (over 50 tons and up to and including 100 tons mrc); Derrick barge operator (over 50 tons up to and including 100 tons mrc); Hoist operator,

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

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

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

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

#### TUNNEL CLASSIFICATIONS

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

GROUP 2: Power-driven jumbo form setter operator

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

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

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

GROUP 6: Heavy Duty Repairman

GROUP 7: Tunnel mole boring machine operator

#### ENGINEERS ZONES

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

That area within the following Boundary: Begin in San Bernardino County, approximately 3 miles NE of the intersection of I-15 and the California State line at that point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Continue W in a straight line to that point which is the SW corner of the northwest quarter of Section 6, T27S, R42E, Mt. Diablo Meridian. Continue North to the intersection with the Inyo County Boundary at that point which is the NE corner of the western half of the northern quarter of Section 6, T25S, R42E, MDM. Continue W along the Inyo and San Bernardino County boundary until the intersection with Kern County, as that point which is the SE corner of Section 34, T24S, R40E, MDM. Continue W along the Inyo and Kern County boundary until the intersection with Tulare County, at that point which is the SW corner of the SE quarter of Section 32, T24S, R37E, MDM. Continue W along the Kern and Tulare County boundary, until that point which is the NW corner of T25S, R32E, MDM. Continue S following R32E lines to the NW corner of T31S, R32E, MDM. Continue W to the NW corner of T31S, R31E, MDM. Continue S to the SW corner of T32S, R31E, MDM. Continue W to SW corner of SE quarter of Section 34, T32S, R30E, MDM. Continue S to SW corner of T11N, R17W, SBM. Continue E along south boundary of T11N, SBM to SW corner of T11N, R7W, SBM. Continue S to SW corner of T9N, R7W, SBM. Continue E along south boundary of T9N, SBM to SW corner of T9N, R1E, SBM. Continue S along west boundary of R1E, SBM to Riverside County line at the SW corner of T1S, R1E, SBM. Continue E along south boundary of T1S, SBM (Riverside County Line) to SW corner of T1S, R10E, SBM. Continue S along west boundary of R10E, SBM to Imperial County line at the SW corner of T8S, R10E, SBM. Continue W along Imperial and Riverside county line to NW corner of T9S, R9E, SBM. Continue S along the boundary between Imperial and San Diego Counties, along the west edge of R9E, SBM to the south boundary of Imperial County/California state line. Follow the California state line west to Arizona state line, then north to Nevada state line, then continuing NW back to start at the point which is the NW corner of Section 1, T17N, R14E, SBM

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

That area within the following Boundary: Begin approximately 5 miles north of the community of Cholame, on the Monterey County and San Luis Obispo County boundary at the NW corner of T25S, R16E, Mt. Diablo Meridian. Continue south along the west side of R16E to the SW corner of T30S, R16E, MDM. Continue E to SW corner of T30S, R17E, MDM. Continue S to SW corner of T31S, R17E, MDM. Continue E to SW corner of T31S, R18E, MDM. Continue S along West side of R18E, MDM as it crosses into San Bernardino Meridian numbering area and becomes R30W. Follow the west side of R30W, SBM to the SW corner of T9N, R30W, SBM. Continue E along the south edge of T9N, SBM to the Santa

Barbara County and Ventura County boundary at that point which is the SW corner of Section 34, T9N, R24W, SBM, continue S along the Ventura County line to that point which is the SW corner of the SE quarter of Section 32, T7N, R24W, SBM. Continue E along the south edge of T7N, SBM to the SE corner to T7N, R21W, SBM. Continue N along East side of R21W, SBM to Ventura County and Kern County boundary at the NE corner of T8N, R21W. Continue W along the Ventura County and Kern County boundary to the SE corner of T9N, R21W. Continue North along the East edge of R21W, SBM to the NE corner of T12N, R21W, SBM. Continue West along the north edge of T12N, SBM to the SE corner of T32S, R21E, MDM. [T12N SBM is a thin strip between T11N SBM and T32S MDM]. Continue North along the East side of R21E, MDM to the Kings County and Kern County border at the NE corner of T25S, R21E, MDM, continue West along the Kings County and Kern County Boundary until the intersection of San Luis Obispo County. Continue west along the Kings County and San Luis Obispo County boundary until the intersection with Monterey County. Continue West along the Monterey County and San Luis Obispo County boundary to the beginning point at the NW corner of T25S, R16E, MDM.

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

That area within the following Boundary: Begin at the intersection of the northern boundary of Mono County and the California state line at the point which is the center of Section 17, T10N, R22E, Mt. Diablo Meridian. Continue S then SE along the entire western boundary of Mono County, until it reaches Inyo County at the point which is the NE corner of the Western half of the NW quarter of Section 2, T8S, R29E, MDM. Continue SSE along the entire western boundary of Inyo County, until the intersection with Kern County at the point which is the SW corner of the SE 1/4 of Section 32, T24S, R37E, MDM. Continue E along the Inyo and Kern County boundary until the intersection with San Bernardino County at that point which is the SE corner of section 34, T24S, R40E, MDM. Continue E along the Inyo and San Bernardino County boundary until the point which is the NE corner of the Western half of the NW quarter of Section 6, T25S, R42E, MDM. Continue S to that point which is the SW corner of the NW quarter of Section 6, T27S, R42E, MDM. Continue E in a straight line to the California and Nevada state border at the point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Then continue NW along the state line to the starting point, which is the center of Section 18, T10N, R22E, MDM.

REMAINING AREA NOT DEFINED ABOVE RECEIVES BASE RATE

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 ENGI0012-004 08/01/2015

Rates                      Fringes

OPERATOR: Power Equipment  
(DREDGING)

(1) Leverman.....	\$ 49.50	23.60
(2) Dredge dozer.....	\$ 43.53	23.60
(3) Deckmate.....	\$ 43.42	23.60
(4) Winch operator (stern winch on dredge).....	\$ 42.87	23.60
(5) Fireman-Oiler, Deckhand, Bargeman, Leveehand.....	\$ 42.33	23.60
(6) Barge Mate.....	\$ 42.94	23.60

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IRON0377-002 07/01/2016

	Rates	Fringes
Ironworkers:		
Fence Erector.....	\$ 28.33	20.64
Ornamental, Reinforcing and Structural.....	\$ 34.75	29.20

PREMIUM PAY:

\$6.00 additional per hour at the following locations:

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

\$4.00 additional per hour at the following locations:

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

\$2.00 additional per hour at the following locations:

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

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LABO0089-001 07/18/2016

	Rates	Fringes
LABORER (BUILDING and all other Residential Construction)		
Group 1.....	\$ 29.42	19.78
Group 2.....	\$ 30.10	19.78
Group 3.....	\$ 30.81	19.78
Group 4.....	\$ 31.61	19.78
Group 5.....	\$ 33.54	19.78

LABORER (RESIDENTIAL

CONSTRUCTION - See definition below)

(1) Laborer.....	\$ 27.32	18.11
(2) Cleanup, Landscape, Fencing (Chain Link & Wood).	\$ 26.03	18.11

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

#### LABORER CLASSIFICATIONS

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

GROUP 2: Asphalt Shoveler; Cement Dumper (on 1 yard or larger mixer and handling bulk cement); Cesspool digger and installer; Chucktender; Chute man, pouring concrete, the handling of the cute from ready mix trucks, such as walls, slabs, decks, floors, foundations, footings, curbs, gutters and sidewalks; Concrete curer-impervious membrane and form oiler; Cutting torch operator (demoliton); Guinea chaser; Headboard man-asphlt; Laborer, packing rod steel and pans; membrane vapor barrier installer; Power broom sweepers (small); Riiprap, stonepaver, placing stone or wet sacked concrete; Roto scraper and tiller; Tank sealer and cleaner; Tree climber, faller, chain saw operator, Pittsburgh Chipper and similar type brush shredders; Underground laborers, including caisson bellower

GROUP 3: Buggymobile; Concrete cutting torch; Concrete cutting torch; Concrete pile cutter; Driller, jackhammer, 2 1/2 feet drill steel or longer; Dri Pak-it machine; High sealer (including drilling of same); Hydro seeder and similar type; Impact wrench, mult-plate; Kettleman, potmen and mean applying asphalt, lay-kold, creosote, line caustic and similar type materials (applying means applying, dipping, brushing or handling of such materials for pipe wrapping and waterproofing); Operators of pneumatic, gas,

electric tools, vibratring machines, pavement breakers, air blasting, come-along, and similar mechanical tools not separately classified herein; Pipelayers back up man coating, grouting, making of joints, sealing, caulking, diapering and including rubber gasket joints, pointing and any and all other services; Rotary Scarifier or multiple head concrete chipping scaarifier; Steel header board man and guideline setter; Tampers, Barko, Wacker and similar type; Trenching machine, handpropelled

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

GROUP 5: Blasters Powderman-All work of loading holes, placing and blasting of all pwder and explosives of whatever type, regardless of method used for such loading and placing; Driller-all power drills, excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and any and all other types of mechanical drills without regard to the form of motive power.

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LABO0089-002 11/01/2016

	Rates	Fringes
LABORER (MASON TENDER) .....	\$ 29.62	15.89

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LABO0089-004 07/03/2016

HEAVY AND HIGHWAY CONSTRUCTION

	Rates	Fringes
Laborers:		
Group 1 .....	\$ 30.54	17.89
Group 2 .....	\$ 31.00	17.89
Group 3 .....	\$ 31.41	17.89
Group 4 .....	\$ 32.25	17.89

## LABORER CLASSIFICATIONS

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

GROUP 2: Asphalt abatement; Buggymobile; Cement dumper (on 1 yd. or larger mixers and handling bulk cement); Concrete curer, impervious membrane and form oiler; Chute man, pouring concrete; Concrete cutting torch; Concrete pile cutter; driller/Jackhammer, with drill steel 2 1/2 feet or longer; Dry pak-it machine; Fence erector; Pipeline wrapper, gas, oil, water, pot tender & form man; Grout man; Installation of all asphalt overlay fabric and materials used for reinforcing asphalt; Irrigation laborer; Kettleman-Potman hot mop, includes applying asphalt, lay-klold, creosote, lime caustic and similar tyhpes of materials (dipping, brushing, handling) and waterproofing; Membrane vapor barrier installer; Pipelayer backup man (coating, grouting, making of joints, sealing caulkiing, diapering including rubber basket joints, pointing); Rotary scarifier, multiple head concrete chipper; Rock slinger; Roto scraper & tiller; Sandblaster pot tender; Septic tank digger/installer; Tamper/wacker operator; Tank scaler & cleaner; Tar man & mortar man; Tree climber/faller, chainb saw operator, Pittsburgh chipper & similar type brush shredders.

GROUP 3: Asphalt, installation of all frabrics; Buggy Mobile Man, Bushing hammer; Compactor (all types), Concrete Curer - Impervious membrane, Form Oiler, Concrete Cutting Torch, Concrete Pile Cutter, Driller/Jackhammer with drill steel 2 1/2 ft or longer, Dry Pak-it machine, Fence erector including manual post hole digging, Gas oil or water Pipeline Wrapper - 6 ft pipe and over, Guradrail erector, Hydro seeder, Impact Wrench man (multi plate), kettleman-Potman Hot Mop includes applying Asphalt, Lay-Kold, Creosote, lime caustic and similar types of materials (dipping, brushing or handling) and

waterproofing. Laser Beam in connection with Laborer work. High Scaler, Operators of Pneumatic Gas or Electric Tools, Vibrating Machines, Pavement Breakers, Air Blasting, Come-Alongs and similar mechanical tools, Remote-Controlled Robotic Tools in connection with Laborers work. Pipelayer Backup Man (Coating, grouting, making of joints, sealing, caulking, diapering including rubber gasket joints, pointing and other services). Power Post Hole Digger, Rotary Scarifier (multiple head concrete chipper scarifier), Rock Slinger, Shot Blast equipment (8 to 48 inches), Steel Headerboard Man and Guideline Setter, Tamper/Wacker operator and similar types, Trenching Machine hand propelled.

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

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

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LABO0300-005 01/01/2017

	Rates	Fringes
Asbestos Removal Laborer.....	\$ 31.88	16.82

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

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LABO1184-001 07/04/2016

	Rates	Fringes
Laborers: (HORIZONTAL		

DIRECTIONAL DRILLING)

(1) Drilling Crew Laborer...	\$ 33.65	13.95
(2) Vehicle Operator/Hauler...	\$ 33.82	13.95
(3) Horizontal Directional Drill Operator.....	\$ 35.67	13.95
(4) Electronic Tracking Locator.....	\$ 37.67	13.95

Laborers: (STRIPING/SLURRY  
SEAL)

GROUP 1.....	\$ 34.86	17.03
GROUP 2.....	\$ 36.16	17.03
GROUP 3.....	\$ 38.17	17.03
GROUP 4.....	\$ 39.91	17.03

LABORERS - STRIPING CLASSIFICATIONS

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

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

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

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

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LABO1414-003 08/03/2016

	Rates	Fringes
LABORER		
PLASTER CLEAN-UP LABORER....	\$ 31.60	19.28
PLASTER TENDER.....	\$ 34.15	19.28

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

Work at Military Bases - \$3.00 additional per hour:

Coronado Naval Amphibious Base, Fort Irwin, Marine Corps Air Station-29 Palms, Imperial Beach Naval Air Station, Marine Corps Logistics Supply Base, Marine Corps Pickle Meadows, Mountain Warfare Training Center, Naval Air Facility-Seeley, North Island Naval Air Station, Vandenberg AFB.

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PAIN0036-001 08/01/2016

	Rates	Fringes
Painters: (Including Lead Abatement)		
(1) Repaint (excludes San Diego County).....	\$ 27.59	13.24
(2) All Other Work.....	\$ 31.12	13.24

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

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PAIN0036-010 10/01/2015

	Rates	Fringes
DRYWALL FINISHER/TAPER		
(1) Building & Heavy Construction.....	\$ 27.84	15.20
(2) Residential Construction (Wood frame apartments, single family homes and multi-duplexes up to and including four stories).....	\$ 21.00	13.91

-----  
PAIN0036-012 10/01/2016

	Rates	Fringes
GLAZIER.....	\$ 41.55	11.93

-----  
PAIN0036-019 01/01/2017

	Rates	Fringes
SOFT FLOOR LAYER.....	\$ 28.77	13.31

-----  
PLAS0200-005 08/06/2015

	Rates	Fringes
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PLASTERER.....\$ 38.44 13.77

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

-----  
 PLAS0500-001 07/01/2016

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER		
GROUP 1.....	\$ 23.84	21.17
GROUP 2.....	\$ 25.49	21.17
GROUP 3.....	\$ 27.57	21.17

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

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

GROUP 2: Work classified as type I and II construction

GROUP 3: All other work

-----  
 PLUM0016-006 07/01/2016

	Rates	Fringes
PLUMBER, PIPEFITTER, STEAMFITTER		
Camp Pendleton.....	\$ 51.69	21.41
Plumber and Pipefitter All other work except work on new additions and remodeling of bars, restaurant, stores and commercial buildings not to exceed 5,000 sq. ft. of floor space and work on strip malls, light commercial, tenant improvement and remodel work.....	\$ 47.19	21.41
Work ONLY on new additions and remodeling of commercial buildings, bars, restaurants, and stores not to exceed 5,000 sq. ft. of floor space.....	\$ 45.73	20.43
Work ONLY on strip malls, light commercial, tenant		

improvement and remodel  
work.....\$ 35.69 18.76

-----  
PLUM0016-011 07/01/2016

	Rates	Fringes
PLUMBER/PIPEFITTER		
Residential.....	\$ 38.17	17.33

-----  
PLUM0345-001 07/01/2014

	Rates	Fringes
PLUMBER		
Landscape/Irrigation Fitter..	\$ 29.27	19.75
Sewer & Storm Drain Work....	\$ 33.24	17.13

-----  
ROOF0045-001 07/01/2014

	Rates	Fringes
ROOFER.....	\$ 27.73	8.12

-----  
SFCA0669-001 04/01/2016

	Rates	Fringes
SPRINKLER FITTER.....	\$ 37.67	19.56

-----  
SHEE0206-001 07/01/2015

	Rates	Fringes
SHEET METAL WORKER		
Camp Pendleton.....	\$ 37.55	23.23
Except Camp Pendleton.....	\$ 35.33	23.23
Sheet Metal Technician.....	\$ 25.22	6.69

SHEET METAL TECHNICIAN - SCOPE:  
a. Existing residential buildings, both single and multi-family, where each unit is heated and/or cooled by a separate system b. New single family residential buildings including tracts. c. New multi-family residential buildings, not exceeding five stories of living space in height, provided each unit is heated or cooled by a separate system. Hotels and motels are excluded. d. LIGHT COMMERCIAL WORK: Any sheet metal, heating and air conditioning work performed on a project where the total construction cost, excluding land, is under \$1,000,000 e. TENANT IMPROVEMENT WORK: Any work necessary to finish interior spaces to conform to the occupants of commercial buildings, after completion of the building shell

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TEAM0036-001 07/04/2016

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 15.90	30.69
GROUP 2.....	\$ 23.49	30.69
GROUP 3.....	\$ 23.69	30.69
GROUP 4.....	\$ 23.89	30.69
GROUP 5.....	\$ 24.09	30.69
GROUP 6.....	\$ 24.59	30.69
GROUP 7.....	\$ 26.09	30.69

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

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Fuel Man, Swamper

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

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

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

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

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

GROUP 7: Repairman

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

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

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

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

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

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

#### Survey Rate Identifiers

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

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

#### Union Average Rate Identifiers

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

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

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#### WAGE DETERMINATION APPEALS PROCESS

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

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

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

and 3.) should be followed.

