



**CITY OF IRVINE
ORANGE COUNTY, CALIFORNIA**

**NOTICE INVITING BIDS, PROPOSAL,
CONTRACT AND SPECIAL PROVISIONS
FOR**

**GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003**

**CITY OF IRVINE
1 CIVIC CENTER PLAZA
P.O. BOX 19575
IRVINE, CALIFORNIA 92623-9575**

**PREPARED BY:
SVA ARCHITECTS
6 HUTTON CENTER DRIVE, SUITE 1150
SANTA ANNA, CA 92707**

NOVEMBER, 2025

**GREAT PARK OPERATIONS & MAINTENANCE FACILITY
IRVINE
CIP 372414**

THE SPECIAL PROVISIONS CONTAINED HEREIN HAVE BEEN PREPARED BY OR UNDER THE DIRECTION OF:



11/20/2025

Shawn Yu, P.E.
R.C.E. No. 87239

Date

DIVISIONS 2 THROUGH 28 CONTAINED HEREIN HAVE BEEN PREPARED BY OR UNDER THE DIRECTION OF:



11/21/2025

Robert Simons, Architect
License No. C-18301

Date

APPROVED BY:



11/25/25

Lincoln Lo, P. E.
Deputy Director/City Engineer

Date

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See Special Provisions Referring to Green Book and Modifications Required.

END OF SECTION

**CITY OF IRVINE, CALIFORNIA
NOTICE INVITING BIDS
BID NO. GP-26-0003**

NOTICE IS HEREBY GIVEN that sealed bids with online bid price submittal will be received by the Purchasing Representative of the City of Irvine, California, for furnishing all labor services, materials, tools, equipment, supplies, transportation, utilities, and all other items and facilities necessary therefore, as provided in the contract documents for the **Great Park Operations & Maintenance Facility** together with appurtenances thereto, in strict accordance with the specifications on file at the Department of Public Works and Sustainability, 17101 Armstrong Ave., Irvine, CA 92614.

DATE OF OPENING BIDS: Bid prices for each line item of the Schedule of Work must be entered and all other required documents for the bid proposal packet (pages 15, 20-35) must be uploaded to the BidsOnline system in accordance with the instructions beginning on page 18 no later than **4:00 p.m. on January 20, 2025**. No late bids will be accepted. No other method of bid submittal will be accepted.

Bids will be made publicly available via BidsOnline at the date and time specified above.

LOCATION OF THE WORK: The work to be performed hereunder is located in the City of Irvine, County of Orange, **at the southwest corner of Great Park Boulevard and Skyhawk, in the Great Park, Irvine, CA 92618.**

MANDATORY PRE-BID MEETING AND SITE WALK: There will be a **mandatory** pre-bid meeting on **December 9, 2025, at 2:00 p.m.** at the north end of Parking Lot 5, 8000 Great Park Blvd, Irvine, CA 92618, near the intersection of Great Park Blvd. and Skyhawk. Failure to attend will result in your bid being declared non-responsive. Only prime contractors are required to attend.

DESCRIPTION OF WORK: The work to be performed shall include, but not be limited to:

The construction of a new operations and maintenance facility at the southwest corner of Skyhawk and Great Park Boulevard. Scope includes construction of a one story type V-B occupancy, S-1 sprinklered main building containing office areas and storage rooms; exterior work areas; a one story type V-B detached support structure with S-1, S-2 and U occupancies and a covered detached exterior fuel storage and fuel dispensing system; and other items not mentioned here, but required by the Plans and Special Provisions. The Engineer's construction cost estimate for the project is above \$12 million (rounded to the nearest ten thousand) .

MINIMUM QUALIFICATIONS: The bidder shall have completed, as the prime contractor, within the last three (3) years, at least two (2) grounds up projects with a gross construction cost of over \$10,000,000. One of these two projects shall be similar to this project, with a new structure and parking lot. Contractor shall also be required to have an

average EMR over the last five (5) years of not more than 1.1. Contractor shall also have a gross annual revenue of no less than \$15,000,000 for each of the last three (3) years. This shall need to be demonstrated upon selection of apparent low bidder.

LICENSE REQUIREMENT: **Prime Contractor must possess a valid Class B (General Contractor) license.** At the time of submitting the bid, the Bidder shall be licensed as a contractor in accordance with the provisions of California Business and Professions Code Chapter 9, Division 3.

DEBARRED CONTRACTORS: The City of Irvine Municipal Code Section 2-12-101 *et seq.* sets forth procedures to debar Contractors from bidding or performing work on City of Irvine contracts at any tier, whether prime, subcontractor, etc. Accordingly, certain Contractors have been debarred and are listed on the City's website at www.cityofirvine.org/purchasing. Click on the link which states: "For a list of Debarred Contractors, please [click here](#)."

COMPLETION OF WORK AND LIQUIDATED DAMAGES: All work shall be completed in a total of **Two Hundred Seventy-Five (275) Working Days** (excluding plant establishment) and **Three Hundred Twenty (320) Working Days** (including plant establishment) from the date specified in the Notice to Proceed. Liquidated damages shall be One Thousand Five Hundred Dollars (**\$1,500**) per Calendar Day, for each and every Calendar Days delay in finishing the work except plant establishment work, in excess of the number of Working Days prescribed above, and liquidated damages shall be **Five Hundred Dollars (\$500)** per Calendar Day for each and every Calendar Days delay in completing the plant establishment work in excess of the number of Working Days prescribed above. In no case will liquidated damages be assessed at more than **One Thousand Five Hundred Dollars (\$1,500)** per Calendar Day.

AWARD OF CONTRACT: The award of the Contract, if it is awarded, will be to the lowest responsive and responsible Bidder whose bid complies with all the requirements prescribed. The City reserves the right, after opening bids, to reject any or all bids, to waive any informality in a bid, to make awards in the interest of the City, and to reject all other bids.

PROPOSAL GUARANTEE AND BONDS: Each bid shall be accompanied by a scanned copy of a certified or cashier's check or corporate surety bond issued by a surety company, admitted to do business in the State of California, on the form furnished by the City as guarantee that bidder will, if an award is made to him in accordance with the terms of his bid, promptly secure Workers' Compensation insurance and liability insurance, execute a contract in the required form, and furnish satisfactory bonds for the faithful performance of the contract ("Performance Bond") and for the payment of claims of materialmen and laborers thereunder ("Payment Bond"). Said check or bidder's bond shall be in an amount of not less than ten percent (10%) of the amount of the bid. **Bidders with the three lowest responsive bids shall deliver an original hard copy of the certified check, cashier's check or surety bond to the Purchasing Representative at 1 Civic Center Plaza, Irvine, CA 92606 within five business days of the bid opening date. Failure to submit the original check or bidder's bond may result in the bid being**

declared non-responsive. The Performance and Payment Bonds shall be not less than one hundred percent (100%) of the total amount of the bid price named in the contract. Only bonds issued by companies admitted to do business in the State of California will be accepted in accordance with the Code of Civil Procedure Section 995.311. Failure to submit acceptable Payment and Performance Bonds as required shall result in a rejection of the bid and a forfeiture of the proposal guarantee.

PREVAILING RATES OF WAGES: Prevailing wage requirements apply to public works projects with a value exceeding \$1,000.00. The definition of “public works” is found at Labor Code Section 1720, *et seq.*

The CITY is subject to the provisions of law relating to public contracts in the State of California. It is agreed that all provisions of law applicable to public contracts are a part of this Agreement to the same extent as though set forth herein, and will be complied with by CONTRACTOR. CONTRACTOR shall abide by all applicable Sections of the California Labor Codes including Sections 1770 - 1781, *et seq.* In accordance with the provisions of Section 1773 of the California Labor Code, the general prevailing rates of per diem wages and holiday and overtime work in the locality in which the Work is to be performed shall be in accordance with the rates posted on the Department of Industrial Relations website, found at <http://www.dir.ca.gov/dirdatabases.html>. The CONTRACTOR, and any subcontractor under him, shall pay not less than the specified prevailing rates of wages to all workers employed in the execution of this Agreement.

The CITY reminds all contractors and subcontractors of the adoption of Senate Bill 96 – Amendments to California Prevailing Wage Law Requires Additional Measures by Public Agencies, Contractors and Subcontractors, and encourages them to understand and comply with the requirements as set forth on the Department of Industrial Relations (DIR) website at <http://www.dir.ca.gov/Public-Works/PublicWorks.html>. All contractors and subcontractors who plan to bid on a public works project when the project is for construction, alteration, demolition, installation, or repair work with a value exceeding \$25,000.00 must first be registered and pay an annual fee with the DIR. Additionally, all contractors and subcontractors who plan to bid on public works projects involving maintenance work with a value exceeding \$15,000.00 must first be registered and pay an annual fee with the DIR. The CITY requires all contractors and subcontractors to be registered with the DIR prior to submitting a bid meeting these parameters. Subject to the exceptions set forth in Labor Code Section 1725.5, bids from contractors that are not currently registered will be deemed nonresponsive. Further, the CITY will not award a contract to and no contractor or subcontractor will be allowed to work on a CITY public works project meeting these parameters unless they are registered with the DIR pursuant to Labor Code Section 1725.5. Please visit the DIR website for further information.

A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of

the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

LABOR REGULATIONS: The Contractor shall comply with all applicable requirements of the California Labor Code and the City of Irvine Municipal Code.

COMMUNITY WORKFORCE AGREEMENT: This project is subject to the Community Workforce Agreement (CWA) between the City and the Los Angeles/Orange County Building and Construction Trades Council (Trades Council). The CWA establishes labor relations policies and procedures for the Contractor and subcontractors of all tiers – including a local hire goal, payment of employee fringe benefits through a union trust fund and registering employees through a union hall. A signed Letter of Assent must be submitted with Bid proposal packet. The City of Irvine will utilize a CWA Administrator who will work with the Contractors and the Trades Council to oversee the provisions of the CWA. A copy of the CWA is included in Appendix A.

Prior to any work being done on the project, Contractors that are not signatory with one of the unions that are signatory to the CWA shall register each of their own workers (Core Employees) with the appropriate union hall and must provide a listing (Core Employees List, see Appendix A) of their Core Employees to the CWA Administrator. The CWA contains a local hiring goal of 30%, calculated based on total hours worked. The local hire provision requires best efforts to utilize qualified workers first residing in the Local Zip Code List (see Appendix A), then to Veterans residing in Orange County, then to graduates from the Building Trades Multi-Craft Core Curriculum (MC3 Graduates) residing in Orange County, and finally other residents of Orange County. When requesting workers from the union hiring hall, the Contractor shall use the Craft Request Form (see Appendix A). This form must be sent to the union hiring hall 48 hours prior to when the worker is needed. The Contractor must hold a Pre-Job Conference that is to be attended by all subcontractors and those attending will disclose their scope of work and union assignments to the Building Trades. The Contractor must fill out the Pre-Job Conference Form (see Appendix A) and submit to the CWA Administrator a week prior to scheduling the Pre-Job Conference.

PLANS AND SPECIFICATIONS: A full set of bid documents consisting of Notice Inviting Bids, Proposal, Contract, Special Provisions and Contract Plans are available for inspection without charge at the Department of Public Works and Transportation, 1 Civic Center Plaza, Irvine, California 92606-5207. Contractors are required to register on PlanetBids. Plans, specifications and addendum are downloadable.

To obtain a copy of the bid documents, please visit the City of Irvine's website at www.cityofirvine.org/purchasing. Click on the "Supplier Registration and Bid Opportunities" link and review the information about our online system. Next, click on the "BidsOnline" link. If you are not currently registered with the City of Irvine, please click on the "New Vendor Registration" button and then complete the electronic supplier registration process, including selecting Category Code(s) describing the goods and/or services you provide, as well as entering your Contractors State License information. After registering your firm, click on the "Bid Opportunities" button to view and download the Bid

Documents. Interested firms must be registered on the City's website and download the Bid Documents in order to submit a bid. Firms must also check the website periodically for addenda information as failure to download any and all addenda will result in bid disqualification.

SECURITY FOR COMPLETION OF WORK: The Contract Documents establish a provision for monthly progress payments based upon the percentage of work completed as determined by the Engineer. The City will retain a portion of each progress payment as security for completion of the balance of the work. At the request and expense of the successful bidder, the City will pay the amount so retained upon compliance with the requirements of California Public Contract Code § 22300 and the provisions of the Contract Documents, Special Provisions Subsection 9-3.2.2 pertaining to "Substitution of Securities."

PROJECT ADMINISTRATION: All questions relative to this project must be submitted via PlanetBids no later than December 30, 2025 at 4 p.m. to allow adequate time to respond to all plan holders. No verbal requests or requests made in any other format will be accepted. Questions must be submitted individually and not in a paragraph format nor combined in a single submission.

Requests submitted for City's consideration of proposed terms and conditions, including modifications to the City's IFB and/or Contract terms and conditions must be submitted by the deadline for questions. Such requests should include an attachment in Word or PDF format on formal company letterhead that shows the requested modifications.

Significant interpretations or clarifications and responses to questions received by the deadline will be addressed via addenda to this FIB, which will be released and posted on PlanetBids under the "Addenda/Emails" tab.

General process questions may be directed to the following:

Purchasing Representative

Tricia Sosa: tsosa@cityofirvine.org

CITY OF IRVINE

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INSTRUCTIONS TO BIDDERS, PROPOSAL REQUIREMENTS AND CONDITIONS

1. CONTRACT DOCUMENTS: The Contract Documents shall consist of:

- a) Permits and Agreements
- b) Contract
- c) Addenda
- d) Instructions to Bidders, Proposal Requirements and Conditions
- e) Special Provisions
- f) Technical Specifications (CSI Div 2 on Plans)
- g) Technical Specifications (CSI Division 1 and 3 through 28)
- h) Contract Plans
- i) Standard Plans
- j) Standard Specifications
- k) Reference Specifications

all of which are on file at the City of Irvine in the Department of Public Works and Sustainability, 17101 Armstrong Ave., Irvine, CA 92614, and are hereby referred to and made a part hereof.

2. BID PROPOSALS: To be considered, bids shall be made in accordance with the following instructions:

- a) For the convenience of bidders, the "SCHEDULE OF WORK" has been posted on the City's BidsOnline system. Bidders must enter their unit price information online in accordance with the INSTRUCTIONS FOR ENTERING ELECTRONIC BIDS included herein. Unit prices must be entered online and then the extended prices and total bid price will be automatically calculated.
- b) Bids shall be submitted only on bid items stated in the Bid Documents; bids on other bases will not be considered. Bids that are not submitted on the prescribed forms, and in accordance with the INSTRUCTIONS FOR ENTERING ELECTRONIC BIDS may be rejected.
- c) Unless called for, additive bids will not be considered.
- d) Pursuant to the provisions of Public Contract Code § 4101 to 4108, inclusive, every Bidder shall set forth in its bid:

- 1) The Bidder shall list the name, license number, and location of the place of business of each subcontractor performing work in an amount in excess of one-half of one percent (1/2%) of the prime contractor's total bid, or, in the case of bids or offers for the construction of streets or highways, including bridges, in excess of one-half of one percent (1/2%) of the prime contractor's total bid or ten thousand dollars (\$10,000), whichever is greater.
 - 2) The bid item numbers and the percentage of the bid item subcontracted.
- e) In the event additive bids are called for and the Bidder intends to use different or additional subcontractors on the additive(s), the Bidder shall fill out additional forms of the list of subcontractors and shall identify such forms with relation to whether they apply to the base or additive bids.
 - f) If the Bidder fails to specify a subcontractor for any portion of the work to be performed under the contract in excess of one-half of one percent (1/2%) of the Bidder's total bid, or, in the case of bids or offers for the construction of streets or highways, including bridges, in excess of one-half of one percent (1/2%) of the Bidder's total bid or ten thousand dollars (\$10,000), whichever is greater, the Bidder agrees to perform that portion of work himself. The successful Bidder shall not, without the consent of the City, either:
 - 1) Substitute any person, firm or corporation as subcontractor in place of the subcontractor designated in the original bid, or
 - 2) Permit any subcontract to be assigned or transferred or allow the work to be performed by anyone other than the original subcontractor listed in the bid.
 - g) If required in the Notice Inviting Bids, bids shall be accompanied by a certified or cashier's check or an acceptable corporate bid bond on the form furnished by the City for an amount not less than ten percent (10%) of the bid, made payable to the order of the City of Irvine. The check or bid bond shall be a guarantee that the Bidder will enter into a contract and provide all required insurance and bonds if awarded the work; and in case of refusal or failure to enter into the contract, the check or bid bond shall be forfeited. The City will return Bidder's check if the project is not awarded to Bidder.

Only bonds issued by companies admitted to do business in the State of California will be accepted, in accordance with Code of Civil Procedure § 995.311 and Insurance Code § 12090.

- h) Before submitting a bid, bidders shall carefully examine the work site, the Contract Documents and the form of Contract and shall fully inform themselves about all existing conditions and limitations. Bidders shall include in their bids a sum to cover the cost of all work included in the Contract.

- i) Bid prices must be entered and the bid proposal packet must be uploaded to the BidsOnline System on or before the day and hour set for the bid opening in the Notice Inviting Bids. No other method of bid submittal will be accepted. Bidders with the three lowest responsive bids shall deliver an original hard copy of the certified check, cashier's check or surety bond to the Purchasing Representative at 1 Civic Center Plaza, Irvine, CA, 92606 within five business days of the bid opening date.
 - j) A bid may be considered non-responsive if it does not comply with the requirements set forth in these bid documents. A responsive bid is one that complies with the solicitation in all acceptability and material respects and contains no material defects.
3. WITHDRAWAL OF BIDS: Bids may be withdrawn at any time before the bid deadline, by going back into the BidsOnline system and selecting "Withdraw."
4. INTERPRETATION OF DRAWINGS AND DOCUMENTS; REQUESTS FOR CLARIFICATION: If any person contemplating submitting a bid for the proposed Contract is in doubt as to the true meaning of any part of the plans and specifications, or other proposed Contract Documents, or finds discrepancies in, or omissions from, the drawings or specifications, he shall submit to the Purchasing Representative a written request for all interpretations or corrections thereof via email to the Project Manager and Purchasing Representative prior to the deadline for submitting questions, as set forth in the Notice Inviting Bids section herein. Any clarification or correction of the proposed documents will be made only by Addendum duly issued, with notice provided to all firms who downloaded the bid documents from the City's website. The City is not responsible for any other explanations or interpretations of the proposed documents.
5. ADDENDA TO THE CONTRACT DOCUMENTS: Any addenda issued during the time of bidding, or forming a part of the Contract Documents after the Bidder has downloaded the bid documents from the City's website, shall be taken into account in the bid and shall be made a part of the Contract.

Addenda may be issued by the City of Irvine for any reason, including but not limited to, clarifying or correcting the Notice Inviting Bids, Special Provisions, Plans, or Bid.

Bidders will be notified of such Addenda during the period of advertising either by email or posting on the City's website, provided however, each Bidder shall be solely responsible for obtaining any such Addenda.

The Bidder shall acknowledge the receipt of Addenda on the City's BidsOnline system.

6. BIDDER RESPONSIVENESS: Failure of the Bidder to provide requested information in a complete and accurate manner may be considered non-responsive resulting in rejection of the bid. The use of "N/A" or "n/a" in response to any request

for information without an explanation as to why that abbreviation is being used may render the bid non-responsive.

7. **BIDDER RESPONSIBILITY:** Bidders are hereby notified that, in accordance with the City of Irvine Municipal Code § 2-12, the City may make a determination that the Contractor is non-responsive if the hearing officer finds evidentiary support that the Bidder has committed any of the following: (1) violated a term of a contract, present or past, with the City or other entity; (2) committed an act or omission which negatively reflects on the Contractor's quality, fitness, or capacity to perform a contract with the City or any other entity or engaged in a pattern or practice which negatively reflects on the same; (3) committed an act or omission which evidences a lack of business integrity or business honesty; (4) made or submitted a false claim against the City or any other entity; or (5) received a fine or citation for performing work in an unsafe manner; or (6) violated a condition, rule, regulation, permit, or standard applicable to a contract with the City or any other entity. In arriving at his or her determination, the hearing officer may consider Bidder's past conduct on City projects or on any other public or private projects upon which Bidder performed work.
8. **BIDDER DEBARMENT:** Bidders are hereby notified that, in accordance with the City of Irvine Municipal Code § 2-12, the City may make a determination that the Bidder shall be debarred if the hearing officer finds evidentiary support that the Bidder has committed any of the following: (1) violated a term of a contract, present or past, with the City or other entity; (2) committed an act or omission which negatively reflects on the Contractor's quality, fitness, or capacity to perform a contract with the City or any entity or engaged in a pattern or practice which negatively reflects on the same; (3) committed an act or omission which evidences a lack of business integrity or business honesty; (4) made or submitted a false claim against the City or any other entity; (5) received a fine or citation for performing work in an unsafe manner; or (6) violated a condition, rule, regulation, permit, or standard applicable to a contract with the City or any other entity. In arriving at his or her determination, the hearing officer may consider past conduct of the Contractor on City projects or on any other public or private projects which Contractor performed work.
9. **OPENING BIDS:** Bids will be publicly available via BidsOnline at the time and date set in the Notice Inviting Bids.
10. **BID PROTEST PROCEDURES:**
 - a) **BASIS FOR PROTEST:** It is the policy of the City to ensure that free and open competition takes place in all procurement activities. If, in the course of a procurement action, an interested party has reason to believe that these conditions do not exist, the interested party may file a protest in accordance with the provisions of these procedures with the City of Irvine Purchasing Representative requesting a review of the claim and a timely resolution of the issue. Any bidder on a project for which it submitted a timely bid may protest

the contract award for that project; however, subcontractors, suppliers or other third parties may not protest contract awards. Moreover, complaints about alleged ambiguity of the bid documents and/or estimates are not appropriate subject matters for bid protests.

- b) **BID PROTEST CONTENTS:** The bid protest shall be submitted in writing via email to the attention of the Purchasing Representative. The written protest shall include:
 - 1) The solicitation number and project description.
 - 2) The name, address, phone number, and email address of the protesting party.
 - 3) A detailed statement of all the legal and factual grounds for the protest and all relevant, supporting documentation (including all written documentation). The grounds for protest must be fully supported.
 - 4) Statement of the form of relief requested from the City.
 - 5) Signature of an authorized representative of the protesting party.
- c) **DEADLINE TO SUBMIT BID PROTESTS:** Bid protests must be filed within five (5) business days after the deadline for receiving bids.
- d) **WHERE TO FILE:** All protests are to be directed to the City of Irvine Purchasing Representative. Protests must be submitted in writing via email to: tsosa@cityofirvine.org. A copy of the email must also be sent to the project manager whose email address is set forth in the bid documents. (A document is considered filed on a particular calendar day when it is received via email by the City of Irvine Purchasing Representative by 5:00 p.m., Pacific Standard Time, on that calendar day). Although not required, in addition to submitting a protest via email, an original protest letter may be sent via United States Postal Service to: Attn: Purchasing Agent, City of Irvine, P.O. Box 19575, Irvine, CA 92623-9575.
- e) **BID PROTEST REVIEW:** Upon receipt, the Purchasing Representative shall consider the protest and may give notice of the protest and its basis to other persons including bidders involved in or affected by the protest. A protest shall be dismissed for failure to comply with any of the requirements set forth in the "Bid Protest Contents" section above. The Purchasing Representative shall review all material submitted with the protest. No additional material will be accepted for consideration from the protesting party unless specifically requested by the Purchasing Representative. If additional material is requested, it must be submitted by the requested date. The Purchasing Representative shall respond to the protesting party via email within ten (10) business days after receipt of the protest. Final determinations shall be binding, except as otherwise provided below.

- f) **RECONSIDERATION OF PROTEST DECISION:** A protesting party may request the Purchasing Representative's reconsideration of a decision prior to contract award only if one or both of the following conditions are met:

- 1) New information becomes available that was not previously known, or could not have been reasonably known, at the time of the original protest; and/or
- 2) The Purchasing Representative's decision contains an error of law.

Any request for reconsideration of a protest decision must be submitted in writing via email to the Purchasing Representative within three (3) business days from the date of issuance of the initial decision. The request must include a detailed explanation of the basis for reconsideration as set forth above. The Purchasing Representative shall respond to the request for reconsideration within seven (7) business days from receipt of the request.

- g) **CONTRACT AWARD:** At its discretion, the City may delay the execution of any proposed agreement pending the resolution of a protest unless one or both of the following conditions are present:

- 1) The project or service being procured is urgently required; and/or
- 2) Failure to make prompt award will otherwise cause undue harm to the City.

- h) **REMEDIES:** There shall be no limitation on remedies selected by the City. Nothing contained herein shall be considered to either act as a limitation on the City's choice of remedies or confer any right upon any interested party to a remedy. In determining the appropriate remedy, the City shall consider all the circumstances surrounding the solicitation, the contract selection, and/or the contract award, including, but not limited to: the seriousness of any deficiency found to exist in the contracting process; the effect of the action of the competitive process; any urgency surrounding the contract requirement; and the effect that implementing the remedy will have on the City's overall ability to accomplish its mission. If the City determines that the award or proposed award was not made in accordance with the applicable City statutes, regulations, policies, and procedures, the City may, in its sole discretion, grant any of the following or any other remedy it deems appropriate: If pre-award, reject all bids and issue a new solicitation, make a new contractor selection or award a contract consistent with applicable statutes, regulations, policies, and procedures; or if post-award, refrain from extending the term of the contract or awarding task orders under an existing task order agreement; or at its sole discretion, take no further action.

11. **AWARD OR REJECTION OF BIDS AND EXECUTION OF CONTRACT:** The award of the Contract will be as of the date specified in the Notice of Award issued by the City. The award of the Contract shall not constitute a binding obligation on

City until the Contract has been lawfully executed by all parties and the Contractor has submitted all required insurance certificates and bonds to the City.

The Contractor shall not commence work in advance of the execution of the Contract, the delivery of the bonds and insurance certificates, as specified above and purchase order issuance.

The award of the Contract, if it is awarded, will be to the responsive and responsible Bidder who submitted the lowest Bid complying with these Proposal Requirements and Conditions and with the Notice Inviting Bids. The lowest bid shall be the lowest bid price on the base contract without consideration of the Additive Bid Items. Such award, if made, will be made within ninety (90) Calendar Days after the opening of the proposals. The ninety (90) Calendar Days period shall be subject to extension for such further period as may be agreed upon in writing between the City and the Bidder(s) concerned. All bids will be compiled on the basis of the estimated quantities of work to be done as shown in the Proposal. However, until an award is made, the City of Irvine reserves the right to reject any and all bids or to waive any informality in bids received, if doing so is deemed to best serve the interest of the City.

12. **CONTRACT AND BONDS:** The Contract, which the successful Bidder, as Contractor, will be required to execute, is included in the Contract Documents and should be carefully examined by the Bidder.

The successful Bidder, simultaneously with his execution of the Contract, will be required to furnish a Payment Bond and a Performance Bond. Said bonds shall be in the form of the two (2) sample bonds included in these Contract Documents and based upon conditions specified in the Standard Specifications Section 2-4, "Contract Bonds," and as specified in the Special Provisions and shall be secured from a surety company satisfactory to the City.

Only bonds issued by companies admitted to do business in the State of California will be accepted, in accordance with Code of Civil Procedure § 995.311 and Insurance Code § 12090. Failure to submit acceptable Payment and Performance Bonds as required shall result in rejection of bid and forfeiture of the proposal guarantee.

All alterations, extensions of time, extra and additional work, and other changes authorized by the Contract Documents will be made without securing the consent of the surety or sureties on the Contract bonds.

The Contract shall be signed by the successful Bidder and delivered to the City together with the Contract bonds within ten (10) days of the date specified in the Notice of Award issued by the City, not including Saturdays, Sundays, and legal holidays. The Contractor shall submit insurance certificates electronically in accordance with 7-3 of the Standard Specifications and as set forth in the Contract

Documents. The executed Contract, together with the required bonds, will be filed with the Clerk of the City of Irvine.

Failure of the lowest responsive and responsible Bidder to execute the Contract and file acceptable insurance certificates and bonds as provided herein within ten (10) days of award of the Contract, not including Saturdays, Sundays and legal holidays, shall be just cause for the forfeiture of the bid bond. The successful Bidder may file with the City a written notice, signed by the Bidder or his authorized representative, specifying that the Bidder will refuse to execute the Contract if presented to him. The filing of such notice shall have the same force and effect as the failure of the Bidder to execute the Contract and furnish acceptable certificates of insurance and bonds within the time herein before prescribed.

13. SPECIAL NOTICE: Bidders are required to inform themselves fully of the conditions relating to construction and labor under which the Work will be performed, and the Contractor must employ, so far as possible, such methods and means in the carrying out of this work as will not cause any interruption or interference with any other contractor.
14. BIDDERS INTERESTED IN MORE THAN ONE BID: No person, firm or corporation shall be allowed to make or file or be interested in more than one bid as prime contractor for the same work.
15. BIDS TO BE LEFT ON DEPOSIT: No Bidder may withdraw its bid for a period of ninety (90) Calendar Days after the time set for opening thereof. However, the City will return all certified checks within fifteen (15) days, not including Saturdays, Sundays, and legal holidays, after the award of the Contract or rejection of the bids, as the case may be, to respective Bidders whose bids are not accepted.
16. NON-COLLUSION DECLARATION: All Bidders shall submit with their bids an executed non-collusion declaration on the form provided in the bidding documents. Failure to provide completed form shall result in the bid being deemed non-responsive.

The U.S. Department of Transportation (DOT) provides a toll-free hotline to report bid rigging activities. Use the hotline to report bid rigging, bidder collusion, and other fraudulent activities. The hotline number is 800-424-9071. The service is available 24 hours 7 days a week and is confidential and anonymous. The hotline is part of the DOT's effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General.

17. SUBSTITUTIONS: Where the Specifications or drawings specify any material, product, thing, or service by one or more brand names, whether or not "or equal" is added, and a Bidder wishes to propose the use of another item as being equal, he shall request approval therefor, as set forth in 4-6 of the Standard Specifications and Special Provisions.

18. **REPORTING SUSPECTED IMPROPRIETY, GROSS WASTE, FRAUD AND OTHER ACTS:** Any City and/or Great Park official, employee, and/or contractor who suspects any type of impropriety relating to purchasing or contracting activities, or gross waste, fraud, or abuse of City and/or Great Park funds or resources, a gross abuse of authority, a specified and substantial danger to public health or safety due to any act or omission of any City and/or Great Park official, employee, or contractor, or the use of a City and/or Great Park office or position, or of City and/or Great Park resources for personal gain, should report the act by calling the City's Integrity Line at 866-428-1509. All such reports shall remain anonymous if desired by the reporting party. Suspected fraudulent activities include bid rigging, product substitution, theft, overcharging, false certifications and representations, and the like. Any allegations of bribery, kickbacks, gratuities, and conflicts of interest involving City employees should also be reported.
19. **ASSIGNMENT OF CONTRACT:** No assignment by the Contractor of any Contract to be entered into hereunder or of any part thereof, or of funds to be received thereunder by the Contractor, will be recognized by the City unless such assignment has had the prior written approval of the City and the surety has been given due notice of such assignment in writing.
20. **OTHER REQUIREMENTS:** Before entering into a Contract, the Bidder to whom the Contract has been awarded shall satisfy all insurance requirements per Section 7-3 of the Standard Specifications and Special Provisions and such insurance shall be maintained in full force and effect at its own expense during the life of this Contract.

Upon request, the successful Bidder shall furnish to the City a statement of its financial condition and previous construction experience or such other evidence of his qualifications.

21. **LABOR CODE:**

PUBLIC WORKS CONTRACTOR REGISTRATION PROGRAM

All contractors and subcontractors who plan to bid on a public works project (the definition of "public works" is found at Labor Code Section 1720, *et seq.*) when the project is for construction, alteration, demolition, installation, or repair work with a value exceeding \$25,000.00 must first be registered and pay an annual fee with the DIR. Additionally, all contractors and subcontractors who plan to bid on public works projects involving maintenance work with a value exceeding \$15,000.00 must first be registered and pay an annual fee with the DIR. The CITY requires all contractors and subcontractors to be registered with the DIR prior to submitting a bid meeting these parameters. By submitting a bid for City of Irvine Department of Public Works and Transportation project, the contractor acknowledges the above requirements and agrees to maintain a valid Department of Industrial Relations (DIR) Public Works Contractor registration during the term of this project.

- a) A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.
- b) Pursuant to Labor Code Section 1771.4, all bidders are hereby notified that this project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

In addition to the requirement for submittal of certified payroll records **to the City**, contractors and subcontractors shall furnish electronic certified payroll records to the Labor Commissioner **(State of California, Division of Labor Standards Enforcement)**.

Contractors and subcontractors shall be responsible for complying and staying current with all DIR requirements and regulations. More information can be found at <http://www.dir.ca.gov/Public-Works/PublicWorks.html>.

Attention is directed to Labor Code § 1735 of which reads as follows:

No discrimination shall be made in the employment of persons upon public works because of the race, religious creed, color, national origin, ancestry, physical handicap, medical condition, marital status, or sex of such persons, except as provided in the Government Code §12940, and every contractor for public works violating this section is subject to all the penalties imposed for a violation of this chapter.

The Contractor shall abide by the provisions of the California Labor Code § 1770-1781, *et seq.* In accordance with the provisions of the California Labor Code § 1773, the general prevailing rates of per diem wages and holiday and overtime work in the locality in which the work is to be performed has been obtained from the Director of the Department of Industrial Relations, a copy of which is on file in the office of the City Clerk of the City of Irvine and will be made available to any interested party upon request. The Contractor shall post a copy of the prevailing rate of per diem wages at the job site. The Contractor, and any subcontractor under him, shall pay not less than the specified prevailing rates of wages to all workers employed in the execution of the contract.

Failure to comply with the subject sections will subject the Contractor to penalty and forfeiture provisions of the Labor Code § 1775.

In accordance with of the Labor Code § 1773.1, the Contractor must make travel and subsistence payments to each worker employed in the execution of the Contract.

The City will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wage rate set forth in the Contract. The possibility of wage increases is one of the elements to be considered by the Contractor in determining his bid and will not under any circumstances be considered as the basis of a claim against the City on the Contract.

The Contractor shall familiarize itself with the provisions of the Labor Code § 1777.5 regarding employment of apprentices, and shall be responsible for compliance therewith, including compliance by his subcontractors.

The Contractor and subcontractors shall comply with Labor Code § 1777.6 which stipulates that it shall be unlawful to refuse to accept otherwise qualified employees as registered apprentices solely on the grounds of race, religious creed, color, national origin, ancestry, sex, or age except as provided in Labor Code § 3077, of such employee.

The Contractor and subcontractors shall comply with Labor Code § 1810 and § 1811 which stipulates that eight hours labor constitutes a legal day's work, and § 1812 which stipulates that the Contractor and subcontractors shall keep an accurate record showing the name of and actual hours worked each calendar day and each calendar week by each worker employed by him in connection with the work performed under the terms of the Contract. Failure to comply with these sections of the Labor Code will subject the Contractor to penalty and forfeiture provisions of the Labor Code § 1813.

22. RESERVATION OF RIGHTS:

The City reserves the right to:

- a) Disqualify any Bidder in accordance with the instructions herein.
- b) Reject any bids, at its discretion, including bids found to be conditional or incomplete, contain irregularities, contain any interlineations or alterations, or found to be not responsive to this Invitation for Bids (IFB).
- c) Investigate the qualifications of any Bidder under consideration.
- d) Require confirmation or clarification of information furnished by the Bidder.
- e) Require additional evidence of Bidder's ability to perform the Work described in these bid documents.
- f) Contact the submitted references to confirm information provided in the bid.

- g) Postpone or cancel the entire IFB or a portion thereof.
- h) Postpone the bid opening or award for its own convenience.
- i) Award a Contract in part or in combination of items.
- j) Issue subsequent IFB.
- k) Seek the assistance of outside technical experts to review the bids.
- l) Disqualify a bid upon evidence of collusion, with intent to defraud, or other illegal practices on the part of the Bidder.
- m) Waive any errors or informalities in any bid to the extent permitted by law.
- n) Require bidder to provide proof as to the equality, substitutability, and compatibility of any items proposed as alternates or equals.
- o) Determine, at the City's sole discretion, the equality, substitutability, and compatibility of any items proposed as alternates or equals.
- p) Exercise any other rights under the City's charter or municipal code.

The City has no obligation to consider any bid unless it is responsive to this IFB and conforming in all respects to the Form of Contract. This IFB does not commit the City to enter into a Contract.

23. Construction contractors are encouraged to allocate the local sales and use tax derived from construction contracts of Five Million Dollars (\$5,000,000) or more directly to the local jurisdiction where the jobsite is located. This qualifying Contract Price applies to each contract or subcontract for work performed at the jobsite. The allocation is accomplished by obtaining a sub-permit of the seller's permit for a specific jobsite. To obtain the sub-permit, please contact the Irvine office of the State Board of Equalization located at 16715 Von Karman Avenue, Suite 200, Irvine, California 92606, phone 949-440-3473, fax 949-440-3482. Further information is available on the following website: www.boe.ca.gov, and in the attached State Board of Equalization Compliance Policy and Procedures Manual Section 260.020, Regulations 1802 and 1806.

MANDATORY PRE-BID MEETING

PART 1 GENERAL

- A. Bidder must sign-in and attend a pre-bid meeting to be declared eligible to bid. Bids received from firms who fail to send a representative to sign-in and attend the mandatory pre-bid meeting shall be considered non-responsive and ineligible for contract award.
- B. Bidder shall visit the Project site(s) prior to the bid date in order to determine the conditions normally encountered and generally recognized as inherent in or to the Work; take measurements, perform and/or cause to be performed all quantitative tests; observe and gather all information necessary in order to determine a comprehensive bid amount.
- C. Additional visits to the Project site(s) shall be coordinated through the Project Manager.

1.02 PRE-BID MEETING

Location: North end of Parking Lot 5, 8000 Great Park Blvd, near the intersection of Great Park Blvd and Skyhawk

City: Irvine

Time: 02:00 PM

Day: Tuesday

Date: 12/9/2025

A. Bidder failure to attend this pre-bid meeting will result in CITY not accepting the bid.

B. Sign-in sheets will be provided for issuing any changes to Bidding Documents. Bidders must print their names legibly, sign their names, submit business cards for identification purposes, and comply with all requirements of the sign-in sheets. Bidders will not be allowed to sign-in for more than one (1) company and/or entity.

C. Bidder is responsible for ensuring that it has complete Bidding Documents, including all Addenda issued by City, prior to the bid due date.