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

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

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

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

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

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

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

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

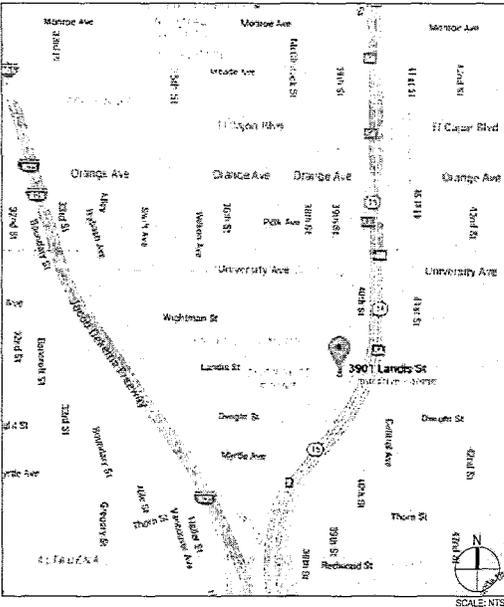
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END OF GENERAL DECISION

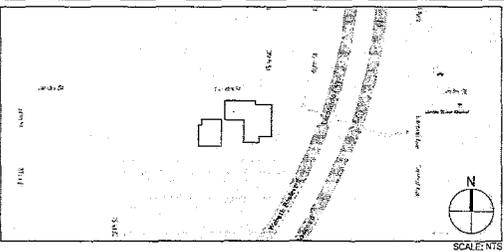
# PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS

3901 LANDIS STREET, SAN DIEGO, CA 92105

## LOCATION MAP



## VICINITY MAP



## PARK CONSTRUCTION INSPECTION STAGES AND INSPECTION TEAM

### PARK INSPECTION TEAM

- SITE SUPERINTENDENT (CONTRACTOR/DEVELOPER'S REPRESENTATIVE)
- CONTRACTOR(S)
- RESIDENT ENGINEER FROM CONSTRUCTION MANAGEMENT & FIELD SERVICES
- CITY PROJECT MANAGER
- DESIGN CONSULTANT
- PARK AND RECREATION DISTRICT MANAGER
- PARK AND RECREATION ASSET MANAGER

### PARK CONSTRUCTION INSPECTION STAGES; (MINIMUM DEPENDING ON PROJECT)

- PRE-CONSTRUCTION MEETING.
- ROUGH GRADING AND DRAINAGE.
- IRRIGATION MAINLINE PRESSURE TEST.
- IRRIGATION LATERAL LINE PRESSURE TESTS.
- WIRING PRIOR TO BACKFILLING TRENCHES.
- HARDSCAPE AT TIME OF FINISHED STAKING AND LAYOUT.
- FINISH GRADING AND SOIL PREPARATION.
- IRRIGATION COVERAGE TEST.
- PLANT MATERIAL (WHEN DELIVERED) AND PLACEMENT APPROVAL.
- PROJECT CONSTRUCTION 50 PERCENT COMPLETE (DEVELOP PUNCH LIST AND SUBMIT)
- 90-DAY PLANT ESTABLISHMENT PERIOD (THIS INSPECTION IS TO BE HELD WHEN THE PUNCH LIST ITEMS ARE COMPLETE, IF TURF AREA IS PLANTED FROM SEED OR STOLONS, THE PLANT MAINTENANCE PERIOD SHALL BE 90-DAYS).
- FINAL WALK-THROUGH, ACCEPTANCE BY THE CITY, CONTRACTOR TO SUBMIT FINAL APPROVED AS-BUILT DRAWINGS TO THE CITY.

## UNDERGROUND UTILITIES

BEFORE EXCAVATING, VERIFY THE LOCATION OF UNDERGROUND UTILITIES. AT LEAST THREE (3) WORKING DAYS PRIOR TO EXCAVATION, THE CONTRACTOR SHALL REQUEST A MARKOUT OF UNDERGROUND UTILITIES BY CALLING THE BELOW LISTED REGIONAL NOTIFICATION CENTER FOR AN INQUIRY IDENTIFICATION NUMBER:

UNDERGROUND SERVICE ALERT (GAS, ELECTRIC, TELEPHONE, WATER, SEWER, LIGHTING & T.V.)	800-422-4133
CITY IRRIGATION SYSTEMS & WIRING	619-533-5783
CITY FACILITIES MAINTENANCE DIVISION	619-525-6500

## LEGAL DESCRIPTION

ASSESSOR'S PARCEL NUMBER: 447-662-03  
 PARK DE LA CRUZ OF CITY HEIGHTS, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MEMORANDUM THEREOF NO. 1007, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, OCTOBER 3, 1956.  
 EXCEPT THEREFROM THAT PORTION DEEDED TO THE STATE OF CALIFORNIA IN GRANT DEED RECORDED MARCH 20, 1988 AS INSTRUMENT NO. 95-6125187 OF OFFICIAL RECORDS.  
 ALSO, EXCEPTING THEREFROM THAT PORTION DEEDED TO THE STATE OF CALIFORNIA IN GRANT DEED RECORDED APRIL 8, 2001 AS INSTRUMENT NO. 2001-0213178 OF OFFICIAL RECORDS.

## PROJECT DIRECTORY

### CLIENT/LEGAL OWNER

CITY OF SAN DIEGO  
 PUBLIC WORKS DEPARTMENT  
 ENGINEERING & CAPITAL PROJECTS  
 525 B STREET SUITE 750 MS #900A  
 SAN DIEGO, CA 92101-3885  
 PHONE: (619) 533-7525  
 ALEXANDRA CORSEI, PROJECT MANAGER

### LEAD CONSULTANT

SCHMIDT DESIGN GROUP  
 1111 6TH AVENUE, SUITE 500  
 SAN DIEGO, CA 92101  
 PHONE: (619) 235-1952  
 JEFF JUSTUS, PROJECT MANAGER

### ARCHITECT

PLATT/WHITELEW ARCHITECTS, INC.  
 4034 30TH STREET  
 SAN DIEGO, CA 92161  
 PH: (619) 548-4226  
 FAX: (619) 548-4350  
 SANDRA GRAMLEY, PROJECT ARCHITECT

### STRUCTURAL ENGINEER

AARK ENGINEERING, INC.  
 1870 CORDELL COURT, SUITE 202  
 SAN DIEGO, CA 92108  
 PH: (619) 312-8336  
 FAX: (619) 312-6560  
 DANIEL GRANT

### MECHANICAL/ELECTRICAL/PLUMBING ENGINEER

SBE ENGINEERING  
 10880 TRENA STREET,  
 SUITE 100  
 SAN DIEGO, CA 92131  
 PH: (659) 279-2000  
 FAX: (659) 279-2626  
 TAMARA BADKHERHANIAN-GANEV

## CITY OF SAN DIEGO POLICY COMPLIANCE

- BACKFLOW DEVICE IS EXISTING AND SHALL BE PROTECTED AS PART OF THIS PROJECT, UNLESS OTHERWISE NOTED.
- COMPLY WITH HAZARDOUS MATERIALS PER CITY OF SAN DIEGO BULLETIN 116
- COMPLY WITH CONSTRUCTION AND DEMOLITION DEBRIS PER CITY BULLETIN 119
- COMPLY WITH STORM WATER REQUIREMENTS PER CITY OF SAN DIEGO STORM WATER MANAGEMENT PLAN AS DETERMINED BY FORM DS-560. PROJECT DOES NOT DISTURB MORE THAN 1 ACRE AND CREATES LESS THAN 5000 SF OF IMPERVIOUS SURFACES. PROJECT DOES NOT REQUIRE A N.P.D.E.S. PERMIT. PROJECT WILL REQUIRE CONSTRUCTION BMP. PER SECTION IV OF THE CITY OF SAN DIEGO'S STORM WATER STANDARDS MANUAL.

## RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ARCHITECT OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED REASONABLE CARE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME AS ARCHITECT OR ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

SANDRA GRAMLEY, IC-21073 FEBRUARY 15, 2017  
 PLATT/WHITELEW ARCHITECTS INC.

## DESCRIPTION OF WORK

COMPLETE BUILDING REMODEL INCLUDES REVISED FLOOR LAYOUT, NEW FINISHES, ACCESSIBILITY BARRIER REMOVALS, ENVELOPE UPGRADES, NEW WINDOWS, NEW DOORS, NEW ELEVATOR, AND UPGRADED OR REPLACED MECHANICAL/ELECTRICAL/PLUMBING FIRE ALARM SYSTEMS. ALSO INCLUDES HAZARDOUS MATERIALS ABATEMENT AND RENOVATION WORK AT GYMNASIUM.

APPROXIMATE AREA OF REMODEL AT COMMUNITY CENTER: 20,330 SF  
 APPROXIMATE AREA OF RENOVATION AT GYMNASIUM: 8,350 SF

## MONUMENTATION/SURVEY NOTES

THE CONTRACTOR SHALL BE RESPONSIBLE FOR SURVEY MONUMENTS AND/OR VERTICAL CONTROL. BENCHMARKS WHICH ARE DISTURBED OR DESTROYED BY CONSTRUCTION, A LICENSED LAND SURVEYOR OR LICENSED CIVIL ENGINEER AUTHORIZED TO PRACTICE LAND SURVEYING IN THE STATE OF CALIFORNIA SHALL FIELD LOCATE, REFERENCE, AND/OR PRESERVE ALL HISTORICAL OR CONTROLLING MONUMENTS PRIOR ANY EARTHWORK, DEMOLITION OR SURFACE IMPROVEMENTS. IF DESTROYED, A LICENSED LAND SURVEYOR SHALL REPLACE SUCH MONUMENT(S) WITH APPROPRIATE MONUMENTS. WHEN SETTING SURVEY MONUMENTS USED FOR RE-ESTABLISHMENT OF THE DISTURBED CONTROLLING SURVEY MONUMENTS AS REQUIRED BY SECTIONS 6730.2 AND 8771 OF THE BUSINESS AND PROFESSIONS CODE OF THE STATE OF CALIFORNIA, A CORNER RECORD OR RECORD OF SURVEY, AS APPROPRIATE, SHALL BE FILED WITH THE COUNTY SURVEYOR. IF ANY VERTICAL CONTROL IS TO BE DISTURBED OR DESTROYED, THE CITY OF SAN DIEGO FIELD SURVEY SECTION SHALL BE NOTIFIED IN WRITING AT LEAST 7 DAYS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF REPLACING AND VERTICAL CONTROL BENCHMARKS DESTROYED BY THE CONSTRUCTION.

## ALTERNATE BID ITEMS

SEE BID SCHEDULE IN BIDD DOCUMENTS. THE FOLLOWING KEY NOTICES HAVE BEEN USED ON THE PLANS TO DENOTATE ALTERNATE BID ITEMS. CONSTRUCTION WILL BE COMPLETED IN A SINGLE PHASE, ANY REFERENCE TO PHASE 2 BASE BID AND ALTERNATES IS IN REFERENCE TO PHASING OF PROJECT FUNDING.

- PHASE 1 BASE BID  
 ALTERNATE 1 - FIRE SUPPRESSION SYSTEM AT REC CENTER. DEFERRED SUBMITTAL (NOT NOTED ON PLANS)  
 ALTERNATE 2 - MODULAR ELEVATOR. DEFERRED SUBMITTAL (NOT NOTED ON PLANS)
- PHASE 2 BASE BID - HVAC SYSTEM AT GYM AND BUILDING ENVELOPE UPGRADES. GYM HVAC IS DEFERRED SUBMITTAL.  
 ALTERNATE BID 1 - NOT USED  
 ALTERNATE BID 2 - DEMOLITION OF BOILER AND POOL EQUIPMENT  
 ALTERNATE BID 3 - EXTERIOR FACADE IMPROVEMENTS  
 ALTERNATE BID 4 - NIGHTTIME MONUMENT SIGN. DEFERRED SUBMITTAL  
 ALTERNATE BID 5 - LOBBY UPGRADES. DEFERRED SUBMITTAL

## DEFERRED SUBMITTAL ITEMS

- PLANS FOR DEFERRED SUBMITTAL ITEMS SHALL BE SUBMITTED BY CONTRACTOR TO THE CITY OF SAN DIEGO FOR REVIEW AND APPROVAL:
  - FIRE SPRINKLER SYSTEM (SPEC 211300 & 211300.01)
  - MODULAR ELEVATOR (SPEC 142-006)
  - GYM HVAC SYSTEM (SPEC 239999)
- IT IS UNDERSTOOD THAT PLANS FOR THE PROJECT HAVE, AT THIS TIME, BEEN REVIEWED FOR COMPLIANCE WITH ALL APPLICABLE STATE AND CITY REGULATIONS, AND THAT THE PROJECT AS A WHOLE HAS BEEN APPROVED BY THE CITY, WITH THE EXCEPTION OF THE DEFERRED ITEMS LISTED.
- I/WE UNDERSTAND THAT I/WE WILL NOT BE AUTHORIZED FOR ANY INSPECTION OF THE DEFERRED ITEMS PRIOR TO THE SUBMITTAL AND APPROVAL OF PLANS AND/OR CALCULATIONS FOR THOSE DEFERRED ITEMS.
- COMPLETE PLANS AND SPECIFICATIONS FOR ALL FIRE EXTINGUISHING SYSTEMS, INCLUDING AUTOMATIC SPRINKLER AND STANDPIPE SYSTEMS AND OTHER SPECIAL FIRE EXTINGUISHING SYSTEMS AND RELATED APPEARANCES SHALL BE SUBMITTED TO THE CITY OF SAN DIEGO FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.

## OCCUPANCIES & TYPE OF CONSTRUCTION

NO CHANGE OF OCCUPANCIES OR TYPE OF CONSTRUCTION PROPOSED.  
 BUILDING OCCUPANCIES INCLUDE B, A3, AND S2.  
 TYPE OF CONSTRUCTION IS V-A.  
 SEE SHEET G-003 FOR COMPLETE CODE ANALYSIS.

T-001

CONSTRUCTION CHANGE / ADDENDUM			
CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.
A	4/25/17	6,8,9,17,30,38,44,45,47,48,49,50,91,92,23,94,95,96,149	

**WARNING**  
 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of San Diego Public Works

**PLATT/WHITELEW ARCHITECTS, INC.**  
 4034 30th Street, SAN DIEGO CA 92164  
 (619) 548-4226 FAX (619) 548-4350

**CONSULTANT**

**SCHMIDT DESIGN GROUP, INC.**  
 1111 6TH AVENUE, SUITE 500 SAN DIEGO, CA 92101  
 (619) 235-1952 FAX (619) 235-1952

**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS**

**COVER SHEET**

SPEC. NO. 1537  
 CITY OF SAN DIEGO, CALIFORNIA  
 PUBLIC WORKS DEPARTMENT  
 SHEET 1 OF 153 SHEETS

WBS S-16059

DATE: 2/23/17  
 DATE: 7/31/17

DESIGNED BY: SAHIR MAHMOUD  
 CHECKED BY: SAHIR MAHMOUD  
 DATE: 7/31/17

PROJECT NUMBER: 217-1735  
 00537 COORDINATOR  
 1852-6297  
 02581 COORDINATOR

CONTRACTOR: DATE STARTED: DATE COMPLETED: 39752-1 - D

PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL

**MEANS OF EGRESS SIZING NOTES**

1. ALL MEANS OF EGRESS COMPONENTS MEET MINIMUM WIDTHS REQUIRED PER CBC.
2. ALL STAIRS ARE 48" OR GREATER IN WIDTH.  
LARGEST OCCUPANT LOAD IS 34 WITH ALLOWABLE OCCUPANT LOAD OF 153.
3. ALL EGRESS DOORS ARE 37" OR GREATER IN WIDTH.  
LARGEST OCCUPANT LOAD IS 154 WITH ALLOWABLE OCCUPANT LOAD OF 360.
4. ALL HALLWAYS ARE WIDER THAN 44".  
SEE A-111 AND A-112 FOR HALL WIDTHS.
5. EXIT TRAVEL DISTANCE FROM MOST REMOTE LOCATIONS:  
LOWER FLOOR 95'  
MAIN FLOOR 131'  
UPPER FLOOR 137'

**GENERAL NOTES**

1. EXIT DOORS COMPLY WITH REQUIREMENT TO BE PLACED AT LEAST 1 1/2 THE MAXIMUM OVERALL DIAGONAL OF AREA SERVED.
2. EXIT WIDTH:  
2.7 OCC. @ DOORS  
1.7 OCC. @ STAIRS
3. SEE ELECTRICAL FOR ILLUMINATED EXIT SIGNS
4. SEE A-99 SIGNAGE DETAILS FOR SIGN TYPES INDICATED. THIS IS INCLUDES TACTILE EXIT SIGNS THAT COMPLY WITH CBC 118-703 AND 1011.4. REFERENCE SIGNAGE PLANS A-95, A-96, A-97, A-98.