1.03 NO VERBAL CHANGES

A. Nothing said or discussed before, during, at or after the mandatory pre-bid meeting shall in any way affect bidder's obligation to strictly comply with the Bidding Documents.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION --NOT USED

END OF SECTION

**GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003**

BIDDERS PROPOSAL

HONORABLE MAYOR AND MEMBERS OF THE CITY COUNCIL
CITY HALL
IRVINE, CALIFORNIA

THE UNDERSIGNED, HAVING CAREFULLY EXAMINED ALL OF THE CONTRACT DOCUMENTS; PERMITS ISSUED BY JURISDICTIONAL REGULATORY AGENCIES; CONTRACT; CONTRACT ADDENDA; INSTRUCTIONS TO BIDDERS; PROPOSAL REQUIREMENTS AND CONDITIONS; SPECIAL PROVISIONS; THE PLANS (166 PAGES); STANDARD PLANS; STANDARD SPECIFICATIONS; TECHNICAL SPECIFICATIONS; AND ALL OTHER INFORMATION PROVIDED BY THE AGENCY FOR THE CONSTRUCTION LISTED ABOVE IN AND FOR THE CITY OF IRVINE, IS FAMILIAR WITH THE CONDITIONS, HAVING PERSONALLY VISITED THE SITE OF THE WORK, AND HEREBY PROPOSES TO FURNISH ALL LABOR, MATERIALS AND EQUIPMENT, AND ALL INCIDENTAL WORK NECESSARY TO DELIVER ALL THE IMPROVEMENTS COMPLETE, IN PLACE AND IN STRICT CONFORMITY WITH THE CONTRACT DOCUMENTS, FOR THE UNIT PRICES NAMED IN THE FOLLOWING SCHEDULE OF WORK, ENTERED THROUGH THE BIDSONLINE SYSTEM.

Bidder's Company Name (please print or type)

Signature of Bidder

Print Name

GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003

BIDDERS PROPOSAL

SCHEDULE OF WORK

All applicable sales taxes, State and/or Federal taxes, and any other special taxes, patent rights or royalties are included in the prices quoted in this Proposal.

BID ITEM NO.	BID ITEM DESCRIPTION	UNIT	PRICE
1	Maintenance Building	LSUM	
2	Covered Yard Areas	LSUM	
3	Fuel Storage System	LSUM	
4	All other areas, including parking lot, landscaping, and site utilities	LSUM	
	LUMP SUM TOTAL Based on 1, 2, 3, and 4 above	LSUM	

NOTE:

The Schedule of Work shown above shall be considered as the complete bidding schedule for all items of work shown or made necessary by the Plans, Specifications or Project Special Provisions. The cost of items of work not shown in the Schedule of Work, including for Contractor General Conditions, Overhead, Profit, Insurance costs, and Bonds, shall be considered as included in other Bid Items shown in the Schedule of Work and no additional compensation will be allowed.

Awarded Contractor shall break these into a detailed schedule of values for payment applications

*SEE DEFINITION OF ITEMS 1, 2, 3, and 4 BELOW

GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003

BIDDERS PROPOSAL

Description of Bid Line Items

1. Maintenance Building

This scope includes but is not limited to rough and finish grading for building pad, footings, slab, all underground utilities to within 5' of the building, structural framing, roofing, exterior enclosure with doors and windows, all interior "fit out", rough and finish "MEP" to create a fully functional building per plans and specifications.

2. Covered Yard Areas

This scope includes but is not limited to rough and finish grade for the covered yard. All underground infrastructure, concrete paving, footings, structure and canopy / roofing, exterior walls, roll up doors, rolling gate, rough and finish MEP to create a fully functional covered service yard.

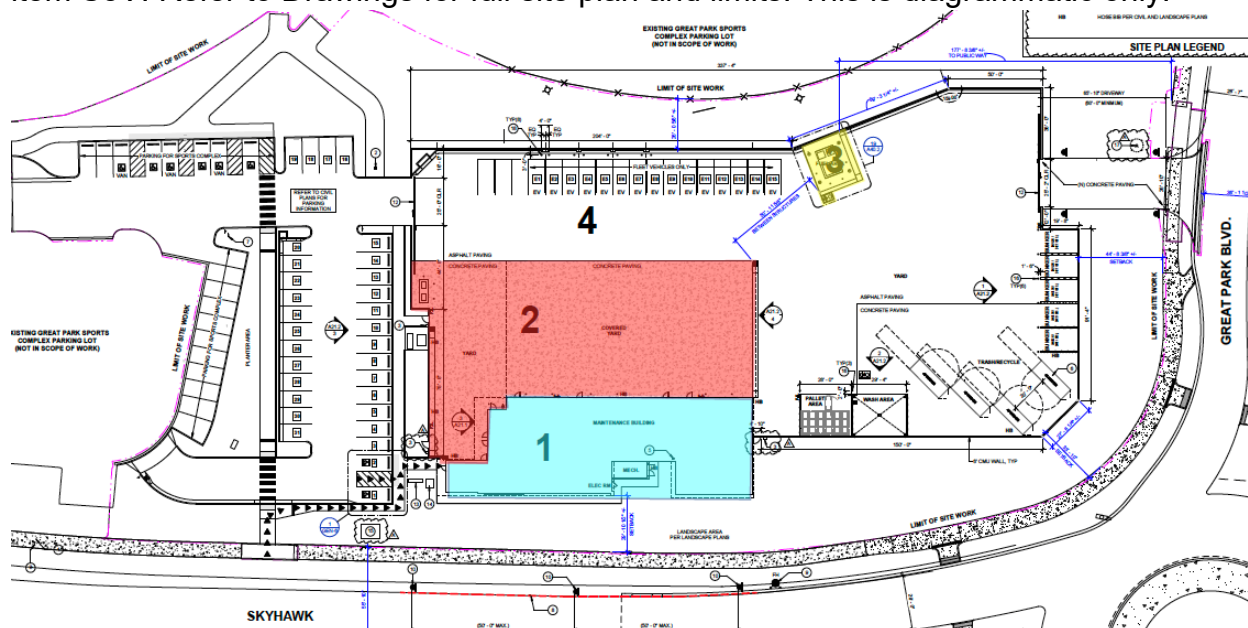
3. Fuel Area System

This scope includes all work as shown in A40.2 / FMP2 Includes but not limited to all rough and finish grade, pads, containers, tanks, bollards, paving, canopy, southern enclosed area and all underground utilities within this area to create a fully functional fuel area.

4. All other areas including parking lot, landscaping, and site utilities

This scope includes the un-highlighted areas within the plans, both inside the compound and outside per plans in accordance with the limits of the site per drawings, including but not limited to survey, all site prep, demolition, de-grub, rough and finish grading, whole site BMPs / SWPP, all underground utilities within zone 4 and stubbed to areas 1,2 and 3 accordingly, asphalt paving, concrete parking, striping, bunkers, trash areas, wash area, pallet areas, EV / Infrastructure, curbs, planters, landscape, irrigation as well as scope outside the perimeter walls and front parking lots to join / tie into existing concrete on the walkways, etc. This category shall include mobilization, site set up, site preparation, demolition and degrub for the entire site.

Any item not specifically called out must be included within the appropriate areas line item SoV. Refer to Drawings for full site plan and limits. This is diagrammatic only.



GREAT PARK OPERATIONS & MAINTENANCE FACILITY
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BIDDERS PROPOSAL

INSTRUCTIONS FOR ENTERING ELECTRONIC BIDS

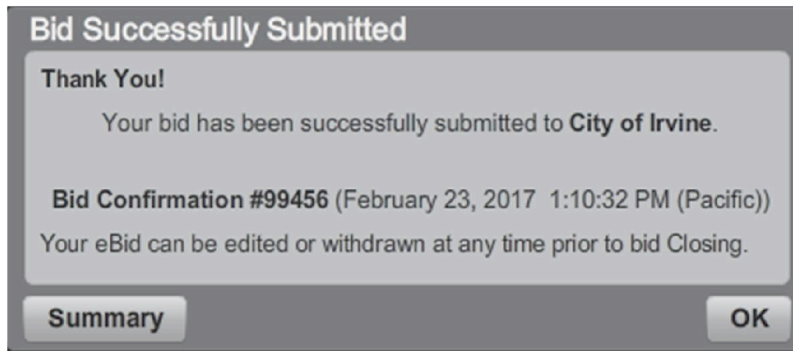
In order to access the BidsOnline system and ensure successful online submission of your bid prices, follow these steps:

- a) Go to <https://www.planetbids.com/portal/portal.cfm?CompanyID=15927#>
- b) On the Vendor Portal page, log into the system (lower right-hand corner of screen) with your assigned username and password. (You must be registered in order to download documents and submit a bid.)
- c) Click on "Bid Opportunities" and then on the Bid # and Description that you wish to bid on. The selected bid will open to allow you to access all tabs, documents, and the pricing sheet.
- d) Click on the "Documents & Attachment" tab to be sure you have downloaded all documents that are part of this bid.
 - *If you have not already downloaded all bid documents, you must download them now, in order to submit your bid. The screen will indicate which documents you've already downloaded.*
- e) Click on the tab "Addenda & Emails" to be sure you have read and acknowledged all addenda that have been issued for this bid.
 - *The screen will display "yes" or "no" next to each addendum to indicate whether you have viewed and acknowledged it. If you have not previously acknowledged an addendum, do so now by clicking on the addendum to open and read it, then click on the "Acknowledge" button on the lower left-hand corner of screen.*
- f) To begin entering your bid, click on "Place eBid" on the lower right corner of the screen. The bid "Terms and Conditions" will pop up with a button for you to click "Accept" to acknowledge your agreement to the terms of the bid.
- g) Enter the Respondee information on the "Detail" tab.
- h) Click the "Attach" button on the "Attachments" tab, browse to your scanned Bid Submittal Documents, and upload all Bid Submittal Documents as a single PDF file.
- i) Go to the "Line Items" tab and enter your unit prices on each line. The system will calculate the extended costs and grand total for you.

**GREAT PARK OPERATIONS & MAINTENANCE FACILITY
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BIDDERS PROPOSAL

- j) When you have finished entering all pricing and attachments, click on the "Save" button. This saves your bid as a draft for you to review or revise as needed anytime up to the bid submittal deadline. When you are ready to submit your bid, click the "Submit" button. You will receive a confirming message that looks like this:



Note: E-Bids are sealed and cannot be viewed by the City until the closing date and time. As noted in the screen print above, if you need to withdraw your bid, you may do so any time before the bid deadline, by going back into the system and selecting "withdraw".

Please begin entering your bid in sufficient time to complete and submit it prior to the stated deadline. The official closing time for the bid is determined, and controlled, by the electronic clock in the bid management system. Once the deadline is reached, the system will not allow any bids to be submitted, and any in process that are not completed will be rejected. The amount of time required to enter and submit your bid depends on the complexity of the bid and the processing speed of your server and internet connections.

Technical Support

In the event you encounter technical difficulties during the uploading process, please contact the Planet Bids, BidsOnline system team as shown below (M-F from 8 a.m. to 5 p.m.):

support@planetbids.com or call 818-992-1771, ext. 0

Bid prices must be entered and the bid proposal packet must be uploaded to the BidsOnline system no later than the date and time indicated in the Notice Inviting Bids. No late bids will be accepted. No other method of bid submittal will be accepted.

GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003

BIDDERS PROPOSAL

INFORMATION REQUIRED OF BIDDERS

In determining the lowest “responsible” bidder, consideration will be given to the general competency of the bidder in regard to the work covered by the Bid Proposal. To this end, each proposal shall be supported by a statement of the Bidder’s experience on this form. **Failure of the Bidder to provide requested information in a complete and accurate manner shall render the bid non-responsive.** Additionally, the City reserves the right to disqualify or refuse to consider a proposal if a Bidder is determined to be non-responsible in accordance with Irvine Municipal Code § 2-12-103 “Determination of Contractor Non-Responsibility.”

The Bidder shall supply the following information. Use additional sheets as necessary.

1. Contact person name: _____ Email: _____
Address: _____
Telephone: (____) _____ Fax: (____) _____
2. Type of firm (Individual, Partnership, or Corporation): _____
3. State Contractor’s License Number and Classification: _____
4. DIR Registration Number: _____ Expiration Date _____
5. Number of years your firm has operated as a contractor: _____
6. Number of years your firm operated under its present business name: _____
7. List the **names and addresses** of all principals or officers authorized to bind your firm.

Name:	Address:

8. List any project(s) your firm has **failed to complete** within the last five years due to a termination of contract. For each project, list the type of project, client’s name,

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BIDDERS PROPOSAL

contact person, current telephone number, email address, and provide a brief description of the grounds for the termination.

Check appropriate box: None ☐ See list below ☐

Type of Project	Client Name	Contact Person	Contact Phone No. and email address
Description:			

Type of Project	Client Name	Contact Person	Contact Phone No. and email address
Description:			

Type of Project	Client Name	Contact Person	Contact Phone No. and email address
Description:			

9. List projects of similar nature to the **Great Park Operations & Maintenance Facility** your firm is **currently** constructing. For each project, list the type of project, contract amount, client's name, contact person, current telephone number, email address, and a brief description. See Qualification Requirements.

Check appropriate box: None ☐ See list below ☐

Type of Project	Contract Amount	Client Name	Contact Person	Contact Phone No. and email address
Description:				

Type of Project	Contract Amount	Client Name	Contact Person	Contact Phone No. and email address

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Description:				
Type of Project	Contract Amount	Client Name	Contact Person	Contact Phone No. and email address
Description:				

10. List projects of a similar nature to the **Great Park Operations & Maintenance Facility** your firm has **completed** within the last five years. For each project, list the type of project, contract amount, date of completion, client's name, contact person, current telephone number, email address, and a brief description.

As outlined in the Notice Inviting Bidders, the bidder shall have completed, as the prime contractor, within the last three (3) years, at least two (2) grounds up projects with a gross construction cost of over \$10,000,000. One of these two projects shall be similar to this project, with a new structure and parking lot. Contractor shall also be required to have an average EMR over the last five (5) years of not more than 1.1. Contractor shall also have a gross annual revenue of no less than \$15,000,000 for each of the last three (3) years. This shall need to be demonstrated upon selection of apparent low bidder.

Check appropriate box: None ☐ See list below ☐

Type of Project	Contract Amount	Date of Completion	Client Name	Contact Person	Contact Phone No. and email address
Description:					

Type of Project	Contract Amount	Date of Completion	Client Name	Contact Person	Contact Phone No. and email address

**GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003**

BIDDERS PROPOSAL

Description:

Type of Project	Contract Amount	Date of Completion	Client Name	Contact Person	Contact Phone No. and email address
Description:					

11. List the name of the person(s) (**A MINIMUM OF ONE**) who managed the Projects of the listed work for your firm.

Name:	Date of Inspection:

12. Complete the following in conformance with Labor Code Section 1725.5:

Name of Subcontractor	Registered with DIR?	DIR Registration No.
	Yes ___ No ___	
	Yes ___ No ___	
	Yes ___ No ___	
	Yes ___ No ___	
	Yes ___ No ___	
	Yes ___ No ___	
	Yes ___ No ___	
	Yes ___ No ___	
	Yes ___ No ___	
	Yes ___ No ___	
	Yes ___ No ___	

**GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003**

BIDDERS PROPOSAL

13. If requested by the City, the Bidder shall furnish a notarized financial statement, financial data, or other information and references sufficiently comprehensive to permit an appraisal of its current financial condition or ability to perform the work.

Failure to furnish information upon request will render the bid nonresponsive.

All of the above statements regarding Contractor's experience and financial qualifications are submitted in conjunction with the Bid Proposal, as a part thereof, and the truthfulness and accuracy of the information is guaranteed by the Bidder.

**GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003**

BIDDERS PROPOSAL

THE CITY OF IRVINE RESERVES THE RIGHT TO REJECT ALL BIDS

The undersigned understands the contract time limit allotted for the completion of the work required by the Contract is **Two Hundred Seventy-Five (275) Working Days** (excluding plant establishment) and **Three Hundred Twenty (320) Working Days** (including plant establishment.)

The undersigned agrees, if awarded the Contract, to sign the Contract and furnish the necessary insurance certificates and bonds within ten (10) days of the date specified in the Notice of Award of Contract, not including Saturdays, Sundays, and legal holidays, and to begin work within ten (10) Working Days from the date specified in the City's Notice to Proceed. Contract time accounting shall begin on the date shown in the Notice to Proceed.

Accompanying this Bid Proposal is **(check appropriate box)**:

☐ **Cashier's Check** ☐ **Certified Check** ☐ **Bid Bond**

Sign Here if Individual:

Signature: _____

Print Name: _____

Address: _____

Affix notary's acknowledgement

(Signature blocks continue on the following page)

**GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003**

BIDDERS PROPOSAL

Sign Here if Co-Partnership or LLC:

Co-Partnership/LLC Name of Firm: _____

Address: _____

Members Signing:

Signature: _____ Print Name: _____

Address: _____

Signature: _____ Print Name: _____

Address: _____

Affix notary's acknowledgement

Sign Here if Corporation:

Name of Corporation: _____

Address: _____

Officers of Corporation Signing:

Signature: _____ Print Name: _____

Address: _____

Signature: _____ Print Name: _____

Address: _____

If executed by other than President and Secretary of the Corporation, attach a certified copy of resolution authorizing signature on behalf of the Corporation.

Affix notary's acknowledgement

GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003

BIDDERS PROPOSAL

LIST OF SUBCONTRACTORS

The Bidder shall list each subcontractor performing work in an amount in excess of one-half of one percent (1/2%) of the prime contractor's total bid, or, in the case of bids for the construction of streets or highways, including bridges, in excess of one-half of one percent (1/2%) of the prime contractor's total bid or ten thousand dollars (\$10,000), whichever is greater. Complete columns (1) and (2) and submit with the bid. Complete columns (3) and (4) and submit with the bid or email to Purchasing@cityofirvine.org within 24 hours after the bid opening. Failure to provide complete information in columns (1) through (4) within the time specified shall render the bid non-responsive. Add pages as needed.

Subcontractors listed must not be debarred from performing the designated work.

Information must be typed or clearly printed.

BUSINESS NAME AND LOCATION (1)	CONTRACTOR LICENSE NUMBER (2)	BID ITEM NUMBER (SUBCONTRACTORS PROVIDING WORK TO MULTIPLE BID ITEMS OF WORK SHOULD BE LISTED FOR EACH BID ITEM SEPARATELY) (3)	PERCENTAGE OF BID ITEM PRICE SUBCONTRACTED AND DESCRIPTION OF THE PORTION OF BID ITEM WORK TO BE PERFORMED BY SUBCONTRACTOR (4)*
<u>Sample: XYZ Contractors</u>	<u>XXXXXX</u>	2	<u>Earthwork / Grading</u>
<u>Sample: XYZ Contractors</u>	<u>XXXXXX</u>	3	<u>Rough and Finish Electrical</u>

BIDDERS PROPOSAL

[illegible]

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GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003

BIDDERS PROPOSAL

NON-COLLUSION DECLARATION-CONTRACTOR
To be Executed by Bidder and Submitted with Bid

The undersigned declares:

I am the _____ [title] of _____ [company name], the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. 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. All statements contained in the bid are true. 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, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____ [date], at _____ [city], _____ [state].

Signature

Print Name

**GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003**

BIDDERS PROPOSAL

FORM OF BID BOND

(10% of the Proposal Amount)

KNOW ALL PERSONS BY THESE PRESENTS that we _____
_____ as Principal, and _____
_____ as Surety, are held and firmly bound unto City of Irvine, hereinafter called the City
in the sum of _____ Dollars (\$____
_____) , for the payment of which sum well and truly to be made, we bind ourselves, our
heirs, executors, administrators and successors, jointly and severally, firmly by these
presents.

The conditions of this obligation are such that whereas the Principal submitted to the City a
certain Bid Proposal, attached hereto and hereby made a part hereof, to enter into a
contract in writing for the **GREAT PARK OPERATIONS & MAINTENANCE FACILITY,
CIP 372414** and will furnish all required certificates of insurance and bonds as required by
the Contract.

NOW THEREFORE, if said Bid Proposal shall be rejected; or in the alternate, if said Bid
Proposal shall be accepted, and the Principal shall execute and deliver a contract in the
prescribed Form of Contract, shall deliver certificates evidencing that the required
insurance is in effect and shall execute and deliver Performance and Payment Bonds in
the forms prescribed, and shall in all other respects perform the Contract created by the
acceptance of said Bid Proposal, then this obligation shall be void; otherwise this
obligation shall remain in force and effect, it being expressly understood and agreed that
the liability of the Surety for any and all default of the Principal hereunder shall be the
amount of this obligation as herein stated. In the event suit is brought upon this bond by
City and judgment is recovered, Surety shall pay all costs incurred by City in said suit,
including a reasonable attorney's fee to be fixed by the court.

The Surety, for the value received, hereby stipulates and agrees that the obligations of
said Surety and its bond shall in no way be impaired or affected by an extension of the
time within which the City may accept such a Bid Proposal; and said Surety does hereby
waive notice of any such extension.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument this
____ day of _____, 20____, the name of each party being hereto written below
and these presents duly signed by each party's undersigned representative, pursuant to
authority of its governing body. This bond shall be authenticated by way of notarized
acknowledgment, including a copy of the power of attorney, for the Surety.

ATTEST:

(Principal) _____

(Address) _____

(By) _____

(Title) _____

ATTEST:

(Surety) _____

(Address) _____

(By) _____

(Title) _____

GREAT PARK OPERATIONS & MAINTENANCE FACILITY

CIP 372414

BID NO. GP-26-0003

FALSE CLAIMS

Bidder shall complete the False Claims Act Certification below or in the alternative, provide the information requested under False Claims Act Violations below. Failure to certify or provide the requested information shall render the bid non-responsive.

"False Claims Act" as used herein is defined as either or both the Federal False Claims Act, 31 U.S.C. § 3729, *et seq.*, and the California False Claims Act, Government Code § 12650, *et seq.*

FALSE CLAIMS ACT CERTIFICATION

I _____ hereby certify that neither
Print name

Contractor name

nor _____
Name of qualifying person licensed by Contractors State License Board

has been determined by a court or tribunal of competent jurisdiction to have violated the False Claims Act as defined above.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed this _____ day of _____ at _____
(Month and year) (City and State)

By _____
(Signature of owner, officer, manager or licensee responsible for submission of Bid Proposal)

FALSE CLAIMS ACT VIOLATIONS

With regard to any determinations by a tribunal or court of competent jurisdiction that the False Claims Act, as defined above, has been violated by (1) the Contractor submitting this Bid Proposal or (2) the qualifying person licensed by the State Contractors License Board to perform the work described in this Bid Proposal, shall provide on a separate sheet the following information: (1) the date of the determination of the violation, (2) the identity of the tribunal or court, (3) the identity of the government contract or project involved, (4) the identity of the government department involved, (5) the amount of fine imposed, and (6) any exculpatory information of which the Agency should be aware.

CIVIL LITIGATION AND ARBITRATION HISTORY

CIP 372414
BID NO. GP-26-0003

For five (5) years preceding the submittal date of this Bid Proposal, identify civil litigation and arbitration arising out of the performance of a construction contract within the State of California in which the (1) Contractor submitting this bid proposal or (2) the qualifying person licensed by the State Contractors Licensing Board to perform the work described in this Bid Proposal was a named as a party in a lawsuit brought by or against the project owner or any action to confirm, vacate or modify an arbitration award involving an owner.

CIVIL LITIGATION AND ARBITRATION CERTIFICATION

If the Bidder has no civil litigation and arbitration history to report as described above, complete the following:

I _____ certify that neither

 Print name

Contractor name _____
nor _____
Name of qualifying person licensed by Contractors State License Board _____

has been involved in civil litigation and arbitration as described above.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this _____ day of _____ at _____
(Month and year) (City and State)

By _____
(Signature of owner, officer, manager or licensee responsible for submission of Bid Proposal)

Do not include litigation and arbitration which are limited solely to enforcement of mechanics' liens or stop notices. Provide on a separate sheet (1) the name and court case identification number of each case, (2) the jurisdiction in which it was filed, and (3) the outcome of the litigation, e.g. whether the case is pending, a judgment was entered, a settlement was reached, or the case was dismissed.

CRIMINAL CONVICTIONS

CRIMINAL CONVICTION CERTIFICATION

GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003

VIOLATION OF LAW OR A SAFETY REGULATION

Has the Bidder, any officer of the Bidder, or any employee who has proprietary interest in the Bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a federal, state, or local government project because of a violation of a law or a safety regulation?

☐ **Yes** ☐ **No**

If the answer is yes, explain the circumstances in the following space.

Name of bidder (print)

Signature

Address

State Contractors' License No. &
Classification

City

Zip Code

Telephone

ATTACHMENT A – LETTER OF ASSENT

To be signed by all Contractors awarded work covered by the City of Irvine
Community Workforce Agreement prior to commencing work.

[Contractor's Letterhead]
City of Irvine
Public Works Department
1 Civic Center Plaza
Irvine, CA 92606
Attn: CWA Administrator

Re: Community Workforce Agreement – Letter of Assent

Dear Sir:

This is to confirm that [name of company] agrees to be party to and bound by the City of Irvine Community Workforce Agreement effective November 1, 2023, as such Agreement may, from time to time, be amended by the negotiating parties or interpreted pursuant to its terms. Such obligation to be a party and bound by this Agreement shall extend to all work covered by the agreement undertaken by this Company on the project and this Company shall require all of its contractors and subcontractors of whatever tier to be similarly bound for all work within the scope of the Agreement by signing and furnishing to you an identical letter of assent prior to their commencement of work.

Sincerely,

[Name of Construction Company]

By: [_____] Name and Title of Authorized Executive

Contractor State License No.: _____

Project Name: _____

GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003

CONSTRUCTION CONTRACT
FOR CAPITAL IMPROVEMENTS

SEE BELOW DRAFT SAMPLE AGREEMENT

GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003

CONSTRUCTION CONTRACT
FOR CAPITAL IMPROVEMENTS

This Contract is made and entered into April 04, 2026 by and between the CITY OF IRVINE, a municipal corporation of the State of California, hereinafter referred to as "CITY" and TBD, a TBD corporation hereinafter referred to as "CONTRACTOR."

W I T N E S S E T H:

That the CITY and the CONTRACTOR, for the consideration hereinafter named, mutually agree as follows:

1. The complete Contract includes all of the Contract Documents, which are incorporated herein by this reference, to wit:

- a. Permits and Agreements
- b. Contract
- c. Addenda
- d. Instructions to Bidders, Proposal Requirements and Conditions
- e. Special Provisions
- f. Contract Plans
- g. Standard Plans
- h. Standard Specifications
- i. Reference Specifications
- j. CSI Specifications Division 1 and 3 through 28. Division 2 on Plans.

The Contract Documents are complementary, and that which is required by one shall be as binding as if required by all.

CONTRACTOR shall provide and furnish all labor, materials, necessary tools, expendable equipment, and all utility and transportation services required for the following work of improvement: The construction of a new operations and maintenance facility at the southwest corner of Skyhawk and Great Park Boulevard. Scope includes, but is not strictly limited to, but not limited to, a one story type V-B occupancy S-1 sprinklered main building containing office areas; exterior work areas; a one story type V-B detached support structure with S-1, S-2 and U occupancies and a covered detached exterior fuel storage & fuel dispensing system, but are required by the plans and the Special Provisions.

GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
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2. CONTRACTOR agrees to perform all the said work and furnish all the said materials at his own cost and expense that are necessary to construct and complete in strict conformance with Contract Documents and to the satisfaction of the Engineer, the work hereinafter set forth in accordance with the Contract therefore adopted by the City Council and as prepared by SVA Architects, 6 Hutton Centre Drive, Ste 1150, Santa Ana, CA 92707.

Contractor Information

Address for Notices and Payments:

TBD

TBD

Attn: TBD

Telephone: TBD

Email: TBD

3. CITY agrees to pay and CONTRACTOR agrees to accept in full payment for performance of this work of improvement as described, the stipulated sum of \$TBD the "Contract Price".

CITY agrees to make progress payments and final payment in accordance with the method set forth in the Special Provisions.

4. CONTRACTOR agrees to commence construction of the work provided for herein within ten (10) Calendar Days after the date specified in the Notice to Proceed, and to continue diligently in strict conformance with Contract Documents and without interruption, and to complete the construction thereof within 275 Working Days after the date specified in the Notice to Proceed.

The CONTRACTOR shall diligently prosecute all the work (including plant establishment) to completion before the expiration of 320 Working Days from the date specified in the Notice to Proceed.

5. Time is of the essence of this Contract, and it is agreed that it would be impracticable or extremely difficult to ascertain the extent of actual loss or damage which the CITY will sustain by reason of any delay in the performance of this Contract. It is, therefore, agreed that CONTRACTOR will pay as liquidated damages to the CITY the following sum: \$1,500 per Calendar Day, for each and every Calendar Days delay in finishing the Work, except plant establishment work, in excess of the number of Working Days prescribed above. The CONTRACTOR shall pay to the CITY the sum \$500 per Calendar Day, for each and every Calendar Days delay in completing the plant establishment work in excess of the number of Working Days prescribed above. In no

GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003

case will liquidated damages be assessed more than \$1,500 per day. If liquidated damages are not paid, as assessed by the CITY, the CITY may deduct the amount thereof from any money due or that may become due the CONTRACTOR under this Contract in addition to any other remedy available to CITY. By executing this Contract, CONTRACTOR agrees that the amount of liquidated damages is reasonable and shall not constitute a penalty.

6. CONTRACTOR will maintain and will require all subcontractors to maintain valid and current Department of Industrial Relations (DIR) Public Works Contractor registration during the term of this project. CONTRACTOR shall notify the CITY in writing immediately, and in no case more than twenty-four (24) hours, after receiving any information that CONTRACTOR'S or any of its subcontractor's DIR registration status has been suspended, revoked, expired, or otherwise changed.

7. CONTRACTOR will pay, and will require all subcontractors to pay, all employees on said Contract a salary or wage at least equal to the prevailing salary or wage established for such work as set forth in the wage determinations and wage standards applicable to this work, a copy of which is on file in the office of the City Clerk of the City of Irvine. Federal prevailing wage rates apply for federally funded projects. Travel and subsistence pay shall be paid in accordance with Labor Code § 1773.1.

8. CONTRACTOR shall be subject to the penalties in accordance with Labor Code of § 1775 for each worker paid (either by him or by any subcontractors under him) less than the prevailing rate described above on the work provided for in this Contract.

9. CONTRACTOR and subcontractors shall comply with Labor Code § 1810 and § 1811 which stipulates that eight hours labor constitutes a legal day's work, and § 1812 which stipulates that the CONTRACTOR and subcontractors shall keep an accurate record showing the name of and actual hours worked each calendar day and each calendar week by each worker employed by him in connection with the work performed under the terms of the Contract. Failure to comply with these sections of the Labor Code will subject the CONTRACTOR to penalty and forfeiture provisions of the Labor Code § 1813.

10. CONTRACTOR will comply with the provisions of Labor Code § 1777.5 pertaining to the employment of apprentices to the extent applicable to this Contract.

12. The City of Irvine will be using the eComply Solutions software for managing certified payrolls on this project. Accordingly, Contractor shall register in, attend training for, and use the eComply Solutions software for submitting certified payrolls and related tasks as deemed appropriate by the City of Irvine. When the project commences, you will be contacted by an eComply Solutions representative regarding this process. Further information will be provided via a separate communication at that time.

13. CONTRACTOR, by executing this Contract, hereby certifies:

GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003

“I am aware of, and will comply with the Labor Code § 3700 by securing payment for, and maintaining in full force and effect for the duration of the contract, complete Workers’ Compensation Insurance, and shall furnish a Certificate of Insurance to the Agency before execution of the Contract. The CITY, its officers, or employees, will not be responsible for any claims in law or equity occasioned by failure of the CONTRACTOR to comply with this paragraph.”

CONTRACTOR further agrees to require all subcontractors to carry Workers’ Compensation Insurance as required by the Labor Code of the State of California.

14. CONTRACTOR shall, concurrent with the execution of this Contract, furnish two bonds approved by the CITY, one in the amount of One Hundred Percent (100%) of the Contract Price, to guarantee the faithful performance of the work “Performance Bond”, and one in the amount of One Hundred Percent (100%) of the Contract Price to guarantee payment of all claims for labor and materials furnished “Payment Bond.” This Contract shall not become effective until such bonds are supplied to and approved by the CITY.

15. CONTRACTOR shall, prior to commencing work, furnish certificates evidencing compliance with all requirements of the Contract Documents pertaining to insurance.

16. Any amendments to any of the Contract Documents must be in writing executed by the CONTRACTOR and the CITY. Any time an approval, time extension, or consent of the CITY is required under the Contract Documents, such approval, extension, or consent must be in writing in order to be effective.

17. This Contract contains all of the agreements and understandings of the parties and all previous understandings, negotiations, and contracts are integrated into and superseded by this Contract.

18. In the event that any one or more of the phrases, sentences, clauses, paragraphs, or sections contained in this Contract shall be declared invalid or unenforceable by a valid judgment or decree of a court of competent jurisdiction, such invalidity or unenforceability shall not affect any of the remaining phrases, sentences, clauses, paragraphs, or sections of this Contract which are hereby declared as severable and shall be interpreted to carry out the intent of the parties hereunder.

19. The persons executing this Contract on behalf of the parties hereto warrant that they are duly authorized to execute this Contract on behalf of said parties and that, by so

GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
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executing this Contract, the parties hereto are formally bound to the provisions of this Contract.

20. This Contract shall be binding upon and shall inure to the benefit of the parties hereto and their respective heirs, personal representatives, successors, and assigns.

21. In performing its obligations and duties under this Contract, each party shall comply with all applicable local, state, and federal laws, regulations, rules, standards, and ordinances.

22. In the event any action is brought between the parties hereto relating to this Contract or the breach thereof, the prevailing party in such action shall be entitled to recover from the other party reasonable expenses, attorneys' fees, and costs in connection with such action or proceeding.

23. This Contract may be executed by the parties in counterparts, which counterparts shall be construed together and have the same effect as if all of the parties had executed the same instrument.

24. This Contract is to be governed by the laws of the State of California.

(Signatures on following page)

GREAT PARK OPERATIONS & MAINTENANCE FACILITY
CIP 372414
BID NO. GP-26-0003

IN WITNESS WHEREOF, the parties have executed and entered into this Agreement as of the date first set forth above.

CITY OF IRVINE

TBD

By:

Steven Torelli

Its: Director of Great Park

By:

Its:

By:

Sean Crumby

Its: City Manager

By:

Its:

By:

Larry Agran

Its: Mayor of the City of Irvine

Attest:

By:

Carl Petersen

Its: City Clerk

APPROVED AS TO FORM:
RUTAN & TUCKER, LLP

By:

Jeffrey Melching

CITY OF IRVINE

GREAT PARK OPERATIONS & MAINTENANCE
FACILITY CIP 372414
BID NO. GP-26-0003

PERFORMANCE BOND (SAMPLE)

KNOW ALL PERSONS BY THESE PRESENTS that we _____
_____, as Principal, and _____ as Surety, are held and
firmly bound unto City of Irvine, hereinafter called the City in the sum of _____
_____ (\$ _____
_____) (this amount being not less than one hundred percent (100%) of the total bid price
of the contract awarded by the owner to the Principal), for the payment of which sum well
and truly to be made, we bind ourselves, our heirs, executors, administrators and
successors, jointly and severally, firmly by these presents.

The conditions of this obligation are such that whereas the Principal entered into a contract
attached hereto, with the City of Irvine.

NOW THEREFORE, if the Principal shall well and truly perform and fulfill all the
undertakings, covenants, terms, conditions and agreements of said Contract during the
original terms thereof, and any extensions thereof that may be granted by the Owner with
or without notice of the Surety, and during the life of any guarantee required under the
Contract, and shall also well and truly perform and fulfill all the undertakings, covenants,
terms, conditions and agreements of any and all duly authorized modifications of said
Contract that may hereafter be made, then this obligation shall be void otherwise this
obligation shall remain in full force and effect.

Further, the said Surety, for value received, hereby stipulates and agrees that no change,
extension of time, alteration or modifications of the Contract Documents and/or of the
Work to be performed thereunder shall in any way affect its obligations on this bond; and it
hereby waives notice of any and all such changes, extensions of time, and alterations or
modifications of the contract documents and/or of the work to be performed thereunder.

As a part of the obligation secured hereby and in addition to the face amount specified
therefore, there shall be included costs and reasonable expenses and fees, including
reasonable attorneys' fees, incurred by the City in successfully enforcing such obligation,
and all to be taxed as costs and included in any judgment rendered by a court of law.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument this
____ day of _____, 20____, the name of each party being hereto written below,
and these presents duly signed by each party's undersigned representative, pursuant to
authority of its governing body. This bond shall be authenticated by way of notarized
acknowledgment, including a copy of the power of attorney, for the Surety.

CITY OF IRVINE

GREAT PARK OPERATIONS & MAINTENANCE
FACILITY CIP 372414
BID NO. GP-26-0003

ATTEST:

(Principal) _____

(Address) _____

(By) _____

(Title) _____

ATTEST:

(Surety) _____

(Address) _____

(By) _____

(Title) _____

CITY OF IRVINE

GREAT PARK OPERATIONS & MAINTENANCE FACILITY

CIP 372414

BID NO. GP-26-0003

PAYMENT BOND (SAMPLE)

KNOW ALL PERSONS BY THESE PRESENTS that we _____, as Principal, and _____ as Surety, are held and firmly bound unto City of Irvine, hereinafter called the City in the sum of _____ (\$_____) (this amount being not less than one hundred percent (100%) of the total bid price of the contract awarded by the owner to the Principal) , for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

The conditions of this obligation are such that whereas the Principal entered into a contract, attached hereto, with the City of Irvine.

NOW THEREFORE, if the Principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of each contract that may hereafter be made, then this obligation shall be void, otherwise this obligation shall remain in full force and effect.

The condition of this obligation is such that, if said Principal or his subcontractors, or heirs, executors, administrators, successors, or assigns thereof, shall fail to pay any of the persons named in the Civil Code § 9100 for any material used in, upon, for or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or shall fail to pay any amount due under the Unemployment Insurance Code with respect to work or labor performed by any such claimant or any amount required to be deducted, withheld, and paid over to the Franchise Tax Board from the wages of employees of the Contractor and his subcontractors with respect to such work and labor, then said Surety will pay and, also, in case suit is brought upon the bond, will pay a reasonable attorney's fee to be fixed by the court. This bond shall inure to the benefit of all persons named in the aforesaid Civil Code § 9100 to give a right of action to them or their assigns in any suit brought upon the bond.

Further, the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or modification of the Contract Documents or of the Work to be performed thereunder shall in any way affect its obligations on this bond; and it hereby waives notice of any and all such changes, extensions of time, and alterations or modifications of the Contract Documents and/or of the work to be performed thereunder.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument this ____ day of _____, 20____, the name of each party being hereto written below and these presents duly signed by each party's undersigned representative, pursuant to authority of its governing body. This bond shall be authenticated by way of notarized acknowledgment, including a copy of the power of attorney, for the Surety.

ATTEST:

(Principal) _____

(Address) _____

(By) _____

(Title) _____

ATTEST:

(Surety) _____

(Address) _____

(By) _____

(Title) _____

SPECIAL PROVISIONS

- A. THESE ADDITIONS, DELETIONS, AND AMENDMENTS MODIFY THE SPECIFICATIONS IN THE “STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION”, 2024 EDITION AND CURRENT SUPPLEMENT
- B. THESE ADDITIONS, DELETIONS, AND AMENDMENTS SHALL TAKE PRECEDENCE IN THE EVENT OF A CONFLICT WITH ANY STANDARD SPECIFICATIONS OF THE 2024 GREEN BOOK.
- C. AS A CONVENIENCE, THESE ADDITIONS, DELETIONS, AND AMENDMENTS HAVE BEEN ARRANGED IN A FORMAT THAT PARALLELS THE “STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION,” 2024 EDITION AND CURRENT SUPPLEMENT.
- D. **THE CSI SPECIFICATIONS DIVISION 2 (ON PLANS) AND 3 THROUGH 28 TAKE PRECEDENT OVER THE GREEN BOOK SPECIFICATIONS.**

PART 1 – SPECIAL PROVISIONS

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

REVISE as follows:

1-1 GENERAL. *ADD the following term:*

The word *provide* shall mean furnish and install.

1-2 TERMS AND DEFINITIONS. *MODIFY to ADD the following:*

Acceptance, Final Acceptance – Formal action by the Agency acknowledging the Work is complete.

Agency/Board/City – The City of Irvine, a municipal corporation.

Agency Representative – The person or engineering/architectural firm Agency authorizes to represent it during the performance of the Work by the Contractor and until Final Acceptance. The Agency Representative means the Agency Representative or his assistants.

Calendar Day – The 24-hour day denoted on the calendar.

Calendar Month – The period including the first through the last day of a month.

City – See Agency.

Clarification – Verbal or written interpretation of Contract Documents by the Agency Representative to clarify intent, procedures, materials or processes with no change in contract sum or time.

REPLACE the definition for “Engineer” with the following:

Engineer – The City Engineer acting either directly or through the Agency Representative.

Field Order – Authorization by Agency Representative to proceed with Change Order work after completion of negotiations, but before the issuance of the Change Order.

Invitation for Bids – Comprised of the NOTICE INVITING BIDS, and all CONTRACT DOCUMENTS, referenced or provided in the project bid package, detailed in paragraph 1 of the INSTRUCTIONS TO BIDDERS, PROPOSAL REQUIREMENTS AND CONDITIONS, included herein.

Laboratory – The laboratory authorized by the Agency or the Agency Representative to test material and work involved in the project.

Major Bid Item – A single Contract item constituting ten percent (10%) or more of the original Contract Price.

Request for Quotation – Contemplated revision of Contract Documents by the Agency requesting detailed information from the Contractor on impacts to contract sum or contract time.

State Standard Specifications – Standard Specifications issued by the State of California, Department of Transportation, 2024.

Traffic Control Devices – All signs, signals, markings, and other devices used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, pedestrian facility, or bikeway, by authority of the Engineer.

1-3 ABBREVIATIONS.

1-3.2 Common Usage. *MODIFY to ADD the following:*

Abbreviation	Word or Words
CSMP	Construction Site Monitoring Program
DBE	Disadvantaged Business Enterprise
ESA	Environmentally Sensitive Area
HMA	Hot Mix Asphalt
NOI	Notice of Intent
SWMP	Storm Water Management Plan
SWRCB	State Water Resources Control Board
WPCP	Water Pollution Control Program
WDID	Waste Discharge Identification Number

DELETE the abbreviation of MUTCD and SUBSTITUTE with the following:

MUTCD	California Manual on Uniform Traffic Control Devices
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1-3.3 Institutions. *MODIFY to ADD the following:*

Abbreviation	Word or Words
AI	The Asphalt Institute
AIA	American Institute of Architects
APWA	American Public Works Association
AREMA	American Railway Engineering and Maintenance of Way Association
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
CRSI	Concrete Reinforcing Steel Institute
NFPA	National Fire Protection Association
PCA	Portland Cement Association
UBC	Uniform Building Code, Pacific Coast Building Officials Conference of the International Conference of Building Officials

DELETE the institution of SSPC and SUBSTITUTE with the following:

SSPC

Steel Structures Painting Council

1-6 BIDDING AND SUBMISSION OF THE BID.

1-6.2 Subcontractor Listing

ADD the following:

If the Contractor subcontracts any part of this Contract, the Contractor shall be as fully responsible to the Agency for the acts and omissions of his subcontractor as he is for the acts and omissions of persons directly employed by him. Nothing contained in the Contract Documents shall create any contractual relationship between any subcontractor and the Agency. The Contractor shall bind every subcontractor to be bound by the terms of the Contract Documents as applicable to his work.

Debarred contractors shall not be employed on the Work pursuant to the provisions of Labor Code § 1777.1 and the City of Irvine Council Ordinance No. 08-10. The Labor Commissioner publishes and distributes a list of contractors ineligible to perform work as a subcontractor on a public works project. This list of debarred contractors is available from the Department of Industrial Relations website: <https://www.dir.ca.gov/dlse/debar.html>

The City will not conduct business with an individual, firm or organization, and the Contractor shall not employ or otherwise use any subcontractor, supplier, or equipment vendor at any tier that is on the City's debarment list, the Department of Industrial Relations debarment list, or on the US General Services Administration "List of Parties Excluded from Federal Procurement and Non Procurement Programs."

A list of individuals, firms and organizations debarred, suspended or who have voluntarily excluded themselves from Federal Procurement and Non-Procurement Programs is maintained by the US General Services Administration. This excluded parties list is available from the website: <https://sam.gov/content/home>

The Contractor and each of its subcontractors shall maintain a valid and current Department of Industrial Relations (DIR) Public Works Contractor registration during the term of this project.

Prior to including a subcontractor's name on the bid, the Contractor shall be responsible for verifying that each of its subcontractors are properly licensed and not debarred from performing the designated work.

This requirement shall be enforced as follows: Noncompliance shall be corrected. Payment for subcontracted work involved will be withheld from progress payments due, or to become due, until correction is made. Failure to comply may result in termination of the Contract.

If any subcontractor or person employed by the Contractor is deemed by the Engineer to be incompetent or to act in an improper manner, at the request of the Engineer, they shall be dismissed immediately from the job and shall not be employed again on the Work.

A copy of each subcontract is required to be filed with the Agency before the subcontractor begins work. Each subcontract shall contain a reference to the Contract between the Agency and the Contractor, and the terms of that Contract, and all parts thereof shall be made a part of such subcontract insofar as applicable to the work covered thereby. Each subcontract shall provide for its annulment by the Contractor at the order of the Agency if in the Agency's opinion the subcontractor fails to comply with the requirements of the Contract.

SECTION 2 – SCOPE OF THE WORK

REVISE as follows:

2-1 WORK TO BE DONE.

ADD the following after the 1st paragraph:

The Contractor shall leave the Work area in a neat condition. Any work not shown in the Plans or Specifications but necessary to complete the Work according to law and governmental codes and regulations shall be performed by the Contractor as if in the Plans and Specifications.

The Contractor shall remove and dispose of all structures, debris, or other obstructions of any character necessary to accommodate the Work. Where such obstructions consist of improvements not required by law to be removed by the Agency thereof, all such improvements shall be removed, maintained, and permanently replaced by the Contractor at his expense.

2-2 PERMITS.

DELETE in its entirety and SUBSTITUTE with the following:

2-2 PERMITS AND LICENSES. Except as otherwise specified in the Special Provisions, the Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary, and incidental to the due and lawful prosecution of the Work. These permits and licenses shall be obtained in sufficient time to prevent delays to the Work. The Contractor shall maintain a copy of all permits on the site. The Contractor shall furnish the Agency with copies of permits and licenses within one (1) Working Day of obtaining them. The Contractor shall comply with all rules and regulations included in permits. Should the Contractor fail to conform to said rules and regulations, the Agency reserves the right to perform the work necessary to conform to the rules and regulations and the cost of such work will be deducted from any monies due or to become due to the Contractor.

The Contractor and all subcontractors shall obtain within five (5) Calendar Days of executing the Contract, a current City of Irvine Business License and maintain such license(s) throughout the term of the Contract.

In the event that the Agency has obtained permits, licenses or other authorizations applicable to the Work, the Contractor shall obtain a rider, pay all fees and comply with the provisions of said permits, licenses, and other authorizations.

2-3 RIGHT OF WAY.

DELETE the 1st sentence and SUBSTITUTE with the following:

Rights of way, easements, agreements, licenses, or rights of entry (all referred to as right of way) for the Work have been provided by the Agency. Temporary right-of-way to construct one or more portions of the Work may also have been acquired by the Agency. If temporary right of way was acquired, the documents or their contractual terms and obligations are included in the Contract Documents. The Contractor shall comply with all the terms and obligations related to the physical use of the temporary right of way and its eventual return of the property to the owner. The Contractor shall schedule the Work that may include landscape establishment, maintenance periods, and final acceptance within the temporary right of way to start and finish within the time allotted in each temporary right of way agreement. Should the Work be delayed through no fault of the Agency, the Contractor shall be responsible for all costs incurred by the Agency to extend use of the temporary right of way.

MODIFY to ADD the following:

Work in the public right of way shall be done in accordance with the requirements of the permit issued by the public agency in whose right of way the Work is located in addition to conforming to the Contract Documents. If a permit or traffic control plan is not required, the Work shall conform to the standards set forth in the MUTCD.

The Contractor shall not allow his employees to use private property for any reason or to use water or electricity from such property without providing the City written permission from the owner. The Contractor shall comply with all applicable federal, state and local laws, ordinances, codes, and regulations in performing any work or doing any activity on lands outside the public rights of way.

The Contractor shall hold harmless, indemnify, and defend the Agency, the Agency Representative and each of their officers, employees, and agents from all claims or suits for damages occasioned by such work or activity, whether done according to this section and with permission from the Agency or in violation of this section without permission from the Agency. To the maximum extent permitted by law, all obligations of the Contractor stated in 5-4.2 shall apply in the case of any such claims or suits.

The Contractor shall comply with City of Irvine Municipal Code § 5-9-521 Construction Site and Vacant Property Security, and be fully responsible for locating and obtaining permission to use equipment yards or material storage site(s). The Contractor shall assume full responsibility and costs for property rental, site preparation, maintenance and cleanup in a manner satisfactory to the City and the property owner.

If, through the failure of the Agency to acquire or clear right of way, the Contractor sustains loss which could not have been avoided by the judicious handling of forces, equipment and plant, the Contractor will be paid an amount as the Engineer may find to be a fair and reasonable compensation for such part of the Contractor's actual loss as, in the opinion of the Engineer, was unavoidable, determined as follows:

Compensation for idle time of equipment will be determined in the same manner as determinations are made for equipment used in the performance of extra work paid for as provided in 2-8 with the following exceptions:

- a) The right of way delay factor for each classification of equipment shown in the State of California, Department of Transportation publication entitled "Equipment Rental Rates and Labor Surcharge," current edition at the time of bid opening will be applied to such equipment rental rate.
- b) The time for which such compensation will be paid will be the actual normal working time during which such delay condition exists, but in no case will exceed eight (8) hours in any day.
- c) The days for which compensation will be paid will be the Calendar Days, excluding Saturdays, Sundays, and legal holidays, during the existence of such delay.

Actual loss shall be understood to include no items of expense other than idle time of equipment and necessary payments for idle time of men, cost of extra moving of equipment, and cost of longer hauls. Compensation for idle time of equipment will be determined, as provided herein, and compensation for idle time of men will be determined as provided in 2-8.

If the performance of the Contractor's work is delayed as a result of the failure of the City to acquire or clear right of way, an extension of time determined pursuant to the provisions in 6-4 will be granted.

2-4 COOPERATION AND COLLATERAL WORK.

DELETE in its entirety 4th paragraph and SUBSTITUTE with the following:

Nothing in the Contract shall be interpreted as granting to the Contractor exclusive occupancy of the site of the project. The Contractor must ascertain to his own satisfaction the scope of the project and the nature of any other contracts that have been or may be awarded by the Agency in the construction of the project, to the end that the Contractor may perform this Contract in the light of such other constraints, if any.

The Contractor shall not cause any unnecessary hindrance or delay to any other contractor working on or adjacent to the project. If the performance of any Contract for the project is likely to be interfered with by the simultaneous performance of some other contract or contracts, the Engineer will decide which contractor shall cease work temporarily and which contractor shall continue or whether the work under the contracts can be coordinated so that the Contractors may proceed simultaneously. On all questions concerning conflicting interest of Contractors performing related work, the decision of the Engineer shall be binding upon Contractors concerned. The Agency, the Engineer, the Agency Representative, and each of their officers, employees, and agents shall not be responsible for any damages suffered or extra costs incurred by the Contractor resulting directly or indirectly from the award of performance or attempted performance of any other

contract or contracts on the project or caused by a decision or omission of the Engineer respecting the order of precedence in the performance of the contracts.

If, through acts of neglect on the part of the Contractor, any other contractor or any subcontractor shall suffer loss or damage on the Work, the Contractor agrees to settle with such other contractor or subcontractor by agreement or arbitration, if such other contractor or subcontractor will so settle. If such other contractor or subcontractor shall assert any claim against the Agency, the Engineer, the Agency Representative, or their consultants on account of any damage alleged to have been so sustained, the Agency will notify the Contractor. To the maximum extent permitted by law, all obligations of the Contractor stated in 5-4.2 shall apply in the case of the assertion of any such claims or liabilities against the Agency, the Engineer, the Agency Representative and each of their officers, employees, and agents against any such claim.

ADD:

2-4.1 Coordination. It is anticipated that work by other contractors, utility companies and City of Irvine forces will be underway adjacent to or within the limits of this project during progress of the Work on this contract.

The Great Park is an active construction site, at any given time, specific construction activity coordination may be required. Should this occur, city team shall coordinate a meeting with the appropriate contractors to coordinate logistics.

The Contractor shall coordinate his operations with the operations of other contractors during stage construction, traffic shifts, opening of new lanes, closing of lanes, roads or ramps, detours, traffic signal facilities, shared irrigation facilities for landscaped areas and during any other operation that may affect or have influence on adjacent projects including, but not limited to, those identified in this subsection.

2-5 THE CONTRACTOR'S EQUIPMENT AND FACILITIES.

2-5.1 General. *MODIFY to ADD the following:*

The Contractor shall render its machinery and equipment inoperable at all times except during actual construction. The Contractor shall be responsible for construction means, controls, techniques, sequences, procedures, and construction safety.

ADD:

2-5.1.1 Equipment. Contractor shall stencil or stamp at a clearly visible location on each piece of equipment, except hand tools, an identifying number and:

- a) On compacting equipment, its make, model number, and empty gross weight that is either the manufacturer's rated weight or the scale weight.
- b) On meters and on the load-receiving element and indicators of each scale, the make, model, serial number, and manufacturer's rated capacity.

The Contractor shall submit a list describing each piece of equipment and its identifying number before commencement of the Work.

Upon request, the Contractor shall submit manufacturer's information that designates portable vehicle scale capacities.

The Contractor's measuring devices shall be tested and approved under California Test 109 in the Agency's presence or by any of the following:

- a) County Sealer of Weights and Measures
- b) Certified Scale Service Agency
- c) Division of Measurement Standards Official

2-5.2 Temporary Utility Services. *DELETE in its entirety and SUBSTITUTE with the following:*

The Contractor shall, at its own expense, make all arrangements to furnish, install and maintain temporary water, electricity, telephone, and sanitary facilities for construction needs throughout construction period. Materials may be new or used, but must be adequate for the purposes intended, and must not violate requirements of applicable codes, specifications or standards.

The Contractor shall maintain systems to provide continuous services, modify, and extend services, as work progress requires. The Contractor shall completely remove temporary materials and equipment when construction needs can be met by use of permanent utility facilities.

The Contractor shall clean and repair damage caused by installation or use of temporary facilities, restore existing facilities used for temporary services to original or better condition, and restore permanent facilities used for temporary services to original condition.

For water, the Contractor shall:

- a) Provide adequate supply of water suitable for construction usage and needs.

Water Source: Irvine Ranch Water District (IRWD)

- a) Obtain meter, inspections, and approvals prior to use of existing system.
- b) Comply with IRWD requirements.

Conservation:

- a) Minimize water use whenever possible.
- b) Maintain watering equipment in good working order.
- c) Repair leaks promptly.

When necessary to maintain pressure, provide temporary pumps, tanks, and compressors.

For electricity, the Contractor shall:

- a) Provide portable power plants and/or connection to existing system for construction needs.
- b) Source of existing power: Southern California Edison Company (SCE). Prior to connecting to existing system:
 - 1) Obtain permit from City of Irvine, Community Development Department for installation of temporary power pole and/or system.
 - 2) Arrange for required inspections and coordinate temporary meter installation with City and SCE.

For sanitary facilities, the Contractor shall:

- a) Furnish and maintain portable toilet units in a clean, operable, and sanitary condition for use by construction personnel.
- b) Place units in conformance with applicable laws, codes, and regulations.

Pay all fees and charges for applications, non-City permits and inspections, installations, temporary meters, utility usage, service charges, maintenance, removals, and restoration.

Contractor shall use standard products of service companies. At Contractor's option with prior approval by the Agency, patented specialty devices may be used, when in compliance with applicable codes and service company requirements.

2-6 CHANGES REQUESTED BY THE CONTRACTOR.

ADD the following:

The Contractor may initiate changes by submitting a written Change Order Request to the Engineer containing:

- a) Description of the proposed changes.
- b) Statement of the reason for making the changes.
- c) Reference applicable specifications sections and specific plans in support of the request.
- d) Statement of the effect on the Contract Price and Contract time.
- e) Statement of the effect on the work of separate subcontractors.
- f) Documentation supporting any change in Contract Price or Contract time as appropriate.

2-7 CHANGES INITIATED BY THE AGENCY.

2-7.1 General. *DELETE in its entirety and SUBSTITUTE with the following:*

The Agency may issue a Change Order for modifications of Work including, but not limited to, the Plans, Specifications, character, quantity or time of Work. Change Orders shall be in writing, on a form substantially conforming to the sample Contract Change Order Form provided in section 2-7.2 below, and state the dollar value of the change or establish the method of payment, and any adjustment in the Contract time of completion.

The Engineer may order minor changes in the Work not involving an increase or decrease in the contract amount, nor involving a change in the time for completion, but consistent with the purposes for which the works are being constructed. If the Contractor believes that any order for minor changes in the work involves changes in the Contract Price or time of completion, the Contractor shall not proceed with the minor changes so ordered and shall immediately, upon the receipt of such order, notify the Engineer in writing of his estimate of the changes in the Contract Price and time of completion he believes to be appropriate.

No payment for changes in the Work will be made and no change in the time of completion by reasons of changes in the Work will be made, unless the changes are covered by a written Change Order approved by the Agency in advance of the Contractor's proceeding with the changed work.

Once a Change Order is finalized and executed by both parties, the Contractor waives its right to seek any additional compensation for the work covered by the Change Order or any project impacts. The Contractor agrees that all Change Orders constitutes full payment for the work covered by the Change Orders, including all direct and indirect overhead expenses.

Notwithstanding any other provision in the Contract Documents, the Agency's issuance of a Change Order shall not constitute a waiver by the Agency of, or preclude the Agency in any way from, asserting any claim with respect to the same, including but not limited to, a claim of breach of contract or claim that the issued Change Order covers work included in the Scope of Work set forth in the Contract Documents for which the Contractor was not entitled to any additional funds.

A Change Order is approved when the Agency signs the Change Order.

A Contract Change Order approved by the Engineer may be issued to the Contractor at any time. Should the Contractor disagree with any terms or conditions set forth in an approved Contract Change Order not executed by the Contractor, the Contractor shall proceed with the Change Order work in accordance with 2-10 of the Standard Specifications and submit a written protest to the Engineer within fifteen (15) days after the receipt of the approved Contract Change Order. The protest shall state the points of disagreement citing the Specification references, quantities, and costs involved. If a written protest is not submitted, payment will be made as set forth in the approved Contract Change Order, and that payment shall constitute full compensation for all work included

therein or required thereby. Unprotested approved Contract Change Orders will be considered as executed Contract Change Orders.

The Engineer may initiate changes by submitting a Request for Quotation to Contractor. Such request will include detailed description of the change, products, and location of the change in the Work, supplementary or revised Plans and Specifications. Such request is for information only and is not an instruction to execute the changes, or to stop work in progress.

The Contractor shall support each quotation for a lump-sum proposal, and for each unit price that has not previously been established, with sufficient substantiating data to allow Engineer to evaluate the quotation.

On request, the Contractor shall provide additional data to support time and cost computations, labor required, equipment required, products required, recommended source of purchase and unit cost, and quantities required, taxes, insurance and credit for work deleted from Contract, similarly documented, justification for any change in Contract time.

The Contractor shall support each claim for additional costs, and for work done on a time-and-material/force account basis, with documentation as required for a lump-sum proposal, plus additional information as follows:

- a) Name of the Agency Representative who ordered the work, and date of the order.
- b) Dates and times work was performed, and by whom.
- c) Time record, summary of hours worked, and hourly rates paid.
- d) Receipts and invoices for equipment used, listing dates and times of use, products used, listing of quantities, and subcontracts.

In lieu of a Request for Quotation, the Engineer may issue a written Field Order for the Contractor to proceed with a change for subsequent inclusion in a Contract Change Order. Authorization will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change and will designate the method of determining any change in the Contract Price and any change in Contract time. Agency Representative will sign and date the Field Order as authorization for the Contractor to proceed with the changes. Contractor may sign and date the Field Order to indicate agreement with the terms therein. Contractor shall proceed with the work so ordered prior to actual receipt of an approved Contract Change Order.

ADD:

2-7.2 Contract Change Order Form

CITY OF IRVINE

Sheet 1 of X

Contract Change Order

Change Requested by: Engineer ☐ Contractor ☒

CCO No.	CIP No.	Description	Federal Number(s)

To

Contractor

*You are directed to make the following changes from the plans and specifications or do the following described work not included in the plans and specifications for this contract. **NOTE: This change order is not effective until approved by the Engineer.***

Description of work to be done, estimate of quantities and prices to be paid. (Segregate between additional work at contract price, agreed price and force account.) Unless otherwise stated, rates for rental of equipment cover only such time as equipment is actually used and no allowance will be made for idle time.

Body of Contract Change Order

Total Cost: \$ _____

Estimated Cost: Decrease ☐ Increase ☐

Revised Contract Amount: \$ _____

By reason of this order, the time of completion will be adjusted as follows: Working Days

The revised completion date is:

Submitted by

Signature	(Print name & title)	Date
	Insert Name - SENIOR PROJECT MANAGER	

Reviewed by

Signature	(Print name & title)	Date
	Insert Name – MANAGER OF PROJECT DELIVERY	

Approval by

Signature	(Print name & title)	Date
	Insert Name – DEPUTY DIRECTOR/CITY ENGINEER	

We, the undersigned Contractor, have given careful consideration to the change proposed and agree, if this proposal is approved, that we will provide all equipment, furnish the materials, except as may otherwise be noted above, and perform all services necessary for the work above specified, and will accept as full payment therefore the prices shown above, including, but not limited to, direct and indirect overhead expenses.

Notwithstanding any other provision in the Contract Documents, the City's issuance of a change order shall not constitute a waiver by the City of, or preclude the City in any way from, asserting any claim with respect to the same, including but not limited to, a claim of breach of contract or claim that the issued change order covers work included in the Scope of Work set forth in the Contract Documents for which the Contractor was not entitled to any additional funds.

Contractor Acceptance by: Contractor's name

Signature	(Print name & title)	Date

cc: Contractor, Finance, Inspection, File

2-8 EXTRA WORK.

DELETE in its entirety and SUBSTITUTE with the following:

When the price for the extra work cannot be agreed upon prior to the commencement of the work, the Agency will pay for the extra work based on the accumulation of costs as provided herein.

SECTION 3 – CONTROL OF THE WORK

REVISE as follows:

3-1 **ASSIGNMENT.**

Modify to add the following:

The performance of the Contract may not be assigned, except upon the written consent of the Agency. Consent will not be given to any proposed assignment that would relieve the original Contractor or its Surety of their responsibilities under the Contract, nor will the Agency consent to any assignment of any part of the Work under the Contract.

Assignment of this Contract shall contain a provision that the funds to be paid to the assignee under the assignment are subject to a prior lien for services rendered or materials supplied for performance of the work called for under the Contract in favor of all persons, firms, or corporations rendering such services or supplying such materials.

3-2 **SELF PERFORMANCE.**

DELETE in its entirety and SUBSTITUTE with the following:

When an item of work is designated as (S) or (S-F) in the “Schedule of Work,” that item of work shall be the considered a “Specialty Item.”

The Contractor shall perform, with its own organization, Contract work amounting to at least 15 percent of the Contract Price on building/facility contracts, and at least 50 percent of the Contract Price on all other Public Works contracts except that any designated “Specialty Items” may be performed by subcontract and the amount of any such “Specialty Items” so performed may be deducted from the Contract Price before computing the amount required to be performed by the Contractor with its own organization. “Specialty Items” will be identified by the Agency in the Bid or Proposal. Where an entire item is subcontracted, the value of work subcontracted will be based on the Contract Unit Price. When a portion of an item is subcontracted, the value of work subcontracted will be based on the estimated percentage of the Contract Unit Price. This will be determined from information submitted by the Contractor, and subject to approval by the Engineer.

The provisions in 3-2 of these Special Provisions require that the Contractor shall perform with the Contractor’s own organization contract work amounting to not less than 50 percent of the original Contract Price is not changed by the Federal Aid requirement specified under “Required Contract Provisions Federal Aid Construction Contracts” of these Special Provisions that the Contractor perform not less than 30 percent of the original contract work with the Contractor’s own organization.

3-4 AUTHORITY OF THE BOARD AND THE **ENGINEER.**

MODIFY TO ADD THE FOLLOWING:

The Contractor is subject to the provisions of Government Code § 8546.7, which provides that this Contract and related documents are subject to the examination and audit of the State Auditor, at the request of the Agency or as part of any audit of the Agency, for a period of three (3) years after final payment under the Contract.

The Agency reserves the right to audit the Contractor's books, records, and documents related to the Contractor's performance and the Contractor's compliance with all of the terms and conditions of this Contract at any time. Upon request by Agency, Contractor shall prepare and submit to Agency any reports concerning Contractor's performance of the services rendered under this Contract. With 72 hours advance written notice delivered to Contractor, Agency shall have access to the books, records, and documents of Contractor related to Contractor's performance of this Contract in the event any audit is requested.

All drawings, documents, and other materials prepared by Contractor in the performance of this Contract:

- a) Shall be the property of Agency and shall be delivered at no cost to Agency upon request of Agency or upon the termination of this Contract, and
- b) Are confidential and shall not be made available to any individual or entity without prior written approval of the Agency.

3-5 **INSPECTION.**

DELETE in its entirety and SUBSTITUTE with the following:

Inspection of the Work will be conducted by an Agency Representative and will include monitoring and enforcing compliance of materials, equipment, installations, workmanship, methods, and requirements of the Contract Documents.

The Agency Representative shall, at all times, have safe access to the Work during construction and shall be furnished with every reasonable facility for ascertaining full knowledge respecting the progress, workmanship, and character of materials and equipment used and employed in the Work.

Whenever the Contractor varies the work hours in which inspection is required, the Contractor shall give at least two (2) Working Days written notice to the Agency Representative so that inspection may be made.

All installations which are to be backfilled or otherwise covered will be inspected by the Agency Representative prior to backfilling or covering. The Contractor shall give the Agency Representative a minimum of two (2) days advance notice prior to backfilling or covering any part of the Work.

Work or materials concealed or performed without the prior notice specified above, will be subject to such tests or exposure as may be necessary to prove to the satisfaction of the Engineer, that all materials used and the work done are in strict conformity with the Contract Documents. All labor and equipment necessary for exposing and testing shall be furnished and paid for by the Contractor. The Contractor shall replace, without additional cost to the Agency, any materials or work damaged by exposure or testing.

Defective work shall be made good at the Contractor's expense including any unsuitable materials and equipment that may have been previously inspected by the Agency Representative, and/or that payment therefore has been included in an estimate for payment.

Inspection of the Work shall not relieve the Contractor of the obligation to fulfill all requirements of the Contract.

All submittals and correspondence between the Agency and the Contractor, related to inspection of the Work of this Contract, shall be directed to the Engineer.

ADD:

3-5.1 Inspection Requirements. The Contractor shall notify the Agency Representative a minimum of 48 hours before inspection is required.

- a) Unless specified elsewhere in the Special Provisions, inspection of the Work will be provided by the Agency between the hours of 7:00 a.m. and 3:30 p.m., Monday through Friday, exclusive of Agency holidays. Any inspections requested by or made necessary as a result of the actions of the Contractor beyond the hours stated above shall be paid for by the Contractor at the prevailing rate of 1-1/2 times the regular hourly wage rate, plus 21% for overhead costs.

The Contractor shall submit a request to the Engineer for approval, a minimum five (5) Calendar Days, in advance of inspections requested by or made necessary as a result of the actions of the Contractor on Saturdays, Sundays or Agency and/or Federal holidays. The Contractor shall pay for these inspections at the prevailing rate of 1-1/2 times for Saturdays and 2 times the regular hourly wage rate for Sundays or Agency and/or Federal holidays plus associated overhead costs.

For purposes of this section, the following holidays are observed by the Agency:

New Year's Day
Martin Luther King Jr. Day
Presidents' Day
Memorial Day
Juneteenth
Independence Day
Labor Day

Veterans Day
Thanksgiving Day
Day after Thanksgiving
Christmas Eve
Christmas Day

A construction calendar showing the days that each of the above holidays will be observed is available upon request from the Engineer.

- b) The Contractor shall telephone the designated Agency Representative at least two (2) Working Days prior to starting construction or resuming construction following suspension of the Work for any reason.

Prior to commencing any work on the Contract, the Contractor shall submit a completed Inspection Overtime Permit form provided by the City of Irvine.

- c) In addition to any inspection required by Codes and/or Ordinances or Contract Documents, Contractor shall notify the Engineer a minimum of 2 days prior to the permanent concealment of any materials or work. The following list is typical, but not all inclusive of such required inspections:

- 1) Foundation/subgrade material, footing, and slab beds
- 2) Reinforcing for concrete, masonry, and plaster
- 3) Contact surface of concrete forms
- 4) Concrete and masonry surfaces
- 5) Piping and conduit
- 6) Finish grade prior to paving, seeding or planting
- 7) All soil mixes prior to installation
- 8) All chemicals and amendments prior to installation or application

3-6 THE CONTRACTOR'S REPRESENTATIVE.

DELETE the 3rd sentence in the 1st paragraph and SUBSTITUTE with the following:

Said authorized representative shall be present at the site of the Work at all times while Work is actually in progress on the Contract. When Work is not in progress and during periods when Work is suspended, arrangements acceptable to the Agency Representative shall be made for any emergency work, which may be required.

ADD the following after the last sentence of the 1st paragraph:

Whenever the Contractor or his authorized representative is not present on any particular part of the Work where it may be desired to give direction, orders will be given by the Agency Representative, which shall be received and obeyed by the superintendent or

supervisor who may have charge of the particular work in reference to which the orders are given.

The Agency reserves the right to approve the Contractor's Superintendent. Once approved, the Superintendent shall remain on the project for the duration of the project so long as he is in the employment of the Contractor.

3-7 CONTRACT DOCUMENTS.

3-7.1 General. ADD the following after the 2nd paragraph:

All work of the Contract including, but not limited to, the general nature and character of the work area and conducting of Contractors' operations shall be performed in accordance with the Standard Specifications for Public Works Construction, 2024 edition, and all supplements thereto, except as modified in these Special Provisions and as follows:

Work to be performed which is directly related to the construction and/or modification of traffic, striping, signing, markings or signals; work within State right of way; and, work which is directly related to the construction of bridges and bridge appurtenances shall be performed in accordance with the State Standard Specifications, current edition as of bid date.

As applicable, unless modified elsewhere in these Special Provisions, Work of the Contract shall conform to current editions of: Uniform Building, Plumbing, Mechanical Codes; Uniform Fire Code; National Electrical Code; and, City of Irvine amendments thereto.

All work shall follow the CSI Technical Specifications Division 0,1 and 3 through 28 and Scope as outlined in the Drawings and Bid Addendum. However, where silent or missing in the above, said items to be performed in accordance to the Standard Specification for Public Works Construction "Greenbook" (2024 Edition, with all current supplements), the California Building Code (2022 Edition) with City Amendments, the California Electrical Code (2022 Edition) with City Amendments, the California Plumbing Code (2022 Edition) with key amendments, California Green Building Standards Code (2022 Edition), Building Energy Efficiency Standards (2022 Edition), California Playground Safety Regulations; All City of Irvine Codes & Ordinances, City of Irvine's Grading Manual, City of Irvine's Standards and Design Manual; City of Irvine's Park/Public Facility Standards; City of Irvine's Construction Site Security Requirements, Americans with Disabilities Act (ADA), Chapter 11B Title 24 of the California Code of Regulations; California Public Contract Laws; these Specifications, Attachments, and the Construction Drawings, and all applicable requirements.

DELETE last paragraph in its entirety and SUBSTITUTE with the following:

If the Contractor, either before commencing work or in the course of the work, finds any discrepancy between the Specifications and the Plans or between either of them and the physical conditions at the site of the work or finds any error or omission in any of the Plans or in any survey, the Contractor shall promptly notify the Agency of such discrepancy,

error, or omission. If the Contractor observes that any plans or specifications are at variance with any applicable law, ordinance, regulation, order, or decree, he shall promptly notify the Agency in writing of such conflict.

The Agency, on receipt of any such notice, will investigate the circumstances and give appropriate instructions to the Contractor. Until such instructions are given, any work done by the Contractor after its discovery of such an error, discrepancy, or conflict that is directly or indirectly affected by such error, discrepancy, or conflict, will be at its own risk and it shall bear all cost arising therefrom.

The Agency will provide, free of charge, three (3) copies of Plans and Special Provisions for the Contractor and one (1) copy of Plans and Special Provisions for each subcontractor listed in the Bidder's Proposal. Any Plans or Special Provisions required by the Contractor/subcontractor in addition to the above can be provided by Agency at Contractor's expense. The Contractor shall keep one set of Plans and Special Provisions in good order and available to the Agency Representative at the site of the Work.

3-7.2 Precedence of Contract Documents. *DELETE the order of precedence and SUBSTITUTE with the following:*

- a) Permits and Agreements
- b) Change Orders and/or Supplemental Agreements; whichever occurs last
- c) Contract
- d) Addenda
- e) Instructions to Bidders, Proposal Requirements and Conditions
- f) Bid/Proposal
- g) Special Provisions
- h) Contract Plans
- i) Standard Plans
- j) Standard Specifications
- k) Reference Specifications

ADD:

3-7.2.1 Interpretation of Plans and Specifications. Figured dimensions on Plans shall govern, but work not dimensioned shall be as directed. Work not particularly shown or specified shall be the same as similar parts that are shown or specified. Specifications shall govern as to materials, workmanship, and installation procedures. Plans and Specifications requiring higher quality material or workmanship shall prevail. In the event of any discrepancy between any drawings and the figures thereon, the figures shall be taken as correct. In the event of any doubt or question arising respecting the true meaning

of the Specifications, reference shall be made to Engineer whose decision thereon shall be final.

3-8 SUBMITTALS.

3-8.1 General. *MODIFY to ADD the following:*

The review period begins anew upon each submittal or resubmittal.

In providing specified submittals, the Contractor certifies that they are complete in all respects and all materials, equipment, and other work shown thereon conforms to the Contract Documents.

Where a manufactured item is designed or engineered by the manufacturer, fabricator, subcontractor, consultant or designee, the drawings, and supporting calculations shall be stamped and signed by an engineer registered by the State of California executing the design within the scope of his registration. Unless otherwise accepted by the Engineer, data shall be submitted only by the prime Contractor. Data that, in the opinion of the Engineer, are incomplete or have not been checked by the prime Contractor or are illegible will be considered as not complying with the Contract requirements and will be returned to the Contractor for resubmittal in the proper form. The City may make this determination at any time during the review period.

Data shall be submitted in a format similar to the arrangement of the applicable section(s) of the Specifications unless otherwise specified. Any submittal not following the format specified, and not conforming to the requirements listed below, will be returned for resubmittal without review.

- a) Data shall include drawings and descriptive information in sufficient detail to show the kind, size, arrangement, and operation of component materials and devices, the external connections, anchorages, and supports required, performance characteristics, dimensions needed for installation and correlation with other materials and equipment, and all additional information as required in the detailed section(s) of the Contract Documents. Identify field dimensions; show relation to adjacent or critical features, work or products.
- b) Calculations to support the adequacy of the design in meeting specified performance ratings or requirements shall be submitted when required by the Specifications.
- c) Each drawing or data sheet shall be clearly marked with the name of the project, the Contractor's name, and references to applicable Specification paragraphs and Plan sheets. Submittals containing multiple drawings or data sheets shall be collated prior to submittal for review.
- d) Data sheets, catalog cuts or drawings showing more than the particular item under consideration shall be marked to cross out all but the applicable information. Submit only pertinent pages; mark each copy of standard printed

data to identify pertinent products, referenced to Specification Section and Article number. Show reference standards, performance characteristics, and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.

- e) Data submitted shall include drawings showing wiring and/or pipe layouts. Any changes proposed by the Contractor shall be stated in a cover letter and essential details of such changes shall be clearly shown in the data submitted.
- f) Present in a clear and thorough manner. Title each drawing with project name and number; identify each element of drawings by reference to sheet number and detail, schedule, or room number of Contract Documents.
- g) Provide manufacturer's preparation, assembly, and installation instructions.
- h) Submit full range of manufacturer's standard finishes except when more restrictive requirements are specified, indicating colors, textures, and patterns, for Engineer's selection.
- i) Submit samples to illustrate functional characteristics of products, including parts and attachments. Label each sample with identification required for transmittal letter. Approved samples which may be used in the Work are indicated in the Specification section.
- j) Provide field samples of finishes for the Work, at location acceptable to Agency Representative, as required by individual Specifications section. Install each sample complete and finished. Finishes in place that have been accepted by the Agency Representative may be retained in completed work.

Submittals shall be accompanied by a letter of transmittal listing the contents of the submittal. Drawings shall show the name of the project, the name of the Contractor, and, if any, the names of suppliers, manufacturers, and subcontractors. Shop drawings shall be submitted with sufficient time for Agency's review and in orderly sequence in accordance with the progress schedule to cause no delay in prosecution of the Work. Drawings shall be submitted on 11"x17" or 24"x36" sheet sizes only. Any submittal not accompanied by such a transmittal, or where all applicable items on the form are not complete, will be returned for resubmittal.