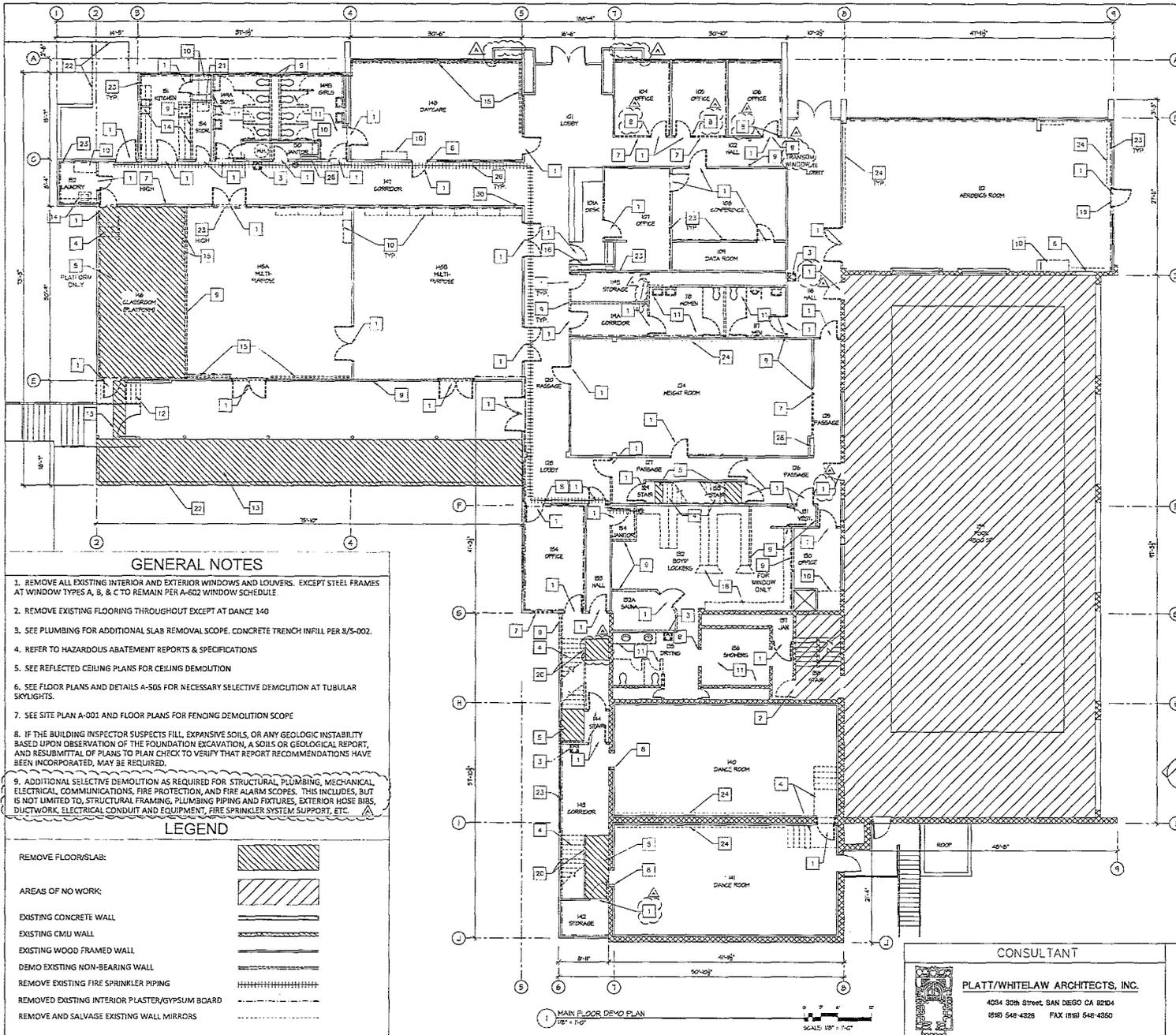
**CODE ANALYSIS**

OCCUPANCY	PER TABLE A.CPC	PER TABLE A.CPC
A-3	3,906 SF	263 OCC.
A-3 POOL	4,300 SF	131 OCC. (305F/OCC.)
B	9,533 SF	220 OCC.
S	2,142 SF	12 OCC.
<b>TOTAL</b>	<b>19,881 SF</b>	<b>623 OCCUPANTS</b>
OTHER - HALLS, RR, STAIRS, WALLS, CHASE		
	4,742 SF	
	<b>TOTAL = 24,623 SF</b>	
<b>TOTAL # OCCUPANTS = 623</b>		
<b>TYPE OF CONST. = VA</b>	USE SPRINKLER SUBSTITUTION FOR 1HR CONSTRUCTION	

ALLOWABLE AREA (SEE A-001 FOR PROPERTY LINES AND FRONTAGE)

$W = (L1 \times W1 + L2 \times W2 + L3 \times W3) / F$       If = (FP - 0.25) W30  
 $W = (125 \times 30 + 125 \times 30 + 186 \times 30 + 184 \times 30) / 620$       If = [ 88 - 0.25 ] 74  
 $W = 29.50$       If = .74

$V_A = (A1 - A2) + (A3 - A4) + (A5 - A6) + (A7 - A8) + (A9 - A10) + (A11 - A12) + (A13 - A14) + (A15 - A16) + (A17 - A18) + (A19 - A20) + (A21 - A22) + (A23 - A24) + (A25 - A26) + (A27 - A28) + (A29 - A30) + (A31 - A32) + (A33 - A34) + (A35 - A36) + (A37 - A38) + (A39 - A40) + (A41 - A42) + (A43 - A44) + (A45 - A46) + (A47 - A48) + (A49 - A50) + (A51 - A52) + (A53 - A54) + (A55 - A56) + (A57 - A58) + (A59 - A60) + (A61 - A62) + (A63 - A64) + (A65 - A66) + (A67 - A68) + (A69 - A70) + (A71 - A72) + (A73 - A74) + (A75 - A76) + (A77 - A78) + (A79 - A80) + (A81 - A82) + (A83 - A84) + (A85 - A86) + (A87 - A88) + (A89 - A90) + (A91 - A92) + (A93 - A94) + (A95 - A96) + (A97 - A98) + (A99 - A100) + (A101 - A102) + (A103 - A104) + (A105 - A106) + (A107 - A108) + (A109 - A110) + (A111 - A112) + (A113 - A114) + (A115 - A116) + (A117 - A118) + (A119 - A120) + (A121 - A122) + (A123 - A124) + (A125 - A126) + (A127 - A128) + (A129 - A130) + (A131 - A132) + (A133 - A134) + (A135 - A136) + (A137 - A138) + (A139 - A140) + (A141 - A142) + (A143 - A144) + (A145 - A146) + (A147 - A148) + (A149 - A150) + (A151 - A152) + (A153 - A154) + (A155 - A156) + (A157 - A158) + (A159 - A160) + (A161 - A162) + (A163 - A164) + (A165 - A166) + (A167 - A168) + (A169 - A170) + (A171 - A172) + (A173 - A174) + (A175 - A176) + (A177 - A178) + (A179 - A180) + (A181 - A182) + (A183 - A184) + (A185 - A186) + (A187 - A188) + (A189 - A190) + (A191 - A192) + (A193 - A194) + (A195 - A196) + (A197 - A198) + (A199 - A200) + (A201 - A202) + (A203 - A204) + (A205 - A206) + (A207 - A208) + (A209 - A210) + (A211 - A212) + (A213 - A214) + (A215 - A216) + (A217 - A218) + (A219 - A220) + (A221 - A222) + (A223 - A224) + (A225 - A226) + (A227 - A228) + (A229 - A230) + (A231 - A232) + (A233 - A234) + (A235 - A236) + (A237 - A238) + (A239 - A240) + (A241 - A242) + (A243 - A244) + (A245 - A246) + (A247 - A248) + (A249 - A250) + (A251 - A252) + (A253 - A254) + (A255 - A256) + (A257 - A258) + (A259 - A260) + (A261 - A262) + (A263 - A264) + (A265 - A266) + (A267 - A268) + (A269 - A270) + (A271 - A272) + (A273 - A274) + (A275 - A276) + (A277 - A278) + (A279 - A280) + (A281 - A282) + (A283 - A284) + (A285 - A286) + (A287 - A288) + (A289 - A290) + (A291 - A292) + (A293 - A294) + (A295 - A296) + (A297 - A298) + (A299 - A300) + (A301 - A302) + (A303 - A304) + (A305 - A306) + (A307 - A308) + (A309 - A310) + (A311 - A312) + (A313 - A314) + (A315 - A316) + (A317 - A318) + (A319 - A320) + (A321 - A322) + (A323 - A324) + (A325 - A326) + (A327 - A328) + (A329 - A330) + (A331 - A332) + (A333 - A334) + (A335 - A336) + (A337 - A338) + (A339 - A340) + (A341 - A342) + (A343 - A344) + (A345 - A346) + (A347 - A348) + (A349 - A350) + (A351 - A352) + (A353 - A354) + (A355 - A356) + (A357 - A358) + (A359 - A360) + (A361 - A362) + (A363 - A364) + (A365 - A366) + (A367 - A368) + (A369 - A370) + (A371 - A372) + (A373 - A374) + (A375 - A376) + (A377 - A378) + (A379 - A380) + (A381 - A382) + (A383 - A384) + (A385 - A386) + (A387 - A388) + (A389 - A390) + (A391 - A392) + (A393 - A394) + (A395 - A396) + (A397 - A398) + (A399 - A400) + (A401 - A402) + (A403 - A404) + (A405 - A406) + (A407 - A408) + (A409 - A410) + (A411 - A412) + (A413 - A414) + (A415 - A416) + (A417 - A418) + (A419 - A420) + (A421 - A422) + (A423 - A424) + (A425 - A426) + (A427 - A428) + (A429 - A430) + (A431 - A432) + (A433 - A434) + (A435 - A436) + (A437 - A438) + (A439 - A440) + (A441 - A442) + (A443 - A444) + (A445 - A446) + (A447 - A448) + (A449 - A450) + (A451 - A452) + (A453 - A454) + (A455 - A456) + (A457 - A458) + (A459 - A460) + (A461 - A462) + (A463 - A464) + (A465 - A466) + (A467 - A468) + (A469 - A470) + (A471 - A472) + (A473 - A474) + (A475 - A476) + (A477 - A478) + (A479 - A480) + (A481 - A482) + (A483 - A484) + (A485 - A486) + (A487 - A488) + (A489 - A490) + (A491 - A492) + (A493 - A494) + (A495 - A496) + (A497 - A498) + (A499 - A500) + (A501 - A502) + (A503 - A504) + (A505 - A506) + (A507 - A508) + (A509 - A510) + (A511 - A512) + (A513 - A514) + (A515 - A516) + (A517 - A518) + (A519 - A520) + (A521 - A522) + (A523 - A524) + (A525 - A526) + (A527 - A528) + (A529 - A530) + (A531 - A532) + (A533 - A534) + (A535 - A536) + (A537 - A538) + (A539 - A540) + (A541 - A542) + (A543 - A544) + (A545 - A546) + (A547 - A548) + (A549 - A550) + (A551 - A552) + (A553 - A554) + (A555 - A556) + (A557 - A558) + (A559 - A560) + (A561 - A562) + (A563 - A564) + (A565 - A566) + (A567 - A568) + (A569 - A570) + (A571 - A572) + (A573 - A574) + (A575 - A576) + (A577 - A578) + (A579 - A580) + (A581 - A582) + (A583 - A584) + (A585 - A586) + (A587 - A588) + (A589 - A590) + (A591 - A592) + (A593 - A594) + (A595 - A596) + (A597 - A598) + (A599 - A600) + (A601 - A602) + (A603 - A604) + (A605 - A606) + (A607 - A608) + (A609 - A610) + (A611 - A612) + (A613 - A614) + (A615 - A616) + (A617 - A618) + (A619 - A620) + (A621 - A622) + (A623 - A624) + (A625 - A626) + (A627 - A628) + (A629 - A630) + (A631 - A632) + (A633 - A634) + (A635 - A636) + (A637 - A638) + (A639 - A640) + (A641 - A642) + (A643 - A644) + (A645 - A646) + (A647 - A648) + (A649 - A650) + (A651 - A652) + (A653 - A654) + (A655 - A656) + (A657 - A658) + (A659 - A660) + (A661 - A662) + (A663 - A664) + (A665 - A666) + (A667 - A668) + (A669 - A670) + (A671 - A672) + (A673 - A674) + (A675 - A676) + (A677 - A678) + (A679 - A680) + (A681 - A682) + (A683 - A684) + (A685 - A686) + (A687 - A688) + (A689 - A690) + (A691 - A692) + (A693 - A694) + (A695 - A696) + (A697 - A698) + (A699 - A700) + (A701 - A702) + (A703 - A704) + (A705 - A706) + (A707 - A708) + (A709 - A710) + (A711 - A712) + (A713 - A714) + (A715 - A716) + (A717 - A718) + (A719 - A720) + (A721 - A722) + (A723 - A724) + (A725 - A726) + (A727 - A728) + (A729 - A730) + (A731 - A732) + (A733 - A734) + (A735 - A736) + (A737 - A738) + (A739 - A740) + (A741 - A742) + (A743 - A744) + (A745 - A746) + (A747 - A748) + (A749 - A750) + (A751 - A752) + (A753 - A754) + (A755 - A756) + (A757 - A758) + (A759 - A760) + (A761 - A762) + (A763 - A764) + (A765 - A766) + (A767 - A768) + (A769 - A770) + (A771 - A772) + (A773 - A774) + (A775 - A776) + (A777 - A778) + (A779 - A780) + (A781 - A782) + (A783 - A784) + (A785 - A786) + (A787 - A788) + (A789 - A790) + (A791 - A792) + (A793 - A794) + (A795 - A796) + (A797 - A798) + (A799 - A800) + (A801 - A802) + (A803 - A804) + (A805 - A806) + (A807 - A808) + (A809 - A810) + (A811 - A812) + (A813 - A814) + (A815 - A816) + (A817 - A818) + (A819 - A820) + (A821 - A822) + (A823 - A824) + (A825 - A826) + (A827 - A828) + (A829 - A830) + (A831 - A832) + (A833 - A834) + (A835 - A836) + (A837 - A838) + (A839 - A840) + (A841 - A842) + (A843 - A844) + (A845 - A846) + (A847 - A848) + (A849 - A850) + (A851 - A852) + (A853 - A854) + (A855 - A856) + (A857 - A858) + (A859 - A860) + (A861 - A862) + (A863 - A864) + (A865 - A866) + (A867 - A868) + (A869 - A870) + (A871 - A872) + (A873 - A874) + (A875 - A876) + (A877 - A878) + (A879 - A880) + (A881 - A882) + (A883 - A884) + (A885 - A886) + (A887 - A888) + (A889 - A890) + (A891 - A892) + (A893 - A894) + (A895 - A896) + (A897 - A898) + (A899 - A900) + (A901 - A902) + (A903 - A904) + (A905 - A906) + (A907 - A908) + (A909 - A910) + (A911 - A912) + (A913 - A914) + (A915 - A916) + (A917 - A918) + (A919 - A920) + (A921 - A922) + (A923 - A924) + (A925 - A926) + (A927 - A928) + (A929 - A930) + (A931 - A932) + (A933 - A934) + (A935 - A936) + (A937 - A938) + (A939 - A940) + (A941 - A942) + (A943 - A944) + (A945 - A946) + (A947 - A948) + (A949 - A950) + (A951 - A952) + (A953 - A954) + (A955 - A956) + (A957 - A958) + (A959 - A960) + (A961 - A962) + (A963 - A964) + (A965 - A966) + (A967 - A968) + (A969 - A970) + (A971 - A972) + (A973 - A974) + (A975 - A976) + (A977 - A978) + (A979 - A980) + (A981 - A982) + (A983 - A984) + (A985 - A986) + (A987 - A988) + (A989 - A990) + (A991 - A992) + (A993 - A994) + (A995 - A996) + (A997 - A998) + (A999 - A1000) + (A1001 - A1002) + (A1003 - A1004) + (A1005 - A1006) + (A1007 - A1008) + (A1009 - A1010) + (A1011 - A1012) + (A1013 - A1014) + (A1015 - A1016) + (A1017 - A1018) + (A1019 - A1020) + (A1021 - A1022) + (A1023 - A1024) + (A1025 - A1026) + (A1027 - A1028) + (A1029 - A1030) + (A1031 - A1032) + (A1033 - A1034) + (A1035 - A1036) + (A1037 - A1038) + (A1039 - A1040) + (A1041 - A1042) + (A1043 - A1044) + (A1045 - A1046) + (A1047 - A1048) + (A1049 - A1050) + (A1051 - A1052) + (A1053 - A1054) + (A1055 - A1056) + (A1057 - A1058) + (A1059 - A1060) + (A1061 - A1062) + (A1063 - A1064) + (A1065 - A1066) + (A1067 - A1068) + (A1069 - A1070) + (A1071 - A1072) + (A1073 - A1074) + (A1075 - A1076) + (A1077 - A1078) + (A1079 - A1080) + (A1081 - A1082) + (A1083 - A1084) + (A1085 - A1086) + (A1087 - A1088) + (A1089 - A1090) + (A1091 - A1092) + (A1093 - A1094) + (A1095 - A1096) + (A1097 - A1098) + (A1099 - A1100) + (A1101 - A1102) + (A1103 - A1104) + (A1105 - A1106) + (A1107 - A1108) + (A1109 - A1110) + (A1111 - A1112) + (A1113 - A1114) + (A1115 - A1116) + (A1117 - A1118) + (A1119 - A1120) + (A1121 - A1122) + (A1123 - A1124) + (A1125 - A1126) + (A1127 - A1128) + (A1129 - A1130) + (A1131 - A1132) + (A1133 - A1134) + (A1135 - A1136) + (A1137 - A1138) + (A1139 - A1140) + (A1141 - A1142) + (A1143 - A1144) + (A1145 - A1146) + (A1147 - A1148) + (A1149 - A1150) + (A1151 - A1152) + (A1153 - A1154) + (A1155 - A1156) + (A1157 - A1158) + (A1159 - A1160) + (A1161 - A1162) + (A1163 - A1164) + (A1165 - A1166) + (A1167 - A1168) + (A1169 - A1170) + (A1171 - A1172) + (A1173 - A1174) + (A1175 - A1176) + (A1177 - A1178) + (A1179 - A1180) + (A1181 - A1182) + (A1183 - A1184) + (A1185 - A1186) + (A1187 - A1188) + (A1189 - A1190) + (A1191 - A1192) + (A1193 - A1194) + (A1195 - A1196) + (A1197 - A1198) + (A1199 - A1200) + (A1201 - A1202) + (A1203 - A1204) + (A1205 - A1206) + (A1207 - A1208) + (A1209 - A1210) + (A1211 - A1212) + (A1213 - A1214) + (A1215 - A1216) + (A1217 - A1218) + (A1219 - A1220) + (A1221 - A1222) + (A1223 - A1224) + (A1225 - A1226) + (A1227 - A1228) + (A1229 - A1230) + (A1231 - A1232) + (A1233 - A1234) + (A1235 - A1236) + (A1237 - A1238) + (A1239 - A1240) + (A1241 - A1242) + (A1243 - A1244) + (A1245 - A1246) + (A1247 - A1248) + (A1249 - A1250) + (A1251 - A1252) + (A1253 - A1254) + (A1255 - A1256) + (A1257 - A1258) + (A1259 - A1260) + (A1261 - A1262) + (A1263 - A1264) + (A1265 - A1266) + (A1267 - A1268) + (A1269 - A1270) + (A1271 - A1272) + (A1273 - A1274) + (A1275 - A1276) + (A1277 - A1278) + (A1279 - A1280) + (A1281 - A1282) + (A1283 - A1284) + (A1285 - A1286) + (A1287 - A1288) + (A1289 - A1290) + (A1291 - A1292) + (A1293 - A1294) + (A1295 - A1296) + (A1297 - A1298) + (A1299 - A1300) + (A1301 - A1302) + (A1303 - A1304) + (A1305 - A1306) + (A1307 - A1308) + (A1309 - A1310) + (A1311 - A1312) + (A1313 - A1314) + (A1315 - A1316) + (A1317 - A1318) + (A1319 - A1320) + (A1321 - A1322) + (A1323 - A1324) + (A1325 - A1326) + (A1327 - A1328) + (A1329 - A1330) + (A1331 - A1332) + (A1333 - A1334) + (A1335 - A1336) + (A1337 - A1338) + (A1339 - A1340) + (A1341 - A1342) + (A1343 - A1344) + (A1345 - A1346) + (A1347 - A1348) + (A1349 - A1350) + (A1351 - A1352) + (A1353 - A1354) + (A1355 - A1356) + (A1357 - A1358) + (A1359 - A1360) + (A1361 - A1362) + (A1363 - A1364) + (A1365 - A1366) + (A1367 - A1368) + (A1369 - A1370) + (A1371 - A1372) + (A1373 - A1374) + (A1375 - A1376) + (A1377 - A1378) + (A1379 - A1380) + (A1381 - A1382) + (A1383 - A1384) + (A1385 - A1386) + (A1387 - A1388) + (A1389 - A1390) + (A1391 - A1392) + (A1393 - A1394) + (A1395 - A1396) + (A1397 - A1398) + (A1399 - A1400) + (A1401 - A1402) + (A1403 - A1404) + (A1405 - A1406) + (A1407 - A1408) + (A1409 - A1410) + (A1411 - A1412) + (A1413 - A1414) + (A1415 - A1416) + (A1417 - A1418) + (A1419 - A1420) + (A1421 - A1422) + (A1423 - A1424) + (A1425 - A1426) + (A1427 - A1428) + (A1429 - A1430) + (A1431 - A1432) + (A1433 - A1434) + (A1435 - A1436) + (A1437 - A1438) + (A1439 - A1440) + (A1441 - A1442) + (A1443 - A1444) + (A1445 - A1446) + (A1447 - A1448) + (A1449 - A1450) + (A1451 - A1452) + (A1453 - A1454) + (A1455 - A1456) + (A1457 - A1458) + (A1459 - A1460) + (A1461 - A1462) + (A1463 - A1464) + (A1465 - A1466) + (A1467 - A1468) + (A1469 - A1470) + (A1471 - A1472) + (A1473 - A1474) + (A1475 - A1476) + (A1477 - A1478) + (A1479 - A1480) + (A1481 - A1482) + (A1483 - A1484) + (A1485 - A1486) + (A1487 - A1488) + (A1489 - A1490) + (A1491 - A1492) + (A1493 - A1494) + (A1495 - A1496) + (A1497 - A1498) + (A1499 - A1500) + (A1501 - A1502) + (A1503 - A1504) + (A1505 - A1506) + (A1507 - A1508) + (A1509 - A1510) + (A1511 - A1512) + (A1513 - A1514) + (A1515 - A1516) + (A1517 - A1518) + (A1519 - A1520) + (A1521 - A1522) + (A1523 - A1524) + (A1525 - A1526) + (A1527 - A1528) + (A1529 - A1530) + (A1531 - A1532) + (A1533 - A1534) + (A1535 - A1536) + (A1537 - A1538) + (A1539 - A1540) + (A1541 - A1542) + (A1543 - A1544) + (A1545 - A1546) + (A1547 - A1548) + (A1549 - A1550) + (A1551 - A1552) + (A1553 - A1554) + (A1555 - A1556) + (A1557 - A1558) + (A1559 - A1560) + (A1561 - A1562) + (A1563 - A1564) + (A1565 - A1566) + (A1567 - A1568) + (A1569 - A1570) + (A1571 - A1572) + (A1573 - A1574) + (A1575 - A1576) + (A1577 - A1578) + (A1579 - A1580) + (A1581 - A1582) + (A1583 - A1584) + (A1585 - A1586) + (A1587 - A1588) + (A1589 - A1590) + (A1591 - A1592) + (A1593 - A1594) + (A1595 - A1596) + (A1597 - A1598) + (A1599 - A1600) + (A1601 - A1602) + (A1603 - A1604) + (A1605 - A1606) + (A1607 - A1608) + (A1609 - A1610) + (A1611 - A1612) + (A1613 - A1614) + (A1615 - A1616) + (A1617 - A1618) + (A1619 - A1620) + (A1621 - A1622) + (A1623 - A1624) + (A1625 - A1626) + (A1627 - A1628) + (A1629 - A1630) + (A1631 - A1632) + (A1633 - A1634) + (A1635 - A1636) + (A1637 - A1638) + (A1639 - A1640) + (A1641 - A1642) + (A1643 - A1644) + (A1645 - A1646) + (A1647 - A1648) + (A1649 - A1650) + (A1651 - A1652) + (A1653 - A1654) + (A1655 - A1656) + (A1657 - A1658) + (A1659 - A1660) + (A1661 - A1662) + (A1663 - A1664) + (A1665 - A1666) + (A1667 - A1668) + (A1669 - A1670) + (A1671 - A1672) + (A1673 - A1674) + (A1675 - A1676) + (A1677 - A1678) + (A1679 - A1680) + (A1681 - A1682) + (A1683 - A1684) + (A1685 - A1686) + (A1687 - A1688) + (A1689 - A1690) + (A1691 - A1692) + (A1693 - A1694) + (A1695 - A1696) + (A1697 - A1698) + (A1699 - A1700) + (A1701 - A1702) + (A1703 - A1704) + (A1705 - A1706) + (A1707 - A1708) + (A1709 - A1710) + (A1711 - A1712) + (A1713 - A1714) + (A1715 - A1716) + (A1717 - A1718) + (A1719 - A1720) + (A1721 - A1722) + (A1723 - A1724) + (A1725 - A1726) + (A1727 - A1728) + (A1729 - A1730) + (A1731 - A1732) +$