A separate letter of transmittal shall be used for each specific item or class of materials or equipment for which a submittal is required. Transmittal of shop drawings on various items using a single letter of transmittal will be permitted only when the items taken together constitute a manufacturer's "package" or are so functionally related that expediency indicates review of the group or package as a whole. Submittals transmitted by facsimile will not be accepted.

The Agency will return any submittal sent (1) without a transmittal letter, (2) with an incomplete form, or (3) by facsimile.

The Contractor shall assign a unique sequential number to each submittal package, which shall be clearly written in the space provided on the transmittal letter. This number shall be used in all correspondence to the Agency when referencing to a particular submittal. The Contractor shall be responsible for ensuring the same submittal number is not assigned to different submittal packages.

Resubmittals shall incorporate the original submittal number followed by the revision number (i.e., the first resubmittal of submittal #1 is numbered 1R1, the second 1R2, etc.). The Agency will return improperly numbered submittals without review. The Contractor shall indicate on the transmittal letter that either no exceptions to the Contract Documents are taken or deviations are submitted. All deviations indicated shall be listed on the transmittal letter and the Contractor shall be solely responsible for any omitted deviations. If any deviations are omitted, the Agency will return the submittal and the engineering data without review for resubmittal. Any consequences from the resulting delay shall be fully borne by the Contractor.

The Engineer's review of the Contractor's submittals will cover only general conformity to the Contract Documents. The Engineer's acceptance of drawings returned marked NO EXCEPTION TAKEN or RESUBMITTAL NOT REQUIRED (CORRECTIONS ARE NOTED) shall not constitute a blanket approval of dimensions, qualities, and details of the materials, equipment, device, or item shown, and does not relieve the Contractor from any responsibility for errors, omission or deviations from conforming to the Contract Documents. The Agency reserves the right to subsequently reject any previously accepted equipment, material, and/or construction method that deviates from the Contract Documents. When the drawings and data are returned marked CORRECT AND RESUBMIT, the corrections shall be made as noted thereon and as instructed by the Engineer, resubmittal shall be made in the same manner as the original submittal.

If the Engineer rejects the submittals, the Contractor is responsible for any subsequent time delays at no additional compensation from the Agency. Subject to these requirements, drawings and data, after final processing by the Engineer, shall become a part of the Contract Documents, and the work shown or described thereby shall be performed in conformity therewith unless otherwise required by the Engineer. In the event of conflict between accepted submittals and the other Contract Documents, the most stringent requirements shall apply unless the Agency has agreed in writing to less stringent requirements in response to a deviation listed on a submittal letter of transmittal.

No portion of the work requiring a submittal shall be commenced until the submittal has been reviewed by the Engineer and returned to the Contractor with a notation indicating that resubmittal is not required.

The review by the Engineer is only of general conformance with the design concept of the project, and general compliance with the Contract Documents and shall not be construed as relieving the Contractor of these full responsibilities for providing materials, equipment, and work required by the Contract; the proper fitting and construction of the Work; the accuracy and completeness of the submittals; selecting fabrication processes and techniques of construction; and performing the Work in a safe manner.

3-10 SURVEYING.

3-10.1 General. *DELETE the 1st sentence in the 1st paragraph and SUBSTITUTE with the following:*

Any and all surveying necessary to complete this project shall be in accordance with Section 3-10 of the Greenbook Specification and shall be provided by the Contractor and be performed by a registered Civil Engineer licensed prior to January 1, 1982 or licensed Land Surveyor in the State of California at the Contractor's expense. Any and all costs prescribed by the Greenbook Specifications and these Special Provisions relative to Surveying shall be included in the various items of work requiring construction staking/surveying and no additional compensation will be allowed therefor.

The Agency will engage a licensed land surveyor or civil engineer registered in the State of California to perform surveying and calculations required for quality assurance surveying only.

DELETE the last sentence in the 1st paragraph and SUBSTITUTE with the following:

Staking will be in accordance with Chapter 12 "Construction Surveys" of the State of California, Department of Transportation "Survey Manual." A copy of the Manual is available at

http://www.dot.ca.gov/hq/row/landsurveys/SurveysManual/12_Surveys.pdf.

Any construction stakes required in addition to those listed in the "Survey Manual", or any re-staking required by loss of stakes, or additional costs encountered by significant delays or conditions which cause the use of more difficult survey methods during field operations and which are, in the judgment of the Agency, caused by interference of Contractor's operations, equipment or materials, are also the Contractor's responsibility.

The Contractor shall submit to the Agency Representative a construction staking form 48 hours in advance of staking operations, with an assigned sequential number, description of specific items, locations, and date to be staked, together with supplemental drawings and/or data as necessary to facilitate the Agency's quality assurance surveying as required.

If additional quality assurance surveying by the Agency's surveyor is necessary due to re-staking attributed to the loss of stakes caused by the Contractor's operations, the Agency shall be compensated by the Contractor at the hourly rate schedule of the Agency's surveyor. Costs shall be deducted from any monies due or to become due the Contractor and any delays due to the replacement or restoration of stakes shall be the responsibility of the Contractor.

ADD:

3-10.3 Conformity with Contract Documents. The Work shall conform to the lines, grades, dimensions, tolerances, and material and equipment requirements shown on the Contract Documents. Although measurement, sampling, and testing may be considered

evidence as to such conformity, the Engineer shall be the sole judge as to whether the work or materials deviate from the Contract Documents and his decision as to any allowable deviations therefrom shall be final.

If specific lines, grades, and dimensions are not shown on the Plans, those furnished by the Engineer shall govern.

3-12 WORK SITE MAINTENANCE.

MODIFY to ADD the Following:

Section 3-12 includes specifications for performing work site maintenance, including spill prevention and control, material management, waste management, water pollution control, and nonstormwater management.

Projects are required to comply with the City of Irvine Ordinance No. 07-18, which establishes requirements for recycling and diversion of construction and demolition waste.

The Contractor shall implement effective handling, storage, usage, and disposal practices to control material pollution and manage waste and nonstormwater at the job site before they come in contact with storm drain systems and receiving waters.

Linear sediment barriers must comply with 3-12.6.2 of the Standard Specifications and the Contract Special Provisions.

ADD:

3-12.1.1 Construction Cleaning. The Contractor shall:

- a) Initiate and maintain a daily program to prevent accumulation of debris on-site and along access roads and haul routes. Maintain areas under Contractor's control free of waste materials, debris, weeds 6" high, and rubbish. Maintain site in a clean and orderly condition.
- b) Provide suitable covered containers for deposit of debris and rubbish. Dispose of accumulation of extraneous materials, prohibit overloading of trucks to prevent spillages on access and haul routes and provide daily inspection of haul routes to enforce requirements.
- c) The Contractor shall supply self-loading motorized street sweepers equipped with a functional water spray system as part of his daily program.
- d) Schedule at a minimum, weekly collection and disposal of debris. Provide additional collections and disposals of debris whenever the weekly schedule is inadequate to prevent accumulation.

The Contractor shall remove debris from closed or remote spaces prior to closing the space, control cleaning operations to minimize dust and other particulates and immediately remove clay and earth which adhere to the paved surface of the roadway.

Remove by hand scraping, washing, sweeping, and/or other method(s) which will leave a clean non-skid surface without impairing, injuring or loosening the surface.

The Contractor shall remove waste materials, debris, vegetation, other rubbish, and non-recyclable materials as required by the Contract Documents, and dispose of off-site in an approved disposal site or recycling center.

Unless otherwise specified in the Special Provisions, all concrete, asphalt, aggregate or sand base material, cement block, trees, shrubs, bushes, and all other recyclable material generated during cleaning, demolition, clearing, and grubbing or other phases of the work is to be disposed of at appropriate recycling centers. The Contractor shall be responsible for removing reinforcing steel, wood, or other deleterious materials as required by the recycling center for acceptance of recycled materials. The Contractor shall supply proof of disposal at a recycling center. The proof of disposal shall include verification of tonnage by certified weigh masters tickets. If weigh masters tickets are not feasible, the Contractor and Agency Representative shall estimate the tonnage prior to disposal at the recycling centers.

Known recycling centers:

Ewles Materials
16081 Construction Circle West
Irvine

The Contractor is required to control dust throughout the life of the Contract. The control may be required by job conditions or Agency Representative. In any case, the Contractor shall use water or other means to control the dust. No chemical agents may be used without written authorization from the Agency. The Contractor shall be solely responsible for safety problems, accidents or any other complications or claims arising from inadequate dust control.

No separate payment will be made for any work performed or material used to control dust resulting from the Contractor's performance of the Work, or by public traffic, either inside or outside the right of way. Full compensation for such dust control will be considered as included in the price paid for the various items of work involved.

No separate payment will be made for any work performed or material used in cleaning the project. Full compensation for such cleaning shall be considered as included in the price paid for the various items of work involved and no additional compensation will be allowed therefor.

ADD:

3-12.1.2 Final Cleaning. The Contractor shall execute cleaning prior to inspection for completion of the Work. The Contractor shall use materials which will not create hazards to health or property, and which will not damage surfaces, remove debris from and otherwise clean exposed-to-view surfaces, remove temporary protection and labels not required to remain, clean finishes free of foreign substances, remove waste, debris, and

surplus materials from site. Clean grounds; remove stains, spills, and foreign substances from paved areas and sweep clean, clean other exterior surfaces, and where applicable:

- a) Clean transparent and glossy materials to a polished condition; remove foreign substances. Polish reflective surfaces to a clear shine.
- b) Vacuum clean carpeted and similar soft surfaces.
- c) Clean resilient and hard surface floors.
- d) Clean surfaces of equipment; remove excess lubrication.
- e) Clean plumbing fixtures to a sanitary condition.
- f) Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction; in addition, clean ducts, blowers, and coils when units have been operated without filters during construction.
- g) Clean light fixtures and lamps.
- h) Remove waste, foreign matter, and debris from roofs, gutters, areaways, and drainage systems.

ADD:

3-12.4.3 Material Management.

3-12.4.3.1 General. The Contractor shall minimize or eliminate discharge of material into the air, storm drain systems, and receiving waters while taking delivery of, using, or storing the following materials:

- a) Hazardous chemicals, including acids, lime, glues, adhesives, paints, solvents, and curing compounds
- b) Soil stabilizers and binders
- c) Fertilizers
- d) Detergents
- e) Plaster
- f) Petroleum materials, including fuel, oil, and grease
- g) Asphalt and concrete components
- h) Pesticides and herbicides

The Contractor's employees trained in emergency spill cleanup procedures must be present during the unloading of hazardous materials or chemicals.

The Contractor shall use less hazardous materials if practicable.

The following activities must be performed at least 100 feet from concentrated flows of stormwater, drainage courses, and inlets if within the floodplain and at least 50 feet if outside the floodplain, unless otherwise authorized:

- a) Stockpiling materials
- b) Storing pile-driving equipment and liquid waste containers
- c) Washing vehicles and equipment in outside areas
- d) Fueling and maintaining vehicles and equipment

3-12.4.3.2 Material Storage. If materials are stored by the Contractor, he shall:

- a) Store liquids, petroleum materials, and substances listed in 40 CFR 110, 117, and 302 and place them in secondary containment facilities as specified by USDOT for storage of hazardous materials.
- b) Ensure that secondary containment facilities are impervious to the materials stored there for a minimum contact time of 72 hours.
- c) Cover secondary containment facilities during nonworking days and whenever precipitation is forecasted. Secondary containment facilities must be adequately ventilated.
- d) Keep secondary containment facilities free of accumulated rainwater or spills. After precipitation, or in the event of spills or leaks, collect accumulated liquid and place it into drums within 24 hours. Handle the liquid as hazardous waste in accordance with subsection 3-12 of the Standard Specifications and these Special Provisions.
- e) Not store incompatible materials, such as chlorine and ammonia, in the same secondary containment facility.
- f) Store materials in their original containers with the original material labels maintained in legible condition. Immediately replace damaged or illegible labels.
- g) Ensure that secondary containment facilities have the capacity to contain precipitation from a 24-hour-long, 25-year storm, plus 10 percent of the aggregate volume of all containers or the entire volume of the largest container within the facility, whichever is greater.
- h) Store bagged or boxed material on pallets. Protect bagged or boxed material from wind and rain during nonworking days and whenever precipitation is forecasted.
- i) Provide sufficient separation between stored containers to allow for spill cleanup or emergency response access. Storage areas must be kept clean, well-organized, and equipped with cleanup supplies appropriate for the materials being stored.

- j) Repair or replace perimeter controls, containment structures, covers, and liners as necessary. Inspect storage areas before and after precipitation, and at least weekly during other times.

3-12.4.3.3 Stockpile Management. The Contractor shall minimize stockpiling of materials at the job site.

The Contractor shall implement water pollution control practices within 72 hours of stockpiling material or before a forecasted storm event, whichever occurs first. If stockpiles are being used, do not allow soil, sediment, or other debris to enter storm drains, open drainages, and watercourses.

Active and inactive soil stockpiles must be:

- a) Covered with soil stabilization material or a temporary cover
- b) Surrounded with a linear sediment barrier

Stockpiles of asphalt concrete and PCC rubble, HMA, aggregate base, or aggregate subbase must be:

- a) Covered with a temporary cover
- b) Surrounded with a linear sediment barrier

Stockpiles of pressure-treated wood must be:

- a) Placed on pallets
- b) Covered with impermeable material

Stockpiles of cold mix asphalt concrete must be:

- a) Placed on an impervious surface
- b) Covered with an impermeable material
- c) Protected from stormwater run-on and runoff

The Contractor shall control wind erosion year-round.

The Contractor shall repair or replace linear sediment barriers and covers as needed to keep them functioning properly. Whenever sediment accumulates to 1/3 of the linear sediment barrier height, remove the accumulated sediment.

3-12.5.3 Spill Prevention and Emergency Response Plan.

ADD:

3-12.5.3.1 Spill Prevention and Control. The Contractor shall keep material or waste storage areas clean, well-organized, and equipped with enough cleanup supplies for the material being stored.

The Contractor shall implement spill and leak prevention procedures for chemicals and hazardous substances stored on the job site. Whenever the Contractor spills or leaks chemicals or hazardous substances at the job site, he is responsible for all associated cleanup costs and related liability.

The Contractor shall report minor, semi significant, and significant or hazardous spills to the WPC manager and the WPC manager must notify the Engineer immediately.

As soon as it is safe, the Contractor shall contain and clean up spills of petroleum materials and sanitary and septic waste substances listed under 40 CFR, parts 110, 117, and 302.

ADD:

3-12.5.3.2 Minor Spills. Minor spills consist of quantities of oil, gasoline, paint, or other materials that are small enough to be controlled by a first responder upon discovery of the spill.

The Contractor shall clean up a minor spill using the following procedures:

- a) Contain the spread of the spill
- b) Recover the spilled material using absorption
- c) Clean the contaminated area
- d) Dispose of the contaminated material and absorbents promptly and properly

ADD:

3-12.5.3.3 Semi Significant Spills. Semi significant spills consist of spills that can be controlled by a first responder with help from other personnel.

The Contractor shall clean up a semi significant spill immediately using the following procedures:

- a) Contain the spread of the spill.
- b) On paved or impervious surfaces, encircle and recover the spilled material with absorbent materials. Do not allow the spill to spread widely.
- c) If the spill occurs on soil, contain the spill by constructing an earthen dike and dig up the contaminated soil for disposal.
- d) If the spill occurs during precipitation, cover the spill with 10-mil plastic sheeting or other material to prevent contamination of runoff.

- e) Dispose of the contaminated material promptly and properly.

ADD:

3-12.5.3.4 Significant or Hazardous Spills. Significant or hazardous spills consist of spills that cannot be controlled by job site personnel.

The Contractor shall immediately notify qualified personnel of a significant or hazardous spill and take the following steps:

- a) Do not attempt to clean up the spill until qualified personnel have arrived.
- b) Notify the Engineer and follow up with a report.
- c) Obtain the immediate services of a spill contractor or hazardous material team.
- d) Notify local emergency response teams by dialing 911 and county officials by using the emergency phone numbers retained at the job site.
- e) Notify the California Emergency Management Agency State Warning Center at 916-845-8911.
- f) Notify the National Response Center at (800) 424-8802 regarding spills of Federal reportable quantities under 40 CFR 110, 119, and 302.
- g) Notify other agencies as appropriate, including:
 - 1) Fire Department
 - 2) Department of Public Works and Transportation
 - 3) Coast Guard
 - 4) Highway Patrol
 - 5) City Police or County Sheriff's Department
 - 6) Department of Toxic Substances
 - 7) California Division of Oil and Gas
 - 8) Cal/OSHA
 - 9) Regional Water Resources Control Board

The Contractor shall prevent a spill from entering stormwater runoff before and during cleanup activities and shall not bury or wash the spill with water.

ADD:

3-12.5.4 Waste Management.

3-12.5.4.1 Paint Waste. The Contractor shall clean water-based and oil-based paint from brushes or equipment within a contained area in a way that does not contaminate soil, receiving waters, or storm drain systems. Handle and dispose of the following as hazardous waste: paints, thinners, solvents, residues, and sludges that cannot be recycled or reused. When thoroughly dry, dispose of the following as solid waste under: dry latex paint, paint cans, used brushes, rags, absorbent materials, and drop cloths.

3-12.5.4.2 Concrete Waste. The Contractor shall use practices to prevent the discharge of asphalt concrete, PCC, and HMA waste into storm drain systems and receiving waters.

The Contractor shall collect and dispose of asphalt concrete, PCC, and HMA waste at locations where:

- a) Concrete material, including grout, is used.
- b) Concrete dust and debris result from demolition.
- c) Saw cutting, coring, grinding, grooving, or hydro-concrete demolition creates a residue or slurry.
- d) Concrete trucks or other concrete-coated equipment is cleaned at the job site.

3-12.5.4.3 Sanitary and Septic Waste. The Contractor shall not bury or discharge wastewater from a sanitary or septic system anywhere at the site of Work. A sanitary facility discharging into a sanitary sewer system must be properly connected and free from leaks. The Contractor shall place a portable sanitary facility at least 50 feet away from storm drains, receiving waters, and flow lines.

The Contractor shall comply with local health agency provisions if using an on-site disposal system.

3-12.5.4.4 Liquid Waste. The Contractor shall use practices that will prevent job-site liquid waste from entering storm drain systems and receiving waters. Liquid wastes include the following:

- a) Drilling slurries or fluids
- b) Grease-free and oil-free wastewater and rinse water
- c) Dredgings, including liquid waste from cleaning drainage systems
- d) Liquid waste running off a surface, including wash or rinse water
- e) Other nonstormwater liquids not covered by separate permits

The Contractor shall hold liquid waste in structurally sound, leak-proof containers, such as roll-off bins or portable tanks.

Liquid waste containers must be of sufficient quantity and volume to prevent overflow, spills, and leaks.

The Contractor shall store containers at least 50 feet from moving vehicles and equipment.

The Contractor shall remove and dispose of deposited solids from sediment traps in accordance with 3-12 of the Standard Specifications and these Special Provisions. Liquid waste may require testing to determine hazardous material content before disposal.

The Contractor shall dispose of drilling fluids and residue.

If an authorized location is available within the job site, fluids and residue exempt under 23 CA Code of Regs § 2511(g) may be dried by evaporation in a leak-proof container. The Contractor shall dispose of the remaining solid waste in accordance with 3-12 of the Standard Specifications and these Special Provisions.

ADD:

3-12.5.5 Nonstormwater Management.

3-12.5.5.1 Water Control and Conservation. The Contractor shall manage water used for work activities in a way that will prevent erosion and the discharge of pollutants into storm drain systems and receiving waters. Obtain authorization before washing anything at the job site with water that could discharge into a storm drain system or receiving waters. Report discharges immediately.

The Contractor shall implement water conservation practices if water is used at the job site. Inspect irrigation areas. Adjust watering schedules to prevent erosion, excess watering, or runoff. Shut off the water source to broken lines, sprinklers, or valves and repair breaks within 24 hours. Reuse water from waterline flushing for landscape irrigation if practicable. Sweep and vacuum paved areas. Do not wash paved areas with water.

The Contractor shall direct runoff water, including water from water line repair, from the job site to areas where it can infiltrate into the ground. Do not allow runoff water to enter storm drain systems and receiving waters. Do not allow spilled water to escape filling areas for water trucks. Direct water from off-site sources around the job site if practicable. Minimize the contact of off-site water with job site water.

3-12.5.5.2 Illicit Connection and Illegal Discharge Detection and Reporting. Before starting work, the Contractor shall inspect the job site and the job site's perimeter for evidence of illicit connections, illegal discharges, and dumping. After starting work, inspect the job site and perimeter on a daily schedule for illicit connections and illegal dumping and discharges.

Whenever illegal connections, discharges, or dumping are discovered, The Contractor shall notify the Engineer immediately, should take no further action unless ordered and assume that unlabeled or unidentifiable material is hazardous.

The Contractor shall look for the following evidence of illicit connections, illegal discharges, and dumping:

- a) Debris or trash piles
- b) Staining or discoloration on pavement or soils
- c) Pungent odors coming from drainage systems
- d) Discoloration or oily sheen on water
- e) Stains and residue in ditches, channels, or drain boxes
- f) Abnormal water flow during dry weather
- g) Excessive sediment deposits
- h) Nonstandard drainage junction structures
- i) Broken concrete or other disturbances at or near junction structures

3-12.5.5.3 Vehicle and Equipment Cleaning. The Contractor shall limit vehicle and equipment cleaning or washing at the job site except for what is necessary to control vehicle tracking or hazardous waste. The Contractor shall notify the Engineer before cleaning vehicles and equipment at the job site with soap, solvents, or steam, and contain and recycle or dispose of resulting waste under 5-7.4. The Contractor shall not use diesel to clean vehicles or equipment and minimize the use of solvents.

The Contractor shall clean or wash vehicles and equipment in a structure equipped with disposal facilities. The Contractor may wash vehicles in an outside area if the area is:

- a) Paved with asphalt concrete, HMA, or PCC
- b) Surrounded by a containment berm
- c) Equipped with a sump to collect and dispose of wash water

The Contractor shall use as little water as practicable whenever washing vehicles and equipment with water and hoses used must be equipped with a positive shutoff valve.

The Contractor shall discharge liquid from wash racks to a recycling system or to another authorized system. Remove liquids and sediment as necessary.

3-12.5.5.4 Vehicle and Equipment Fueling and Maintenance. If practicable, the Contractor shall perform maintenance on vehicles and equipment off-site.

If fueling or maintenance must be done at the job site, the Contractor shall assign a site or sites, and obtain authorization before using them. The Contractor shall minimize mobile fueling and maintenance activities. The Contractor's fueling and maintenance activities must be performed on level ground in areas protected from stormwater run-on and runoff.

The Contractor shall use containment berms or dikes around fueling and maintenance areas. Keep adequate quantities of absorbent spill-cleanup material and spill kits in the fueling or maintenance area and on fueling trucks. The Contractor shall dispose of spill-

cleanup material and kits immediately after use and use drip pans or absorbent pads during fueling or maintenance.

The Contractor shall not leave fueling or maintenance areas unattended during fueling and maintenance activities. The Contractor's fueling nozzles must be equipped with an automatic shutoff control. The Contractor shall use equipment with vapor-recovery fueling nozzles where required by the Air Quality Management District, secure nozzles in an upright position when not in use and shall not top off fuel tanks.

The Contractor shall recycle or properly dispose of used batteries and tires.

If leaks cannot be repaired immediately, the Contractor shall remove the vehicle or equipment from the job site.

3-12.5.5.5 Material and Equipment Used Over Water. The Contractor shall place drip pans and absorbent pads under vehicles and equipment used over water, keep an adequate supply of spill-cleanup material with vehicles and equipment, place drip pans or plastic sheeting under vehicles and equipment on docks, barges, or other surfaces over water whenever vehicles or equipment will be idle for more than one (1) hour.

The Contractor shall furnish watertight curbs or toe boards on barges, platforms, docks, or other surfaces over water to contain material, debris, and tools and shall secure material to prevent spills or discharge into the water due to wind.

The Contractor shall report discharges to receiving waters immediately upon discovery and shall submit a discharge notification.

3-12.5.5.6 Structure Removal Over or Adjacent to Water. The Contractor shall not allow demolished material to enter storm drain systems and receiving waters, use authorized covers and platforms to collect debris, use attachments on equipment to catch debris during small demolition activities and empty debris-catching devices daily and dispose of debris in accordance with 3-12 of the Standard Specifications and these Special Provisions.

3-12.5.5.7 Paving, Sealing, Saw Cutting, Grooving, and Grinding Activities. The Contractor shall prevent material from entering storm drain systems and receiving waters including:

- a) Cementitious material
- b) Asphaltic material
- c) Aggregate or screenings
- d) Saw cutting, grooving, and grinding residue
- e) Pavement chunks
- f) Shoulder backing

g) Methacrylate

h) Sandblasting residue

The Contractor shall cover drainage inlets and use linear sediment barriers to protect downhill receiving waters until paving, sealing, saw cutting, grooving, and grinding activities are completed and excess material has been removed and cover drainage inlets and manholes during the application of seal coat, tack coat, slurry seal, or fog seal.

Whenever precipitation is forecasted, the Contractor shall limit paving, saw cutting, and grinding to places where runoff can be captured.

The Contractor shall not start seal coat, tack coat, slurry seal, or fog seal activities whenever precipitation is forecasted during the application and curing period and shall not excavate material from existing roadways during precipitation.

The Contractor shall use a vacuum to remove slurry immediately after slurry is produced and shall not allow the slurry to run onto lanes open to traffic or off the pavement.

The Contractor shall collect the residue from PCC grooving and grinding activities with a vacuum attachment on the grinding machine. The Contractor shall not leave the residue on the pavement or allow the residue to flow across pavement.

The Contractor shall not coat asphalt trucks and equipment with substances that contain soap, foaming agents, or toxic chemicals.

The Contractor shall park paving equipment over drip pans or plastic sheeting with absorbent material to catch drips if the paving equipment is not in use.

3-12.5.5.8 Thermoplastic Striping and Pavement Markers. The Contractor shall not preheat, transfer, or load thermoplastic within 50 feet of drainage inlets and receiving waters.

The Contractor shall not unload, transfer, or load bituminous material for pavement markers within 50 feet of drainage inlets and receiving waters.

The Contractor shall collect and dispose of bituminous material from the roadway after removing markers.

3-12.5.5.9 Pile Driving. The Contractor shall keep spill kits and cleanup materials at pile driving locations; park pile driving equipment over drip pans, absorbent pads, or plastic sheeting with absorbent material; protect pile driving equipment by parking on plywood and covering with plastic whenever precipitation is forecasted.

The Contractor shall store pile driving equipment on level ground and protect it from stormwater run-on when not in use. Use vegetable oil instead of hydraulic fluid if practicable.

3-12.5.5.10 Concrete Curing. The Contractor shall not overspray chemical curing compounds and shall not allow runoff of curing compounds.

The Contractor shall minimize the drift by spraying as close to the concrete as practicable, cover drainage inlets before applying the curing compound, and minimize the use and discharge of water by using wet blankets or similar methods to maintain moisture when concrete is curing.

3-12.5.5.11 Concrete Finishing. The Contractor shall collect and dispose of water and solid waste from high-pressure water blasting, collect and dispose of sand and solid waste from sandblasting. Before sandblasting, the Contractor shall cover drainage inlets within 50 feet of sandblasting, and shall minimize the drift of dust and blast material by keeping the nozzle close to the surface of the concrete. If the character of the blast residue is unknown, the Contractor shall test it for hazardous materials and dispose of it properly.

The Contractor shall inspect containment structures for concrete finishing for damage before each day of use and before forecasted precipitation and remove liquid and solid waste from containment structures after each work shift.

3-12.5.5.12 Sweeping. The Contractor shall sweep by hand or mechanical methods, such as vacuuming, and shall not use methods that use only mechanical kick brooms.

The Contractor shall sweep paved roads at construction entrance and exit locations and paved areas within the job site:

- a) During clearing and grubbing activities
- b) During earthwork activities
- c) During trenching activities
- d) During pavement structure activities
- e) When vehicles are entering and leaving the job site
- f) After soil-disturbing activities
- g) After observing off-site tracking of material
- h) As deemed necessary by the Engineer

The Contractor shall monitor paved areas and roadways within the project and sweep within:

- a) 1 hour whenever sediment or debris is observed during activities that require sweeping.
- b) 24 hours whenever sediment or debris is observed during activities that do not require sweeping.

The Contractor shall remove collected material, including sediment, from paved shoulders, drain inlets, curbs and dikes, and other drainage areas, may stockpile collected material at the job site, and shall dispose of collected material at least once per week if stockpiled.

The Contractor shall keep dust to a minimum during street sweeping activities and use water or a vacuum whenever dust generation is excessive or sediment pickup is ineffective.

The Contractor shall remove and dispose of trash collected during sweeping.

3-12.5.5.13 Dewatering. Dewatering consists of discharging accumulated stormwater, groundwater, or surface water from excavations or temporary containment facilities.

The Contractor shall perform dewatering work as specified for the work items involved, such as temporary active treatment system or dewatering and discharge.

If dewatering and discharging activities are not specified under a work item and the Contractor performs dewatering activities, he shall:

- a) Conduct dewatering activities under the Caltrans' *Field Guide for Construction Site Dewatering*.
- b) Ensure that any dewatering discharge does not cause erosion, scour, or sedimentary deposits that could impact natural bedding materials.
- c) Discharge the water within the project limits if approved by the Engineer. Dispose of the water if it cannot be discharged within project limits due to site constraints or contamination.
- d) Not discharge stormwater or nonstormwater that has an odor, discoloration other than sediment, an oily sheen, or foam on the surface.
- e) Notify the Engineer immediately upon discovering any such condition.

3-12.6 Water Pollution Control.

3-12.6.1 General. *ADD the following after the last paragraph:*

This project is anticipated to be Risk Level 2.

ADD:

3-12.6.1.1 Definitions and Abbreviations.

Active and inactive areas: (1) Active areas have soil disturbing work activities occurring at least once within 15 days, and (2) Inactive areas are areas that have not been disturbed for at least 15 days.

BMPs: Best Management Practices are water pollution control practices.

Construction phase: Construction phases are (1) Highway Construction including work activities for building roads and structures, (2) Plant Establishment including maintenance on vegetation installed for final stabilization, and (3) Suspension where work activities are suspended and areas are inactive.

NAL: Numeric Action Level.

NEL: Numeric Effluent Limit.

Normal working hours: The hours the Contractor normally works on this project.

Preparation Manual: The Caltrans' "Storm Water Pollution Prevention Plan and Water Pollution Control Program Preparation Manual."

QSD: Qualified SWPPP Developer.

QSP: Qualified SWPPP Practitioner.

Qualified rain event: A qualified rain event is a storm that produces at least 0.5 inch of precipitation with a 48 hour or greater period between storms.

REAP: Rain Event Action Plan.

SAP: Sampling and Analysis Plan.

SSC: Suspended Sediment Concentration.

SWRCB: State Water Resources Control Board.

WPC: Water Pollution Control.

WPC Manager: The Contractor's Water Pollution Control Manager. The WPC Manager implements water pollution control work described in the SWPPP and oversees revisions and amendments to the SWPPP.

ADD:

3-12.6.1.2 Summary. Section 3-12.6 includes general specifications for preventing, controlling, and abating water pollution in streams, waterways, and other bodies of water.

Information on forms, reports, and other documents can be found in the following Caltrans manuals:

- a) Field Guide for Construction Site Dewatering
- b) Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual
- c) Construction Site Best Management Practices (BMP) Manual

d) Construction Site Monitoring Program (CSMP) Guidance Manual

For the above-referenced manuals, go to the Caltrans' website for the Division of Construction, Storm Water and Water Pollution Control at (<https://dot.ca.gov/programs/construction/storm-water-and-water-pollution-control/manuals-and-handbooks>) or the Caltrans' publication distribution unit.

The Contractor shall not start job site activities until:

- a) The WPCP or SWPPP, in accordance with 3-12.6.3 of the Special Provisions, is authorized.
- b) The waste discharge identification number is issued if the project requires a SWPPP.
- c) WPCP or SWPPP review requirements have been fulfilled. If the RWQCB requires time for review, allow 30 days for the review.

If the Contractor operates a Contractor-support facility, the Contractor shall protect stormwater systems or receiving waters from the discharge of potential pollutants by using water pollution control practices.

Contractor-support facilities include:

- a) Staging areas
- b) Storage yards for equipment and materials
- c) Mobile operations
- d) Batch plants for PCC and HMA
- e) Crushing plants for rock and aggregate
- f) Other facilities installed by the Contractor for his, such as haul roads

Discharges from manufacturing facilities, such as batch plants and crushing plants, must comply with the general waste discharge requirements for *Order No. 97-03-DWQ, NPDES General Permit No. CAS000001*, issued by the State Water Resources Control Board for "*Discharge of Storm Water Associated with Industrial Activities Excluding Construction Activities*" and referred to herein as "General Industrial Permit." For the General Industrial Permit, go to the website for the State Water Resources Control Board.

If the Contractor operates a batch plant to manufacture PCC, HMA, or other material or a crushing plant to produce rock or aggregate, the Contractor shall obtain coverage under the General Industrial Permit. The Contractor must be covered under the General Industrial Permit for batch plants and crushing plants located:

- a) Outside of the job site
- b) Within the job site that serve 1 or more contracts

If the Contractor obtains or disposes of material at a noncommercially operated borrow or disposal site, the Contractor shall prevent water pollution due to erosion at the site during and after completion of his activities. Upon completion of his work, the Contractor shall leave the site in a condition such that water will not collect or stand therein.

The Agency does not pay for water pollution control practices at Contractor-support facilities and noncommercially operated borrow or disposal sites.

3-12.6.1.3 Submittals. Within 48 hours after the conclusion of a storm event resulting in a discharge, after a nonstormwater discharge, or after receiving a written notice or an order from the RWQCB or another regulatory agency, the Contractor's WPC manager must submit the following information:

- a) Date, time, location and nature of the activity and the cause of the notice or order
- b) Type and quantity of discharge
- c) Water pollution control practices in use before the discharge or before receiving the notice or order
- d) Description of water pollution control practices and corrective actions taken to manage the discharge or cause of the notice

The Contractor shall submit water pollution control training records for all employees and subcontractors who will be working at the job site as an informational submittal that includes the training subjects, training dates, ongoing training, and tailgate meetings with the submittal. The Contractor shall submit records for:

- a) Existing employees within 5 business days of obtaining SWPPP or WPCP authorization
- b) New employees within 5 business days of receiving the training
- c) Subcontractor's employees at least 5 business days before a subcontractor starts work

At least Five (5) business days before operating any Contractor-support facility, the Contractor shall submit:

- a) A plan showing the location and quantity of water pollution control practices associated with the Contractor-support facility
- b) A copy of the notice of intent approved by the RWQCB and the WPCP or SWPPP approved by the RWQCB if the Contractor will be operating a batch plant or a crushing plant under the General Industrial Permit

3-12.6.1.4 Quality Control and Assurance.

Training

The Contractor's employees must receive water pollution control training before starting work at the job site.

For the Contractor's project managers, supervisory personnel, subcontractors, and employees involved in water pollution control work:

a) The Contractor shall provide stormwater training in the following subjects:

- 1) Water pollution control rules and regulations
- 2) Implementation and maintenance for:
 - i. Temporary soil stabilization
 - ii. Temporary sediment control
 - iii. Tracking control
 - iv. Wind erosion control
 - v. Material pollution prevention and control
 - vi. Waste management
 - vii. Nonstormwater management

b) The Contractor shall conduct weekly training meetings covering:

- 1) Deficiencies and corrective actions for water pollution control practices
- 2) Water pollution control practices required for work activities during the week
- 3) Spill prevention and control
- 4) Material delivery, storage, usage, and disposal
- 5) Waste management
- 6) Nonstormwater management procedures

Training for personnel who collect water quality samples must include:

- a) CSMP review
- b) Health and safety review
- c) Sampling simulations

3-12.6.1.5 Water Pollution Control Manager.

General

The Contractor's WPC manager must be a QSP if the project requires a WPCP. The Contractor's WPC manager must be a QSD if the project requires a SWPPP.

The Contractor shall assign one (1) WPC manager to implement the WPCP or SWPPP, whichever is applicable for the project.

Qualifications

The Contractor's QSD must:

- a) Have completed the stormwater management training described in the Caltrans' website for the Division of Construction, Storm Water and Water Pollution Control Information
- b) Be registered or certified for at least one of the following:
 - 1) California registered civil engineer
 - 2) California registered professional geologist or engineering geologist
 - 3) California licensed landscape architect
 - 4) Professional hydrologist registered through the American Institute of Hydrology
 - 5) Certified Professional in Erosion and Sediment Control (CPESC)[™] registered through Enviro Cert International, Inc.
 - 6) Certified Professional in Storm Water Quality (CPSWQ)[™] registered through Enviro Cert International, Inc.
 - 7) Professional in erosion and sediment control registered through the National Institute for Certification in Engineering Technologies (NICET)

The Contractor's QSP must comply with the qualifications for a QSD or must:

- a) Have completed the storm water management training described in the Caltrans' website for the Division of Construction, Storm Water and Water Pollution Control Information
- b) Be certified for at least one of the following:
 - 1) Certified Erosion, Sediment and Storm Water Inspector (CESSWI)[™] registered through Enviro Cert International, Inc.
 - 2) Certified Inspector of Sediment and Erosion Control (CISEC) registered through CISEC, Inc.

Responsibilities

The Contractor's WPC manager must:

- a) Be responsible for water pollution control work
- b) Be the primary contact for water pollution control work

c) Oversee:

- 1) Maintenance of water pollution control practices
 - 2) Inspections of water pollution control practices identified in the SWPPP or WPCP
 - 3) Inspections and reports for visual monitoring
 - 4) Preparation and implementation of REAPs
 - 5) Sampling and analysis
 - 6) Preparation and submittal of:
 - i. NAL exceedance reports
 - ii. NEL violation reports
 - iii. SWPPP annual certification
 - iv. Annual reports
 - v. BMP status reports
- d) Oversee and enforce hazardous waste management practices, including spill prevention and control measures
- e) Have authority to mobilize crews to make immediate repairs to water pollution control practices
- f) Ensure that all employees have current water pollution control training
- g) Implement the authorized SWPPP or WPCP
- h) Amend the SWPPP or WPCP if required
- i) Be at the job site within 2 hours of being contacted
- j) Have the authority to stop construction activities damaging water pollution control practices or causing water pollution

3-12.6.1.6 Construction.