**GENERAL NOTES**

1. REMOVE ALL EXISTING INTERIOR AND EXTERIOR WINDOWS AND LOUVERS. EXCEPT STEEL FRAMES AT WINDOW TYPES A, B, & C TO REMAIN PER A-502 WINDOW SCHEDULE
2. REMOVE EXISTING FLOORING THROUGHOUT EXCEPT AT DANCE 140
3. SEE PLUMBING FOR ADDITIONAL SLAB REMOVAL SCOPE. CONCRETE TRENCH INFILL PER 8/5-002.
4. REFER TO HAZARDOUS ABATEMENT REPORTS & SPECIFICATIONS
5. SEE REFLECTED CEILING PLANS FOR CEILING DEMOLITION
6. SEE FLOOR PLANS AND DETAILS A-505 FOR NECESSARY SELECTIVE DEMOLITION AT TUBULAR SKYLIGHTS.
7. SEE SITE PLAN A-001 AND FLOOR PLANS FOR FENCING DEMOLITION SCOPE
8. IF THE BUILDING INSPECTOR SUSPECTS FILL, EXPANSIVE SOILS, OR ANY GEOLOGIC INSTABILITY BASED UPON OBSERVATION OF THE FOUNDATION EXCAVATION, A SOILS OR GEOLOGICAL REPORT, AND RESUBMITTAL OF PLANS TO PLAN CHECK TO VERIFY THAT REPORT RECOMMENDATIONS HAVE BEEN INCORPORATED, MAY BE REQUIRED.
9. ADDITIONAL SELECTIVE DEMOLITION AS REQUIRED FOR STRUCTURAL, PLUMBING, MECHANICAL, ELECTRICAL, COMMUNICATIONS, FIRE PROTECTION, AND FIRE ALARM SCOPES. THIS INCLUDES, BUT IS NOT LIMITED TO, STRUCTURAL FRAMING, PLUMBING PIPING AND FIXTURES, EXTERIOR HOSE BIBS, DUCTWORK, ELECTRICAL CONDUIT AND EQUIPMENT, FIRE SPRINKLER SYSTEM SUPPORT, ETC.

**LEGEND**

- REMOVE FLOOR/SLAB: [Hatched pattern]
- AREAS OF NO WORK: [Diagonal hatched pattern]
- EXISTING CONCRETE WALL: [Solid line]
- EXISTING CMU WALL: [Dashed line]
- EXISTING WOOD FRAMED WALL: [Dotted line]
- DEMO EXISTING NON-BEARING WALL: [Long dashed line]
- REMOVE EXISTING FIRE SPRINKLER PIPING: [Short dashed line]
- REMOVED EXISTING INTERIOR PLASTER/GYPSUM BOARD: [Horizontal dashed line]
- REMOVE AND SALVAGE EXISTING WALL MIRRORS: [Vertical dashed line]

**KEY NOTES**

NOT ALL KEY NOTES MAY BE USED ON THIS SHEET

1. REMOVE EXISTING DOOR, FRAME, & HARDWARE
2. REMOVE EXISTING DOOR & HARDWARE. EXISTING FRAME TO REMAIN
3. REMOVE EXISTING DRINKING FOUNTAIN. SEE PLUMBING FOR ASSOCIATED PIPING.
4. REMOVE ENTIRE EXISTING WOOD FRAMED STAIRCASE & HANDRAILS
5. REMOVE EXISTING WOOD FRAMED FLOOR. SEE STRUCTURAL.
6. REMOVE EXISTING DOOR, FRAME, & HARDWARE. REMOVE WOOD FRAME WALL INFILL
7. REMOVE EXISTING WINDOW. SEE FLOOR PLANS FOR NEW WORK
8. WIDEN DOOR OPENING FOR NEW DOOR & FRAME
9. DEMO WOOD-FRAMED WALL TO APPROXIMATE EXTENTS INDICATED
10. REMOVE EXISTING CASEWORK & SINK WHERE SHOWN. SEE PLUMBING FOR ASSOCIATED PIPING.
11. DEMO ALL RESTROOM AND SHOWER FIXTURES, PARTITIONS, ACCESSORIES, MIRRORS, & TILE
12. REMOVE EXISTING STEEL-FRAMED STAIR, LANDING & HANDRAIL
13. REMOVE EXISTING CONCRETE SLAB; SAWCUT WHERE NECESSARY
14. REMOVE CASEWORK, APPLIANCES, & SINK. CAP GAS & WATER LINES PER PLUMBING
15. REMOVE ELECTRIC WALL HEATERS PER MECHANICAL
16. REMOVE EXISTING DISPLAY CASE
17. DEMO EXISTING CMU/CONCRETE WALL TO APPROXIMATE EXTENTS INDICATED
18. REMOVE EXISTING LOCKERS AND RELATED SCOPE
19. REMOVE TRANSOM WINDOW
20. REMOVE TEMPORARY WOOD HANDRAILS AND GUARDRAILS
21. REMOVE SERVICE SINK. SEE PLUMBING FOR ASSOCIATED PIPING.
22. REMOVE EXISTING CHAIN LINK FENCE
23. REMOVE EXISTING INTERIOR PLASTER/GYPSUM BOARD. EXISTING FRAMING TO REMAIN
24. REMOVE AND SALVAGE EXISTING WALL MIRRORS
26. EXISTING LADDER TO REMAIN
28. REMOVE EXISTING FIRE SPRINKLER SYSTEM
27. REMOVE SACRIFICIAL PAVING AND EXCAVATE ELEVATOR FOR PIT
28. REMOVE FIRE HOSE CABINET
29. REMOVE EXISTING CONCRETE STAIRCASE, HANDRAILS, AND ASSOCIATED ITEMS
30. REMOVE EXISTING WALL MOUNTED PAY PHONE

A-101

**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS  
REC CENTER MAIN FLOOR DEMOLITION PLAN**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 6 OF 153 SHEETS

DATE: 7/24/17	WBS: S-16052
FOR CITY ENGINEER: [Signature]	DATE: 7/27/17
FOR CITY MANAGER: [Signature]	DATE: 7/27/17
PROJECT NAME: 212-1735	PROJECT ENGINEER: ALEXANDRA CONNOR
DESCRIPTION: 20227 RECONSTRUCT	PROJECT MANAGER: [Signature]
ADDENDUM A: 1852-8297	DESIGN COORDINATOR: [Signature]
CONTRACTOR: [Signature]	DATE STARTED: 3/29/17
INSPECTOR: [Signature]	DATE COMPLETED: 3/29/17

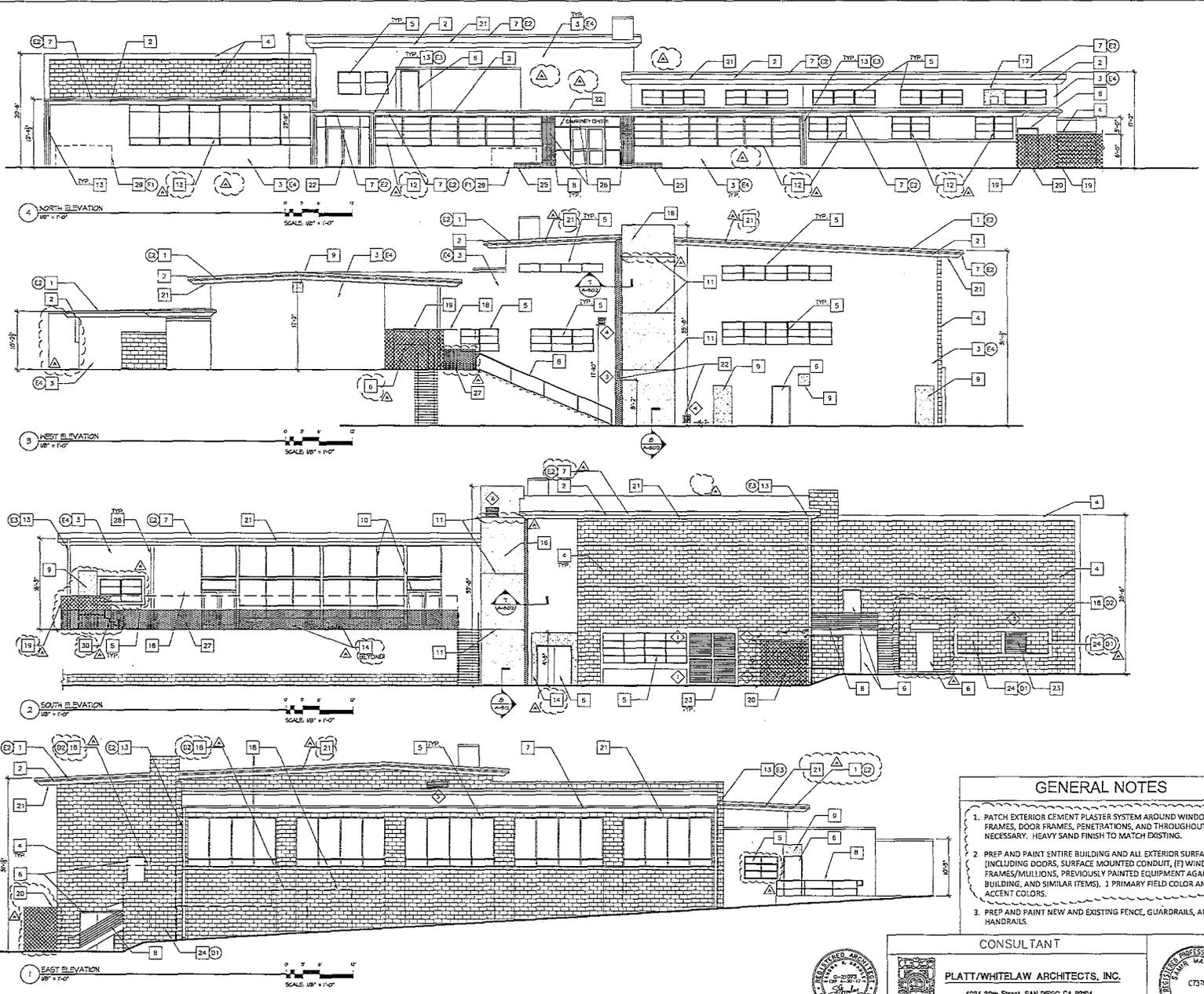
**CONSULTANT**

**PLATT/WHITELAW ARCHITECTS, INC.**  
4284 30th Street, SAN DIEGO, CA 92104  
619 548-4328 FAX 619 548-4350



PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL





**KEY NOTES**

- 1 PATCH, PRIME AND PAINT WOOD EAVE MOLDING. REPLACE METAL DRIP EDGE AND PAINT. TYP. FOR BUILDING.
- 2 PATCH, PRIME AND PAINT ALL STUCCO OVERHANGS.
- 3 PATCH, PRIME AND PAINT STUCCO FINISH & TRIM. TYP. FOR BLDG.
- 4 PATCH, PRIME AND PAINT CONCRETE MASONRY BLOCK & TRIM. TYPICAL FOR BUILDING.
- 5 REPLACE EXISTING WINDOWS. TYP. FOR BUILDING U.C.N.
- 6 HOLLOW METAL DOOR PER DOOR SCHEDULE.
- 7 PATCH, PRIME AND PAINT WOOD EAVE MOLDING W.O. REPLACE METAL GUTTER AND PAINT. TYP. FOR BUILDING.
- 8 SAND, PATCH, PRIME AND PAINT EXISTING RAILING.
- 9 REMOVE FRAMES, DOORS, LOUVERS, AND WINDOWS. INFILL EXISTING OPENING W/ WOOD FRAMING AND PROVIDE CEMENT STUCCO SYSTEM TO MATCH EXISTING FINISH. SEE DETAIL 1/A-516
- 10 REMOVE WINDOWS AT PATIO AND PROVIDE ALUMINUM STOREFRONT SYSTEM
- 11 HORIZONTAL REVEALS. SEE 12/A-502.
- 12 EXISTING STEEL WINDOW FRAMES TO REMAIN. SEE A-602/Δ
- 13 REPLACE METAL DOWNSPOUT AND PAINT. SEE 10,11/A-504. TYP. FOR BUILDING.
- 14 PROVIDE WOOD FRAMED WALL. MATCH EXISTING STUCCO FINISH.
- 15 NOT USED Δ
- 16 ELEVATOR TOWER. FINE SAND FINISH STUCCO. SECTIONS ON A-302.
- 17 FRAME IN SECTION OF WINDOW TO RUN MECHANICAL DUCT. INFILL OPENING AROUND MECHANICAL EQUIPMENT AND PROVIDE CEMENT STUCCO SYSTEM TO MATCH EXISTING FINISH.
- 18 REMOVE CHAIN LINK FENCE
- 19 PAINT EXISTING CHAIN LINK FENCE AND GATE TO REMAIN
- 20 EXISTING CHAIN LINK FENCE ENCLOSURE AND GATE. Δ
- 21 INFILL OVERHANG STRIP VENT. SEE 9/A-501.
- 22 (E) STOREFRONT SYSTEM TO REMAIN
- 23 REMOVE AND REPLACE LOUVERS
- 24 NEW CMU WALL INFILL AT EXISTING OPENING
- 25 CLEAN, REPAIR, & REPOINT BRICK AT ENTRANCE (INT. & EXT.) Δ
- 26 DIMENSIONAL SIGNAGE
- 27 GUARDRAIL. SEE DETAIL 9/A-518.
- 28 PREP, PRIME, AND PAINT METAL POLES Δ
- 29 MONUMENT SIGN
- 30 REMOVE STEEL FRAMED STAIR AND RAILING. Δ

**ALTERNATE KEYNOTES**

- (A) ADD ALTERNATE - CMU INFILL AT EXISTING OPENINGS
- (B) ADD ALTERNATE - REMOVE CHAIN LINK FENCE
- (C) ADD ALTERNATE - PROVIDE DARK ANODIZED FASCIA FLASHING, RAKE FLASHING, AND GUTTERS W.O. SEE 18/2/A-530.
- (D) ADD ALTERNATE - DARK ANODIZED DOWNSPOUTS. SEE 10&11/A-530
- (E) ADD ALTERNATE - APPLY NEW STUCCO FINISH COLOR COAT. HEAVY SAND FINISH TO MATCH EXISTING. PROVIDE IN LIEU OF PAINTING STUCCO. ENTIRE BUILDING.
- (F) MONUMENT SIGN

**LEGEND**

NEW STUCCO		
CMU		A-201

**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS  
EXTERIOR ELEVATIONS - REC CENTER**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 17 OF 153 SHEETS

WGS 5-16059

FOR CITY ENGINEER SAMIR MAHALLA	DATE 7/25/17	BY 7/31	DATE 7/31	FOR PROJECT MANAGER ALEXANDRA CORRE
REVISION	BY	APPROVED	DATE	PROJECT ENGINEER
ORIGINAL	PWA		4/8/17	212-1735
ADDENDUM A	PWA		3/28/17	CCSD COORDINATOR
				1852-6297
				CCSD COORDINATOR
CONTRACTOR	DATE STARTED			39752-17-D
INSPECTOR	DATE COMPLETED			

**GENERAL NOTES**

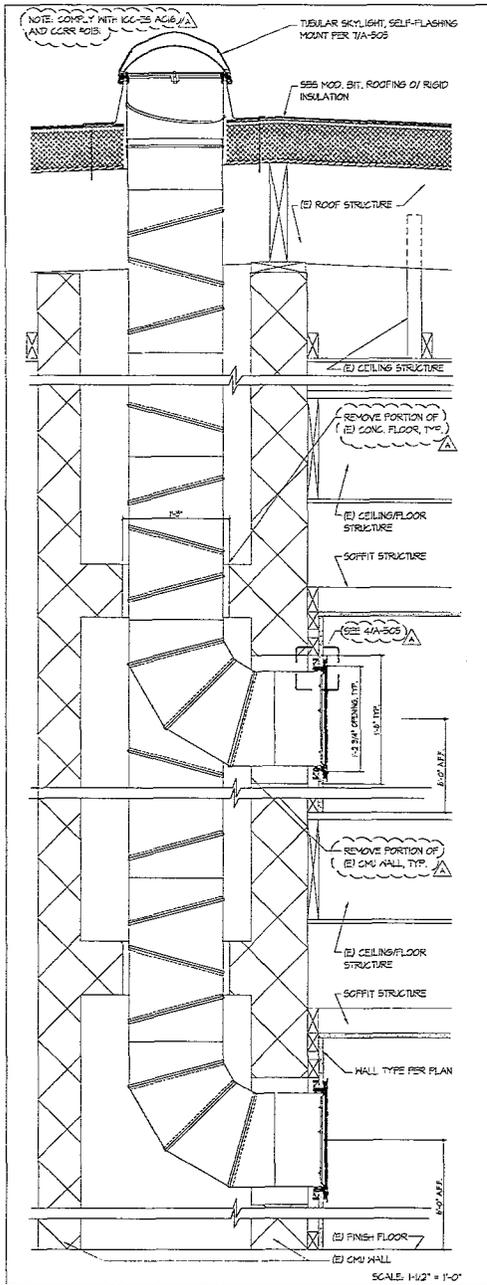
1. PATCH EXTERIOR CEMENT PLASTER SYSTEM AROUND WINDOW FRAMES, DOOR FRAMES, PENETRATIONS, AND THROUGHOUT AS NECESSARY. HEAVY SAND FINISH TO MATCH EXISTING.
2. PREP AND PAINT ENTIRE BUILDING AND ALL EXTERIOR SURFACES (INCLUDING DOORS, SURFACE MOUNTED CONDUIT, (E) WINDOW FRAMES/MULLIONS, PREVIOUSLY PAINTED EQUIPMENT AGAINST BUILDING, AND SIMILAR ITEMS). 1 PRIMARY FIELD COLOR AND 3 ACCENT COLORS.
3. PREP AND PAINT NEW AND EXISTING FENCE, GUARDRAILS, AND HANDRAILS.

**CONSULTANT**

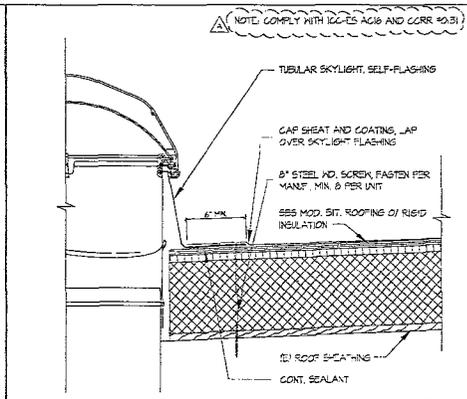
**PLATT/WHITLAW ARCHITECTS, INC.**  
4084 50th Street, SAN DIEGO CA 92104  
(619) 548-4228 FAX (619) 548-4350



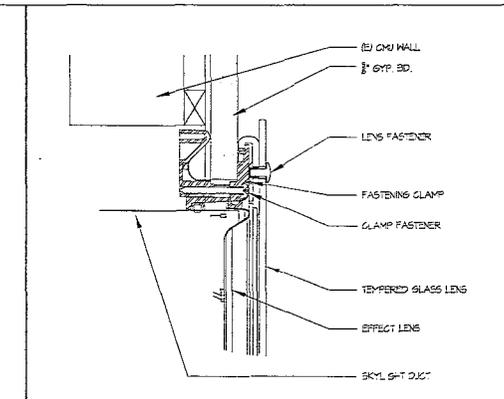
PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL



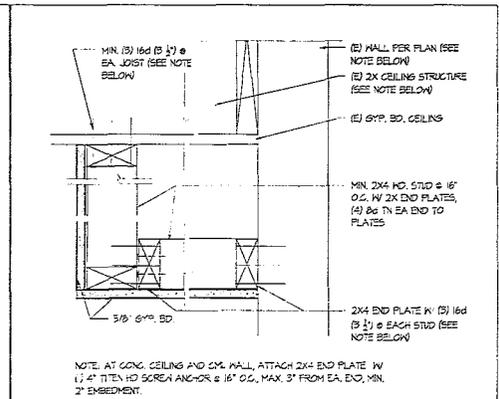
TUBULAR SKYLIGHT - WALL MOUNT 12 NOT USED



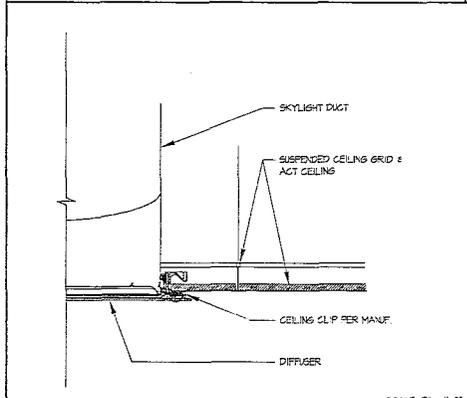
TUBULAR SKYLIGHT @ ROOF 7



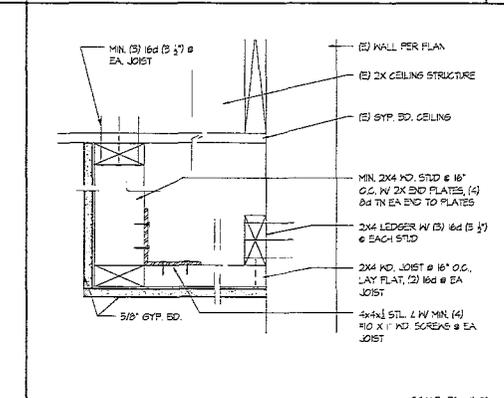
TUBULAR SKYLIGHT DIFFUSER - CLIP DETAIL 4



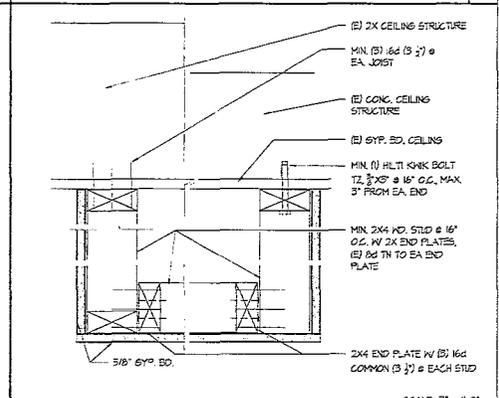
SOFFIT @ CEILING & WALL 1



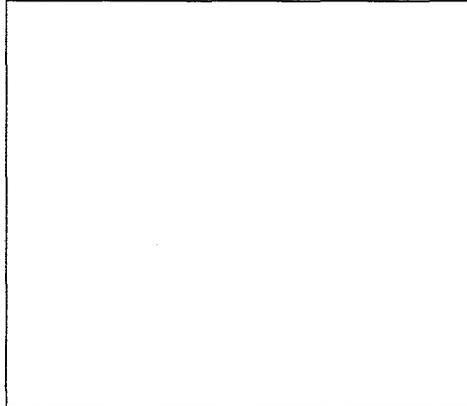
TUBULAR SKYLIGHT @ SUSPENDED CEILING 8



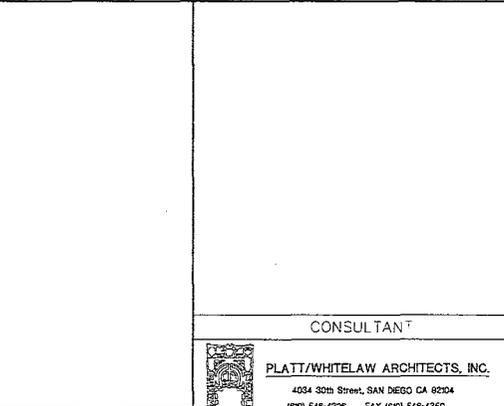
SOFFIT @ HALL 5



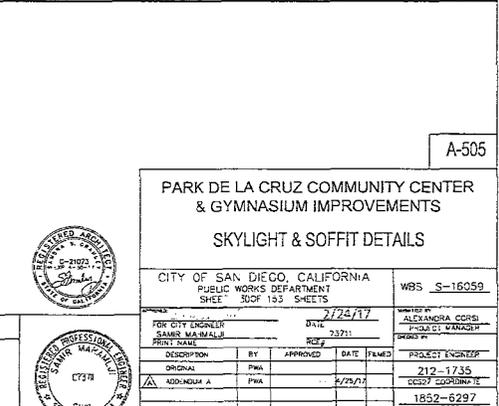
SOFFIT @ CEILING 2



TUBULAR SKYLIGHT @ SUSPENDED CEILING 8



SOFFIT @ HALL 5



SOFFIT @ CEILING 2

NOT USED 9

NOT USED 9

NOT USED 9

A-505

**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS**  
**SKYLIGHT & SOFFIT DETAILS**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 300F 153 SHEETS

WBS S-16059

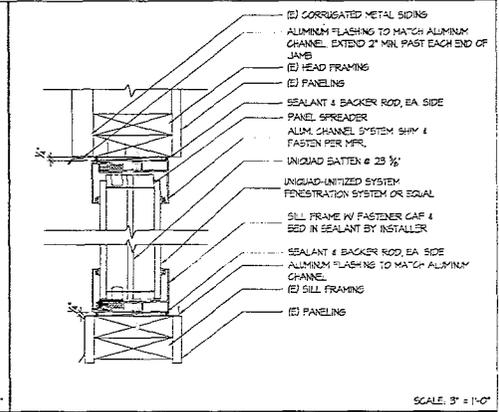
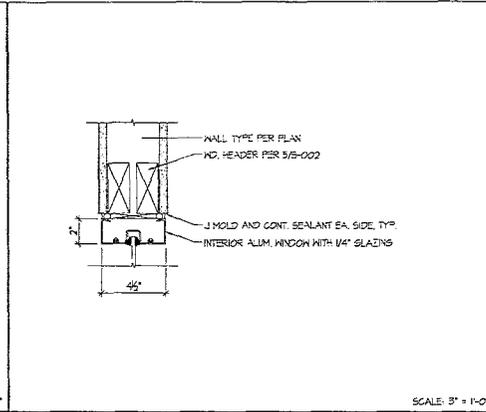
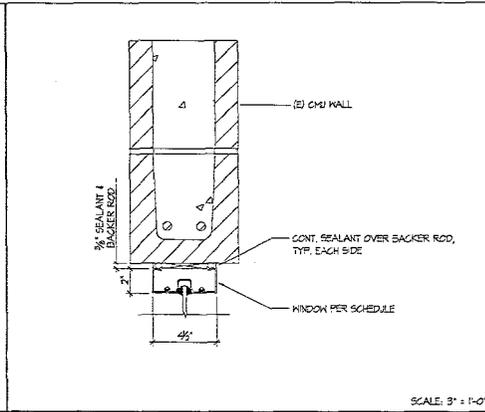
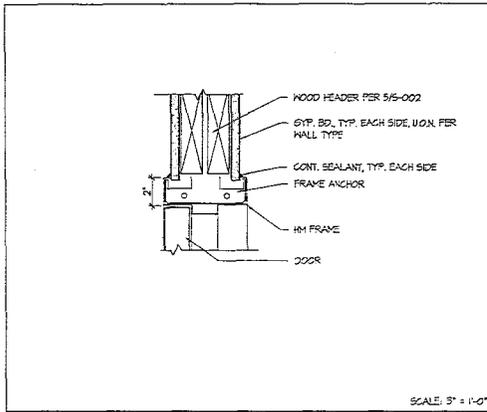
DESIGNED BY	DATE	2/24/17	PROJECT NUMBER	
CHECKED BY	DATE	2/24/17	212-1735	
APPROVED BY	DATE	2/24/17	0007 COORDINATOR	
DATE COMPLETED			1852-5297	
			ISSUED ORIGINAL	
			39752-3C-0	

CONTRACTOR: DATE OF REVISION: 3/29/17  
INSPECTOR: DATE COMPLETED: 3/29/17

THROUGH SKYLIGHT DETAILS REVISED

CONSULTANT  
**PLATT/WHITELAW ARCHITECTS, INC.**  
4034 30th Street, SAN DIEGO CA 92104  
(619) 548-4326 FAX (619) 548-4350

ADDENDUM A

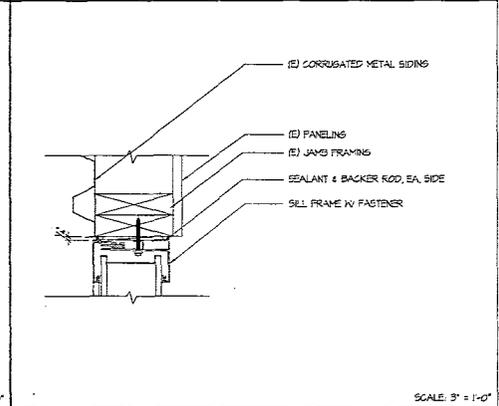
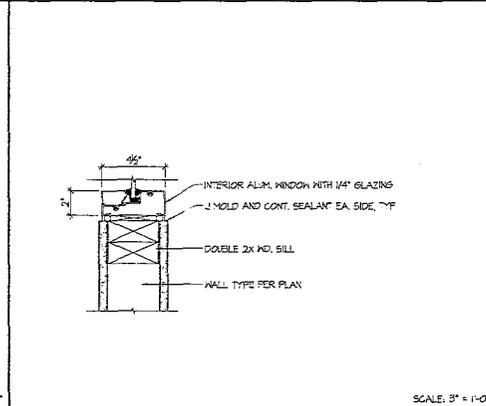
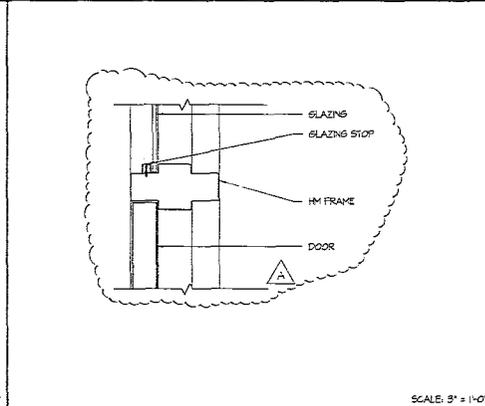
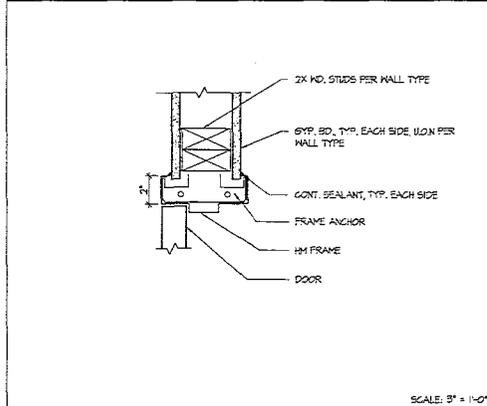


DOOR HEAD DETAIL 10

WINDOW HEAD/JAMB DETAIL 7

WINDOW HEAD DETAIL 4

WINDOW HEAD/SILL DETAIL AT GYM 1



DOOR JAMB DETAIL 11

HM TRANSOM DETAIL 8

WINDOW JAMB/SILL DETAIL 5

WINDOW JAMB DETAIL AT GYM 2

NOT USED 12

SCALE: 3" = 1'-0"

NOT USED 9

SCALE: 3" = 1'-0"

A-515

**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS**  
**DOOR & WINDOW DETAILS**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 300' 153 SHEET'S