General

The Contractor shall install facilities and devices used for water pollution control practices before performing work activities. The Contractor shall install soil stabilization materials for water pollution control practices in all work areas that are inactive and before storm events.

The Contractor shall repair or replace water pollution control practices within 24 hours of discovering any damage, unless a longer period is authorized.

The Agency will not pay for the cleanup, repair, removal, disposal, or replacement of water pollution control practices due to improper installation or the Contractor's negligence.

The Contractor shall retain a printed copy of the authorized WPCP or SWPPP at the job site at all times.

Monitoring

The Contractor shall monitor the National Weather Service's forecast on a daily basis. For the National Weather Service's forecast, go to the website for the National Weather Service.

Inspections

The Contractor shall use the *Stormwater Site Inspection Report* form for documenting site inspections.

The Contractor's WPC manager must oversee:

- a) Inspections of water pollution control practices identified in SWPPP or WPCP:
 - 1) Before a forecasted storm event
 - 2) After a qualifying rain event that produces site runoff
 - 3) At 24-hour intervals during extended storm events
 - 4) On a predetermined schedule of at least once a week
- b) Daily inspections of:
 - 1) Storage areas for hazardous materials and waste
 - 2) Hazardous waste disposal and transporting activities
 - 3) Hazardous material delivery and storage activities
- c) Inspections of:
 - 1) Vehicle and equipment cleaning facilities:
 - i. Daily if vehicle and equipment cleaning occurs daily
 - ii. Weekly if vehicle and equipment cleaning does not occur daily
 - 2) Vehicle and equipment maintenance and fueling areas:
 - i. Daily if vehicle and equipment maintenance and fueling occurs daily
 - ii. Weekly if vehicle and equipment maintenance and fueling does not occur daily

- 3) Vehicles and equipment at the job site for leaks and spills on a daily schedule. Verify that operators are inspecting vehicles and equipment each day of use.
- 4) Demolition sites within 50 feet of storm drain systems and receiving waters daily.
- 5) Pile driving areas for leaks and spills:
 - i. Daily if pile driving occurs daily
 - ii. Weekly if pile driving does not occur daily
- 6) Temporary concrete washouts:
 - i. Daily if concrete work occurs daily
 - ii. Weekly if concrete work does not occur daily
- 7) Paved roads at job site access points for street sweeping:
 - i. Daily if earthwork and other sediment or debris-generating activities occur daily
 - ii. Weekly if earthwork and other sediment or debris-generating activities do not occur daily
 - iii. Within 24 hours of precipitation forecasted by the National Weather Service
- 8) Dewatering work:
 - i. Daily if dewatering work occurs daily
 - ii. Weekly if dewatering work does not occur daily
- 9) Temporary active treatment system:
 - i. Daily if temporary active treatment system activities occur daily
 - ii. Weekly if temporary active treatment system activities do not occur daily
- 10) Work over water:
 - i. Daily if work over water occurs daily
 - ii. Weekly if work over water does not occur daily

Deficiencies

Whenever the Contractor or the Engineer identify a deficiency in the implementation of the authorized WPCP or SWPPP, The Contractor shall correct the deficiency:

- a) Immediately, unless a later date is authorized
- b) Before precipitation occurs

The Agency may correct the deficiency and deduct the cost of correcting the deficiency from payment if the Contractor fails to correct the deficiency by the agreed date or before the onset of precipitation.

3-12.6.2 Best Management Practices (BMPs). *MODIFY to ADD the following:* BMPs shall be maintained and/or added based on any exceedances of Numeric Action Levels (NALs) and Numeric Effluent Limitations (NELs). The Contractor shall make any necessary changes to the SWPPP and implement additional BMPs that will result in effluent levels below that of NALs.

3-12.6.3 Storm Water Pollution Prevention Plan (SWPPP). *DELETE in its entirety and SUBSTITUTE with the following:*

3-12.6.3 Storm Water Pollution Prevention Plan (SWPPP)

3-12.6.3.1 General.

Summary

The Contractor shall prepare a storm water pollution prevention plan that includes developing and implementing the SWPPP, providing a WPC manager, conducting water pollution control training, and monitoring, inspecting, and correcting water pollution control practices.

The Contractor shall provide all documents to the SMARTS System for Agency review and acceptance.

The Contractor may assign a QSD other than the WPC manager to develop the SWPPP.

Construction activities will be conducted in a manner to protect channels, storm drains, and bodies of water from pollution. Water pollution control work shall consist of activities necessary to meet the requirements of the Orange County MS4 permit, Order No. R8-2009-0030, NPDES Permit No. CAS618030 a copy of which can be found at https://www.waterboards.ca.gov/rwqcb8/board_decisions/adopted_orders/orders/2009/09_030_oc_ms4_as_amended_by_10_062.pdf; the County's Drainage Area Management Plan (DAMP) at <https://ocerws.ocpublicworks.com/service-areas/oc-environmental-resources/oc-watersheds/documents/drainage-area-management-plan-7>; The State's General Construction Activities Permit (Order No. 2022-0057-DWQ, NPDES No CAS000002, at https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2022/wqo_2022-0057-dwq.pdf; and as required by the Engineer. The Contractor shall coordinate water pollution control work with all other work done on the Contract.

The Contractor shall comply with all requirements of the above-mentioned permits, including visual monitoring, sample collection and analysis, training qualifications and certification requirements, risk determination, preparation and implementation of a Storm

Water Pollution Prevention Plan (SWPPP), including updates and Changes of Information (COI).

The Contractor shall make the accepted SWPPP available at the construction site during working hours while construction is occurring and shall be made available upon request by a State or Agency Representative. When the original SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site, current copies of the BMPs and map/drawing will be left with the field crew and the original SWPPP shall be made available via a request by radio/telephone.

Implementation of the SWPPP shall not reduce effectiveness of existing storm drain system or interfere with traffic on public streets. The Contractor shall implement the SWPPP, make changes both to the SWPPP, and in the field as conditions warrant it. The Contractor shall be solely responsible for preventing any pollutants from leaving the project site.

In lieu of the Notice of Intent, the Contractor is required to notify the Engineer prior to the beginning of construction and upon project completion.

The Contractor shall notify the Agency Representative immediately upon request from any regulatory agency to enter, inspect, sample, monitor, or otherwise access the project site or the Contractor's records pertaining to storm water pollution control work. The Contractor shall provide copies of correspondence, notices of violation, enforcement actions, or fines proposed by regulatory agencies to the Engineer.

During each estimate period the Contractor fails to conform to the provisions in this section, "Water Pollution Control," or fails to implement the water pollution control practices shown on the accepted SWPPP and specified elsewhere in these special provisions, the City will withhold 25 percent of the progress payment.

Withholds for failure to perform water pollution control work will be in addition to all other withholds provided for in the contract. The City will return performance-failure withholds in the progress payment following the correction for noncompliance.

Contractor will also be responsible for any enforcement actions and penalties enacted on the Agency by the State Water Resources Control Board, Regional Water Quality Control Board, and/or any other agency due to Contractor's non-compliance with applicable water pollution regulations. Progress payments and/or final payments may be withheld to cover enforcement liabilities that include, but are not limited to, maximum financial penalties, legal costs, staff costs, and economic savings from violations and/or costs associated with corrective actions as required by enforcing agency.

Whenever a qualifying rain event produces runoff for a risk level 2 or risk level 3 project, sampling and analysis work must comply with the project's CSMP.

A storm water annual report must cover the preceding period from July 1st to June 30th.

Submittals

Submittals shall conform to 3-8 of the Standard Specifications and the Special Provisions.

Within 20 days of Contract approval:

- a) The Contractor shall submit 3 printed copies of his SWPPP for review. Allow 20 days for the Agency's review. The Engineer provides comments and specifies the date when the review stopped if revisions are required.
- b) The Contractor shall change and resubmit a revised SWPPP within 15 days of receiving the Engineer's comments. The Agency's review resumes when a complete SWPPP has been resubmitted.
- c) When the Engineer authorizes the SWPPP, submit an electronic copy in Portable Document Format (PDF) or Microsoft Word (DOC) format and 4 printed copies of the authorized SWPPP.
- d) If the RWQCB requires review of the authorized SWPPP, the Engineer submits the authorized SWPPP to the RWQCB for its review and comment.
- e) If the Engineer requests changes to the SWPPP based on the RWQCB's comments, the Contractor shall amend the SWPPP within 10 days.

The SWPPP must comply with the Caltrans' *Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Plan (WPCP) Preparation Manual* and shall include the following:

- a) Description of the work involved in the installation, maintenance, repair, and removal of temporary and permanent water pollution control practices.
- b) Maps showing:
 - 1) Locations of disturbed soil areas
 - 2) Water bodies and conveyances
 - 3) Locations and types of water pollution control practices that will be used for each Contractor-support facility:
 - 4) Locations and types of temporary water pollution control practices that will be used in the work for each construction phase
 - 5) Locations and types of water pollution control practices that will be installed permanently under the Contract
 - 6) Pollutant sampling locations
 - 7) Locations planned for storage and use of potential nonvisible pollutants
 - 8) Receiving water sampling locations
- c) CSMP

- d) Copy of permits obtained by the Agency, including Fish & Game permits, US Army Corps of Engineers permits, RWQCB 401 certifications, aerially deposited lead variance from the Department of Toxic Substance Control, aerially deposited lead variance notification, and RWQCB waste discharge requirements for aerially deposited lead reuse.

The Contractor shall include the following items in the SWPPP:

- a) For all projects:
 - 1) Schedule
 - 2) CSMP
- b) For risk level 2 projects add:
 - 1) Adherence to effluent standards for NALs
- c) For risk level 3 projects add:
 - 1) Adherence to effluent standards for NALs and NELs

The SWPPP schedule must show when:

- a) Work activities will be performed that could cause the discharge of pollutants into stormwater
- b) Water pollution control practices associated with each construction phase will be implemented
- c) Soil stabilization and sediment control practices for disturbed soil areas will be implemented

The Contractor shall amend and resubmit the SWPPP:

- a) Annually before July 15th
- b) Whenever:
 - 1) Changes in work activities could affect the discharge of pollutants
 - 2) Water pollution control practices are added by Change Order work
 - 3) Water pollution control practices are added at the Contractor's discretion
 - 4) Changes in the quantity of disturbed soil are substantial
 - 5) Objectives for reducing or eliminating pollutants in stormwater discharges have not been achieved
 - 6) The Contractor receive a written notice of a permit violation for the project from the RWQCB or any other regulatory agency

The Contractor shall allow the same review time for amendments to the SWPPP as for the original SWPPP.

Construction Site Monitoring Program

A QSD must prepare the CSMP. The Contractor shall change the program to reflect current job site activities as needed. The CSMP must include the following:

- a) For all projects:
 - 1) Visual monitoring procedures
 - 2) SAP for nonvisible pollutants
 - 3) SAP for nonstormwater discharges
 - 4) SAP for monitoring required by RWQCB
- b) For risk level 2 projects add:
 - 1) SAP for pH and turbidity
- c) For risk level 3 projects add:
 - 1) SAP for pH and turbidity
 - 2) SAP for temporary active treatment systems

Sampling and Analysis Plan

The SAP must comply with the Caltrans' *Construction Site Monitoring Program (CSMP) Guidance Manual*.

The Contractor shall describe the following water quality sampling procedures in the SAP:

- a) Sampling equipment
- b) Sample preparation
- c) Collection
- d) Field measurement methods
- e) Analytical methods
- f) Quality assurance and quality control
- g) Sample preservation and labeling
- h) Collection documentation
- i) Sample shipping
- j) Chain of custody

- k) Data management and reporting
- l) Precautions from the construction site health and safety plan
- m) Laboratory selection and certifications

The SAP must identify the State-certified laboratory, sample containers, preservation requirements, holding times, and analytical method. For a list of State-certified laboratories go to the California Department of Public Health website.

The Contractor shall include procedures for sample collection during precipitation.

The Contractor shall list conditions when the Contractor's personnel will not be required to physically collect samples such as:

- a) Dangerous weather
- b) Flooding or electrical storms
- c) Times outside of normal working hours

The Contractor shall amend the SAP whenever discharges or sampling locations change because of changed work activities or knowledge of site conditions.

The Contractor shall include procedures for collecting and analyzing at least 3 samples for each day of each qualifying rain event for a risk level 2 or risk level 3 project and shall describe the collection of effluent samples at all locations where the stormwater is discharged off-site.

Sampling and Analysis Plan for Nonvisible Pollutants

The SAP for nonvisible pollutants must describe the sampling and analysis strategy for monitoring nonvisible pollutants.

The SAP for nonvisible pollutants must identify potential nonvisible pollutants present at the job site associated with any of the following:

- a) Construction materials and wastes
- b) Existing contamination due to historical site usage
- c) Application of soil amendments, including soil stabilization materials, with the potential to change pH or contribute toxic pollutants to stormwater

The SAP for nonvisible pollutants must include sampling procedures for the following conditions when observed during a stormwater visual inspection. The Contractor shall include a procedure for collecting at least 1 sample for each storm event for:

- a) Materials or wastes containing potential nonvisible pollutants not stored under watertight conditions

- b) Materials or wastes containing potential nonvisible pollutants stored under watertight conditions at locations where a breach, leak, malfunction, or spill occurred and was not cleaned up before the precipitation
- c) Chemical applications occurring within 24 hours before precipitation or during precipitation that could discharge pollutants to surface waters or drainage systems, including fertilizer, pesticide, herbicide, methyl methacrylate concrete sealant, or nonpigmented curing compound
- d) Applied soil amendments, including soil stabilization materials that could change pH levels or contribute toxic pollutants to stormwater runoff and discharge pollutants to surface waters or drainage systems, unless independent test data is available to indicate acceptable concentrations of nonvisible pollutants in the material
- e) Stormwater runoff from an area contaminated by historical usage of the site that could discharge pollutants to surface waters or drainage systems

The SAP for nonvisible pollutants must provide sampling procedures and a schedule for:

- a) Sample collection during the first 2 hours of rain events that generate runoff
- b) Sample collection during normal working hours
- c) Each nonvisible pollutant source
- d) Uncontaminated control sample

The SAP for nonvisible pollutants must identify locations for sampling downstream and control samples and the reasons for selecting those locations. The Contractor shall select locations for control samples where the sample does not come in contact with materials, wastes, or areas associated with potential nonvisible pollutants or disturbed soil areas.

Annual Certification

The Contractor shall submit an annual certification of compliance as described in the Caltrans' *Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Plan (WPCP) Preparation Manual* before July 15th of each year.

Site Inspection Reports

The WPC manager must submit the following informational submittals within 24 hours of completing a weekly inspection:

- a) Completed Stormwater Site Inspection Report form.
- b) BMP status report. The WPC manager must oversee the preparation of the report. The report must include:
 - 1) Location and quantity of installed water pollution control practices
 - 2) Location and quantity of disturbed soil for active and inactive areas

Visual Monitoring Reports

The Contractor shall submit visual monitoring reports for:

- a) Each storm event, include:
 - 1) Date, time, and rain gauge reading
 - 2) Visual observations:
 - i. Within 2 business days before the storm for:
 - (a) Spills, leaks, or uncontrolled pollutants in drainage areas
 - (b) Proper implementation of water pollution control practices
 - (c) Leaks and adequate freeboard in storage areas
 - ii. Every 24 hours during the storm event for:
 - (a) Effective operation of water pollution control practices
 - (b) Water pollution control practices needing maintenance and repair
 - iii. Within 2 business days after the qualifying rain event for:
 - (a) Stormwater discharge locations
 - (b) Evaluation of design, implementation, effectiveness, and locations of water pollution control practices including locations where additional water pollution control practices may be needed
- b) Nonstormwater discharges during each of the following periods:
 - 1) January through March
 - 2) April through June
 - 3) July through September
 - 4) October through December

Use the *Stormwater Site Inspection Report* form to document visual monitoring. A visual monitoring report must include:

- 1) Name of personnel performing the inspection, inspection date, and date the inspection report is completed
 - 2) Storm and weather conditions
- c) Location of any:

- 1) Floating and suspended material, sheen on the surface, discoloration, turbidity, odor, and source of observed pollutants for flowing and contained stormwater systems
 - 2) Nonstormwater discharges and their sources
- d) Corrective action taken

The Contractor shall retain visual monitoring reports at the job site as part of the SWPPP.

Sampling and Analysis Day

General

The Contractor shall submit a printed copy and electronic copy of water quality analysis results, and quality assurance and quality control reports within 48 hours of field sampling, and within 30 days of laboratory analysis. Electronic copies must be in one of the following formats: (1) xls, (2) doc. The Contractor shall include an evaluation of whether the downstream samples show levels of the tested parameter that are higher than the control sample. The evaluation must include:

- a) Sample identification number
- b) Contract number
- c) Constituent
- d) Reported value
- e) Analytical method
- f) Method detection limit
- g) Reported limit

Numeric Action Level Exceedance Reports

Whenever a NAL is exceeded, the Contractor shall notify the Engineer and submit a NAL exceedance report within 48 hours after conclusion of a storm event. The report must include:

- a) Field sampling results and inspections, including:
 - 1) Analytical methods, reporting units, and detection limits
 - 2) Date, location, time of sampling, visual observations, and measurements
 - 3) Quantity of precipitation from the storm event
- b) Description of BMPs and corrective actions taken to manage NAL exceedance

Numeric Effluent Limit Violation Reports

Whenever a NEL is exceeded, the Contractor shall notify the Engineer and submit a NEL violation report within 6 hours. The report must include:

- a) Field sampling results and inspections, including:
 - 1) Analytical methods, reporting units, and detection limits
 - 2) Date, location, time of sampling, visual observation, and measurements
 - 3) Quantity of precipitation from the storm event
- b) Description of BMPs and corrective actions taken to manage NEL exceedance

Rain Event Action Plan

More action-based requirements have been implemented by the General Permit in lieu of the reporting-based strategy embodied by the REAP. REAPS are no longer required and have been replaced with 1) QSD involvement over the life of the project, 2) additional inspections and visual observations, and 3) an increased requirement to document and implement these site corrective actions.

Storm Water Annual Report

The Contractor shall submit the storm water annual report

before July 15th if construction occurs from July 1st through June 30th or within 15 days after Contract acceptance if construction ends before June 30th. Submit two (2) copies of the report. Allow 10 days for the Engineer's review. The Engineer provides comments and specifies the date when the review stopped if revisions are required.

The Contractor shall obtain authorization for the format of the storm water annual report. The report must include:

- a) Project information such as description and work locations
- b) Stormwater monitoring information, including:
 - 1) Summary and evaluation of sampling and analysis results and laboratory reports
 - 2) Analytical methods, reporting units, and detections limits for analytical parameters
 - 3) Summary of corrective actions taken
 - 4) Identification of corrective actions taken and compliance activities not implemented
 - 5) Summary of violations
 - 6) Names of individuals performing stormwater inspections and sampling

- 7) Logistical information for inspections and sampling, including location, date, time, and precipitation
 - 8) Visual observations and sample collection records
- c) Documentation of training for individuals responsible for:
- 1) Permit compliance
 - 2) BMP installation, inspection, maintenance, and repair
 - 3) Preparing, revising, and amending the SWPPP

The Contractor shall submit a revised report within five (5) Working Days of receiving the Engineer's comments. The Engineer's review resumes when a complete report has been resubmitted.

When the storm water annual report is authorized, the Contractor shall submit one (1) electronic copy and two (2) printed copies of the report signed by the WPC manager.

Quality Control and Assurance

General

The Contractor shall assign trained personnel to collect water quality samples. Document the personnel and training in the SAP.

Samples taken by assigned field personnel must comply with the equipment manufacturer's instructions for collection, analytical methods, and equipment calibration.

Samples taken for laboratory analysis must comply with water quality sampling procedures and be analyzed by a State-certified laboratory under 40 CFR part 136, *Guidelines Establishing Test Procedures for the Analysis of Pollutants*.

Whenever downstream samples show increased levels of pollutants, the Contractor shall assess water pollution control practices, site conditions, and surrounding influences to determine the probable cause for the increase.

For a risk level 2 or risk level 3 project, the Contractor shall obtain samples of pH and turbidity as shown in the following table:

Parameter	Test method	Detection limit (min)	Unit
Turbidity	Field test with calibrated portable instrument	1	NTU
pH	Field test with calibrated portable instrument	0.2	pH units

For a risk level 3 project, the Contractor shall obtain samples and analyze the suspended sediment concentration whenever the turbidity NEL is exceeded as shown in the following table:

Parameter	Test method	Detection limit (min)	Unit
Suspended sediment concentration	ASTM D 3977	5	Mg/L

For a risk level 3 project, the Contractor shall obtain samples of pH and turbidity from representative and accessible locations upstream of the discharge point and downstream of the discharge point.

For multiple discharge points, the Contractor shall obtain samples from a single upstream and a single downstream location.

Numeric Action Levels

For a risk level 2 or risk level 3 project, NALs must comply with the values shown in the following table:

Numeric Action Levels

Parameter	Test method	Detection limit (min)	Unit	Value
pH	Field test with calibrated portable instrument	0.2	pH	Lower NAL = 6.5 Upper NAL = 8.5
Turbidity	Field test with calibrated portable instrument	1	NTU	250 NTU max

Numeric Effluent Limits

For a risk level 3 project, NELs must comply with the values shown in the following table:

Numeric Effluent Limits

Parameter	Test method	Detection limit (min)	Unit	Value
pH	Field test with calibrated portable instrument	0.2	pH	Lower NEL = 6.0 Upper NEL = 9.0
Turbidity	Field test with calibrated portable instrument	1	NTU	500 NTU max

The storm event daily average for storms up to the 5-year, 24-hour storm must not exceed the NEL for turbidity.

The daily average sampling results must not exceed the NEL for pH.

3-12.6.3.2 Construction.

General

The Contractor shall:

- a) Obtain, install, and maintain a rain gauge at the job site. Observe and record daily precipitation.
- b) Continue SWPPP implementation during any suspension of work activities.

Sampling and Analysis Day

For a risk level 2 or risk level 3 project, the Contractor shall collect samples:

- a) During a storm event for:
 - 1) Each nonvisible pollutant source and a corresponding uncontaminated control sample
 - 2) All locations identified on the *Storm Event Sampling and Analyses Plan* form
- b) During a qualifying rain event for:
 - 1) Each nonvisible pollutant source and a corresponding uncontaminated control sample
 - 2) Turbidity, pH, and other constituents as required
 - 3) At least 3 samples for each day of a qualifying rain event
 - 4) All locations identified on the *Qualifying Rain Event Sampling and Analyses Plan* form

The Contractor shall perform sample collection during:

- a) Normal working hours
- b) Each qualifying rain event
- c) First 2 hours of each storm event

The Contractor shall collect receiving-water samples for a risk level 3 project and whenever a direct discharge to receiving waters occurs and NELs are violated.

The Contractor shall not physically collect samples during dangerous weather conditions, such as flooding or electrical storms.

Whenever downstream samples show increased levels of turbidity, pH, and other constituents, the Contractor shall assess water pollution control practices, site conditions, and surrounding influences to determine the probable cause for the increase.

The Contractor shall document sample collection during precipitation.

The Contractor shall retain documentation of water quality sampling and analysis results with the SWPPP at the job site. The Contractor shall upload all required reports and documentation to the State Regional Water Quality Control Board SMARTS system for City review and certification.

Storm Water Annual Report

The Contractor shall document and summarize monitoring, sampling and analysis results, laboratory reports, and training.

3-12.6.3.3 Payment. Payment for **STORM WATER POLLUTION PREVENTION PLAN (SWPPP)** shall be made as part of the contract lump sum price for Bid Item No. 4 and shall include full compensation for furnishing all labor, materials, tools, equipment to perform all the work involved in 3-12, including preparing and modifying a SWPPP, permitting fees, Agency filing and processing, furnishing, installing, maintaining and removing BMPs, monitoring and reporting, uploading and filing required documentation to the State and all incidentals for doing all the work involved as described herein or as otherwise required by the permit process, and shall be included in the contract lump sum price in the bid. No additional compensation shall be allowed therefor.

Payment will be issued by the Agency as follows:

- a) 25% - upon SWPPP approval
- b) 25% - upon installation of project BMPs
- c) 50% - to be paid monthly as a percentage of the total working days expended for monitoring, maintenance, testing, reporting, and all other requirements as outlined in these Special Provisions

3-12.6.4 Dewatering. *MODIFY to ADD the following:*

Submittals

Before the Contractor starts dewatering, he shall submit a dewatering and discharge work plan. The dewatering and discharge work plan must include:

- a) Title sheet and table of contents
- b) Description of dewatering and discharge activities detailing locations, quantity of water, equipment, and discharge point
- c) Estimated schedule for dewatering and discharge start and end dates of intermittent and continuous activities
- d) Discharge alternatives, such as dust control or percolation
- e) Visual monitoring procedures with inspection log

- f) Copy of written approval to discharge into a sanitary sewer system at least 5 business days before starting discharge activities

The Contractor shall submit the following informational submittals:

- a) MSDS at least 5 business days before material is used or stored
- b) Monthly inventory records for material used or stored

The Contractor shall submit written approval from the local health agency, city, county, and sewer district before discharging from a sanitary or septic system directly into a sanitary sewer system.

3-12.6.5 Payment. *DELETE in its entirety and SUBSTITUTE with the following:*

Payment for implementation and maintenance of BMPs and dewatering shall be included in the Contract Unit Price paid for Bid Item No. 4 and no separate compensation shall be allowed therefor.

ADD:

3-12.7 Drainage Control. The Contractor shall maintain drainage within and through the work areas. Earth dams will not be permitted in paved areas. Temporary dams of sandbags, asphaltic concrete, or other acceptable material will be permitted when necessary. Such dams shall be removed from the site as soon as their use is no longer necessary.

The Contractor shall ensure that storm and drainage water does not pond due to the temporary blockage of existing drainage facilities. To this end, the Contractor shall provide temporary works that allow for the passage of storm and drainage water in a manner equivalent to the existing drainage system.

No separate payment will be made for any work performed or material used in drainage control. Full compensation for such controls shall be considered as included in the price paid for the various items of work involved and no additional compensation will be allowed therefor.

ADD:

3-12.8 Graffiti Control. Throughout all phases of Work, including suspension of Work, and until final acceptance, the Contractor shall keep Work, all equipment, field offices, storage facilities, fences, signs, and other facilities free of graffiti. Within twenty-four (24) hours after notification by the Agency Representative, graffiti shall be water blasted and cleaned to original surface or repainted if previously painted.

No separate payment will be made for any work performed or material used in graffiti control. Full compensation for such cleaning shall be considered as included in the price paid for the various items of work involved and no additional compensation will be allowed therefor.

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

When the Contractor considers the Work, or a designated portion of Work, if specified in the Contract Documents, is complete, the Contractor shall submit a written request to the Engineer for inspection. By submittal of such request, Contractor certifies that:

- a) Contract Documents have been reviewed by the Contractor.
- b) Work has been completed in accordance with Contract Documents and is ready for inspection.
- c) Equipment and systems have been tested, adjusted/balanced and are fully operational.

The Contractor shall submit the request a minimum of five (5) Working Days in advance of requested inspection date. Contractor shall be responsible for allowing sufficient time during the Contract period to complete inspections and make any corrections. Each day beyond the time prescribed to complete the Contract will be subject to assessment of liquidated damages in accordance with 6-9.

Should Agency Representative's inspection find Work incomplete, Agency Representative will notify the Contractor in writing, listing observed deficiencies. The Contractor shall remedy listed deficiencies immediately and send a request for final inspection. Failure of the Contractor to remedy deficiencies may, at the Agency's option, result in reinspection(s) of the work to identify additional deficiencies, if any. Agency's costs associated with reinspection(s) are subject to provisions of 3-13.4.

When the Agency confirms Work is complete and, closeout submittals, as referred to in 3-13.5 have been provided, Agency Representative will notify Contractor of date of completion on the Weekly Statement of Working Days.

ADD:

3-13.4 Reinspections. Should status of completion of Work require reinspection(s) by Agency due to failure of the Contractor to make corrections on initial inspection, Agency may deduct the amount of compensation for reinspection services from final payment to Contractor. Observed deficiencies in excess of ten (10) will be reason for reinspection.

Inspections initiated at the request of the Agency will not be subject to provisions of this Subsection.

ADD:

3-13.5 Closeout Submittals.

Contractor shall submit:

- a) Project Record Documents clearly marked with all changes to Plans within thirty (30) Calendar Days of Final Acceptance

- b) Operation and Maintenance Data
 - c) Warranties and Bonds
 - d) Spare Parts and Maintenance Materials, as specified
 - e) Evidence of Payment and Release of Stop Payment Notices
 - f) Other data and materials as may be required in the Contract Documents
- SECTION 4 – CONTROL OF MATERIALS

REVISE as follows:

4-1 GENERAL.

ADD the following before the 1st sentence in the 1st paragraph:

The Contractor shall furnish all materials required to complete the Work, except materials that are designated in the Special Provision to be furnished by the Agency.

ADD:

4-1.1 Contractor Equipment and Plants. Only equipment and plants suitable to produce the quality of work and materials required will be permitted to operate on the project. Such equipment and plants shall be maintained in a good state of repair during the process of the Work. No obsolete or badly worn equipment and plants shall be used. Manufacturer's ratings shall not be exceeded.

Plants shall be designed and constructed in accordance with general practice for such equipment and shall be of sufficient capacity to ensure a production rate of sufficient material to carry to completion within the time limit(s) specified in the Contract Documents, if any.

The Contractor, when ordered by the Engineer, shall remove unsuitable equipment from the work site and discontinue the operation of unsatisfactory plants and equipment.

ADD:

4-1.2 Adoption or Revision Date for Standards, Codes, and Tests. Whenever reference is made to a standard, code, specification, or test and the designation representing the date of adoption or latest revision thereof is omitted, it shall mean the latest revision of such standard, code; specification or test in effect on the day of the Notice Inviting Bids is dated.

In accordance with the Public Contract Code § 3400, the Contractor shall submit data substantiating requests for substitution of "equal" items within thirty-five (35) days of Contract award or before ten percent of the Contract Working Days have expired, whichever is less. This time is included in the number of Working Days allowed for the completion of the Work. The Engineer's decision regarding the acceptability of the substitution is final.

Materials, equipment, and supplies provided shall, without additional charge to Agency, fully conform with all applicable local, State and Federal safety laws, rules, and regulations, and orders, and it shall be the Contractor's responsibility to provide only such materials, equipment, and supplies notwithstanding any omission in the Contract Documents therefore on that particular material, equipment or supply as specified.

4-3 INSPECTION.

4-3.1 General. *ADD the following before the 1st paragraph:*

Materials to be used in the Work will be subject to inspection and tests by the Engineer. The Contractor shall furnish without charge such samples as may be required. The Contractor shall furnish the Engineer a list of his sources of materials and the locations at which such materials will be available for inspection a minimum of twenty (20) Calendar Days in advance of their intended use. The Engineer may inspect, sample or test materials at the source of supply or other locations, but such inspection, sampling or testing will not be undertaken until the Engineer is assured by the Contractor of the cooperation and assistance of both the Contractor and the supplier of the material. The Contractor shall assure that the Engineer has free access at all times to the material to be inspected, sampled or tested. It is understood that such inspections and tests, if made at any point other than the point of incorporation in the Work, in no way shall be considered as a guarantee of acceptance of such material nor of continued acceptance of material presumed to be similar to that upon which inspections and tests have been made, and that inspection and testing performed by the Agency shall not relieve the Contractor or his suppliers of responsibility for quality control.

Manufacturers' warranties, guarantees, instruction sheets, and parts lists, which are furnished with certain articles or materials incorporated in the Work, shall be delivered to the Engineer before acceptance of the Contract Work.

Reports and records of inspections made and tests performed when available at the site of the Work, may be examined by the Contractor.

The Engineer may inspect the production of material, or the manufacture of products at the source of supply. Plant inspection, however, will not be undertaken until the Engineer is assured of the cooperation and assistance of both the Contractor and the material producer. The Engineer shall have free entry at all times to such parts of the plant as concerns the manufacture or production of the materials. Adequate facilities shall be furnished free of charge to make the necessary inspection. The Agency assumes no obligation to inspect materials at the source of supply.

4-4 TESTING. *ADD the following:*

The Contractor shall furnish the Agency Representative with a list of his sources of materials in sufficient time to permit proper inspection and testing of materials to be furnished for such listed sources in advance of their use. The Contractor shall furnish without charge such samples as may be required.

Inspection and tests will be made by the Agency Representative or his designated representative, but it is understood that such inspections and tests, if made at any point other than the point of incorporation in the work, in no way shall be considered as guarantee of acceptance of such materials nor of continued acceptance of materials, presumed to be similar to that upon which inspection and tests have been made.

Tests of materials will be made in accordance with commonly recognized procedures of technical organizations and such special procedures as prescribed in the Contract Documents. Materials will be sampled and tested at such times during the process of the Work as deemed desirable by the Engineer, the Contractor shall cooperate in obtaining the samples.

Add:

4-4.1 Testing Laboratory. The Contractor shall employ and pay for services of an independent testing laboratory, subject to approval by the Agency, to perform other testing and inspections services required by the Contract Documents.

Prior to start of Work, the Contractor shall submit his testing laboratory name, address, and telephone number, and names of full-time registered engineer and responsible officer.

Employment of testing laboratories will in no way relieve Contractor of its obligation to perform the Work in accordance with Contract Documents.

Laboratory field technicians employed by the Agency shall have no authority to release, revoke, alter, or enlarge on requirements of Contract Documents, or to approve, accept or stop any portion of the Work.

The Contractor shall:

- a) Cooperate with laboratory personnel, provide access to work, arrange access to manufacturer's operations.
- b) Provide the laboratory with preliminary representative samples of materials to be tested, in required quantities.
- c) Furnish copies of mill test reports.
- d) Provide casual labor and facilities for access to work being tested; obtain and handle samples at the site; facilitate inspections and tests; provide facilities for the laboratory's exclusive use for storage and curing of test samples.
- e) Coordinate requests for testing through the Agency Representative. Notify Agency Representative a minimum of three (3) Working Days in advance of operations to allow for assignment of personnel and scheduling of tests.
- f) Pay for additional laboratory inspections, sampling, and testing required for Contractor's convenience and when initial tests indicate that work does not comply with Contract Documents.

- g) When required by the Contract Documents, submit manufacturer's certificate, executed by responsible officer, certifying that the product(s) meet or exceed specified requirements. Provide certification in duplicate.

4-6 TRADE NAMES.

ADD the following:

The Contractor shall submit products list in accordance with the following:

- a) Within the time specified in 4-1.2 of the Standard Specifications and these Special Provisions, transmit number of copies Contractor needs plus four (4) of a list of major products which are proposed for installation, including name of manufacturer. Tabulate products by specification section number, title, and article number.
- b) For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.
- c) The Engineer will reply in writing, stating whether there is reasonable objection to listed items. Failure to object to a listed item shall not constitute a waiver of requirements of Contract Documents.

The following limitations shall apply to substitutions:

- a) During the bidding period, Instructions to Bidders govern times for submitting requests for substitutions under requirements specified in this Subsection.
- b) Requests for substitutions of products will be considered only within the time period specified in the Contract Documents. Subsequent requests will be considered only in the case of product unavailability or other conditions beyond control of Contractor. Material delivery schedules will not be considered justification for substitution.
- c) Substitutions will not be considered when indicated on shop drawings or product data submittals without separate formal request or when requested directly by subcontractor or supplier, or when acceptance will require substantial revision of Contract Documents.
- d) Substitute products shall not be ordered or installed without written acceptance by the Engineer.
- e) Only one request for substitution for each product line will be considered. When substitution is not accepted, provide specified product.
- f) The Engineer will determine acceptability of substitutions.

Requests for substitutions shall conform to the following:

- a) Submit separate request for each substitution. Document each request with complete data substantiating compliance of proposed substitution with requirements of Contract Documents.
- b) Identify product by specifications section and article numbers. Provide manufacturer's name and address, trade name or product, and model or catalog number. List fabricators and suppliers, as appropriate.
- c) Give itemized comparison of proposed substitution with specified product, listing variations, and reference to specifications section and article numbers.
- d) Give cost data comparing proposed substitution with specified product, and amount of net change to Contract sum.
- e) List availability of maintenance services and replacement materials.
- f) State effect of substitution on construction schedule, and changes required in other work or products.

Request for substitution constitutes a representation that Contractor has investigated proposed product and has determined that it is equal to or superior in all respects to specified product. The Contractor shall provide the same warranty for the substitution as for the specified product, shall coordinate installation of accepted substitute, making such changes as may be requested for Work to be complete in all respects, certifies that cost data presented is complete and includes all related costs under this Contract and waives claims for additional costs related to substitution which may later become apparent. The Contractor shall submit the number of copies the Contractor needs plus four of request for substitution. For accepted products, submit shop drawings, product data, and samples, and tests conducted in accordance with 3-8.

ADD:

4-9. AGENCY-FURNISHED MATERIALS.

Materials which are listed as Agency-furnished materials in the Special Provisions will be available to the Contractor free of charge.

The Contractor shall submit a written request to the Engineer for the delivery of Agency-furnished material at least fifteen (15) Working Days in advance of the date of its intended use. The request shall state the quantity and the type of each material.

The locations at which Agency-furnished materials will be available to the Contractor free of charge will be designated in the Special Provisions. In those cases, the materials shall be hauled to the site of the Work by the Contractor at the Contractor's expense, including any necessary loading and unloading that may be involved. If the locations are not designated in the Special Provisions, the Agency-furnished materials will be furnished to the Contractor free of charge at the site of the Work. In either case, all costs of handling and placing Agency-furnished material shall be considered as included in the price paid for the contract item involving the Agency-furnished material.

The Contractor shall be responsible for Agency-furnished materials furnished to the Contractor, and shall pay all demurrage and storage charges. Agency-furnished materials, once furnished, delivered, or picked-up by the Contractor, that are lost or damaged from any cause whatsoever shall be replaced by the Contractor at the Contractor's expense. The Contractor shall be liable to the Agency for the cost of replacing Agency-furnished materials, and those costs may be deducted from any monies due or to become due the Contractor. All Agency-furnished material that is not used on the Work shall remain the property of the Agency, and the Contractor shall arrange with the Agency Representative for delivery back to the Agency at Contractor's expense.

SECTION 5 – LEGAL RELATIONS AND RESPONSIBILITIES

REVISE as follows:

5-1 LAWS AND REGULATIONS.

DELETE in its entirety and SUBSTITUTE with the following:

The Contractor shall keep itself fully informed of all existing and future State and National laws and County and Municipal ordinances and regulations which in any manner affect those engaged or employed in the Work or the materials used in the Work or which in any way affect the conduct of the Work and of all such order and decrees of bodies or tribunals having any jurisdiction or authority in the Plans, Specifications, or Contract for the Work in relation to any such law, ordinance, regulation, order or decree, he shall forthwith report the same to the Agency Representative in writing.

The Contractor shall at all times observe and comply with and shall cause all its agents, employees, and subcontractors to observe and comply with all such existing and future laws, ordinances, regulations, orders, and decrees even though such requirements may not be specifically mentioned in the specifications or shown on the Plans, and shall hold harmless, indemnify, and defend the Agency, the Engineer, the Agency Representative and each of their officers, employees, and agents against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by itself, its employees, its agents, or its subcontractors. To the maximum extent permitted by law, all obligations of the Contractor stated in 5-4.2 shall apply in the case of any such claim or liability.

As a material part of this Contract, Contractor's and subcontractors' owners and employees agree to be bound by and adhere to the Federal Department of Transportation (DOT) regulations found in Title 49 CFR 382. All Contractor's and subcontractors' owners and employees who are required to hold commercial licenses and/or who are in safety sensitive positions shall be subject to the provisions of the DOT regulations.

5-2 SPECIAL NOTICES.

MODIFY to ADD the following:

Any notice required or given by one party to the other under the Contract shall be in writing and shall be dated and signed by the party giving such notice or by a duly authorized representative of such party. Any such notices shall not be effective for any purpose whatsoever, unless served in the following manner:

- a) If the notice is given to the Agency, by personal delivery or by depositing the same in the United States mail, enclosed in a sealed envelope addressed to the Agency, postage prepaid and registered.
- b) If the notice is given by the Engineer to the Contractor by personal delivery to said Contractor or to his authorized representative or by depositing the same in the United States mail, enclosed in a sealed envelope addressed to said Contractor at his regular place of business or such other address as may have been established for the conduct of the work under this Contract, postage prepaid and registered.
- c) If notice is given to the surety or any other person by personal delivery to said surety or other person, or by depositing the same in the United States mail, enclosed in a sealed envelope addressed to such surety or person at the address of said surety or person last communicated by him to the party giving the notice, postage prepaid and registered.

5-3 LABOR.

5-3.3 Payroll Records. *MODIFY to ADD the following:*

The Contractor and all its subcontractors shall submit to the City and the Labor Commissioner (Division of Labor Standards Enforcement) certified payroll records every Friday until Notice of Completion is filed and recorded.

The City of Irvine will be using the eComply Solutions software for managing certified payrolls on this project. Accordingly, Contractor shall register in, attend training for, and use the eComply Solutions software for submitting certified payrolls and related tasks as deemed appropriate by the City of Irvine. When the project commences, you will be contacted by an eComply Solutions representative regarding this process. Further information will be provided via a separate communication at that time.

5-4 INSURANCE.

MODIFY to ADD the following:

5-4.1 General. Without limiting Contractor's indemnification obligations, the Contractor shall not commence work until he procures and maintains, at his sole cost and for the duration of this Contract, insurance coverage as provided herein, against all claims for injuries against persons or damages to property which may arise from or in connection with the performance of the Work hereunder by Contractor, its agents, representatives, employees, and/or subcontractors. In the event that Contractor subcontracts any portion of the Work in compliance with 1-6.2 of the Standard Specifications and Special Provisions, the Contract between the Contractor and such subcontractor shall require the

subcontractor to maintain the same policies of insurance that the Contractor is required to maintain pursuant to 5-4.

The Insurance obligations under this agreement shall be (1) all the Insurance coverage and/or limits carried by or available to the Contractor; or (2) the minimum Insurance coverage requirements and/or limits shown in this agreement; whichever is greater. Any insurance proceeds in excess of or broader than the minimum required coverage and/or minimum required limits, which are applicable to a given loss, shall be available to the City. No representation is made that the minimum Insurance requirements of this agreement are sufficient to cover the obligations of the Contractor under this agreement.

Insurance policies shall be deemed not in compliance if they include any limiting provision or endorsement that has not been submitted for approval in accordance with 5-4.

The Contractor's insurance shall be "occurrence" rather than "claims made" insurance, except for Professional Liability insurance, which may be for claims made and 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.

Any deductibles or self-insured retentions must be declared to and approved by Agency prior to the execution of this Contract by Agency. Prior to commencing work, the Contractor will provide the Agency, in accordance with 7-3, written confirmation of the deductible for each insurance coverage required by this contract.

Self-insurance will be subject to the Agency's review and prior approval. If the Contractor uses any form of self-insurance, it shall submit:

- a) A notice of election to self-insure.
- b) The coverages for which self-insurance applies.
- c) The amount of self-insurance.
- d) Declaration under penalty of perjury by a certified public accountant certifying the accountant has applied Generally Accepted Accounting Principles (GAAP) guidelines and the Contractor has sufficient funds or other resources to cover the self-insurance amounts.
- e) Copy of its commercial general liability policy and its excess policy, including the declarations page, all amendments, riders, endorsements, and other modifications in effect at the time of contract execution, for those amounts not covered by self-insurance.

Self-insurance programs and self-insured retentions are subject to separate annual review and approval by the Agency as evidence of the Contractor's financial capacity to respond to potential claims. Additionally, self-insurance programs or retentions must provide the Agency with at least the same protection from liability and defense of suits as would be afforded by first-dollar insurance.

All policies shall be endorsed to state that coverage shall not be suspended, voided, cancelled, reduced in coverage or in limits, non-renewed, or materially changed for any reason, without thirty (30) days prior written notice thereof given by the insurer to Agency by U.S. mail, or by personal delivery, except for nonpayment of premiums, in which case ten (10) days prior notice shall be provided.

- a) In lieu of this endorsement, the Contractor shall either:
- b) Submit a letter, signed by the insurance agent or broker, certifying that he/she shall notify the City should the coverage be suspended, voided, cancelled, reduced in coverage or in limits, non-renewed, or materially changed for any reason, without thirty (30) days prior written notice thereof given by the insurer to Agency by U.S. mail, or by personal delivery, except for nonpayment of premiums, in which case ten (10) days prior notice shall be provided; or
- c) Submit evidence that the insurance premium has been paid in full for the life of the policy.

Indemnification. Contractor shall immediately report all claims to its insurance carrier and acknowledge receipt within thirty (30) days.

No officer, employee, or agent of the City, City Representative, the Engineer, or their consultants shall be personally responsible for any liability arising under or by virtue of the Agreement.

To the maximum extent permitted by law, Contractor shall hold harmless, indemnify, and defend the City, City Representatives, and each of their officers, employees, and agents from and against any and all actions, suits, claims, demands, judgments, attorney's fees, costs, damages to persons or property, losses, penalties, obligations, expenses or liabilities (herein "claims" or "liabilities") that may be asserted or claimed by any person or entity arising out of the willful or negligent acts, errors or omissions of Contractor, its employees, agents, representatives or subcontractors in the performance of any tasks or services for or on behalf of City, whether or not there is concurrent active or passive negligence on the part of City and/or City Personnel, but excluding such claims or liabilities arising from the active negligence or willful misconduct of City or City Personnel. In connection therewith:

- a) Contractor shall defend any action or actions filed in connection with any such claims or liabilities, and shall pay all costs and expenses, including attorney's fees incurred in connection therewith.
- b) Contractor shall promptly pay any judgment rendered against City or any City Personnel for any such claims or liabilities.
- c) In the event City and/or any City Personnel is made a party to any action or proceeding filed or prosecuted for any such damages or other claims arising out of or in connection with the negligent performance or a failure to perform the work or activities of Contractor, Contractor shall pay to City any and all

costs and expenses incurred by City or City Personnel in such action or proceeding, together with reasonable attorney's fees and expert witness fees. So much of the money due to the Contractor under and by virtue of the Agreement as shall be considered necessary by the City may be retained by the City until disposition has been made of such actions or claims for damages as aforesaid.

These Indemnification provisions are independent of and shall not in any way be limited by the Insurance Requirements of this Agreement. Entity approval of the Insurance contracts required by this Agreement does not in any way relieve the Contractor from liability under this section.

5-4.2 General Liability Insurance. *DELETE the 2nd paragraph and SUBSTITUTE with the following:*

General Liability (including premises, operations and mobile equipment, products, and completed operations, broad form property damage including completed operations, explosion, collapse and underground hazards, contractual liability, personal injury, independent contractors' liability): with a minimum limit of Five Million Dollars (\$5,000,000) for each occurrence (combined single limit for bodily injury and property damage) and Ten Million Dollars (\$10,000,000) general aggregate. The general aggregate limit shall apply separately to the Contractor's work under this Contract.

If the contractor maintains broader coverage and/or higher limits than the minimums shown above, the City requires and shall be entitled to the broader coverage and/or higher limits maintained by the contractor.

<p>Products-Completed Operations: Contractor shall procure and submit evidence of insurance in accordance with 7-3 of the Standard Specifications and these Special Provisions for a period of at least three (3) years from the time that all Work under this Contract is completed.</p>
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5-4.3 Workers' Compensation Insurance. *MODIFY to ADD the following:*

Workers' Compensation and Employer's Liability: Workers' Compensation Insurance in an amount required by the laws of the State of California (Statutory Limits). Employer's Liability Insurance with a minimum limit of One Million Dollars (\$1,000,000) per occurrence.

Such insurance shall be endorsed to waive the insurer's right of subrogation against the City of Irvine and their elected officials, officers, employees, volunteers, boards, and representatives.

In the event Contractor has no employees requiring Contractor to provide Workers' Compensation Insurance, Contractor shall so certify to Agency in writing prior to Agency's execution of this Contract. Agency and Agency Personnel shall not be responsible for any claims in law or equity occasioned by failure of the Contractor to comply with this section or with the provisions of law relating to Workers' Compensation.

If Contractor is providing on-site staffing services, then the Workers' Compensation insurance shall include an Alternative Employers Endorsement.

5-4.4 Automobile Liability Insurance. *DELETE in its entirety and SUBSTITUTE with the following:*

Automobile liability insurance with a limit of liability not less than Two Million dollars (\$2,000,000) each occurrence. The limits shall be provided by either a single primary policy or combination of policies. If limits are provided with excess and/or umbrella coverage the limits combined with the primary will equal the minimum limits set above. Such insurance shall include coverage for all "owned," "hired" and "non-owned" vehicles, or coverage for "any auto."

If the contractor maintains broader coverage and/or higher limits than the minimums shown above, the City requires and shall be entitled to the broader coverage and/or higher limits maintained by the contractor.

ADD:

5-4.5 Contractor's Pollution Liability. Contractors Pollution Liability Insurance covering all of the contractor's operations to include onsite and offsite coverage for bodily injury, property damage, defense costs, cleanup costs, coverage for offsite disposal facilities with minimum limits of Two Million Dollars (\$2,000,000) each loss and Four Million Dollars (\$4,000,000) in the aggregate.

If the contractor maintains broader coverage and/or higher limits than the minimums shown above, the City requires and shall be entitled to the broader coverage and/or higher limits maintained by the contractor.

Prior to commencing work, the Contractor shall provide the City the names and locations of disposal facilities for approval by the City.

The insurance coverage required for General Liability, Automobile Liability and Contractor's Pollution Liability shall be endorsed to provide the following:

The Contractor shall name as additional insured the City of Irvine, their elected officials, officers, employees, volunteers, boards, and representatives with regard to liability and defense of suits or claims arising out of the performance of the Contract.

Additional Insured Endorsements shall not:

- a) Be limited to "Ongoing Operations"
- b) Exclude "Contractual Liability"
- c) Restrict coverage to the "Sole" liability of contractor
- d) Contain any other exclusion contrary to the Contract

This insurance shall be primary and any other insurance, deductible, or self-insurance available to the insured shall be in excess of and shall not contribute with this insurance.

5-4.6 Builders Risk Insurance. At its own expense, the successful Contractor will be required to obtain, pay for, and maintain, for the duration of the Agreement, builders risk insurance for any property constructed on behalf of the City, to cover “all risks” of physical loss providing coverage for loss or damage from collapse, including collapse resulting from builder’s design error. The value of the insured shall cover 100% of the completed Contract cost and shall maintain until acceptance of the Work. Proceeds payable under this insurance policy shall be fully payable to the City as Loss Payee.

Such insurance shall be endorsed to waive the insurer’s right of subrogation against the indemnified parties.

5-4.7 Professional Liability Insurance. At its own expense, the successful Contractor will be required to obtain, pay for, and maintain, for the duration of the Agreement and for a minimum of five (5) years thereafter, a Professional Liability Insurance Policy (that includes errors and omissions, and professional malpractice) with a minimum limit of Three Million Dollars (\$3,000,000) per claim. The policy shall provide coverage for any loss arising out of or caused by the Contractors performance of the Agreement.

If the contractor maintains broader coverage and/or higher limits than the minimums shown above, the City requires and shall be entitled to the broader coverage and/or higher limits maintained by the contractor.

5-4.8 Evidence of Insurance. Contractor shall provide to City a Certificate(s) of Insurance evidencing such coverage together with copies of the required policy endorsements no later than five (5) business days prior to commencement of service and at least fifteen (15) business days prior to the expiration of any policy. Coverage shall not be suspended, voided, cancelled, reduced in coverage or in limits, non-renewed, or materially changed for any reason, without thirty (30) days prior written notice thereof given by the insurer to City by U.S. mail, or by personal delivery, except for nonpayment of premiums, in which case ten (10) days prior notice shall be provided.

A statement on an insurance certificate will not be accepted in lieu of the actual endorsement. Insurance policies shall not be in compliance if they include any limiting provision or endorsement that has not been submitted to the City for approval.

The City’s insurance certificate tracking services provider, EXIGIS, LLC, will send Contractor an email message providing instructions for submitting insurance certificates and endorsements.

The City project title or description MUST be included in the “Description of Operations” box on the certificate.

Certificate Holder:

City of Irvine
c/o EXIGIS Risk Management Services

P.O. Box 4668 - ECM #35050
New York, NY 10163-4668

ADD:

5-5.1 Property Rights in Materials. Nothing in the Contract shall be construed as vesting in the Contractor any right of property in the materials used after they have been attached or affixed to the Work or the soil, or after payment has been made for materials delivered to the site of the Work, or stored subject to or under the control of the Agency.

ADD:

5-5.2 Warranty of Title. No materials, supplies or equipment for the Work under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest therein or any part thereof is retained by the seller or supplier. The Contractor warrants clear and good title to all materials, supplies, and equipment installed and incorporated in the Work and agrees upon completion of all Work to deliver the premises together with all improvements and appurtenances constructed or placed thereon by him to the Agency free from any claims, liens, encumbrances, or charges and further agrees that neither he nor any persons, firm, or corporation furnishing any material or labor for any work covered by the Contract shall have any right to a lien upon the premises or any improvement or appurtenance thereon, provided that this shall not preclude the Contractor from installing metering devices or other equipment of utility companies or of municipalities, the title of which is commonly retained by the utility company or the municipality. Nothing contained in this article, however, shall defeat or impair the right of such persons furnishing materials or labor under any bond given by the Contractor for their protection, or any right under any law permitting such persons to look to funds due the Contractor in the hands of the Agency.

The provisions of this subsection shall be physically inserted in all subcontracts and material contracts and notices of its provision shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

5-6 PATENT FEES AND ROYALTIES.

DELETE in its entirety and SUBSTITUTE with the following:

The Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the Work and shall hold harmless, indemnify, and defend the Agency, the Engineer, the Agency Representative and each of their officers, employees, and agents from all claims, suits or actions of every nature for or on account of the use of any patented materials, equipment devices, or processes. To the maximum extent permitted by law, all obligations of the Contractor stated in 7-3.2 shall apply in the case of any such claim, suit or action.

5-7.1.2 Work Site Safety Official. *MODIFY to ADD the following:*

Failure by the Contractor to provide the required Work Site Safety Official shall be grounds for the Agency to direct the cessation of all work activities and operations at no cost to the Agency until the Contractor is in compliance.

ADD:

5-7.1.3 Emergencies. Unusual conditions may arise on the Work which will require that immediate and unusual provisions be made to protect the public from danger or loss or damage to life and property, due directly or indirectly to the prosecution of the Work, and it is part of the service required of the Contractor to make such provisions and to furnish such protection.

The Contractor shall use such foresight and shall take such steps and precautions as his operations make necessary to protect from danger or damage, or loss of life or property, which would result from the interruption or contamination of public water supply, irrigation or other public service, or from failure or partly completed work.

Whenever, in the opinion of the Engineer, an emergency exists against which the Contractor has not taken sufficient precaution for the safety of the public or the protection of utilities or of adjacent structures or property which may be injured by process of construction on account of such neglect; and whenever in the opinion of the Engineer, immediate action shall be considered necessary in order to protect public or private, personal or property interest, or prevent likely loss of human life or damage on account of the operations under the Contract, then and in that event the Agency may provide suitable protection to said interest by causing such work to be done and material to be furnished as, in the opinion of the Agency Representative may seem reasonable and necessary.

The cost and expense of said labor and material, together with the cost and expense of such repairs as may be deemed necessary, shall be borne by the Contractor, and if he shall not pay said cost and expense upon presentation of the bills therefor, duly certified by the Agency Representative, then said cost and expense will be paid by the Agency and shall thereafter be deducted from any amounts due, or which may become due to the Contractor. Failure of the Agency, however, to take such precautionary measure, shall not relieve the Contractor of his full responsibility for public safety.

The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to the Agency.

5-7.2.1 General. *DELETE in its entirety 2nd paragraph and SUBSTITUTE with the following:*

The Contractor shall submit to the Engineer, as a condition of obtaining City issued permits and in advance of excavation, a permit from the Division of Occupational Safety and Health pursuant to Chapter 6 (commencing with Section 6500) of Part 1 of Division 5 of the Labor Code along with a detailed plan showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground during the excavation of any trench or trenches five (5) feet or more in depth. The plan shall be prepared by a registered civil or structural engineer. As a part of the plan, a

notice shall be included stating that the registered civil or structural engineer certifies that the plan complies with the CAL/OSHA Construction Safety Orders. A copy of the plan and permit shall be submitted to the Engineer.

In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for conditions on the job site, including safety of all persons and property during performance of the Work, and the Contractor shall fully comply with all local, county, state and federal laws, rules, regulations, and orders relating to safety of the public and workers.

The Contractor shall hold harmless, indemnify, and defend the Agency, the Engineer, the Agency Representative and each of their officers, employees, and agents from civil or criminal penalties resulting from a failure to comply with applicable safety laws, rules, regulations and orders. To the maximum extent permitted by law, all obligations of the Contractor stated in 5-4.2 shall apply in the event of any such failure to comply with applicable safety laws, rules, regulations or orders.

The duty, if any, of the Agency Representative to conduct construction review or inspection of the Contractor's performance is not intended to include review or inspection of the adequacy of the Contractor's safety measures in, on, or near the construction site.

5-7.8 Steel Plate Covers. *MODIFY to ADD the following:*

The Contractor shall protect transverse or longitudinal cuts, voids, trenches, holes, and excavations in the right-of-way that cannot be properly completed within one (1) Working Day by adequately designed barricades and structural steel plates (plates) that will support legal vehicle loads in such a way as to preserve unobstructed traffic flow.

The Contractor shall secure approval, in advance, from Engineer concerning the use of any bridging proposed on the Work.

The Contractor shall adequately shore trenches to support the bridging and traffic loads.

The Contractor shall design plates for HS 20-44 truck loading in accordance with Caltrans Bridge Design Specifications Manual.

For spans greater than 5'-3", submit a structural design prepared by a California Registered Civil Engineer to the Engineer.

The surface of the plates shall be skid-resistant with a nominal Coefficient Of Friction (COF) of 0.35 as determined by California Test Method 342.

Plates must provide complete coverage to prevent any person, bicycle, motorcycle or motor vehicle from being endangered due to plate movement causing separations or gaps.

Install and secure plates against movement or displacement by using adjustable cleats, shims, welding, or other devices in a manner that will minimize noise.

The Contractor shall Install plates as follows:

Mill the pavement to a depth equal to the thickness of the plate and to a width and length equal to the dimensions of the plate. Method 2 installation is prohibited.

Alternative installation method may be submitted in accordance with 3-8, "Submittals" for the Engineer's approval.

The Contractor is responsible for maintenance of the plates and shoring, or any other approved device used to secure the plates. The Contractor shall immediately mobilize necessary personnel and equipment after being notified by the Agency Representative, the Agency Code Enforcement or Police Department of a repair needed e.g., plate movement, noise, anchors, and asphalt ramps. Failure to respond to the emergency request within 2 hours will be grounds for Agency to perform necessary repairs that will be invoiced at actual cost including overhead or \$500 per incident, whichever is greater.

When plates are removed, the Contractor shall repair any damage to the pavement with fine graded asphalt concrete mix or slurry seal satisfactory to the Engineer.

Payment for Steel Plate Covers is included in the various bid items of work.

ADD:

5-8 CORRESPONDENCE. Unless specified otherwise or requested by the Engineer, the use of facsimile (fax) machines, text messages, or phone calls shall not be considered official project correspondence. Unless otherwise allowed by the Engineer, all email shall be directed to the Engineer. The email address for the Engineer will be provided at the pre-construction meeting. Correspondence received after 2:00 p.m. shall be considered as being received the following working day. The Engineer will not accept any illegible correspondence.

ADD:

5-9 CONTRACT COORDINATION. The Contractor shall coordinate scheduling, submittals, and the Work to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.

In addition to weekly progress meetings, as required by the Agency, the Contractor shall hold coordination meetings and pre-installation conferences with Agency Representatives and subcontractors to assure coordination of Work.

Should the Agency exercise partial Acceptance or beneficial occupancy of premises, the Contractor shall coordinate access to site to complete work or to correct defective work and work not in strict conformance with Contract Documents to minimize disruption of Agency's activities.

ADD:

5-10 CONTRACTOR'S RESPONSIBILITY FOR THE WORK. Until Acceptance of the Work, the Contractor shall have the responsibility, charge and care of the Work and of the materials to be used therein (including materials for which it has received partial payment or materials which have been furnished by the Agency) and shall bear the risk of injury, loss or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the Work.

The Contractor shall rebuild, repair, restore, and make good all injuries, losses, or damages to any portion of the work or the material occasioned by any cause before its completion and acceptance and shall bear the expense thereof. Where necessary to protect the work or materials from damage, the Contractor shall at his expense provide suitable drainage and erect such temporary structures as are necessary to protect the work or materials from damage. The suspension of the work from any cause whatever shall not relieve the Contractor of his responsibility for the work and materials as herein specified. If ordered by the Agency Representative, the Contractor shall at his expense properly store materials which have been partially paid for by the Agency or which have been furnished by the Agency. Such storage by the Contractor shall be on behalf of the Agency, the Agency shall at all times be entitled to the possession of such materials, and the Contractor shall promptly return the same to the site of the work when requested. The Contractor shall not dispose of any of the materials so stored, except on written authorization from the Agency.

In an emergency affecting the safety of life or property, including adjoining property, the Contractor, without special instructions or authorizations, is authorized to act at his discretion to prevent such threatened loss or injury, and he shall so act as though instructed to do so by the Agency.

5-11 PROJECT RECORD DOCUMENTS.

5-11.1 Maintenance of Documents and Samples. The Contractor shall maintain one record copy of:

- a) Contract Drawings
- b) Specifications
- c) Addenda
- d) Change Orders and Other Modifications to the Contract
- e) Reviewed Shop Drawings, Product Data, Samples, and approved submittals
- f) Field Test Records
- g) Construction Schedules
- h) Manufacturer's Certificates

The Contractor shall maintain documents in clean, dry, legible condition and not used for construction purposes.

The Contractor shall keep Record Documents and samples accessible for inspection by Agency Representative. Applications for partial payment will not be approved if the Record Documents are not kept current. The Agency Representative must so verify prior to submittal of each Application for Payment.

ADD:

5-11.2 Recording. The Contractor shall record changes to the plans and discoveries of buried objects at the Work on Record Documents with red ball-point pen, label each Document "PROJECT RECORD" in large printed letters, record information concurrently with construction progress, not conceal any work until required information is recorded and legibly mark each item on Contract Drawings and Shop Drawings to record actual construction, including:

- a) Measured depths of elements in relation to fixed datum point
- b) Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements
- c) Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction
- d) Field changes of dimension and detail
- e) Changes made by Contract modifications
- f) Details not on original Contract Drawings
- g) Previously unknown buried objects

The Contractor shall legibly mark each item to record actual construction, including:

- a) Manufacturer, Trade Name, and Catalog Number of each product actually installed, particularly optional items and substitute items
- b) Changes made by Addenda or modifications

The Contractor shall maintain other documents per requirements of individual specifications sections.

ADD:

5-11.3 Submittals. At Contract closeout the Contractor shall deliver Record Documents and samples as specified in 5-11.1. Request for final payment will not be approved until all Record Documents have been delivered.

The submittals shall be transmitted with cover letter with signature of Contractor or authorized representative, listing date, project title and number, and number and title of each Record document.

SECTION 6 – PROSECUTION AND PROGRESS OF THE WORK

REVISE as follows:

6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK.

DELETE in its entirety and SUBSTITUTE with the following:

The Contractor shall begin the Work on or before the date stipulated in the Notice to Proceed and shall diligently prosecute the Contract to completion within the time limit provided in the Contract.

The Contractor shall notify the Agency Representative of his intent to begin work at least two (2) Working Days prior to the start of any work.

The Contractor may, upon written approval from the Agency, begin work in advance of the date in the Notice to Proceed; however, **no work shall be started in advance of the completed execution of the Contract and approval of the construction progress schedule by the Agency.** The Agency may, but shall not be required to, provide access to the site prior to the date specified in the Notice to Proceed.

6-1.1 General. Within ten (10) days after the date of the City's execution of the Contract, the Contractor shall submit a proposed construction schedule to the Engineer for approval. The construction schedule shall be in accordance with 6-1.2 and 6-1.3 and shall be in sufficient detail to show chronological relationship of all activities of the Work. These include, but are not limited to, estimated starting and completion dates of various activities, submittal of shop drawings to the Engineer for approval, utility relocation efforts, procurement of materials, and scheduling of equipment.

Prior to issuing the Notice to Proceed, the Engineer will schedule a Pre-Construction Meeting with the Contractor to review the proposed construction schedule and delivery dates, arrange utility coordination and clarify inspection procedures.

Notwithstanding any other provisions of the contract, the Contractor shall not be obligated to perform any work and the City shall not be obligated to accept or pay for any work performed by the Contractor prior to delivery of the Notice to Proceed. The City's knowledge of work performed prior to the delivery of the Notice to Proceed shall not obligate the City to accept or pay for such work. The Contractor shall provide the required contract bonds and evidences of insurance prior to commencing work at the site.

6-1.2 Definitions. The following definitions shall apply to this section:

- a) **ACTIVITY** – a task, event or other project element on a schedule that contributes to completing the project. Activities have a description, start date, finish date, duration, and one or more logic ties.
- b) **BASELINE SCHEDULE** – the initial schedule representing the Contractor's work plan on the first working day of the project.

- c) **CONTRACT COMPLETION DATE** – the current extended date for completion of the contract shown on the Weekly Statement of Working Days furnished by the Engineer in conformance with the provisions in 6-3.
- d) **CRITICAL PATH** – the longest continuous chain of activities for the project that has the least amount of total float of all chains. In general, a delay on the critical path will extend the scheduled completion date.
- e) **CRITICAL PATH METHOD (CPM)** – a network based planning technique using activity durations and the relationships between activities to mathematically calculate a schedule for the entire project.
- f) **DATA DATE** – the day after the date through which a schedule is current. Everything occurring earlier than the data date is “as-built” and everything on or after the data date is “planned.”
- g) **FLOAT** – the difference between the earliest and latest allowable start or finish times for an activity.
- h) **FRAGNET** – a fragnet is defined as the sequence of new activities that are proposed to be added to the existing schedule, to demonstrate either added scope, or a change and the corresponding impact. The fragnet shall identify the predecessors to the new activities and demonstrate the impacts to successor activities.
- i) **MILESTONE** – an event activity that has zero duration and is typically used to represent the beginning or end of a certain stage of the project.
- j) **NEAR CRITICAL PATH** – a chain of activities with total float exceeding that of the critical path, but having no more than ten (10) Working Days of total float.
- k) **SCHEDULED COMPLETION DATE** – the planned project finish date shown on the current accepted schedule.
- l) **TOTAL FLOAT** – the amount of time that an activity or chain of activities can be delayed before extending the scheduled completion date.
- m) **UPDATE SCHEDULE** – a current schedule developed from the baseline or subsequent schedule through regular monthly review to incorporate as-built progress and any planned changes.

6-1.3 General Requirements. The Contractor shall meet with the Engineer on a date mutually agreed by the parties with the intent of discussing the schedule requirements. This meeting shall happen before the Contractor begins the work on the Baseline schedule.

The Contractor shall submit to the Engineer baseline, monthly update, look-ahead schedules, and final update schedules, each consistent in all respects with the time and

order of work requirements of the contract. The project work shall be executed in the sequence indicated on the current accepted schedule.

Schedules shall show the order in which the Contractor proposes to carry out the work with logical links between time-scaled work activities and calculations made using the critical path method to determine the controlling operation or operations. The Contractor is responsible for assuring that all activity sequences are logical and that each schedule shows a coordinated plan for complete performance of the work.

The Contractor shall produce schedules using computer software and shall furnish compatible software for the Engineer's exclusive possession and use. The Contractor shall furnish network diagrams and schedule data as parts of each schedule submittal.

The schedule shall be prepared using the latest version of Oracle's Primavera P6 scheduling tool or approved equal. Any tool other than Primavera shall first require approval from the Engineer.

The Contractor shall not sequester float through strategies such as extending activity duration estimates to consume available float, using preferential logic, using extensive crew/resource constraints, using special lead/lag logic restraints, using imposed dates or other float suppression techniques.

Schedules shall include, but not be limited to, applicable activities that show the following:

- a) Project characteristics, salient features, or interfaces, including those with outside entities that could affect time of completion.
- b) Project start date, scheduled completion date, and other milestones.
- c) Work performed by the Contractor, subcontractors, and suppliers.
- d) Submittal development, delivery, review and approval, including those from the Contractor, subcontractors, and suppliers.
- e) Procurement, delivery, installation, and testing of materials, plants, and equipment.
- f) Testing and settlement periods.
- g) Utility notification and relocation.
- h) Erection and removal of false work and shoring.
- i) Lane closures, ramp closures, etc.
- j) Major traffic stage switches.
- k) Finishing roadway and final cleanup.
- l) Schedule shall further include the following:

- 1) A clear and legible description for each activity.
- 2) A detailed Work Breakdown Structure (WBS) or Activity Coding Structure, sufficient to clearly organize, sort, and filter activities as needed.
- 3) A duration of not less than one (1) Working Day, except for event activities, and not more than twenty (20) Working Days, unless otherwise authorized by the Engineer.
- 4) At least one predecessor and one successor activity, except for project start and finish milestones.
- 5) Required constraints.

The Engineer's review and acceptance of schedules shall not waive any contract requirements and shall not relieve the Contractor of any obligation thereunder or responsibility for submitting complete and accurate information. Schedules that are rejected shall be corrected by the Contractor and resubmitted to the Engineer within five (5) Working Days of notification by the Engineer, at which time a new review period of one week will begin.

Errors or omissions on schedules shall not relieve the Contractor from finishing all work within the time limit specified for completion of the contract. If, after a schedule has been accepted by the Engineer, either the Contractor or the Engineer discover that any aspect of the schedule has an error or omission, it shall be corrected by the Contractor on the next update schedule.

The Contractor shall include the following for each schedule submittal:

- a) Two sets of originally plotted, time-scaled network diagrams.
- b) Two copies of a narrative report.
- c) Two copies of each of three (3) sorts of the CPM software-generated tabular reports.
- d) Electronic copy of the schedule data.

The time-scaled network diagrams shall conform to the following:

- a) Show a continuous flow of information from left to right.
- b) Be based on early start and early finish dates of activities.
- c) Clearly show the primary paths of criticality using graphical presentation.
- d) Include a title block and a timeline on each page.

Tabular reports shall be software-generated and provide information for each activity included in the project schedule. Three different reports shall be sorted by (1) activity ID,

(2) early start and (3) total float. Tabular reports shall be 8 ½" x 11" in size and shall include, as a minimum, the following applicable information:

- a) Data date
- b) Activity number and description
- c) Predecessor and successor activity, numbers, and descriptions
- d) Activity codes
- e) Scheduled, or actual and remaining durations (work days) for each activity
- f) Earliest start (calendar) date
- g) Earliest finish (calendar) date
- h) Actual start (calendar) date
- i) Actual finish (calendar) date
- j) Latest start (calendar) date
- k) Latest finish (calendar) date
- l) Free float (working days)
- m) Total float (working days)
- n) Percentage of activity completed and remaining duration for incomplete activities
- o) Lags
- p) Required constraints

Schedule submittals will only be considered complete when all documents and data have been provided as described above.

6-1.4 Computer Software. The software shall be the current version of Oracle's Primavera P6 for Windows or equal. If the Contractor proposes to use a different software than Primavera, the Contractor shall submit to the Engineer for approval a description of proposed software. All software shall be compatible with the latest Windows operating system.

The Contractor shall furnish schedule software and all original software instruction manuals to the Engineer with submittal of the baseline schedule. The furnished schedule software will be returned to the Contractor upon Project Acceptance.

The Contractor shall instruct the Engineer in the use of the software and provide software support until the contract is accepted. Within twenty (20) Working Days of approval of the Contract, the Contractor shall provide a commercial 16-hour training session and training manuals for 3 City employees in the use of the software at a location acceptable to the

Engineer. It is recommended that the Contractor also send at least 3 employees to the same training session to facilitate development of similar knowledge and skills in the use of the software.

6-1.5 Schedule Submittals, Network Diagrams and Reports.

The Contractor shall:

- a) Submit the Baseline Schedule within twenty (20) Working Days after the approval of the Contract. Review 6-1.6 for more details on the Baseline Schedule requirements.
- b) Contractor shall incorporate any revisions deemed necessary by the City after the City's review of the Baseline Schedule.
- c) Once the City approves the Baseline Schedule, the Contractor shall submit two (2) color plots on "E" size sheets (approximately 34" x 44") of each required schedule, four (4) copies of the schedule in 11" x 17" format. A computer copy of the schedule data in the native file format should also be presented.
- d) Submit the Monthly Updated Schedules and reports along with the computer copy of the schedule file, on or within the first working day of each month. The Monthly Updated Schedule shall incorporate the Project's actual progress (or as-built information) as of the data date indicated on the update into the Baseline Schedule or the latest monthly update as appropriate.
- e) Submit a 3-Week Look-Ahead Schedule weekly and at every progress meeting during construction.
- f) Submit Final As-Built Schedule upon completion of the entire Project.

6-1.6 Baseline Schedule. The Contractor shall submit to the Engineer a baseline schedule within ten (10) days after the date of the City's execution of the Contract. The Contractor shall allow three (3) weeks for the Engineer's review after the baseline schedule and all support data are submitted. Beginning the week the baseline schedule is first submitted, the Contractor shall meet with the Engineer weekly to discuss and resolve schedule issues until the baseline schedule is accepted.

The baseline schedule shall include the entire scope of work and shall show how the Contractor plans to complete all work contemplated. The baseline schedule shall clearly identify the activities that define the critical path. Multiple critical paths and near-critical paths shall be kept to a minimum. Not more than 30 percent of the baseline schedule activities shall be critical or near critical, unless otherwise authorized by the Engineer.

The baseline schedule shall not extend beyond the number of Working Days originally provided in these Special Provisions. The baseline schedule shall have a data date of the

first working day of the contract and not include any completed work to date. The baseline schedule shall not attribute negative float or negative lag to any activity.

Each baseline schedule submittal shall include the following:

- a) A Baseline Narrative report which must include the following information:
 - 1) Explanation of the Contractor's general approach to this project and an explanation of what the Contractor considers as key factors to successfully complete the project within the contractual time.
 - 2) A brief explanation of where the work will begin and the how the work and crews will flow through the project.
 - 3) Describe how the Agency's jurisdictional requirements regarding working times and lane closures have been factored in the schedule.
 - 4) A general explanation of the anticipated workdays per week, number of shifts per day, number of hours per shift, and holidays observed.
 - 5) A description of problems, risks or issues anticipated.
 - 6) Typical crew sizes and major equipment to be used in the job.
 - 7) Long lead items.
- b) Hard copy of the schedule in 11" x 17" format.
- c) Color plots in "E" sheet (Approximately 34" x 44".)

6-1.7 Update Schedule. The Contractor shall submit an update schedule and meet with the Engineer to review contract progress, on or before the first day of each month, beginning one month after the baseline schedule is accepted. The Contractor shall allow two (2) weeks for the Engineer's review after the update schedule and all support data are submitted, except that the review period shall not start until any previous month's required schedule is accepted. Update schedules that are not accepted or rejected within the review period will be considered accepted by the Engineer.

The update schedule shall have a date of the last date of the reporting period month or other date established by the Engineer. The update schedule shall show the status of work actually completed to date and the work yet to be performed as planned. The following shall be included with each monthly update:

- a) The electronic copy of the schedule file in the native file format.
- b) Hard copies of the schedule in 11" x 17" format and color plots in "E" sheet size.
- c) A critical path report, showing only the longest path in the project.
- d) A list and detailed description of all changes made to the schedule.

- e) A narrative report. The narrative report shall be organized in the following sequence with all applicable documents included:
 - 1) Contractor's transmittal letter.
 - 2) Work completed during the period.
 - 3) Identification of unusual conditions or restrictions regarding labor, equipment or material; including multiple shifts, 6-day work weeks, specified overtime or work at times other than days or hours.
 - 4) Description of the critical path method.
 - 5) Changes to the critical path and scheduled completion date since the last schedule submittal.
 - 6) Description of the problem areas.
 - 7) Current and anticipated delays:
 - b. Cause of Delay.
 - c. Impacts of delay on other activities, milestones, and completion dates.
 - d. Corrective action and schedule adjustments to correct the delay.
 - 8) Pending Items and status thereof:
 - e. Permits
 - f. Change Orders
 - g. Time adjustments
 - h. Non-compliance notices
 - 9) Reasons for an early or late schedule completion date in comparison to the contract completion date.

6-1.8 Look-Ahead Schedule. The Contractor shall prepare and issue a 3-Week Look Ahead schedule to provide a more detailed day-to-day plan of upcoming work identified on the Baseline/Monthly Update. Each task in the Look Ahead Schedule shall be referenced back to a relevant Activity ID on the Master Schedule (Either the Baseline or the latest Monthly Update). Activities shall not exceed five (5) Working Days in duration and have sufficient level of detail to assign crews, tools and equipment required to complete the work. The Contractor shall update this schedule weekly.