WB3 S-16059

DATE: 7/25/17	PROJECT ENGINEER: ALLYANDRA COHSU
FOR CITY ENGINEER: SAMI MAHMOUD	PROJECT MANAGER: [Signature]
PROJECT NAME: [Blank]	PROJECT NUMBER: [Blank]
DESCRIPTION: [Blank]	DATE: [Blank]
APPROVED BY: [Blank]	DATE: [Blank]
ORIGINAL: PWA	DATE: 2/28/17
ADDENDUM A: PWA	DATE: [Blank]
CONTRACTOR: [Blank]	DATE STARTED: [Blank]
INSPECTOR: [Blank]	DATE COMPLETED: 3/9/15

CONSULTANT  
**PLATT/WHITELAW ARCHITECTS, INC.**  
4034 30th Street, SAN DIEGO CA 92104  
16191 546-4326 FAX 16191 546-4350

REGISTERED ARCHITECT  
STATE OF CALIFORNIA  
C7376

REGISTERED PROFESSIONAL ENGINEER  
STATE OF CALIFORNIA  
CIVIL  
C7376

TRACON 3124 8/4 915 4000 Page 41 of 54

DOOR AND FRAME SCHEDULE

MARK	TYPE	NEW OR EXISTING	DOOR			FRAME			FIRE RATING LABEL	HOWE SET #	DOOR FINISH	NOTES				
			WD	HGT	THK	MATL	GLAZING	LITE (IN)					HEAD	JAMB	SILL	
002-1	D	NI	PR 3/0	7/0	1-3/4	HM	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	1	P	
003-1	B	NI	3/0	6/15	1-3/4	HM	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	2	P	
003-2	D	NI	PR 3/0	7/0	1-3/4	HM	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	1	P	
004-1	F	NI	3/0	7/0	1-3/4	HD	CT	8 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	5	FF	#5
004-2	C	NI	PR 3/0	7/0	1-3/4	HM	--	--	HM	11/A-5/2	2/A-5/2	5/A-5/2	--	7	P	#5
004-3	A	NI	3/6	7/0	1-3/4	HD	CT	24 (42)	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	21	FF	#5
006-1	B	NI	3/0	6/15	1-3/4	HD	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	2	FF	
006-2	B	NI	2/8	6/8	1-3/4	HM	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	20	P	#2
007-1	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	20	FF	
007-2	B	NI	1/8	6/8	1-3/4	HD	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	20	FF	
008-1	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	18	FF	
008-2	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	24	FF	#5
008-3	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	24	FF	#5 #5
009-1	F	NI	PR 3/0	6/15	1-3/4	HD	CT	8 (42)	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	21	FF	
009-2	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	26	FF	#10
009-3	D	NI	3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	27	FF	
009-4	A	NI	3/6	7/0	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	21	FF	
010-1	B	NI	3/0	7/0	1-3/4	HM	--	--	HM	11/A-5/2	2/A-5/2	5/A-5/2	--	5	P	#5
010-2	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	HR	20	FF
011-1	B	NI	3/0	7/0	1-3/4	HM	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	--	--	
011-2	--	PR 3/0	7/0	--	--	--	--	--	--	--	--	--	--	--	--	NIC
101-1	B	NI	3/0	6/15	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	16	FF	#6, #11
105-1	B	NI	3/0	6/15	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	16	FF	#6, #11
106-1	A	NI	3/0	6/15	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	16	FF	#6, #11
107-1	B	NI	3/0	6/15	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	16	FF	
106-4	A	NI	3/0	6/15	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	25	FF	
108-2	A	NI	3/0	6/15	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	16	FF	△ SILL
109-1	B	NI	2/8	6/15	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	4	FF	△ SILL
11-1	--	PR 3/0	7/0	--	--	--	--	--	--	--	--	--	--	--	--	NIC
112-1	B	NI	3/0	7/0	1-3/4	HM	--	--	HM	11/A-5/2	2/A-5/2	5/A-5/2	--	5	P	#5, #11
112-2	C	NI	PR 3/0	7/0	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	14	FF	#5
116-1	A	NI	3/0	6/15	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	5	FF	
114-1	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	24	FF	#5
114-2	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	24	FF	#5
114-3	B	NI	2/8	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	24	FF	#1
114-4	B	NI	2/8	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	24	FF	#1
114-5	B	NI	1/8	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	20	FF	
120-1	C	NI	PR 3/0	7/0	1-3/4	HM	CT	24 (42)	HM	11/A-5/2	2/A-5/2	5/A-5/2	--	7	P	#5
124-1	A	NI	3/0	7/0	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	16	FF	
124-2	A	NI	3/0	7/0	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	16	FF	
124-3	F	NI	3/0	6/15	1-3/4	HD	CT	8 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	15	FF	#5
130-1	A	NI	3/0	6/15	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	16	FF	#6
132-1	A	NI	3/0	7/0	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	21	FF	
132-2	A	NI	3/0	7/0	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	21	FF	
133-1	A	NI	3/0	6/15	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	31	FF	
134-1	B	NI	3/0	6/15	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	16	FF	#6
135-1	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	24	FF	#5
136-1	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	20	FF	#6, #5
137-1	B	NI	3/0	6/15	1-3/4	HD	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	20	FF	
138-1	B	NI	2/8	6/8	1-3/4	HM	--	--	HM	--	--	--	--	20	P	#2
139-1	B	NI	3/0	6/15	1-3/4	HD	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	1	FF	#5
139-2	B	NI	3/0	6/15	1-3/4	HD	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	1	FF	#5
139-3	--	ED	3/0	7/0	1-3/4	HM	--	--	HM	--	--	--	--	12	P	#1, #5

DOOR AND FRAME SCHEDULE

MARK	TYPE	NEW OR EXISTING	DOOR			FRAME			FIRE RATING LABEL	HOWE SET #	DOOR FINISH	NOTES					
			WD	HGT	THK	MATL	GLAZING	LITE (IN)					HEAD	JAMB	SILL		
140-1	A	NI	3/0	7/0	1-3/4	HD	CT	24 (42)	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	17	FF	#5	
141-1	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	17	FF	#6, #5	
141-2	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	4	FF	#5, #10	
141-3	B	ED	3/0	7/0	1-3/4	HM	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	10	F	#1, #4 DELAY	
142-1	B	NI	2/8	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	15	FF		
144-1	F	NI	3/0	7/0	1-3/4	HD	CT	8 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	15	FF	#5	
145A-1	H	NI	PR 3/0	7/0	1-3/4	ALUM	CT	24 (70)	U2	ALUM	11/A-5/2	12/A-5/2	12/A-5/2	--	6	ANOD	#5
145A-2	C	NI	PR 3/0	6/15	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	15	FF		
145A-3	D	NI	PR 3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	24	FF		
145B-1	H	NI	PR 3/0	7/0	1-3/4	ALUM	CT	24 (70)	U2	ALUM	11/A-5/2	12/A-5/2	12/A-5/2	--	9	ANOD	#5
145B-2	C	NI	PR 3/0	6/15	--	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	15	FF		
145C-1	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	27	FF		
146-1	A	NI	3/0	7/0	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	28	FF		
146-2	E	NI	PR 3/0	7/0	1-3/4	HD	CT	24 (82)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	27	FF		
147-1	B	NI	3/6	7/0	1-3/4	HM	--	--	HM	11/A-5/2	2/A-5/2	5/A-5/2	--	6	P	#5, ASSIGNED	
148-1	A	NI	3/0	6/15	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	21	FF	#6, #11	
148-2	A	NI	3/0	6/15	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	22	FF	#1	
148A-1	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	25	FF		
148B-1	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	25	FF	#6	
150-1	B	NI	2/8	6/15	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	14	FF		
151-1	F	NI	3/6	6/15	1-3/4	HD	CT	8 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	22	FF		
151-2	D	NI	PR 2/4	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	27	FF		
152-1	B	NI	2/8	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	14	FF		
155-1	F	NI	3/0	7/0	1-3/4	HD	CT	8 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	15	FF	#5	
201-1	B	NI	3/0	6/8	1-3/4	HM	--	--	HM	11/A-5/2	2/A-5/2	5/A-5/2	--	15	P		
203-1	B	NI	2/8	6/8	1-3/4	HM	--	--	HM	--	--	--	--	20	P	#2	
204-1	B	NI	3/0	6/15	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	17	FF		
205-1	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	20	FF		
206-1	F	NI	3/0	7/0	1-3/4	HD	CT	8 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	3	FF	#5	
206-2	A	NI	3/0	6/15	1-3/4	HD	CT	24 (42)	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	3	FF	#5	
207-1	B	NI	3/0	6/8	1-3/4	HM	--	--	HM	11/A-5/2	2/A-5/2	5/A-5/2	--	20	P		
208-1	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	20	FF	#6	
209-1	B	NI	3/0	7/0	1-3/4	HD	--	--	HM	10/A-5/5	11/A-5/5	9/A-5/0	--	24	FF	#5	
210-1	B	NI	3/0	6/15	1-3/4	HD	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	14	FF	#2, #5	
301	S	NI	PR 3/0	2/0	1-3/4	HM	--	--	HM	4/A-5/2	4/A-5/2	5/A-5/2	--	1	P	GYM DOORS, #5	
302	S	NI	PR 3/0	2/0	1-3/4	HM	--	--	HM	4							

**GLAZING SCHEDULE**

**MONOLITHIC GLASS SCHEDULE**

- A. GLASS TYPE GL-1: CLEAR ANNEALED FLOAT GLASS.
  - 1. MINIMUM THICKNESS: 6 MM.
- B. GLASS TYPE GL-2: CLEAR FULLY TEMPERED FLOAT GLASS.
  - 1. MINIMUM THICKNESS: 6 MM.
  - 2. WHERE PURE RESISTIVE OR SAFETY GLAZING IS REQUIRED.

**INSULATING GLASS SCHEDULE**

- A. GLASS TYPE GL-3: LOW-E-COATED, CLEAR INSULATING GLASS.
  - 1. BASIS-OF-DESIGN PRODUCT: SOLARBAN Z76 ON OPTIBLUE + CLEAR INSULATING GLASS OR EQUAL.
  - 2. OVERALL UNIT THICKNESS: 1 INCH.
  - 3. MINIMUM THICKNESS OF EACH GLASS LITE: 6 MM.
  - 4. OUTDOOR LITE: ANNEALED FLOAT GLASS.
  - 5. INTERSPACE CONTENT: AIR.
  - 6. INDOOR LITE: ANNEALED FLOAT GLASS.
  - 7. LOW-E COATING: PYROLYTIC OR SPUTTERED ON SECOND OR THIRD SURFACE.
- B. GLASS TYPE GL-4: LOW-E-COATED, CLEAR INSULATING GLASS HEAT STRENGTHENED.
  - 1. BASIS-OF-DESIGN PRODUCT: SOLARBAN Z76 ON OPTIBLUE + CLEAR INSULATING GLASS OR EQUAL.
  - 2. OVERALL UNIT THICKNESS: 1 INCH.
  - 3. MINIMUM THICKNESS OF EACH GLASS LITE: 6 MM.
  - 4. OUTDOOR LITE: HEAT STRENGTHENED FLOAT GLASS.
  - 5. INTERSPACE CONTENT: AIR.
  - 6. INDOOR LITE: HEAT STRENGTHENED FLOAT GLASS.
  - 7. LOW-E COATING: PYROLYTIC OR SPUTTERED ON SECOND OR THIRD SURFACE.

**LAMINATED GLASS SCHEDULE (AT EXISTING FRAMES)**

- A. GLASS TYPE GL-5: TINTED LAMINATED GLASS WITH TWO PLYS OF CLEAR HEAT STRENGTHENED FLOAT GLASS AND TINTED INTERLAYER.
  - 1. BASIS-OF-DESIGN PRODUCT: VIRACON 7167 VEI-42 LAMINATED GLASS HSFS.
  - 2. MINIMUM THICKNESS OF EACH GLASS PLY: 5 MM.
  - 3. OUTER PANE CLEAR HS IN VE-42 #2.
  - 4. INTERLAYER THICKNESS: 0.060 INCH (1.52 MM).
  - 5. INTERLAYER COLOR: FROSTED.
  - 6. INNER PANE CLEAR HS.
  - 7. SAFETY GLAZING REQUIRED.
- B. GLASS TYPE GL-6: TINTED LAMINATED GLASS WITH TWO PLYS OF CLEAR HEAT STRENGTHENED FLOAT GLASS AND TINTED INTERLAYER.
  - 1. BASIS-OF-DESIGN PRODUCT: VIRACON 7167 VEI-42 LAMINATED GLASS HSFS.
  - 2. MINIMUM THICKNESS OF EACH GLASS PLY: 5 MM.
  - 3. OUTER PANE CLEAR HS IN VE-42 #2.
  - 4. INTERLAYER THICKNESS: 0.060 INCH (1.52 MM).
  - 5. INTERLAYER COLOR: CLEAR PVB.
  - 6. INNER PANE CLEAR HS.
  - 7. REFLECTANCE: 1%.
  - 8. SAFETY GLAZING REQUIRED.

**LOUVER SCHEDULE**

MARK	SIZE			DETAILS			NOTES
	N	H	MATL	HEAD	JAMB	SELL	
1	48"	52"	AL	7/A-5/6	8/A-5/6	9/A-5/6	
2	48"	48"	AL	7/A-5/6	8/A-5/6	9/A-5/6	
3	10"	22"	AL	10/A-5/6	11/A-5/6	12/A-5/6	
4	10"	12"	AL	10/A-5/6	11/A-5/6	12/A-5/6	QUANTITY OF 2
5	48"	16"	AL	7/A-5/6	8/A-5/6	9/A-5/6	
6	28"	22"	AL	10/A-5/6	11/A-5/6	12/A-5/6	

GENERAL NOTE: COORDINATE LOUVER LOCATIONS WITH MECHANICAL WORK.

**ENERGY PERFORMANCE NOTES**

ALUMINUM ENTRANCES AND STOREFRONTS ASSEMBLY  
 47 MAX U-VALUE, 25 MAX SHGC  
 HOT-ROLLED STEEL WINDOW ASSEMBLY  
 33 MAX U-VALUE, 21 MAX SHGC  
 GLAZING: GL-3 & GL-4  
 28 MAX U-VALUE, 24 MAX SHGC, 45% MIN VT  
 GLAZING: GL-5 & GL-6  
 16 MAX U-VALUE, 5 MAX SHGC, 41% MIN VT (GL-6 ONLY)  
 HORIZONTAL UNIT SKYLIGHT ASSEMBLY  
 88 MAX U-VALUE, 6 MAX SHGC  
 KALWALL BOB - CRYSTAL EXTERIOR, WHITE INTERIOR, 53 U-VALUE, 52 SHGC, 56% VT  
 VERTICAL FIBERGLASS-SANDBWICH-PANEL ASSEMBLY  
 30 MAX U-VALUE, 30 MAX SHGC  
 CPI DAYLIGHTING BOB - GREEN EXTERIOR, WHITE MATTE INTERIOR, 24 U-VALUE, 174 SHGC, 83% VT  
 TUBULAR DAYLIGHTING  
 SOLARTEE 250 DS BOB - ESTIMATED, 60 U-VALUE, 21 SHGC, 42% VT

**WINDOW SCHEDULE**

MARK	QUANTITY	MATERIAL	FRAME DETAILS			GLAZING	BLINDS (Y/N)	NOTES
			HEAD	JAMB	SELL			
<b>EXTERIOR WINDOWS</b>								
A	1	STL	10/A-5/6	11/A-5/6	12/A-5/6	GL-6	Y	#2
B	2	STL	4/A-5/6	5/A-5/6	6/A-5/6	GL-6	Y	#2
C	3	STL	7/A-5/6	8/A-5/6	9/A-5/6	GL-6/BL-5	Y	#2, GL-6 AT RESTROOMS 149A & B
D	5	STL	2/A-5/4	3/A-5/6	4/A-5/6	GL-3	Y	--
E	1	STL	1/A-5/6	2/A-5/6	3/A-5/6	GL-3	Y	#1
F	1	AL	7/A-5/4	8/A-5/4	9/A-5/4	GL-4/SL-5	Y	#1, GL-3 AT HIGH KNOCKS
G	1	STL	2/A-5/4	3/A-5/6	4/A-5/6	GL-4	Y	#1
H	1	STL	2/A-5/4	3/A-5/6	4/A-5/6	GL-3	Y	--
I	1	STL	2/A-5/4	3/A-5/6	4/A-5/6	GL-4	Y	--
J	5	AL	10/A-5/4	11/A-5/4	12/A-5/4	GL-3	Y	--
K	1	STL	2/A-5/4	3/A-5/6	4/A-5/6	GL-4	Y	--
L	1	STL	4/A-5/4	5/A-5/6	6/A-5/6	GL-4	Y	#1
M	1	STL	2/A-5/4	3/A-5/6	4/A-5/6	GL-3	Y	--
N	1	STL	2/A-5/4	3/A-5/6	4/A-5/6	GL-3	Y	--
O	2	STL	2/A-5/4	3/A-5/6	4/A-5/6	GL-4	Y	--
<b>INTERIOR WINDOWS</b>								
1	2	AL	4/A-5/6	5/A-5/6	6/A-5/6	GL-2	Y	--
2	2	AL	4/A-5/6	5/A-5/6	6/A-5/6	GL-2	Y	--
3	1	AL	4/A-5/6	5/A-5/6	6/A-5/6	GL-1	Y	--
4	2	AL	4/A-5/6	5/A-5/6	6/A-5/6	GL-2	Y	--
5	2	AL	4/A-5/6	5/A-5/6	6/A-5/6	GL-2	Y	--
6	5	AL	4/A-5/6	5/A-5/6	6/A-5/6	GL-1	Y	--
7	1	AL	4/A-5/6	5/A-5/6	6/A-5/6	GL-2	Y	--
8	1	AL	4/A-5/6	5/A-5/6	6/A-5/6	GL-2	Y	--
9	1	AL	7/A-5/6	8/A-5/6	9/A-5/6	GL-2	Y	--
10	1	AL	4/A-5/6	5/A-5/6	6/A-5/6	GL-1	Y	--
11	4	AL	7/A-5/6	8/A-5/6	9/A-5/6	GL-2	Y	--

**LEGEND**

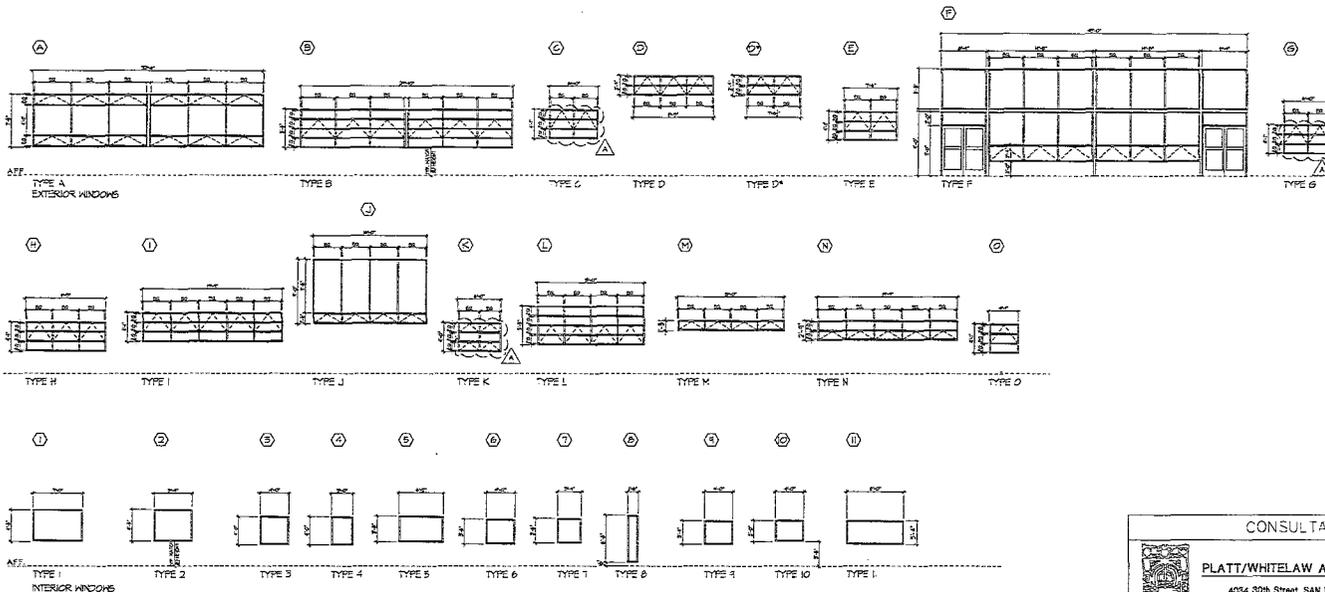
- AL - ALUMINUM
- STL - STEEL
- GL # - SEE GLAZING SCHEDULE
- A-602 & SEE 088000.