6-1.9 Time Impact Analysis (TIA). The Contractor shall submit a written TIA to the Engineer with each request for adjustment of contract time, or when the Contractor or Engineer consider that an approved or anticipated change may impact the critical path or contract progress. The Contractor shall submit the TIA for review within ten (10) Working Days after the date of the alleged delay impact to the schedule or within ten (10) Working Days after receiving a written request for TIA from the Engineer. Delays of any non-critical

Work shall not be the basis for an extension of Contract time until the delays consume the float associated with that non-critical work activity and cause the work activity to become critical. The City will not grant time extensions unless substantiated by the CPM Schedule, and then not until the project float becomes zero. If the Contractor fails to submit a TIA within the aforementioned time specified, then the City shall deem the Contractor to have agreed that there is no time impact and that the Contractor has irrevocably waived its rights to any additional Contract time.

For each TIA the Contractor shall provide information justifying the request and stating the extent of the adjustment requested for each specific change or alleged delay. Each TIA shall be in a form and content suitable to the Engineer and include the following:

- a) The TIA shall illustrate the impacts of each change or delay on the current schedule completion date or internal milestones, as appropriate.
- b) The TIA shall include a written narrative. The narrative shall detail the proposed methodology for creating the Fragnet, include a chronology of events leading to the delay, and an explanation of how the delay impacted the critical path.
- c) The analysis shall use the accepted schedule that has a data date closest to and prior to the event. If the Engineer determines that the accepted schedule used does not appropriately represent the conditions prior to the event, the accepted schedule shall be updated to the day before the event being analyzed.
- d) The TIA shall include an impact schedule developed from incorporating the event into the accepted schedule by adding or deleting activities, or by changing durations or logic of existing activities. If the impact schedule shows that incorporating the event modifies the critical path and completion date of the accepted schedule, the difference between schedule completion dates of the two schedules shall be equal to the adjustment of Contract time. The Engineer may construct and utilize an appropriate project schedule or other recognized method to determine adjustments in Contract time until the Contractor provides the TIA.

The Contractor shall allow the Engineer 2 weeks after receipt to approve or reject the submitted TIA. If the TIA is accepted, the contract completion time shall be adjusted accordingly. All approved TIA schedule changes shall be shown on the next update schedule.

If the TIA submitted by the Contractor is rejected by the Engineer, the Contractor shall meet with the Engineer to discuss and resolve issues related to the TIA. If agreement is not reached, the Contractor will be allowed 15 days from the meeting with the Engineer to give notice in conformance with the provisions in Section 3. The Contractor shall only show actual as-built work, not unapproved changes related to the TIA, in subsequent update in schedules. If agreement is reached at a later date, approved schedule changes shall be shown on the next update schedule.

6-1.10 Final Update Schedule. The Contractor shall submit a final update, as-built schedule with actual start and finish dates for the activities, within thirty (30) Calendar Days after completion of the Work. The Contractor shall provide a written certificate with this submittal signed by the Contractor's project manager and an officer of the company stating, "To my knowledge and belief, the enclosed final update schedule reflects the actual start and finish dates of the actual activities for the project contained herein." An officer of the company may delegate in writing the authority to sign the certificate to a responsible manager.

6-1.11 Retention. The City will retain an amount equal to 25 percent of the estimated value of the Work performed during each estimate period in which the Contractor fails to submit an acceptable schedule conforming to the requirements of these Special Provisions as determined by the Engineer. Schedule retentions will be released for payment on the next monthly estimate for partial payment following the date that acceptable schedules are submitted to the Engineer or as otherwise specified herein. Upon completion of all contract work and submittal of the final update schedule and certification, any remaining retained funds associated with this section, "Progress Schedule (Critical Path Method)," will be released for payment. Retentions held in conformance with this section shall be in addition to other retentions provided for in the contract. No interest will be due the Contractor on retention amounts.

6-1.12 Payment. Payment for **Construction Schedule (critical path method)** shall be made as part of the contract lump sum price for Bid Item No. 4 and shall include full compensation for furnishing all labor, materials, equipment, and incidentals, including computer software, and for doing all the work involved in preparing, furnishing, and updating schedules, and instructing and assisting the Engineer in the use of computer software, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

Payment for the construction schedule (critical path method) contract item will be made progressively as follows:

- a) A total of 25 percent of the item amount will be paid upon achieving all of the following:
 - 1) Completion of 5 percent of all contract item work.
 - 2) Software training for Agency staff.
 - 3) Acceptance of all schedules and any time impact analyses required at the time 5 percent of all contract item work is complete.
- b) A total of 50 percent of the item amount will be paid upon completion of 25 percent of all contract item work and acceptance of all schedules and time impact analyses required at the time 25 percent of all contract item work is complete.
- c) A total of 75 percent of the item amount will be paid upon completion of 50 percent of all contract item work and acceptance of all schedules and time

impact analyses required at the time 50 percent of all contract item work is complete.

- d) A total of 100 percent of the item amount will be paid upon completion of all percent of all contract item work and acceptance of all schedules and time impact analyses required at the time all percent of all contract item work is complete, and submittal of the certified final update schedule.

If the Contractor fails to complete any of the work or provide any of the schedules required by this section, the Engineer shall make an adjustment in the compensation in conformance with the provisions in Section 3 "Changes of Work," of the Standard Specifications for the work not performed. Adjustments in compensation for schedules will not be made for any increased or decreased work ordered by the Engineer in furnishing schedules.

Should the Contractor fail to meet the requirements under 6-1 of these Special Provisions, the Engineer reserves the right to withhold payment for work being performed. Furthermore, if after notice is given to the Contractor to perform work to meet these requirements, and the Contractor refuses or for any reason fails to perform sufficiently to meet these schedules, City may withhold or deny payment for work being performed.

6-2 PROSECUTION OF THE WORK.

ADD:

6-2.1 Time of Completion and Forfeiture Due to Delay. The Contractor shall complete the Work called for under the Contract within the time set forth in the Special Provisions.

In accordance with Government Code § 53069.85, Contractor agrees to forfeit and pay to the Agency the amount per day set forth in the Contract for each and every day of delay which shall be deducted from any payments due or to become due the Contractor.

The Agency has endeavored to identify all areas of the site which may contain hazardous waste, as defined by Health and Safety Code § 25117, and unless otherwise noted said hazardous waste in these areas has been mitigated. However, the parties expressly acknowledge the possibility of the existence of further hazardous waste not previously identified. If, during the course of his work, the Contractor encounters any such hazardous waste, he shall promptly notify the Agency through its designated representative. If the material is indeed "hazardous waste" pursuant to Health and Safety Code § 25117, the Agency has the option to have the mitigation work performed by the Contractor or by a separate contract from the work being performed. If the Contractor performs said mitigation work, the cost will be paid for as an addition to the work in accordance with Section 2. To the maximum extent permitted by law, the Agency shall not be liable for any damages beyond an appropriate time extension for delays occasioned by the existence of hazardous waste conditions contemplated herein.

No forfeiture due to delay shall be made because of any delays in the completion of the work due to unforeseeable causes beyond the control and without the fault or negligence

of the Contractor (including but not restricted to acts of nature or of the public enemy, acts of the government, acts of the Agency, or acts of another contractor in the performance of a contract with the Agency, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather). Any such delays, except for acts of the Agency, shall not entitle the Contractor to any additional compensation. The sole remedy of the Contractor shall be an extension of time obtained in accordance with this section.

The Contractor shall, within ten (10) Calendar Days from the beginning of any such delay, notify the Agency Representative in writing of the cause of delay, whereupon the Agency Representative will ascertain the facts and extent of the delay and extend the time for completing the Work if, in his judgment, the findings of the fact justify such an extension, and the Agency Representative's findings of facts thereon shall be final and conclusive.

ADD:

6-2.2 Order of Work Requirements. When required by these Special Provisions or the Plans, the Contractor shall follow the sequence of operations and restrictions as set forth therein.

The Work shall be performed in conformance with the staging of construction shown on the Plans and if indicated below. Subject to approval by the Engineer, non-conflicting work in subsequent stages may proceed concurrently with work in preceding stages, provided satisfactory progress is maintained in the preceding stages of construction. The Engineer's approval of any Contractor-requested modifications to the order of work or staging of the work shall not be grounds for a Change Order request or time extension request by the Contractor. If the Contractor deviates from the specified order of work or the staging plans, it does so at its own risk and shall assume all time impacts and cost associated with such deviations.

6-4 DELAYS AND EXTENSIONS OF TIME

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

The Agency may extend the time fixed for completion of the Work under the Contract from time to time. All applications for extensions of time shall be in writing and shall be filed with the Agency before the expiration of the original time fixed in the Contract or as previously extended.

An extension of time may be granted by the Agency after the expiration of the time originally fixed in the Contract or as previously extended, and the extension so granted shall be deemed to commence and be effective from the date of such expiration. Any extension of time shall not release the sureties upon any bond required under the Contract nor effect forfeitures due to delay.

No extension of time will be granted for delays that are not on the critical path.

6-6 SUSPENSION OF THE WORK.

6-6.1 General. *DELETE in its entirety and SUBSTITUTE with the following:*

The Engineer shall have the authority to suspend the Work wholly or in part, for any time period as the Engineer deems necessary in the interest of Agency, for Agency's convenience, or due to the failure on the part of the Contractor to carry out orders given, or to perform any provision of the Contract. The Contractor shall immediately comply with the written order of the Engineer to suspend the Work wholly or in part. The suspended work shall be resumed as ordered or approved in writing by the Engineer.

Resumption of work shall be predicated on receipt of the following from the Contractor:

- a) A revised schedule showing each task yet to be accomplished and the time line to accomplish each – until final completion.
- b) The work force projections attached to each task listed per workweek.
- c) The cost expenditures attached to each task summarized per each workweek.
- d) Lien releases from each subcontractor, supplier, and vendor to which the Contractor has requested materials, equipment or any other service recognizing the payments received.
- e) An Income and Expense Statement projecting how the Contractor will finance the remainder of the project.

Such suspension shall be without liability to the Contractor on the part of the Agency except as otherwise specified in 6-4.3. For purposes of 6-4.3, delays resulting from suspensions ordered by the Engineer due to the failure on the part of the Contractor to carry out orders given, or to perform any provision of the Contract, shall not be delays for which the Agency is responsible.

In the event that a suspension of Work is ordered as provided above, the Contractor, at the Contractor's expense, shall do all the work necessary to provide a safe, smooth, and unobstructed passageway through construction for use by public traffic during the period of that suspension as provided in 5-7, and as specified in these Special Provisions. In the event that the Contractor fails to perform the work above specified, the Agency will perform that work and, if the suspension is due to Contractor's failure to carry out orders given or to perform any provision of the Contract, the cost thereof will be deducted from monies due or to become due the Contractor.

If a suspension of work is ordered by the Engineer, in accordance with this subsection, the days on which the suspension order is in effect shall be considered working days if those days are working days within the meaning of the definition set forth in 1-2.

The suspension of Work shall not relieve the Contractor of the responsibilities as set forth in the Contract Documents.

6-7 TERMINATION OF THE CONTRACT FOR DEFAULT.

ADD the following:

In the event this Contract is terminated for grounds which are later determined not to justify a termination for breach, such termination shall be deemed to constitute a Termination of the Contract for Convenience pursuant to 6-8.

6-8 TERMINATION OF THE CONTRACT FOR CONVENIENCE.

DELETE in its entirety and SUBSTITUTE with the following:

The Agency reserves the right to terminate the Contract at any time upon a determination by the Engineer that termination of the Contract is in the best interest of the Agency.

If the Agency elects to terminate the Contract, the termination of the Contract and the total compensation payable to the Contractor shall be governed by the following:

- a) The Engineer will issue the Contractor a signed written notice, specifying that the Contract is to be terminated. Upon termination of the Contract, the Contractor will be relieved of further responsibility for damage to the Work (excluding materials) as specified in 4-2 of the Standard Specifications, 5-11 of these Special Provisions and, except as otherwise directed in writing by the Engineer, the Contractor shall:
 - 1) Stop all work under the Contract except that specifically directed to be completed prior to Acceptance.
 - 2) Perform work the Engineer deems necessary to secure the project for termination.
 - 3) Remove equipment and plant from the site of the Work.
 - 4) Take action that is necessary to protect materials from damage.
 - 5) Notify all subcontractors and suppliers that the Contract is being terminated and that their contracts or orders are not to be further performed unless otherwise authorized in writing by the Engineer.
 - 6) Provide the Engineer with an inventory list of all materials previously produced, purchased or ordered from suppliers for use in the Work and not yet used in the Work, including its storage location, and such other information as the Engineer may request.
 - 7) Dispose of materials not yet used in the Work as directed by the Engineer. It shall be the Contractor's responsibility to provide the Agency with good title to all materials purchased by the Agency hereunder, including materials for which partial payment has been made as provided in 7-3.2 and with bills of sale or other documents of title for those materials.

- 8) Subject to the prior written approval of the Engineer, settle all outstanding liabilities and all claims arising out of subcontracts or orders for materials terminated hereunder. To the extent directed by the Engineer, the Contractor shall assign to the Agency all the right, title, and interest of the Contractor under subcontracts or orders for materials terminated hereunder.
 - 9) Furnish the Engineer with the documentation required to be furnished by the Contractor under the provisions of the Contract including, on projects as to which Federal funds are involved, all documentation required under the Federal requirements included in the Contract.
 - 10) Take other actions directed by the Engineer.
- b) Acceptance of the contract as hereinafter specified shall not relieve the Contractor of responsibility for damage to materials. The Contractor shall continue to be responsible for damage to materials after issuance of the Notice of Termination, except as follows:
- 1) The Contractor's responsibility for damage to materials for which partial payment has been made as provided in 7-3.2 and for materials furnished by the Agency for use in the Work and unused shall terminate when the Engineer certifies that those materials have been stored in the manner and at the locations the Engineer has directed.
 - 2) The Contractor's responsibility for damage to materials purchased by the Agency subsequent to the issuance of the notice that the Contract is to be terminated shall terminate when title and delivery of those materials has been taken by the Agency.

When the Engineer determines that the Contractor has completed the Work under the Contract directed to be completed prior to termination and such other work as may have been ordered to secure the project for termination, the Engineer will formally accept the Contract, and immediately upon and after the acceptance by the Engineer, the Contractor will not be required to perform any further work thereon.

- c) Termination of the Contract shall not relieve the surety of its obligation for any just claims arising out of the work performed.
- d) Where Agency terminates the Contract for Agency's convenience and not due to the fault of Contractor, the total compensation to be paid to the Contractor shall be determined by the Engineer based on the following:
 - 1) The reasonable cost to the Contractor, without profit, for all work performed under the contract, including mobilization, demobilization, and work done to secure the project for termination. In determining the reasonable cost, deductions will be made for the cost of materials to be retained by the Contractor, amounts realized by the sale of materials,

and for other appropriate credits against the cost of the work. When, in the opinion of the Engineer, the cost of a contract item of work is excessively high due to costs incurred to remedy or replace defective or rejected work, the reasonable cost to be allowed will be the estimated reasonable cost of performing that work in compliance with the requirements of the Plans and Specifications and the excessive actual cost shall be disallowed.

- 2) A reasonable allowance for profit on the cost of the work performed as determined under part (1) above, provided the Contractor establishes to the satisfaction of the Engineer that it is reasonably probable that the Contractor would have made a profit had the Contract been completed and provided further, that the profit allowed shall in no event exceed 4 percent of the cost.
- 3) The reasonable cost to the Contractor of handling material returned to the vendor, delivered to the Agency or otherwise disposed of as directed by the Engineer.
- 4) A reasonable allowance for the Contractor's administrative costs in determining the amount payable due to termination of the Contract.

All records of the Contractor and the Contractor's subcontractors, necessary to determine compensation in conformance with the provisions in this Section 6-8, shall be open to inspection or audit by representatives of the Agency at all times after issuance of the notice that the Contract is to be terminated and for a period of 3 years, thereafter, and those records shall be retained for that period.

After acceptance of the Work by the Agency, the Engineer may make payments on the basis of interim estimates pending issuance of the final estimate in conformance with the provisions in 7-3.2 and 7-6, when, in the Engineer's opinion, the amount thus paid, together with all amounts previously paid or allowed, will not result in total compensation in excess of that to which the Contractor will be entitled. All payments, including payment upon the final estimate shall be subject to deduction for prior payments and amounts, if any, to be kept or retained under the provisions of the Contract.

THE PROVISIONS IN THIS SECTION 6-8 SHALL BE PHYSICALLY INCLUDED IN ALL SUBCONTRACTS.

6-9 LIQUIDATED DAMAGES. *DELETE in its entirety and SUBSTITUTE with the following:*

Liquidated damages shall be as specified in the Contract.

SECTION 7 – MEASUREMENT AND PAYMENT

REVISE as follows:

7-2 LUMP SUM WORK.

DELETE 2nd paragraph in its entirety.

ADD:

7-2.1 Detailed Schedule. The Contractor shall furnish the Agency a cost break-down for all contract lump sum items. Cost break-down tables shall be submitted to the Agency Representative for acceptance within fifteen (15) days after award of Contract. Cost break-down tables will be approved, in writing, by the Agency Representative before any partial payment will be made for the applicable items involved.

The Contractor shall determine the quantities required to complete the Work shown on the Plans. The quantities and their values shall be included in the cost break-downs submitted to the Agency Representative for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost break-downs submitted for approval.

The sum of the amounts for the line items of work listed in each cost break-down table for each lump sum item shall be equal to the contract lump sum price bid. Overhead and profit shall be included in each individual line item of work listed in a cost break-down table.

No adjustment in compensation will be made in the contract lump sum prices due to differences between the quantities shown in the cost break-downs furnished by the Contractor and the quantities required to complete the Work as shown on the plans and as specified in the Special Provisions.

Individual line item values in the approved cost break-down tables will be used to determine partial payments during the progress of the Work and as the basis for calculating an adjustment in compensation for the contract lump sum items due to changes in line items of work ordered by the Engineer. When the total of ordered changes to line items of work increases or decreases the lump sum price bid by more than twenty-five percent, the adjustment in compensation for the applicable lump sum item will be determined in the same manner specified for increases and decreases in the total pay quantity of an item of work in Section 3 of the Standard Specifications and the Special Provisions.

7-3 PAYMENT

7-3.1 General. *ADD the following at the end of the 2nd paragraph:*

The cost of items of work not listed in the "Schedule of Work" in the Bidders

Proposal shall be considered to be included in the cost of the other work that is listed and no additional compensation will be allowed therefor.

When an item of work is designated as (F) or (S-F) in the "Schedule of Work," the estimated quantity for that item of work shall be the final pay quantity, unless the dimensions of any portion of that item are revised by the Engineer, or the item or any portion of the item is eliminated. If the dimensions of any portion of the item are revised, and the revisions result in an increase or decrease in the estimated quantity of that item of work, the final pay quantity for the item will be revised in the amount represented by the changes in the dimensions. If a final pay item is eliminated, the estimated quantity for the item will be eliminated. If a portion of a final pay item is eliminated, the final pay quantity will be revised in the amount represented by the eliminated portion of the item of work.

The estimated quantity for each item of work designated as (F) or (S-F) in the "Schedule of Work" shall be considered as approximate only, and no guarantee is made that the quantity which can be determined by computations, based on the details and dimensions shown on the Plans, will equal the estimated quantity. No allowance will be made in the event that the quantity based on computations does not equal the estimated quantity.

In case of discrepancy between the quantity shown in the "Schedule of Work" for a final pay item and the quantity or summation of quantities for the same item shown on the Plans, payment will be based on the quantity shown in the "Schedule of Work."

ADD:

7-3.1.1 Application for Payment. The Contractor shall use the City of Irvine Certified Invoice for Progress Payment Form; furnished to the Contractor.

The Contractor shall type the required information, follow the schedule of work and bid prices in accepted Bidder's proposal for unit price contract, execute certification by signature of an authorized officer, use data on accepted Schedule of Values for lump sum work, provide dollar value in each column for each line item for portion of work performed, list each authorized Change Order number and dollar amount and adjusted Contract Price, and obtain the Agency Representative concurrence on invoiced amounts prior to submittal for payment.

The Contractor shall follow the following submittal procedures: Submit original and one (1) copy of each Application for Payment at times stipulated in 7-3.2; submit under transmittal letter; include submittal date, project title and number and submit updated Progress Schedule with Application for verification of progress. Incomplete application for payment will be rejected.

When Agency Representative requires substantiating information, the Contractor shall submit data justifying line item amounts in question.

The Contractor shall provide one copy of data with cover letter for each copy of submittal, show application number and date, and line item by number and description.

7-3.2 Partial and Final Payment. *DELETE in their entirety 1st and 2nd paragraphs and SUBSTITUTE with the following:*

Payment for services will be made monthly on approved invoices, with payment terms of net thirty (30) days upon receipt of invoice. The Contractor shall submit invoices within fifteen (15) days from the end of each month on the form (Certified Invoice for Progress Payment) provided by the Agency. This estimate shall include the value of the total amount of the work completed by the Contractor during the calendar month previous to that in which the estimate is made.

When the Work has been completed to the satisfaction of the Engineer, the Contractor shall make a final estimate of the total amount of work done thereunder and the amount to be paid therefor under the terms of the Contract and shall certify to the Agency the amount of the final estimate. If the Agency finds the Work has been completed according to the Contract, the Agency will accept the work, will file a notice of completion, and will pay the entire sum so found to be due after deducting therefrom all previous payments and all amounts to be retained under the provisions of the Contract and upon receiving signed unconditional releases upon final payment from all subcontractors and material suppliers. All prior progress estimates and payments shall be subject to correction in the final estimate and payment. The project retention release will not be due and payable until the expiration of the 60 days from the date of filing a notice of completion of the Work by the Agency.

Interest penalties are not required on payment delays due to disagreement between the Agency and Contractor over the payment amount or other issues involving contract compliance.

It is mutually agreed between the parties to the Contract that no certificate given or payment made under the Contract shall be conclusive evidence of performance of the Contract and no payment shall be construed to be an acceptance of any defective work or improper materials.

The Contractor further agrees that the payment and acceptance of the final amount due under the Contract shall release the Agency, the Agency Representative, the Engineer, and their consultants from any and all claims or liability arising out of the Contract.

ADD:

7-3.2.1 Agency's Right to Withhold Certain Amounts and Make Application Thereof. In addition to the amount which the Agency may retain under the above article on progress payments, the Agency may withhold a sufficient amount or amounts from any payment otherwise due to the Contractor as in the Agency's judgment may be necessary to cover:

- a) Payments which may be past due and payable for just claims against the Contractor or any subcontractors for labor or materials furnished in or about the performance of the Work on the project under this Contract.

- b) Estimated or actual costs for correcting defective work not remedied.
- c) Amounts claimed by the Agency as forfeiture due to delay or other offsets.
- d) Any other amounts the Agency is authorized to withhold under the Contract Documents or under applicable law.

The Agency may apply such withheld amount or amounts to the payment of such claims in its discretion. In so doing, the Agency shall be deemed the agent of the Contractor and any payments so made by the Agency shall be considered as a payment made under the Contract by the Agency to the Contractor, and the Agency shall not be liable to the Contractor for such payment made in good faith. Such payments may be made without prior judicial determination of the claim or claims. The Agency will render to the Contractor a prior account of such funds disbursed in behalf of the Contractor.

ADD:

7-3.2.2 Substitution of Securities. Upon the Contractor's request, the Agency will make payment of funds withheld from progress payments pursuant to the requirements of Public Contract Code Section 22300 if the Contractor deposits in escrow with a bank acceptable to the Agency, securities eligible for the investment of State funds under Government Code Section 16430 or bank or savings and loan certificates of deposit, upon the following conditions:

- a) The Contractor shall bear the expense of the Agency and the Escrow Agent in connection with the escrow deposit made.
- b) Securities or certificates of deposit to be placed in escrow shall be of a value at least equivalent to the amounts of retention to be paid to the Contractor pursuant to this section.
- c) The Contractor shall enter into an escrow agreement satisfactory to the Agency, such agreement shall include provisions governing inter alia;
 - 1) The amount of securities to be deposited,
 - 2) The providing of powers of attorney or other documents necessary for the transfer of the securities to be deposited,
 - 3) Conversion to cash to provide funds to meet defaults by the Contractor including, but not limited to, termination of the Contractor's control over the Work, stop notices filed pursuant to law, assessment of liquidated damages or other amounts to be kept or retained under the provisions of the Contract,
 - 4) Decrease in value of securities on deposit, and
 - 5) The termination of the escrow upon completion of the Contract.
- d) The Contractor shall obtain the written consent of the surety of such agreement.

7-3.4 Mobilization *DELETE in its entirety and SUBSTITUTE with the following:*

ADD:

7-3.4.1 General. Mobilization shall consist of preparatory work and operations including, but not limited to, those necessary for the movement of personnel, equipment, materials and incidentals to the project site necessary for work on the project and for all other work and operations which must be performed or costs incurred including bonds, insurance, and financing prior to beginning work on the various contract items on the project site.

Mobilization shall also include the cost, time and labor to move the necessary construction equipment to and from the job site, supervisory time on the job by the Contractor's personnel to keep the construction site in a safe condition, and all other related work as required for all non-working days during the course of construction. Contractor is responsible for securing an adequate storage site for equipment and materials.

The Contractor shall have on the work site at all times, as its agent, a competent English-speaking superintendent capable of reading and thoroughly understanding the plans, specifications, other related documents, and directions from Agency's Representative.

ADD:

7-3.4.2 Measurement and Payment. Mobilization is eligible for partial payment if the Contract includes a bid item for mobilization. Payment for **Mobilization** shall be made as part of the contract lump sum price for Bid Item No. 4 and shall include obtaining and paying for all permits and business licenses as required from the City of Irvine, State of California and other agencies. The City of Irvine will waive its permit fee. The Contractor shall comply with the requirements specified by each license or permit. No payment for Mobilization will be made until the Contractor's Construction Schedule has been submitted, reviewed and accepted and is current. Progress payments for this item shall be paid in accordance with the percentage completion of the project, and shall include the costs of such mobilization and administration for the entire contract period including construction schedule as specified in these specifications. Payments shall be made upon the basis of the following:

- a) When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 5 percent or more of the original contract amount, 50 percent of the contract item price for mobilization or 5 percent of the original contract amount, whichever is the lesser, will be included in the estimate for payment.
- b) When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 10 percent or more of the original contract amount, the total amount earned for mobilization shall be 75 percent of the contract item price for mobilization or 7.5 percent of the original contract amount, whichever is the lesser, and that amount will be included in the estimate for payment.

- c) When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 20 percent or more of the original contract amount, the total amount earned for mobilization shall be 95 percent of the contract item price for mobilization or 9.5 percent of the original contract amount, whichever is the lesser, and that amount will be included in the estimate for payment.
- d) When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 50 percent or more of the original contract amount, the total amount earned for mobilization shall be 100 percent of the contract item price for mobilization or 10 percent of the original contract amount, whichever is the lesser, and that amount will be included in the estimate for payment.
- e) Upon completion of all work on the project, payment of any amount bid for mobilization in excess of 10 percent of the original contract amount shall be paid.

7-3.5 Contract Unit Prices

7-3.5.1 General. *ADD the following after the 3rd paragraph:*

In the case of such an increase or decrease in a Major Bid Item, the use of this basis for the adjustment of payment will be limited to that portion of the change, which together with all previous changes to that item, is not in excess of twenty-five percent of the total cost of such item based on the original quantity and Contract Unit Price.

7-3.5.2 Increases of More Than 25 Percent. *MODIFY to ADD the following:*

If payment for units of a bid item that exceeds 125 percent of the price shown on the Bid Item List is less than \$5,000 at the unit price, the Engineer may not adjust the unit price unless asked to do so in writing by the Contractor.

7-3.7 Agreed Prices. *ADD the following after the 1st sentence:*

Agreed prices shall be negotiated before commencement of the changed work.

7-4 PAYMENT FOR EXTRA WORK

7-4.2 Basis for Establishing Costs.

7-4.2.3 Tool and Equipment Rental. *DELETE the 2nd paragraph in its entirety and SUBSTITUTE with the following:*

The rates to be used for determining equipment rental costs shall be those rates listed for such equipment in the State of California, Department of Transportation (Caltrans) publication entitled "Equipment Rental Rates and Labor Surcharge", which is in effect on the date upon which the work is accomplished, regardless of ownership and any rental or other agreement entered into by the Contractor, if such may exist, for the use of such equipment. If it is deemed necessary by the Engineer to use equipment not listed in the said publication, the Engineer will establish a suitable rental rate for such equipment. The

Contractor may furnish any cost data, which might assist the Engineer in the establishment of such rental rate. Equipment Rental Rates and Labor Surcharge publication is available from Caltrans at <https://dot.ca.gov/programs/construction>. Rental time will not be allowed while equipment is inoperative due to breakdowns.

Operators of rented equipment will be paid for as provided in 7-4.

7-4.3 Markup.

7-4.3.1 Work by the Contractor. *DELETE in its entirety and SUBSTITUTE with the following:*

The following percentages will be added to the Contractor's costs as determined under 3-3.2.2 and shall constitute the markup for all overhead, increase in Contractor's bonds, administrative expenses, and profit on work by the Contractor:

- a) Labor _____ 20%
- b) Materials _____ 15%
- c) Equipment Rental _____ 15%
- d) Other Items and Expenditures__ 15%

7-4.3.2 Work by a Subcontractor. *DELETE in its entirety and SUBSTITUTE with the following:*

When any part of the extra work is performed by a subcontractor, of any tier, the markup established in 7-4.3.1 shall be applied to the subcontractor's actual cost of such work. Contractor markup on subcontractor work shall be limited to five percent.

No payment shall be made for any item not set forth in 7-4.3.1 and 7-4.3.2, including without limitation, Contractor's overhead, general administrative expense, supervision or damages claimed for delay in prosecuting the remainder of the work.

This provision shall not be construed to preclude the recovery of damages by the Contractor stemming from delay for which the Agency is responsible, which is unreasonable under the circumstances involved, and which was not within the contemplation of the Agency and the Contractor.

7-4.4 Daily Reports. *ADD the following after the 1st sentence:*

The Contractor shall notify the Agency Representative at the beginning of each day when extra work is in progress. No payment will be made for work not verified by the Agency Representative.

ADD:

7-6 RESOLUTION OF CONSTRUCTION CLAIMS.

Any claims submitted by the Contractor against the Agency for Work covered by this Contract in the amount of \$375,000 or less shall be subject to the procedures specified in Public Contract Code § 20104, *et seq.*

ADD:

7-7 PROMPT PAYMENT.

In addition to requirements specified elsewhere, the following shall also apply: Subsection (f) of Section 20104.50 of the Public Contract Code, Article 1.7 of Part 3 of Division 2.

ARTICLE 1.7

§ 20104.50 Timely progress payments; legislative intent; interest; payment requests:

- a) It is the intent of the Legislature in enacting this section to require all local governments to pay their Contractors on time so that these Contractors can meet their obligations. In requiring prompt payment by all local governments, the Legislature hereby finds and declares that the prompt payment of outstanding receipts is not merely a municipal affair, but is instead a matter of statewide concern.
- b) It is the intent of the Legislature in enacting this article to fully occupy the field of public policy relating to the prompt payment of local governments' outstanding receipts. The Legislature finds and declares that all government officials, including those in local government, must set a standard of prompt payment that any business in the private sector which may contract for services should look towards for guidance.
- c) Any local agency which fails to make any progress payment within 30 days after receipt of an undisputed and properly submitted payment request from a contractor on a construction contract shall pay interest to the contractor equivalent to the legal rate set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure.
- d) Upon receipt of a payment request, each local agency shall act in accordance with both of the following:
 - 1) Each payment request shall be reviewed by the local agency as soon as practicable after receipt for the purpose of determining that the payment request is a proper payment request.
 - 2) Any payment request determined not to be a proper payment request suitable for payment shall be returned to the Contractor as soon as practicable, but not later than seven days, after receipt. A request returned pursuant to this paragraph shall be accompanied by a

document setting forth in writing the reasons why the payment request is not proper.

- e) The number of days available to a local agency to make a payment without incurring interest pursuant to this section shall be reduced by the number of days by which a local agency exceeds the seven-day return requirement set forth in paragraph (2) of subsection (c).
- f) For purposes of this article:
 - 1) A “local agency” includes, but is not limited to, a city, including a charter city, a county, and a city and county, and is any public entity subject to this part.
 - 2) A “progress payment” includes all payments due Contractors, except that portion of the final payment designated by the Contract as retention earnings.
 - 3) A payment request shall be considered properly executed if funds are available for payment for the payment request, and payment is not delayed due to an audit inquiry by the financial officer of the local agency.
- g) Each local agency shall require that this article, or a summary thereof, be set forth in the terms of any contract subject to this article.

SECTION 8 – FACILITIES FOR AGENCY PERSONNEL

8-1 GENERAL.

ADD the following after the 4th paragraph:

Prior to installation of field office, the Contractor shall consult with Agency Representative on location, access, and related facilities. The facilities shall be structurally sound, weather tight, with floors raised above ground.

At Contractor's option, portable or mobile buildings may be used. Mobile homes, when used, shall be modified for office use. Mobile homes shall not be used for living quarters.

The Contractor shall pay fees and charges for applications, permits, and building inspections for installation.

The Contractor shall fill and/or grade site for temporary structures to provide surface drainage. Construct temporary field office on proper foundations, provide connections for utility services. Secure portable or mobile buildings when used. Provide steps and landings at entrance doors. Provide suitable and safe access.

With approval from the Agency Representative, the Contractor shall remove the temporary field office, contents and services when no longer needed. The Contractor shall remove foundations and debris and restore site to required elevations and clean the areas.

8-2.1 Class "A" Field Office. *ADD the following before the 1st paragraph:*

The office for Agency Representative shall be a separate space for sole use of the Agency with lockable entrance door and two (2) keys.

Interior lighting shall be provided at desk and table. Exterior lighting shall be provided at entrance door.

All items above in 8-1 apply.

PART 2 – CONSTRUCTION MATERIALS

SECTION 201 – CONCRETE, MORTAR, AND RELATED MATERIALS

REVISE as follows:

201-1.3.3 Concrete Specified by Class and Alternate Class. *ADD the following to Table 201-1.3.3:*

Headwall, Concrete Class 560-C-3250

SECTION 214 – TRAFFIC STRIPING, CURB AND PAVEMENT MARKINGS AND PAVEMENT MARKERS

REVISE as follows:

214-4 PAINT FOR STRIPING AND MARKINGS.

214-4.1 General. *MODIFY to ADD the following:*

All paint, beads, and other materials used in painting traffic stripes and markings shall conform to the requirements of the State Standard Specifications, Section 84 and all other applicable sections. Certificates of Compliance for each material shall be submitted prior to use on this Contract.

214-5 THERMOPLASTIC MATERIAL FOR TRAFFIC STRIPING AND MARKINGS.

214-5.1 General. *After the first paragraph, ADD the following:*

Green thermoplastic material must be PreMark ViziGrip as manufactured by Ennis-Flint. You may obtain PreMark ViziGrip from the manufacturer:

ENNIS-FLINT
115 TODD COURT
THOMASVILLE, NC 27360
<http://www.ennisflintamericas.com/>
(800) 331-8118

214-6 PAVEMENT MARKERS. *MODIFY to ADD the following:*

All pavement markers, and other materials used in painting traffic stripes and markings shall conform to the requirements of the State Standard Specifications, Section 81, Section 84 and all other applicable sections. Certificates of Compliance for each material shall be submitted prior to use on this Contract.

214-6.1 Types of Markers. *MODIFY to ADD the following:*

Reflective pavement markers shall conform to the following:

- a) Type B, 2-Way Clear Reflective Markers shall be Model 290-2W as manufactured by 3M Company or approved equal.
- b) Type C, 2-Way Red-Clear Reflective Markers shall be Model 290-WR as manufactured by 3M Company or approved equal.
- c) Type D, 2-Way Yellow Reflective Markers shall be Model 291-2Y as manufactured by 3M Company or approved equal.
- d) Type G, 1-Way Clear Reflective Markers shall be Model 290-W as manufactured by 3M Company or approved equal.

- e) Type H, 1-Way Yellow Reflective Markers shall be Model 291-Y as manufactured by 3M Company or approved equal.
- f) Type I, Blue - 2-Way Blue Reflective Markers shall be Model 295-2B as manufactured by 3M Company or approved equal.

PART 3 – CONSTRUCTION METHODS

SECTION 300 – EARTHWORK

REVISE as follows:

300-4.1 General. *MODIFY to ADD the following:*

Fill should consist of approved earth materials free of trash debris, roots, vegetation, or other deleterious material.

300-4.2 Preparation of Placement Areas. *DELETE the last part of the 2nd sentence and SUBSTITUTE with the following:*

. . . to a relative compaction of at least 90 percent.

SECTION 314 – TRAFFIC STRIPING, CURB AND PAVEMENT MARKINGS, AND PAVEMENT MARKERS

REVISE as follows:

314-1 GENERAL.

After the last paragraph, ADD the following:

Apply PreMark ViziGrip Green thermoplastic material under the manufacturer's instructions.

314-2 REMOVAL OF TRAFFIC STRIPING AND CURB AND PAVEMENT MARKINGS.

314-2.1 General. *MODIFY to ADD the following:*

All conflicting striping, pavement markings, and curb paint shall be removed by wet sandblasting or other approved method prior to installation of new striping. All conflicting raised pavement markers shall be removed.

Pavement that is damaged due to removal of markers or striping shall be repaired to the satisfaction of the Agency Representative.

314-4 APPLICATION OF TRAFFIC STRIPING AND CURB AND PAVEMENT MARKINGS.

314-4.1 General. *MODIFY to ADD the following:*

The Contractor shall furnish and apply traffic stripes and pavement markings as shown on the Plans and as directed by the Agency's Representative. Placement of striping and markings shall conform to the requirements of Section 84 of the State Standard Specifications, latest edition, the City of Irvine Standard Plans and these Special Provisions.

Signing and striping shall conform to part 2 signs & part 3 markings of the (MUTCD), latest edition, these Plans and Special Provisions.

Detail 9 lane line striping pattern in part 3 markings shall be used on all multilane streets regardless of street design speed.

Pavement legends shall match the City stencils (Hawkins stencils or equivalent).

All striping and pavement markings shall be reflectorized and applied in two coats. A minimum of seven days shall be provided between first and second coats.

The Contractor shall contact the City of Irvine inspection services for inspection 48 hours prior to beginning of construction.

Contractor shall verify all existing conditions and dimensions before starting work. If conditions exist which are contrary to those shown on these Plans, the City of Irvine inspection services shall be notified before proceeding with work.

Striping shall be cat tracked and approved by the Agency Representative prior to final installation.

Crosswalk shall conform to the City of Irvine Standard Plan No. 203.

314-4.3.6 Measurement and 314-4.3.7 Payment. *DELETE and SUBSTITUTE with the following:*

314-4.3.6 Measurement and Payment. Full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in painting pavement markings, complete in place, as shown on the Plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer is included in the contract lump sum price for Bid Item No. 4 and no additional compensation will be allowed therefor.