**NOTES**

- 1. PROVIDE LIMIT DEVICE.
- 2. EXISTING FRAME TO REMAIN. REPLACE HARDWARE IN KIND. REMOVE EXISTING GLAZING AND PUTTY. PREP STEEL PER STANDARD 1625-CP1 POWER TOOL CLEANING TO BARE METAL.

**GENERAL NOTES**

- MATCH EXISTING ROOF-OPENING SIZE AND LOCATION UO.N.
- MATCH EXISTING WINDOW FRAME MATERIAL AT KNOCKS TO BE REPLACED UO.N.
- INSTALL BLINDS AT INTERIOR KNOCKS ON OFFICE/CONFERENCE/POOL ROOM SIDE OF FRAME.
- PROVIDE INSET SCREENS AT ALL OPERABLE EXTERIOR KNOCKS.



A-602

**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS WINDOW AND LOUVER SCHEDULES**

CITY OF SAN DIEGO, CALIFORNIA  
 PUBLIC WORKS DEPARTMENT  
 SHEET 25 OF 153 SHEETS

PROJECT NO.	272477	DATE	7/27/17
FOR CITY ENGINEER	AMANDA CORN	DATE	7/27/17
FOR CITY ENGINEER	AMANDA CORN	DATE	7/27/17
FOR CITY ENGINEER	AMANDA CORN	DATE	7/27/17
FOR CITY ENGINEER	AMANDA CORN	DATE	7/27/17
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**CONSULTANT**

**PLATT/WHITELAW ARCHITECTS, INC.**

4034 30th Street, SAN DIEGO CA 92104  
 (619) 548-4328 FAX (619) 548-4350



GYM SIGNAGE SCHEDULE			
DOOR (XXX-X)	SIGN TYPE ▽	SIGN TEXT (TEXT TO BE ROOM NUMBER AND NAME AS NOTED ON PLAN U.O.N.)	NOTES
301	D6J		
502	D6J		

LOWER FLOOR SIGNAGE SCHEDULE			
DOOR (XXX-X)	SIGN TYPE ▽	SIGN TEXT (TEXT TO BE ROOM NUMBER & NAME AS NOTED ON PLAN U.O.N.)	NOTES
002-1	I	002 EQUIPMENT ROOM	
003-1	I	STORAGE	EQUIP. REMOVAL ALT. D
003-2	DJ	STORAGE	EQUIP. REMOVAL ALT. D
004-1	EJR	004 MULTI-PURPOSE	
004-2	D6J	004 MULTI-PURPOSE	
004-3	(U) Δ	(TO RESTROOMS, 004 MULTI-PURPOSE Δ)	
006-1	FR		
006-2	R		
007-1	I	STORAGE	
007-2			
008-1	I	MECHANICAL	
009-2	G1C2		
009-3	G1C2		
009-4	EJL	009 MULTI-PURPOSE	
009-2	I	009A QUIET ROOM	
009-3	I	STORAGE	
009-4	(U) Δ	(TO RESTROOMS, 009 MULTI-PURPOSE Δ)	
010-1	D		
012-1			
013-1	I	STORAGE	

UPPER FLOOR SIGNAGE SCHEDULE			
DOOR (XXX-X)	SIGN TYPE ▽	SIGN TEXT (TEXT TO BE ROOM NUMBER & NAME AS NOTED ON PLAN U.O.N.)	NOTES
204	(P) Δ		
204-1	R		
205-1	I	MECHANICAL	
205-1	I	STORAGE	
206-1	L1OP	206 MULTI-PURPOSE	
206-2	(L1E) Δ	206 MULTI-PURPOSE	
207-1	I	STORAGE	
208-1	I	STORAGE	
209-1	G1C2		
210-1	I	JANITOR	

**NOTES**

- DOOR NUMBERS FOR SIGNAGE ONLY. REFER TO DOOR SCHEDULES FOR REINFORCED DOORS.
- SEE SIGN DETAILS AND MOUNTING LOCATIONS ON A-605 THRU A-608.
- SEE SIGNAGE PLAN FOR EXTRA SIGN LOCATIONS. THIS INCLUDES ROOM SIGNAGE AT GYMNASIUM. IF ROOM NAME IS NOT INDICATED ON SCHEDULE, MATCH ROOM NAME/ # SHOWN ON PLANS.
- SEE ELECTRICAL PLANS FOR LIGHTED EXIT SIGNS.

MAIN FLOOR SIGNAGE SCHEDULE			
DOOR (XXX-X)	SIGN TYPE ▽	SIGN TEXT (TEXT TO BE ROOM NUMBER & NAME AS NOTED ON PLAN U.O.N.)	NOTES
101-1	D6J		
104-1	I	104 OFFICE	
105-1	I	105 OFFICE	
106-1	I	106 OFFICE	
107-1		107 OFFICE	
108-1		108 OFFICE	
108-2	I	108 OFFICE	
109-1	I	109 DATA ROOM	
111-1	D6J		
112-1	(D) Δ	112 EXERCISE	
112-2	I	112 EXERCISE	
116-1	E		
118-1	G1C2		
118-2	G1C2		
119-3	G1C3		
119-4	G1C3		
119-5	G1C3		
124-1	M	124 OFFICE	
124-2		124 OFFICE	
128-1	R		
130-1	I	130 OFFICE	
132-1	E1P	132 CONFERENCE ROOM	
132-2	EJ	132 CONFERENCE ROOM	
133-1	(E) Δ		
134-1		134 OFFICE	
135-1	G1C2		
136-1	I	STORAGE	
137-1	I	JANITOR	
138-1	R		
139-1	EFJ	139 POOL	
139-2	EFJ	139 POOL	
139-3	(E) Δ	139 POOL	
140-1	(E) Δ	140 DANCE	
141-1	(E) Δ	141 SENSORY ROOM	
141-2	(E) Δ	140 DANCE, 141 SENSORY ROOM Δ	
141-3	(E) Δ	141 SENSORY ROOM	
142-1	I	STORAGE	
144-1	FR		
145A-1	LM	145A MULTI-PURPOSE	
145A-2	E1DP	145A MULTI-PURPOSE	
145A-3	I		
145B-1	LM	145B MULTI-PURPOSE	
145B-2	E1DP	145B MULTI-PURPOSE	
145C-1	I	STORAGE	
146-1	E1D	MEDIA	
146-2		MEDIA	
147-1	D		
148-1	I	148 MULTI-PURPOSE	
148-2	I	148 MULTI-PURPOSE	
149A-1	B1B2		
149B-1	ALQ2		
150-1		JANITOR	
151-1	I	BREAK AREA	
151-2			
152-1	L,N	RECYCLING AREA	
153-1	R		

A-604

**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS**

**SIGNAGE SCHEDULE**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 2 OF 153 SHEETS

WB5 S-16059

DATE: 7/28/17  
FOR CITY ENGINEER: SAMUEL MAMMALAS  
BY: [Signature]  
PROJECT MANAGER: [Signature]

DESCRIPTION: [Blank]  
BY: [Blank]  
APPROVED: [Blank] DATE: [Blank] FILED: [Blank]  
PROJECT ENGINEER: [Blank]  
CONTRACTOR: [Blank] DATE STARTED: [Blank]  
INSPECTOR: [Blank] DATE COMPLETED: [Blank]

1852-6297  
CROSS COORDINATE  
13/52-47 - 3  
ADDENDUM A

**CONSULTANT**

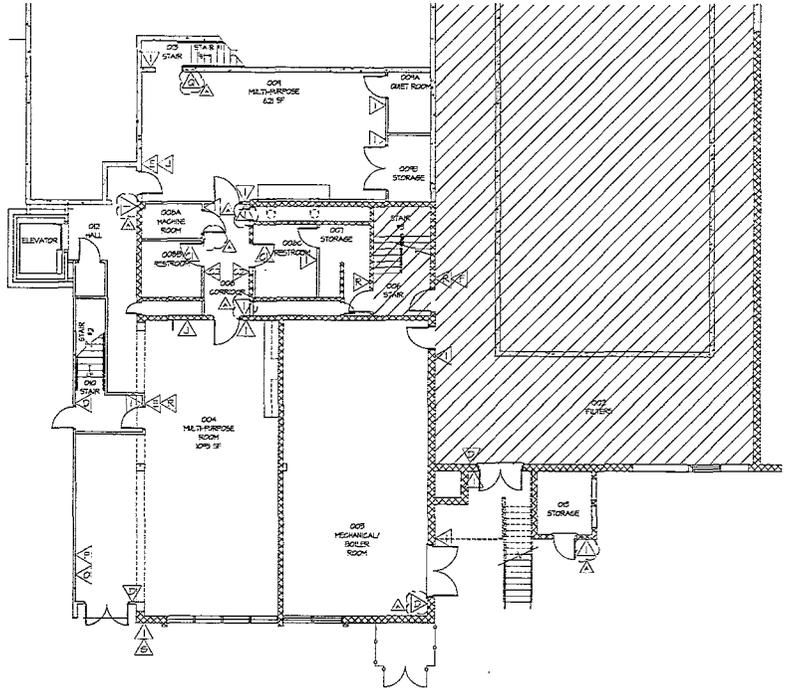
**PLATT/WHITELAW ARCHITECTS, INC.**

4034 30th Street, SAN DIEGO CA 92104  
(619) 548-4326 FAX (619) 548-4350

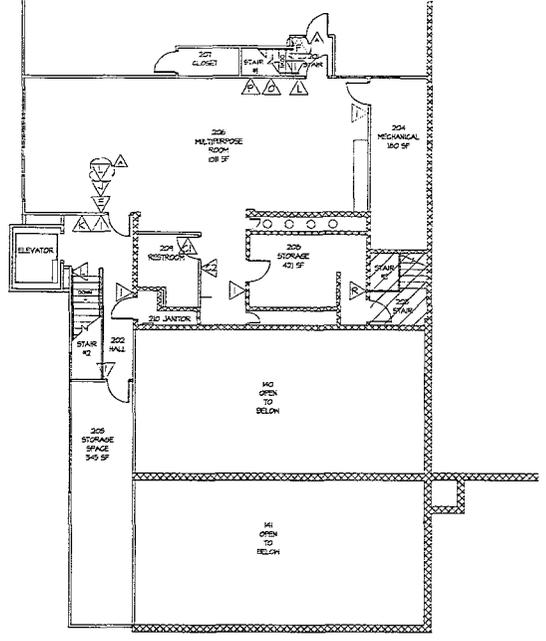


PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL





1 LOWER FLOOR SIGNAGE PLAN  
1/8" = 1'-0"  
SCALE: 1/8" = 1'-0"



2 UPPER FLOOR SIGNAGE PLAN  
1/8" = 1'-0"  
SCALE: 1/8" = 1'-0"

AREAS OF NO WORK: A-606

PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS  
LOWER & UPPER FLOOR  
SIGNAGE PLANS

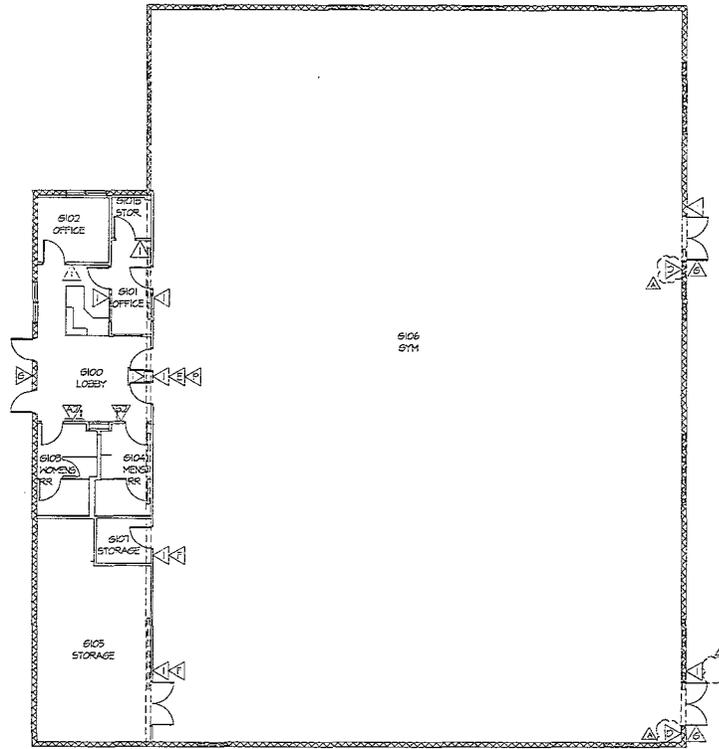
CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 43 OF 153 SHEETS

PROJECT NO.	212417	ISSUED BY	ALFANDRA CORSI
FOR CITY ENGINEER	DATE	APPROVED	DATE
SAMUEL MARRAS	1/27/11	1/27/11	1/27/11
PROJECT MANAGER	PROJECT MANAGER	PROJECT MANAGER	PROJECT MANAGER
PROJECT NO.	WBS S-16059	PROJECT NO.	WBS S-16059
DESCRIPTION	BY	APPROVED	DATE
ORIGINAL	PWA	1/27/11	1/27/11
ADDENDUM A	PWA	1/27/11	1/27/11
CONTRACTOR	DATE COMPLETED	CONTRACTOR	DATE COMPLETED
INSPECTOR	3/9/12	INSPECTOR	3/9/12

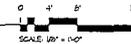
CONSULTANT  
**PLATT/WHITELAW ARCHITECTS, INC.**  
4034 30th Street, SAN DIEGO CA 92104  
858 546-4328 FAX 858 546-4850



PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL



1 GYM SIGNAGE PLAN  
1/8" = 1'-0"



A-607

PARK DE LA CRUZ COMMUNITY CENTER  
& GYMNASIUM IMPROVEMENTS  
GYM SIGNAGE PLAN

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 500F 153 SHEETS

WBS S-16059

FOR CITY ENGINEER SAMUEL MARIANO, E. PRINT NAME	DATE 2/27/11	PROJECT NO. 212-1735	PROJECT MANAGER ALEXANDRA COSSU
DESCRIPTION ADDENDUM A	BY PWA	APPROVED 6/25/11	DATE 6/25/11
PROJECT ENGINEER DATE COMPLETED 3/9/12	PROJECT NO. 212-1735	CHECK COORDINATOR 1:552-6297	CONTRACTOR DATE COMPLETED 3/9/12

CONSULTANT

**PLATT/WHITELAW ARCHITECTS, INC.**  
4084 30th Street, SAN DIEGO CA 92104  
(619) 548-4526 FAX (619) 548-4350



REVISIONS: NONE REVERSED  
DATE COMPLETED: 3/9/12  
ADDENDUM A

PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL



**SECTION 05100 - PAINTS, PRIMER, AND FINISHES**

1. PAINTS, PRIMER, AND FINISHES

Item	Description	Quantity	Unit	Notes
05100-01	PRIMER	100	sq. yd.	
05100-02	PAINT	200	gal.	

**SECTION 05200 - METALS**

1. METALS

Item	Description	Quantity	Unit	Notes
05200-01	STEEL	100	lb.	
05200-02	ALUMINUM	50	sq. ft.	

**SECTION 05300 - MASONRY**

1. MASONRY

Item	Description	Quantity	Unit	Notes
05300-01	BRICK	1000	sq. ft.	
05300-02	CONCRETE	50	cu. yd.	

**SECTION 05400 - ROOFING**

1. ROOFING

Item	Description	Quantity	Unit	Notes
05400-01	ROOFING	100	sq. ft.	
05400-02	FLASHING	50	sq. ft.	

**SECTION 05500 - FLOORING**

1. FLOORING

Item	Description	Quantity	Unit	Notes
05500-01	CARPET	100	sq. ft.	
05500-02	WOOD	50	sq. ft.	

**SECTION 05600 - PARTITIONS**

1. PARTITIONS

Item	Description	Quantity	Unit	Notes
05600-01	PARTITION	100	sq. ft.	
05600-02	GLASS	50	sq. ft.	

**SECTION 05700 - CEILING**

1. CEILING

Item	Description	Quantity	Unit	Notes
05700-01	CEILING	100	sq. ft.	
05700-02	TRUSS	50	sq. ft.	

**SECTION 05800 - ELECTRICAL**

1. ELECTRICAL

Item	Description	Quantity	Unit	Notes
05800-01	ELECTRICAL	100	sq. ft.	
05800-02	WIRING	50	sq. ft.	

**SECTION 05900 - MECHANICAL**

1. MECHANICAL

Item	Description	Quantity	Unit	Notes
05900-01	MECHANICAL	100	sq. ft.	
05900-02	VENTILATION	50	sq. ft.	

**SECTION 06000 - PLUMBING**

1. PLUMBING

Item	Description	Quantity	Unit	Notes
06000-01	PLUMBING	100	sq. ft.	
06000-02	PIPING	50	sq. ft.	

**SECTION 06100 - HEATING, VENTILATION, AND AIR CONDITIONING**

1. HEATING, VENTILATION, AND AIR CONDITIONING

Item	Description	Quantity	Unit	Notes
06100-01	HVAC	100	sq. ft.	
06100-02	DUCTWORK	50	sq. ft.	

**SECTION 06200 - SPECIALTIES**

1. SPECIALTIES

Item	Description	Quantity	Unit	Notes
06200-01	SPECIALTIES	100	sq. ft.	
06200-02	FIXTURES	50	sq. ft.	

PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS - 100% SUBMITTAL

M-007

**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS**

**TITLE 24 DOCUMENTATION**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 92 OF 153 SHEETS

WBS 5-16059

DATE PROJECT # 278-002  
BSE ENGINEERING, INC.  
15840 TAMPA AVE, SUITE 100  
SAN DIEGO, CA 92128  
TEL: 619-594-8300  
FAX: 619-594-8300

**CONSULTANT**

**PLATT/WHITELAW ARCHITECTS, INC.**  
4034 90th Street, SAN DIEGO CA 92124  
619-540-4526 FAX 619-540-4550

**APPROVED**

**APPROVED**

DATE STARTED: \_\_\_\_\_  
DATE COMPLETED: \_\_\_\_\_

TITLE 24 DOCUMENTS REVISED

ADDENDUM A

Item No.	Description	Quantity	Unit	Material	Notes
1	...	...	...	...	...
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97	...	...	...	...	...
98	...	...	...	...	...
99	...	...	...	...	...
100	...	...	...	...	...

Item No.	Description	Quantity	Unit	Material	Notes
1	...	...	...	...	...
2	...	...	...	...	...
3	...	...	...	...	...
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94	...	...	...	...	...
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96	...	...	...	...	...
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100	...	...	...	...	...

Item No.	Description	Quantity	Unit	Material	Notes
1	...	...	...	...	...
2	...	...	...	...	...
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60	...	...	...	...	...
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62	...	...	...	...	...
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66	...	...	...	...	...
67	...	...	...		

System ID	System Name	Area	Flow Rate (GPM)	Pressure (PSI)	Notes
1	Water Supply	1st Floor	100	100	
2	Water Supply	2nd Floor	100	100	
3	Water Supply	3rd Floor	100	100	
4	Water Supply	4th Floor	100	100	
5	Water Supply	5th Floor	100	100	
6	Water Supply	6th Floor	100	100	
7	Water Supply	7th Floor	100	100	
8	Water Supply	8th Floor	100	100	
9	Water Supply	9th Floor	100	100	
10	Water Supply	10th Floor	100	100	

System ID	System Name	Area	Flow Rate (GPM)	Pressure (PSI)	Notes
11	Water Supply	11th Floor	100	100	
12	Water Supply	12th Floor	100	100	
13	Water Supply	13th Floor	100	100	
14	Water Supply	14th Floor	100	100	
15	Water Supply	15th Floor	100	100	
16	Water Supply	16th Floor	100	100	
17	Water Supply	17th Floor	100	100	
18	Water Supply	18th Floor	100	100	
19	Water Supply	19th Floor	100	100	
20	Water Supply	20th Floor	100	100	

System ID	System Name	Area	Flow Rate (GPM)	Pressure (PSI)	Notes
21	Water Supply	21st Floor	100	100	
22	Water Supply	22nd Floor	100	100	
23	Water Supply	23rd Floor	100	100	
24	Water Supply	24th Floor	100	100	
25	Water Supply	25th Floor	100	100	
26	Water Supply	26th Floor	100	100	
27	Water Supply	27th Floor	100	100	
28	Water Supply	28th Floor	100	100	
29	Water Supply	29th Floor	100	100	
30	Water Supply	30th Floor	100	100	

System ID	System Name	Area	Flow Rate (GPM)	Pressure (PSI)	Notes
31	Water Supply	31st Floor	100	100	
32	Water Supply	32nd Floor	100	100	
33	Water Supply	33rd Floor	100	100	
34	Water Supply	34th Floor	100	100	
35	Water Supply	35th Floor	100	100	
36	Water Supply	36th Floor	100	100	
37	Water Supply	37th Floor	100	100	
38	Water Supply	38th Floor	100	100	
39	Water Supply	39th Floor	100	100	
40	Water Supply	40th Floor	100	100	

System ID	System Name	Area	Flow Rate (GPM)	Pressure (PSI)	Notes
41	Water Supply	41st Floor	100	100	
42	Water Supply	42nd Floor	100	100	
43	Water Supply	43rd Floor	100	100	
44	Water Supply	44th Floor	100	100	
45	Water Supply	45th Floor	100	100	
46	Water Supply	46th Floor	100	100	
47	Water Supply	47th Floor	100	100	
48	Water Supply	48th Floor	100	100	
49	Water Supply	49th Floor	100	100	
50	Water Supply	50th Floor	100	100	

System ID	System Name	Area	Flow Rate (GPM)	Pressure (PSI)	Notes
51	Water Supply	51st Floor	100	100	
52	Water Supply	52nd Floor	100	100	
53	Water Supply	53rd Floor	100	100	
54	Water Supply	54th Floor	100	100	
55	Water Supply	55th Floor	100	100	
56	Water Supply	56th Floor	100	100	
57	Water Supply	57th Floor	100	100	
58	Water Supply	58th Floor	100	100	
59	Water Supply	59th Floor	100	100	
60	Water Supply	60th Floor	100	100	

System ID	System Name	Area	Flow Rate (GPM)	Pressure (PSI)	Notes
61	Water Supply	61st Floor	100	100	
62	Water Supply	62nd Floor	100	100	
63	Water Supply	63rd Floor	100	100	
64	Water Supply	64th Floor	100	100	
65	Water Supply	65th Floor	100	100	
66	Water Supply	66th Floor	100	100	
67	Water Supply	67th Floor	100	100	
68	Water Supply	68th Floor	100	100	
69	Water Supply	69th Floor	100	100	
70	Water Supply	70th Floor	100	100	

System ID	System Name	Area	Flow Rate (GPM)	Pressure (PSI)	Notes
71	Water Supply	71st Floor	100	100	
72	Water Supply	72nd Floor	100	100	
73	Water Supply	73rd Floor	100	100	
74	Water Supply	74th Floor	100	100	
75	Water Supply	75th Floor	100	100	
76	Water Supply	76th Floor	100	100	
77	Water Supply	77th Floor	100	100	
78	Water Supply	78th Floor	100	100	
79	Water Supply	79th Floor	100	100	
80	Water Supply	80th Floor	100	100	




**M-009**

**PARK DE LA CRUZ COMMUNITY CENTER & GYMNASIUM IMPROVEMENTS**

**TITLE 24 DOCUMENTATION**

CITY OF SAN DIEGO, CALIFORNIA  
PUBLIC WORKS DEPARTMENT  
SHEET 94 OF 153 SHEETS

WBS 5-16059

DATE: 2/24/17  
DATE: 3/31/17

FOR CITY BOARD: SAMIR AZHARALLA  
PROJECT MANAGER

PROJECT TEAM: [List of team members]

DESCRIPTION: [Project description]

BY: [Name] DATE: [Date] FILED: [Date]

ORIGINAL: [Name] DATE: [Date]

ADDENDUM A: [Name] DATE: [Date]

CONTRACTOR: [Name] DATE STARTED: [Date]

INSPECTOR: [Name] DATE COMPLETED: [Date]

TITLE 24 DOCUMENTS REVISED

**CONSULTANT**

**PLATT/WHITELAW ARCHITECTS, INC.**

4034 30th Street, SAN DIEGO CA 92104  
619 546-4326 FAX (619) 546-4350

BSE PROJECT # 2784002

**BSE ENGINEERING, INC.**

15400 TRACY BLVD. SUITE 100  
SAN DIEGO, CA 92128  
TEL: 619 579 2700  
FAX: 619 579 0500







**Bid Results**

**Bidder Details**

**Vendor Name** USS Cal Builders Inc  
**Address** 8051 Main Street  
 Stanton, CA 90680  
 United States  
**Respondee** ERIC OTHMAN  
**Respondee Title** SECRETARY  
**Phone** 714-828-4882 Ext.  
**Email** BIDDING@USSCALBUILDERS.COM  
**Vendor Type** PQUAL,CADIR  
**License #** 654454  
**CADIR** 1000003215

**Bid Detail**

**Bid Format** Electronic  
**Submitted** May 23, 2017 1:58:23 PM (Pacific)  
**Delivery Method**  
**Bid Responsive**  
**Bid Status** Submitted  
**Confirmation #** 106552  
**Ranking** 0

**Respondee Comment**

**Buyer Comment**

**Attachments**

File Title	File Name	File Type
Contractors Certification of Pending Actions	Contractors Certification of Pending Actions.pdf	Contractors Certification of Pending Actions
Lobby Prohibition, Certification and Disclosure	Lobby Prohibition, Certification and Disclosure.pdf	Lobby Prohibition, Certification and Disclosure
Subcontractors Additive Deductive Alternate	Subcontractors Additive_Deductive Alternate.pdf	Subcontractors Additive/Deductive Alternate
Bid Bond	Bid Bond.pdf	Bid Bond

**Line Items**

Type	Item Code	UOM	Qty	Unit Price	Line Total	Comment
<b>Main Bid Phase 1</b>						
1	Bonds (Payment and Performance)					
	524126	LS	1	\$58,000.00	\$58,000.00	
2	Renovation of Community Center Per Plans and Specifications.					
	236220	LS	1	\$4,656,000.00	\$4,656,000.00	
3	Water Pollution Control Program Development					
	541330	LS	1	\$2,000.00	\$2,000.00	
4	Water Pollution Control Program Implementation					
	236220	LS	1	\$38,000.00	\$38,000.00	

**Bid Results**

Type	Item Code	UOM	Qty	Unit Price	Line Total	Comment
5	Building Permits (EOC Type I)					
	236220	AL	1	\$90,000.00	\$90,000.00	
6	Special Inspection (EOC Type I)					
	238210	AL	1	\$25,000.00	\$25,000.00	
7	Field Order (EOC Type II)					
		AL	1	\$500,000.00	\$500,000.00	
8	Lead and Asbestos Abatement (EOC Type I)					
	236220	AL	1	\$100,000.00	\$100,000.00	
9	SDGE/ATT/Cox Fees (EOC Type I)					
	238210	AL	1	\$30,000.00	\$30,000.00	
				<b>Subtotal</b>	<b>\$5,499,000.00</b>	
	<b>Alternate Items Phase 1 A</b>					
10	Install Code Compliant Fire Suppression System					
	238220	LS	1	\$98,000.00	\$98,000.00	
				<b>Subtotal</b>	<b>\$98,000.00</b>	
	<b>Alternate Items Phase 1 B</b>					
11	Modular Elevator					
	238210	LS	1	\$225,000.00	\$225,000.00	
				<b>Subtotal</b>	<b>\$225,000.00</b>	
	<b>Main Bid Phase 2</b>					
12	Bonds (Payment and Performance)					
	524126	LS	1	\$28,000.00	\$28,000.00	
13	HVAC System for Gymnasium - Contractor to Provide Design, Engineering, Permitting Processing and Material, Equipment and Labor to Provide a Fully Functioning System, Including Any Service Lines for Water, Sewer, Electrical or Gas. Includes Gym Building Envelope Upgrades Including New Windows and Louvers and Insulation Below the Roof.					
	238220	LS	1	\$280,000.00	\$280,000.00	
14	Replace Community Center and Gym Roofing					
	238160	LS	1	\$330,000.00	\$330,000.00	
15	Replace Existing Community Center Windows Interior and Exterior					
	238350	LS	1	\$400,000.00	\$400,000.00	
16	Provide LEED Silver Certification and Commissioning for the Project, Including All GBCI Reporting and Fees.					
	541330	LS	1	\$120,000.00	\$120,000.00	
17	Building Permits (EOC Type I)					
	236220	AL	1	\$50,000.00	\$50,000.00	
18	Special Inspection (EOC Type I)					
	238210	AL	1	\$15,000.00	\$15,000.00	

**Bid Results**

Type	Item Code	UOM	Qty	Unit Price	Line Total	Comment
19	Field Order - (EOC Type II)					
		AL	1	\$370,000.00	\$370,000.00	
				<b>Subtotal</b>	<b>\$1,593,000.00</b>	
	<b>Alternate Items Phase 2 D</b>					
20	REMOVE BOILERS AND POOL EQUIPMENT and Associated Tanks, and Piping					
	238910	LS	1	\$28,000.00	\$28,000.00	
				<b>Subtotal</b>	<b>\$28,000.00</b>	
	<b>Alternate Items Phase 2 E</b>					
21	EXTERIOR FAÇADE IMPROVEMENTS including new stucco color coat, custom angled gutter system at sloped eaves, and bronze anodized aluminum gutters and downspouts.					
	238140	LS	1	\$180,000.00	\$180,000.00	
				<b>Subtotal</b>	<b>\$180,000.00</b>	
	<b>Alternate Items Phase 2 F</b>					
22	LIGHTED MONUMENT SIGN (EOC Type I)					
	238210	AL	1	\$75,000.00	\$75,000.00	
				<b>Subtotal</b>	<b>\$75,000.00</b>	
	<b>Alternate Items Phase 2 G</b>					
23	LOBBY UPGRADES: Upgrade Reception Desk, Ceiling and Wall Treatments					
	238350	LS	1	\$90,000.00	\$90,000.00	
				<b>Subtotal</b>	<b>\$90,000.00</b>	
				<b>Total</b>	<b>\$7,788,000.00</b>	

**Subcontractors**

Name & Address	Description	License Num	CADIR	Amount	Type
Naval Coating, Inc. 3475 E Street  San Diego, CA 92102 United States	PAINTING	1022673	1000046274	\$184,740.00	DVBE,CADIR,SDVSB
California Granite & Flooring, Inc. 2399 Pine Valley Glen Escondido, CA 92026 United States	CERAMIC TILES	893891	1000013586	\$73,664.49	
Richardson Steel, Inc. 9102 Harness Street Spring Valley, CA 91977 United States	STEEL	756989	1000000243	\$52,500.00	CAU,MALE,CADIR
Diversified Window Coverings, Inc. 7964 Arjons Drive, Suite F San Diego, CA 92126 United States	WINDOW COVERINGS	469647	1000009799	\$10,842.00	
NEW CENTURY CONCEPTS INCORPORATED 555 BIRCH COURT UNIT C COLTON, CA 92324 United States	CASEWORKS	979292	1000015296	\$24,850.00	
TL SHIELD & ASSOCIATES INC P O BOX 6845 THOUSAND OAKS, CA 91359 United States	ELEVATOR  ALTERNATE B	605460	1000001711	\$208,834.14	

**Bid Results**

Name & Address	Description	License Num	CADIR	Amount	Type
<b>Stumbaugh &amp; Associates</b> 8920 Kenamar Drive 212 San Diego, CA 92121 United States	PREFAB EQUIPMENT	288724	1000004145	\$30,938.00	CAU,MALE
<b>A Good Roofer, Inc.</b> 11651 Riverside Dr., Suite 145 Lakeside, CA 92040 United States	ROOFING	685015	1000000746	\$330,755.00	PQUAL,CADIR
<b>In-Line Fence &amp; Railing</b> P.O. Box 2637 Ramona, CA 92065 United States	CHAINLINK FENCES	769516	1000002605	\$18,416.00	CADIR,DBE,LAT,MA LE,MBE,SDB,SLBE
<b>e l hoobs inc</b> 123 mollison el cajon, CA 92041 United States	PLASTER & DRYWALL  ALTERNATE E, ALTERNATE G	777073	1000004428	\$525,450.00	
<b>Bradshaw Engineering Corporation</b> 8645 Argent Street, Ste.B Santee, CA 92071 United States	FIRE SPRINKLER  ALTERNATE A	383330	1000006261	\$94,800.00	CAU,MALE,CADIR
<b>Core Contracting, Inc.</b> 2336 La Mirada Drive #300 Visa, CA 92081 United States	ROUGH CARPENTRY	905751	1000012197	\$141,216.00	
<b>Comprehensive Glass Works</b> 6950 El Cajon Blvd San Diego, CA 92115 United States	GLAZING	643139	10000051110	\$416,070.00	
<b>AMERICAN DIRECT</b> 11000 LAKEVIEW AVE LENEXA, KS 66219 United States	DOORS, FRAMES AND HARDWARES	995087	1000006113	\$185,311.00	
<b>Stanton Utilities Inc.</b> 10580 Beach Blvd Stanton, CA 90680 United States	SITE UTILITIES, HVAC, PLUMBING & ELECTRICAL  ALTERNATE F	967030	1000009551	\$1,075,000.00	
<b>Time And Alarm Systems Inc.</b> 9260 Isaac St Suite D Santee, CA 92071 United States	LOW VOLTAGES	393251	1000000832	\$37,500.00	
<b>Johnson Finch</b> 9749 Cactus Street Lakeside, CA 92040 United States	INSULATION	392277	1000004431	\$82,000.00	
<b>Pro Spectra Contract Flooring</b> 8320 Camino Santa Fe Ste 1 San Diego, CA 92121 United States	FLOOR FINISHES	740392	1000002810	\$140,500.00	
<b>SoCal Demolition Company</b> 245 3rd Avenue Suite 204 Chula Vista, CA 91910 United States	DEMOLITION  ALTERNATE D	1015989	1000040401	\$230,000.00	LAT,MALE
<b>PGC Construction</b> 27475 YNEZ RD #111 Temecula, CA 92591 United States	UNIT SKYLIGHTS	829086	1000036314	\$94,853.00	