314-5 PAVEMENT MARKERS.

314-5.4 Placement. *MODIFY to ADD the following:*

All pavement markers shall comply with Sections 81 and 84 of the State Standard Specifications. Non-reflective markers shall be ceramic. All new markers shall have glass faces or be 3M series 290.

Blue raised reflective pavement marker shall be installed adjacent to all existing fire hydrants in accordance with the latest MUTCD.

314-5.6 Measurement and 314-5.7 Payment. *DELETE and SUBSTITUTE with the following:*

314-5.6 Measurement and Payment. Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing pavement marker, complete in place, as shown on the Plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer is included in the contract lump sum price for Bid Item No. 4 and no additional compensation will be allowed therefor.

Full compensation for removal of existing pavement markers and placing temporary pavement markers is included in the contract **LUMP SUM** price paid for Bid Item No. 4 and no additional compensation will be allowed therefor.

PART 4 – EXISTING IMPROVEMENTS

SECTION 400 – PROTECTION AND RESTORATION

REVISE as follows:

400-1 GENERAL. *ADD the following before the 1st paragraph:*

Material shown on the Plans or designated in the Special Provisions which is to be salvaged or used in the reconstructed work and which has been damaged or destroyed as a result of the Contractor's operations, shall be repaired or replaced by the Contractor at his expense.

ADD:

400-1.1 Preservation of Property. The Contractor shall exercise due care to avoid injury to existing improvements or facilities, utility facilities, adjacent property, and trees and shrubbery that are not to be removed.

All damage done to existing improvements by the Contractor shall be repaired by him to the satisfaction of the Engineer. Where sidewalks, curbs or gutters are to be repaired, the repairs shall be made by removing and replacing the damaged section back to the nearest scoring lines.

All trees and shrubbery that are not to be removed, and pole lines, fences, signs, survey markers and monuments, buildings and structures, conduits, pipelines under or above ground, sewer and waterlines, all highway or street facilities, and any other improvements of facilities within or adjacent to the work shall be protected from injury or damage, and the Contractor shall provide and install suitable safeguards to protect such objects from injury or damage. If such objects are injured or damaged by reason of the Contractor's operation, they shall be replaced or restored at the Contractor's expense to a condition as good as when the Contractor entered upon the work or as good as required by the Plans and Specifications if any such objects are a part of the work being performed.

The fact that any such pipe or other underground facility is not shown on the Plans shall not relieve the Contractor of his responsibility under this article. It shall be the Contractor's responsibility to ascertain the existence of any underground improvement or facilities which may be subject to damage by reason of his operations.

In addition to any requirements imposed by law, the Contractor shall shore up, brace, underpin, and protect as may be necessary, all foundations and other parts of all existing structures adjacent to and adjoining the site of the work which are in any way affected by the excavations or other operations connected with the performance of the Work.

Whenever any notice is required to be given by the Agency or the Contractor to any adjacent or adjoining landowner or other party before commencement of any work, such notice shall be given by the Contractor.

ADD:

400-1.2 Video Recording and Photographing of Pre-existing Conditions. The Contractor shall video record and photograph pre-existing conditions of the project site prior to any construction activities such as, but not limited to:

- a) Property markers
- b) Right of way and easement conditions
- c) Utility markings and USA markings
- d) Existing property damages
- e) Survey conditions
- f) Pavement conditions, markings, and striping
- g) Adjacent property conditions
- h) Sidewalk, median, curb, and gutter conditions
- i) Safety conditions
- j) Unusual conditions or equipment
- k) Existing landscape conditions (including vegetation and irrigation) along the project limit.

The Contractor shall submit recordings/photographs on CD, DVD or USB media to the Engineer no later than (five) 5 Working Days after Notice to Proceed.

Payment for video recording and photographing services shall be included in the various Bid Items and no additional compensation will be allowed therefor.

SECTION 402 – UTILITIES

REVISE as follows:

ADD:

402-0 GENERAL. For purposes of this Section 402, the terms referenced below are defined as follows:

An “unidentified” underground main or trunk line utility is one that is not indicated at all on the Plans, and a “misidentified” underground main or trunk line utility is one that is not indicated on the Plans with reasonable accuracy (a “misidentification”). An underground main or trunk line utility is indicated on the Plans with reasonable accuracy unless its actual location is substantially and materially different from that indicated on the Plans.

The term “rearrangement” of utilities means the relocation, alteration, reinstallation, and/or reconstruction of utilities (including removal of existing utilities incidental thereto) as necessary in order to accommodate the Work. Whenever in this Section 402 reference is made to any one or more of these rearrangement activities, such reference shall be deemed to include all other such activities as required in order to accommodate the Work.

402-1 LOCATION. *MODIFY to ADD the following:*

A list of utility companies that have facilities located within or near the construction area is included in the Special Provisions. The Engineer has endeavored to determine the existence of utility substructures at the site of the Work by reviewing the records of the owners of known utilities in that vicinity and consulting with those owners, and based on that information has indicated on the Plans those utility substructures (except for service connections) that may affect the Work.

The Contractor acknowledges that the utility information provided on the Plans and Special Provisions has not been verified and may not be accurate or complete. Except as expressly provided in this Section 402, the Contractor may not rely upon such utility information and the City assumes no responsibility for its accuracy or completeness. Changed conditions within the scope of 2-9 do not include utilities.

The Contractor shall determine the exact location (both horizontal and vertical), type, and size of all existing utilities, including service connections, prior to commencing work which could result in damage to such utilities or could otherwise affect or be affected by such utilities or interfere with the service they provide. Where underground main distribution conduits such as water, gas, sewer, electric power, telephone or cable television are shown on the Plans, the Contractor shall assume that every adjacent property parcel will be served by a service connection for each type of utility shown. The Contractor shall do such investigation, research, surveys, and potholing as the Contractor deems necessary to make such determinations. The Contractor shall immediately notify the Engineer as to any utility discovered by it which is in a different position than indicated on the Plans or is not indicated at all on the Plans.

The Contractor's cost of locating any unidentified or misidentified underground main or trunk line utility will be paid for as an addition to the Work in accordance with Section 2; provided, however, that the Contractor will not be entitled to such additional compensation if the existence and location (with reasonable accuracy) of such utility was (or should have been) known to the Contractor as of the date on which the Bids were due or could otherwise have been inferred at that time from the presence of visible facilities such as buildings, meters, junction boxes or identifying markers. The cost of locating all other utilities shall be considered as included in prices in the Bid for other items of the Work.

The information regarding underground and internal utilities and appurtenances which the Contractor is required to record in the Record Documents as specified in 5-10 shall include (but not be limited to) the accurate locations of underground utilities determined pursuant to this 402-1 and remaining in place, as well as utilities rearranged by either the Contractor or the utility owners.

At least two (2) Working Days prior to commencing any excavation, the Contractor shall contact the regional notification center (Underground Service Alert of Southern California [USA] at 1-800-422-4133) to obtain an inquiry identification number. The Contractor shall comply in all respects with California Government Code § 4216 *et seq.*

Caltrans is not required by Section 4216 *et seq.* to become a member of the regional notification center. The Contractor shall contact Caltrans for the location of its subsurface installations. In addition, the Contractor shall be aware that non-pressurized sewer lines, non-pressurized storm drains, and other non-pressurized drain lines are not required by § 4216 *et seq.* to be marked by the respective owners. The Contractor shall contact those utility owners as necessary to locate their subsurface installations.

The Contractor shall request the City of Irvine Traffic Operations Division at 949-724-7649 to locate any existing traffic signal conductors and interconnect within the construction area before performing Work that may affect or be affected by the existing facilities.

Except as expressly provided in this Section 402 with respect to unidentified or misidentified underground main or trunk line utilities, the failure of any utility company to accurately mark its facilities shall not be justification for a time extension or for additional compensation from the City.

The Contractor shall obtain photographs of all markings made by its forces as well as all USA markings. All such photographs shall show the subject markings in relation to one or more identifiable landmarks that will remain in place after completion of the Work and completion of any utility removal and/or rearrangement work in the vicinity.

The right is reserved to governmental agencies and to the owner of utilities to enter at any time upon any street, alley, right of way, or easement for the purpose of maintaining and making repairs to their property.

402-1.2 Payment. *DELETE in its entirety and SUBSTITUTE with the following:*

Payment for utility location by the Contractor shall be included in the various items of work and no additional compensation will be allowed therefor.

402-2 PROTECTION. *DELETE in its entirety and SUBSTITUTE with the following:*

The Contractor shall not interrupt the service function or disturb the support of any utility without authority from the utility owner or direction from the Engineer. Valves, switches, vaults, and meters shall be maintained readily accessible for emergency shutoff.

Where protection is required to ensure support of utilities potentially impacted by the Work, the Contractor shall, unless otherwise specified on the Plans or in the Special Provisions, furnish and place the necessary protection and support.

Any additional cost incurred by the Contractor for protecting and supporting an unidentified underground main or trunk line utility or resulting from the misidentification of an underground main or trunk line utility will be paid for as an addition to the Work in accordance with Section 2, unless such utility's existence and location (with reasonable accuracy) was (or should have been) known to the Contractor as of the date on which the Bids were due or could otherwise have been inferred at that time from the presence of visible facilities such as buildings, meters, junction boxes or identifying markers. The cost of protecting and supporting all other utilities shall be considered as included in prices in the Bid for other items of the Work.

The Contractor shall immediately notify the Engineer and the utility owner if any utility is disturbed or damaged in the course of the Work. The Contractor shall, if directed by the Engineer, restore, repair or replace any such disturbed or damaged utility.

For any unidentified or misidentified underground main or trunk line utility that is disturbed or damaged in the course of the Work, the cost of restoration, repair or replacement incurred by the Contractor, if not made necessary by the Contractor's failure to perform its obligations pursuant to the Contract Documents (including without limitation Section 402-1) or to otherwise exercise reasonable care, will be paid for as an addition to the Work in accordance with Section 2. Except where additional compensation is allowed pursuant to this paragraph, all utilities disturbed or damaged in the course of the Work shall be restored, repaired or replaced at the Contractor's cost and expense, either by the utility owner or by the Contractor.

To the maximum extent permitted by law, all obligations of the Contractor stated in 5-4.2 shall apply in the case of any claims or liabilities (as defined therein) that may be asserted or claimed by any person or entity arising out of any disturbance or damage to utilities caused by the act or omission of the Contractor, whether or not such utilities are accurately marked either on the Plans or by the utility owner in the field, and whether or not there is concurrent active or passive negligence on the part of City and/or City Personnel, but excluding any such claims or liabilities arising from the sole active negligence or willful misconduct of City or City Personnel. All claims and liabilities for which

the Contractor is responsible pursuant to this paragraph are sometimes referred to herein as "Utility Damage Claims."

When placing concrete around or contiguous to any non-metallic utility installation, the Contractor shall at its expense:

- a) Furnish and install a 2-inch (50 mm) cushion of expansion joint material or other similar resilient material; or
- b) Provide a sleeve or other opening which will result in a 2-inch (50 mm) minimum-clear annular space between the concrete and the utility; or
- c) Provide other acceptable means to prevent embedment in or bonding to the concrete.

Where concrete is used for backfill or for a structure which would result in embedment, or partial embedment, of a metallic utility installation; or where the coating, bedding or other cathodic protection system is exposed or damaged by the Contractor's operations, the Contractor shall notify the Engineer, shall arrange to secure the advice of the affected utility owner regarding the procedures required to maintain or restore the integrity of the system, and shall implement such procedures at the Contractor's expense.

402-4 RELOCATION. *DELETE in their entirety 2nd and 3^d paragraphs and SUBSTITUTE with the following:*

If utilities are found to interfere with the Work after award of the Contract, such utilities will be rearranged by the respective utility owners, or the Engineer may order the Contractor to perform such rearrangement, as an addition to the Work in accordance with Section 2. Alternatively, the Engineer may order changes in the Work to avoid such interference, in accordance with Section 2. All work by the Contractor on utilities shall be done to the reasonable satisfaction of the utility owner as well as complying with the requirements of the Contract Documents.

When the Plans or Special Provisions provide for the Contractor to rearrange a utility as part of the Work, all costs for such work shall be considered included in the Bid for the items of work necessitating such work. However, if an underground main or trunk line utility to be rearranged by the Contractor is misidentified in the Plans, any additional cost incurred by the Contractor for such work resulting from the misidentification shall be treated as an addition to the Work in accordance with Section 2, unless the utility's location (with reasonable accuracy) was (or should have been) known to the Contractor as of the date on which the Bids were due or could otherwise have been inferred at that time from the presence of visible facilities such as buildings, meters, junction boxes or identifying markers. Except as provided in this paragraph, the Contractor shall not be entitled to any additional compensation on account of inaccuracies in the Plans with respect to rearrangements of utilities that are included in the Work.

Temporary or permanent rearrangement of utilities requested by the Contractor for its convenience shall be its responsibility and the Contractor shall make all arrangements

necessary for such work and bear all related costs. The Contractor shall not be entitled to any additional compensation on account of any such utilities or work.

ADD the following at the beginning of the last paragraph:

The provisions of this paragraph are subject to the provisions of the previous paragraph. Where the Plans or Special Provisions provide for the Contractor to rearrange any service connections, such work is considered included in the Bid for the items of work necessitating such work.

402-5 DELAYS DUE TO UTILITY CONFLICTS. *DELETE in its entirety and SUBSTITUTE with the following:*

The construction schedule developed in accordance with 6-1 shall allow adequate time for the necessary protection, removal, and rearrangement of utilities by either the utility owner or the Contractor, as applicable. For work to be performed by a utility owner, the construction schedule shall allow for the time period required by the utility owner for such work. The Contractor shall notify the Engineer in writing of any subsequent changes in the construction schedule which will affect the time available for protection, removal, or rearrangement of utilities, and shall obtain the Engineer's approval of such changes.

The Contractor will not be entitled to any extensions of the Contract time or compensation for damages incurred due to delays attributable to utilities at the site of the Work except as otherwise provided in 6-4.1 or as provided below. Delays described below will not be considered delays for which the City is responsible within the meaning of 6-4.3.

- a) Subject to 6-4.2 and 6-4.4, the Contractor shall be entitled to an extension of the Contract time to the extent that any delay in the Work is directly attributable to an unidentified underground main or trunk line utility or the misidentification of an underground main or trunk line utility in the Plans, unless the utility's location (with reasonable accuracy) was (or should have been) known to the Contractor as of the date on which the Bids were due or could otherwise have been inferred at that time from the presence of visible facilities such as buildings, meters, junction boxes or identifying markers. If the Contractor is entitled to such a time extension, the Contractor also shall be entitled to compensation for idle time of equipment on account of such delay, determined by the Engineer in the same manner as determinations are made for equipment used in the performance of Extra Work in accordance with Section 2. The Contractor shall not be entitled to any other compensation or damages on account of such delay.
- b) The Contractor may be given an extension of time (but no additional compensation) for unforeseen delays attributable to failure of a utility owner to complete utility rearrangement work within the time period reasonably scheduled for such work in the construction schedule, or to timely complete utility rearrangement work which the Contract Documents indicate will be completed in advance of the Contractor's construction operations.

The Contractor shall not be entitled to any time extension or additional compensation for any delays or losses described in 402-5: (a) to the extent resulting from the Contractor's actions or omissions or which could have been avoided by any reasonable means, such as the judicious handling of forces, equipment or plant, or (b) arising in connection with utilities being rearranged for the Contractor's convenience. The determination of what damages the Contractor could have avoided will be made by the Engineer.

The Contractor shall immediately notify the Engineer of any delays to the Contractor's operations described in 402-5. Delays described in 402-5 are not considered right of way delays within the scope of 2-3.

ADD:

402-7 CONTRACTOR RESPONSIBILITIES.

The Contractor shall:

- a) Cooperate with utility personnel; provide access to work site.
- b) Coordinate Work of the Contract with affected utilities. All USA markings shall be removed after completion of the work for which the markings were provided, and before Agency's Acceptance and/or approval of the Work.
- c) Asphalt concrete pavement not overlaid or slurry sealed as part of the project bid items which is damaged by trenching, potholing or where the contractor otherwise damages pavement shall be slurry sealed after the pavement section is repaired. "Perpendicular" street cuts shall be slurry sealed ten (10) feet each side of the cut and for "longitudinal" cuts shall be slurry sealed from pavement lane to pavement lane line for the entire damaged area or as directed by the Agency Representative. Type I slurry shall be used on non-arterial streets and Type II slurry shall be used on arterial streets. Damaged traffic striping, legends and markers shall also be replaced if damaged. "Patchwork" application of slurry shall be avoided by joining closely grouped areas of slurry applications. Compensation for this requirement shall be considered as included in the prices paid for the related items of work and no additional compensation will be allowed therefor.

ADD:

402-8 PERMANENT UTILITIES. Contractor shall contact and make all arrangements with utility owners and coordinate all provisions for installation and connection of all permanent utilities that are necessary for the Work, such as, but not limited to, natural gas, electricity, water, sewer, and telephone. All costs for such installation and connection, as well as costs for operating permanent utilities prior to acceptance of the Work by the Agency, shall be considered as included in the prices in the Bid for the related items of work.

PART 6 – TEMPORARY TRAFFIC CONTROL

SECTION 600 – ACCESS

REVISE as follows:

600-2 VEHICULAR ACCESS. *DELETE in its entirety and SUBSTITUTE with the following:*

Vehicular access to residential driveways shall be maintained to the property line except when necessary construction precludes such access for reasonable periods of time. If backfill has been completed to the extent that safe access may be provided, and the street is opened to local traffic, the Contractor shall immediately clear the street and driveways and provide and maintain access.

Safe, adequate, continuous, and unobstructed vehicular access shall be maintained to fire hydrants, residences, commercial and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, bus stops, hospitals, etc., unless otherwise approved by the Engineer.

During non-working hours or when work is not scheduled, all roadway lanes shall be returned to their full traffic use by backfilling and paving open trenches unless otherwise approved by the Engineer. At the end of the workday, the Contractor shall remove all Traffic Control Devices not in use.

The Contractor shall replace vehicle loop detectors damaged by the Contractor's operations, at its own expense within 24 hours of the damage. The Contractor shall replace existing loop detectors, shown on the plans to be replaced, within 24 hours from when they are removed from service.

Should the Contractor fail to replace the vehicle loop detectors within 24 hours from when they are damaged or removed from service, or the installed signal loops are not functional, the Agency, at its option and at the Contractor's sole cost and expense, may install such temporary detection methods as may be necessary. The Agency will deduct cost of such work from any monies due the Contractor. Failure of the Agency, however, to install such temporary detection methods, shall not relieve the Contractor of his full responsibility for public safety per 5-7 of the Standard Specifications and the Special Provisions.

If the Contractor proposes temporary alternate detection methods, video or wireless, the Contractor shall provide submittals of the alternate methods for acceptance by the Engineer in accordance with 3-8 of the Standard Specifications and the Special Provisions. The cost for providing all temporary detection methods shall be as included in the various items of Work and no additional compensation will be allowed therefor.

600-3 PEDESTRIAN ACCESS.

DELETE in its entirety and SUBSTITUTE with the following:

Safe, adequate, continuous and unobstructed pedestrian access shall be maintained to sidewalks, cross walks, residences, commercial and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, hospitals, etc., unless other arrangements satisfactory to the Agency have been made by the Contractor and accepted by the Agency. Pedestrian access and paths shall meet federal, state, and Agency ADA requirements.

ADD:

600-4 CONSTRUCTION PARKING CONTROL.

The Contractor shall control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, owners operations, or construction operations, and monitor parking or construction personnel private vehicles by maintaining free vehicular access to and through parking areas and prohibit parking on or adjacent to access roads, or in non-designated areas.

ADD:

600-5 SITE ACCESS.

When entering or leaving roadways carrying public traffic, contractors' equipment, whether empty or loaded, shall in all cases yield to public traffic.

The Contractor shall comply with the following City of Irvine truck route restrictions:

DESIGNATED TRUCK ROUTES – ORD. NO. 92-09

<u>Name of Street</u>	<u>Portion Designated</u>
a) Alton Parkway	Sand Canyon Avenue to Irvine Boulevard
b) Bake Parkway	Rockfield Boulevard to easterly City limit
c) Barranca Parkway	Red Hill Avenue to Jamboree Road
d) Campus Drive	Jamboree Road to MacArthur Boulevard
e) Irvine Boulevard	Culver Drive to Jeffrey Road
f) Irvine Boulevard	Alton Parkway to easterly City limit
g) Jamboree Road	Warner Avenue to MacArthur Boulevard
h) Laguna Canyon Road	Alton Parkway to State Route 133

- | | |
|---------------------------|--|
| i) Laguna Freeway (133) | |
| j) MacArthur Boulevard | Daimler Street. to Campus Drive |
| k) MacArthur Boulevard | Jamboree Road to Ford Road |
| l) Main Street | Jamboree Road to westerly City limit |
| m) Red Hill Avenue | Barranca Parkway to San Diego Fwy. (I-405) |
| n) Rockfield Boulevard | Bake Parkway to easterly City limit |
| o) Sand Canyon Avenue | San Diego Fwy. (I-405) to northerly City limit |
| p) San Diego Fwy. (I-405) | |
| q) Santa Ana Fwy. (I-5) | |

RESTRICTED ROUTES, SEVEN TON (14,000 POUNDS) GROSS WEIGHT - ORD. NOS. 92-09 AND 98-16

<u>Name of Street</u>	<u>Portion Designated</u>
a) Campus Drive	Jamboree Road to University Drive
b) Culver Drive	Santa Ana Fwy. (I-5) to northerly City limit
c) Jeffrey Road	Irvine Center Drive to Santa Ana Fwy. (I-5)
d) Jeronimo Road	Goodyear to 400 feet westerly of Bake Pkwy.
e) Toledo Way	Goodyear to 400 feet westerly of Bake Pkwy.
f) Trabuco Road	400 feet easterly of the northbound Santa Ana Freeway off-ramp near Culver Drive and the easterly City limits
g) Walnut Avenue	Harvard Avenue to Culver Drive
h) Harvard Avenue	Walnut Avenue to Irvine Center Drive

THREE TON (6,000 POUNDS) GROSS WEIGHT - ORD. NO. 92-09

<u>Name of Street</u>	<u>Portion Designated</u>
a) Bonita Canyon Road/Shady Canyon	Newport Coast Drive to Sunnyhill
b) Culver Drive	Michelson Drive to Bonita Canyon Road

c) University Drive

Ridgeline Drive to Harvard Avenue

SECTION 601 – TEMPORARY TRAFFIC CONTROL FOR CONS. & MAINT. WORK ZONES

REVISE as follows:

601-1 GENERAL.

DELETE in its entirety and SUBSTITUTE with the following:

The Contractor shall provide and maintain all construction area traffic controls in accordance with Part 6 of the Standard Specifications, the latest version of the (MUTCD), and Work Area Traffic Control Handbook (WATCH), and these Special Provisions.

Portable delineators (traffic cones are not allowed) which conform to the current California Manual of Uniform Traffic Control Devices (CA MUTCD) shall be spaced as necessary for proper delineation of the travel way. The spacing between delineators shall not exceed 50 feet. The minimum lane transitions shall be a 50 to 1 taper unless otherwise shown on the plans. Double base delineators will be required.

If the portable delineators are damaged, displaced or are not in an upright position, from any cause, said portable delineators shall immediately be replaced or restored to their original location, in an upright position, by the Contractor.

Where construction detours and signing conflict with existing signing, the Contractor shall cover existing signs in a manner approved by the Agency's Representative. The Contractor shall also provide temporary traffic delineation per Section 601-4 at the conclusion of each working day, if not sooner, as approved by the Agency's Representative, for any centerline, painted median or lane line which is obliterated by construction.

The Contractor shall provide temporary delineation as directed/accepted. Temporary delineation shall include removal of conflicting markings by accepted means; installation and removal of temporary centerlines or lane lines, detour signing, barricading; and replacement of traffic lines and markings in their proper locations upon termination of the detour. Conflicting existing and temporary striping, as required for traffic control during construction, shall be removed by the Contractor by methods accepted by the Engineer. Blacking out the pavement will not be allowed. Temporary reflective striping tape may be used, except that it shall not be applied to final asphalt surfaces. Tape shall be removed from temporary surfaces prior to placement of additional asphalt.

The Contractor shall maintain a 24-hour emergency service to remove, install, relocate, and maintain warning devices and shall furnish to the Agency's Representative, names and telephone numbers of three persons responsible for this emergency service. In the event the Contractor does not promptly respond when notified, the Agency may make corrections at Contractor's expense.

Each workday, the Contractor shall ensure traffic control is in place prior to starting construction.

Should the Contractor appear, in the opinion of the Engineer, to be lacking in providing adequate warning devices and protective measures as above provided, the Engineer may direct attention to the existence of a hazard, and the necessary warning and protective measures shall be furnished and installed by the Contractor, at his/her expense. Should the Engineer point out the inadequacy of warning and protective measures, such action on the part of the Engineer shall not relieve the Contractor from responsibility for public safety or abrogate its obligation to furnish and pay for these devices.

The Contractor shall notify local Police and Fire Departments of its intent to begin work at each location at least ten (10) days before work is to begin. The Contractor shall cooperate with local authorities relative to handling traffic through the area. The Contractor shall also coordinate with OCTA to ensure the safe operation of buses and access to bus stops in the construction area.

No work that interferes with public traffic shall be performed except during the hours specified for lane closures 601-6.6.

Existing traffic loop detector replacement shall be required as necessary such that no traffic signal loop is out of operation at the end of the workday. The cost for providing all temporary traffic signal loop detectors shall be included into the various related items of work and no additional compensation will be allowed; this includes traffic signal loop detectors damaged by the Contractor's operations not designated for replacement in the contract plans.

Areas requiring edge cold mill shall be cold milled not more than three (3) Calendar Days prior to AC paving. Areas requiring digouts shall be repaved and open for traffic at the end of the same day.

The Contractor shall maintain access to all driveways at all times.

601-2 TRAFFIC CONTROL PLAN (TCP).

601-2.1 General.

DELETE in their entirety 2nd, 4th and 5th paragraphs and SUBSTITUTE with the following:

The Contractor shall provide a plan prepared and stamped by registered civil engineer in the State of California for approval by the Agency prior to commencing Work of the Contract. Allow a minimum of fifteen (15) Working Days for the first Agency review and ten (10) Working Days for subsequent reviews.

The Contractor shall legibly indicate the following information on a reproducible drawing.

- a) All lane closures and/or detours anticipated during construction.

- b) Temporary signage, striping and delineation.
- c) Special traffic control requirements.

The Contractor shall submit two (2) prints of approved drawings to Agency Representative and retain one (1) print at construction site.

601-2.2 Payment.

MODIFY to ADD the following:

Payment for **Traffic Control** shall be made as part of the contract lump sum price for Bid Item No. 4 and shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for preparing traffic control plans, doing all the work involved in all temporary traffic control related work involving placing, removing, storing, maintaining, moving to new locations, replacing and disposing of the components of traffic control system, complete in place, temporary Asphalt Concrete including installation and removal; all associated temporary signing and striping; flashing arrow signs; flagging and/or flagger costs; and project notifications, as shown on the Plans, as specified in the Standard Specifications and these Special Provisions, and as approved by the Engineer.

ADD:

601-7 STREET CLOSURE, DETOURS, BARRICADES.

Unless shown on the plans, no street closure shall be allowed.

The Contractor shall construct the proposed improvements to minimize public inconvenience. The Contractor shall provide ADA accessible pedestrian detours around construction areas.

The Contractor shall have all Traffic Control Devices properly installed prior to commencing construction and shall maintain these devices to ensure proper flow and safety of traffic while working in the street.

The contractor shall be responsible for any additional Traffic Control Devices deemed necessary by the Engineer to assure public safety at all times.

ADD:

601-8 STORAGE OF EQUIPMENT.

Unless otherwise authorized in writing by the Engineer, construction materials may not be stored in streets, roads, or highways beyond the end of each Working Day. No equipment shall be stored within limits of the acquired temporary construction easements at any time.

Construction equipment shall not be stored at the work site before its actual use on the Work nor for more than two (2) Calendar Days after it is no longer needed on the Work. Time necessary for repair or assembly of equipment may be authorized by the Agency.

Excavated materials, except that which is to be used as backfill in the adjacent trench, may not be stored in public streets, roads, temporary construction easements, or highway unless otherwise permitted. After placing backfill, all excess material shall be removed immediately from the site.

The Contractor shall submit an equipment-staging plan for approval by the Engineer. The plan shall address the use of private property for the staging, unloading, loading, and storing of equipment. The Contractor shall obtain an agreement from private property owners prior to the start of the project. The agreement shall release and hold the Agency, the Engineer, the Agency Representative and their consultants harmless from claims for damages. Failure to file a plan or obtain written approval from private property owners is considered a breach of Contract and subject to all remedies and enforcement procedures specified in the Contract Documents.

ADD:

601-9 TRAFFIC REGULATIONS.

601-9.1 General. Furnish, install, and maintain Traffic Control Devices, equipment, materials, and other safeguards to provide safe and effective work areas, and to warn, control, protect and expedite vehicular and pedestrian traffic.

On daily basis, remove temporary traffic delineation, signage and other devices when no longer required. Restore areas to original or to specified conditions.

601-9.2 Related Requirements. Traffic control work and Traffic Control Devices for construction shall conform to the latest edition of:

- a) MUTCD
- b) Work Area Traffic Control Handbook (WATCH manual)
- c) Standard Specifications
- d) O.S.H.A. requirements
- e) California Vehicle Code

601-9.3 Construction Area Signs. The Contractor shall:

- a) Use only signs that conform to the dimension, color, legend, reflectorization and lighting requirements of the current WATCH, MUTCD and the Contract Documents.
- b) All sign panels shall be the product of a commercial sign manufacturer, but need not be new. Used sign panels clean and in good repair, as determined by the Agency Representative, may be used.
- c) Sign panels for portable signs may be metal, cotton drill fabric, flexible industrial nylon fabric or other approved fabric.

- d) Temporary stop signs shall have a minimum clearance of seven (7) ft. from bottom of sign to existing ground or pavement.
- e) Further requirements as discussed in the Contract Documents.

601-9.4 Flaggers. The Contractor shall provide flaggers as deemed necessary by the Engineer to give adequate warning to traffic or to the public of any dangerous conditions to be encountered, and employ only flaggers trained in flagging fundamentals and procedures referred to in the "Flagger Handbook" available on the Internet at the following website: <https://dot.ca.gov/programs/construction/safety-traffic/flagging-handbook>. Payment for flagging is considered as included in the various items of work and no additional compensation will be allowed therefor.

601-9.5 Temporary Closure of Existing Traffic Lanes. Unless the traffic control, working hours and lane requirements are modified in the Special Provisions, the following requirements shall be followed

- a) When permitted by the Engineer, one (1) lane on each roadway adjacent to the working area may be closed to public traffic. Use of reflective or lighted traffic delineators to direct traffic away from excavations or other obstructions will be considered as a lane closure.
- b) A minimum of one (1) lane of traffic, twelve (12) feet wide, fourteen (14) feet wide if a lane is adjacent to an outside curb, in each direction, shall be maintained through the work area at all times.
- c) A minimum of two (2) lanes of traffic, each being twelve (12) feet wide, fourteen (14) feet wide if a lane is adjacent to an outside curb, in each direction, shall be maintained through the work area at all times when the work area is within a major arterial highway unless otherwise approved.
- d) When work is in progress within three (3) feet of a lane being used by public traffic, Contractor shall close the lane adjacent to the work. Reflective or lighted traffic delineators shall be placed to direct public traffic around the construction area in accordance with the requirements of this section. During non-working hours or when work is not in progress, position and maintain reflective traffic delineators in the 1 to 1-1/2 foot width of the existing traffic lane adjacent to the work.
- e) On roads open to public travel, temporary lane closures are limited between the hours of 9:00 a.m. and 3:00 p.m. Closures of roads on Sundays, holidays, or between the hours of 3:00 p.m. and 9:00 a.m. are prohibited unless otherwise approved by the Engineer.

All Traffic Control Devices used between dusk and 6:00 a.m. shall be lighted or reflectorized. Agency approved arrow board(s) shall be used to direct public traffic on all roads.

Prior to the start of each work day, the Contractor shall perform all necessary work incidental to and commensurate with the proper signing, detouring, barricading, etc., that is required for that particular day's schedule of operations. No construction shall be permitted until such signing and detouring operations have been completed.

601-9.6 Lane Requirements/Working Hours.

Working Hours:

Monday through Friday: 7:00 a.m. to 7:00 p.m.

Saturday: 9:00 a.m. to 6:00 p.m.

Sunday: No work permitted

Legal holidays: No work permitted

Work requiring lane closures may be in progress during the following hours:

Monday through Friday: 9:00 a.m. to 3:00 p.m.

Saturday: 9:00 a.m. to 3:00 p.m.

Sunday: No work permitted

Legal holidays: No work permitted

Lane closures are permitted and will only occur in accordance with the lane closure chart below, unless otherwise approved by the Engineer.

CHART NO. 1																									
McGaw Avenue Lane Closure Chart																									
Lane Requirements																									
City: Irvine																									
Closure Limits: Westbound and eastbound between Gillette Avenue and Von Karman Avenue																									
From Hour to Hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	N	N	N	N	N	N	N	N	N	N	1	1	1	1	1	1	N	N	N	N	N	N	N	N	N
Fridays	N	N	N	N	N	N	N	N	N	N	1	1	1	1	1	1	N	N	N	N	N	N	N	N	N
Saturdays	N	N	N	N	N	N	N	N	N	N	1	1	1	1	1	1	N	N	N	N	N	N	N	N	N
Sundays	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Legend:																									
1 Provide at least one (1) lane open in direction of travel on McGaw Avenue.																									
N No lane closure allowed																									
REMARKS:																									
1. The Closure starts with the first cone down and ends with the last cone picked up.																									
2. No closure signs shall be exposed to public traffic more than 15 minutes before or after a closure, except as otherwise indicated in the special provisions.																									
3. Construction safety zone guidelines shall apply at all times.																									
4. Traffic control and traffic control devices shall be in accordance with the latest edition of MUTCD and WATCH.																									

601-9.7 Closure Schedule. The Engineer shall be provided a list of any street lane closures, ramp closures, trail closures, sidewalk closures or detours for review and acceptance at least three (3) weeks advance of the closure.

Contractor shall submit a written schedule of planned closures utilizing the closure schedule request form, furnished by the Engineer. The closure schedule shall show the number of lanes, locations and times of the proposed closures, a precise description of work to be performed. Closure schedules submitted to the Engineer with incomplete or inaccurate information will be rejected and returned for correction and resubmittal. The Contractor will be notified of disapproved closures or closures that require coordination with other parties as a condition of approval.

Upon approval of the closure schedule by the Engineer and at least three (3) Working Days in advance of closing a lane, the Contractor shall notify the Police, Fire, Orange County Transportation Authority (OCTA) bus service, the Agency Representative and all other affected jurisdictional agencies, and comply with their requirements.

Closure schedule amendments, including adding additional closures, shall be submitted by noon to the Engineer, in writing, at least five (5) Working Days in advance of a planned closure. Approval of closure schedule amendments will be at the discretion of the Engineer.

The Engineer, the Police, Fire, Orange County Transportation Authority (OCTA) bus service, and all other affected jurisdictional agencies shall be notified of cancelled closures two (2) Working Days before the date of closure

The Contractor shall notify by email the City of Irvine four (4) Working Days prior to commencing any work within 250 feet of any signalized intersection (measured from the nearest cross street curb), implementing any road closure, and/or implementing any detour of traffic. Email notifications shall be sent to roadworkcoordination@cityofirvine.org.

Closures that are cancelled due to unsuitable weather may be rescheduled at the discretion of the Engineer.

601-9.8 Late Reopening of Closures and Required Contingency Plan. If a closure is not reopened to public traffic by the specified time, work shall be suspended in conformance with the provisions in 6-6 of the Special Provisions. No further closures shall be made until the Engineer has accepted a contingency plan, submitted by the Contractor that will ensure future closures will be reopened to public traffic at the specified time. A detailed contingency plan shall be prepared and submitted to the Engineer within one business day of the Engineer's request. The Engineer will have two (2) Working Days to accept or reject the Contractor's proposed contingency plan. The Contractor will not be entitled to compensation for the suspension of work resulting from the late reopening of closures.

601-9.9 Compensation. The Engineer shall be notified of delays in the Contractor's operations due to the following conditions:

- a) The Contractor's proposed closure schedule is denied and his planned closures are within the time frame allowed for closures in the Special Provisions, except that the Contractor will not be entitled to compensation for amendments requested by the Contractor to the closure schedule that are not approved.
- b) The Contractor is denied a confirmed closure.

If, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of these conditions, and the Contractor's loss due to that delay could not have been avoided by rescheduling the affected closure or by judicious handling of forces, equipment and plant, the delay will be considered a right of way delay and will be compensated in conformance with the provisions in 2-8 of the Standard Specifications and the Special Provisions.

Should the Engineer direct the Contractor to remove a closure before the time designated in the approved closure schedule, delay to the Contractor's schedule due to removal of the closure will be considered a right of way delay and compensation for the delay will be determined in conformance with the provisions in 2-3 of the Standard Specifications and these Provisions.

ADD:

601-10 AUTHORITY OF AGENCY REPRESENTATIVE.

Provisions of this section may be modified or altered if, in the opinion of the Agency Representative, public traffic will be better served and work expedited.

601-10.1 Execution. The Contractor shall field check all temporary traffic control signs, barricades, and other devices at least three (3) times every day, including Saturdays, Sundays and holidays to insure their proper maintenance and conformance to the Contract Documents and detailed instructions by the Agency Representative.

Should Contractor fail to properly place and/or maintain delineated lane closures or work areas, the Agency, at its option and at Contractor's sole cost and expense, may place delineation, barricades, or other devices, as may be necessary, to protect the public. Agency may in its discretion withhold the cost of such work from any monies due the Contractor at an amount equal to the rates shown below:

Delineation

Delineator	\$2.00/day plus-labor & equipment
Lighted Barricade	\$5.00/day plus-labor & equipment
8 Foot Wood Barricade	\$7.50/day plus-labor & equipment
Temporary Signs	\$25.00/day plus-labor & equipment
Type III Barricade	\$10.00/day plus-labor & equipment

Labor (2 Hour Minimum) – Regular Time

Lead Street Maintenance Technician	\$52.88
Street Maintenance Technician	\$40.82
Equipment Operator I	\$46.14
Equipment Operator II	\$49.74
Street Maintenance Supervisor	\$62.99
Street Superintendent	\$79.80

Equipment

Arrow Board	\$15.00/hour
Pickup	\$10.00/hour
Sweeper	\$45.00/hour
5-Yard Dump	\$25.00/hour
Loader	\$25.00/hour
Water Truck	\$25.00/hour
1-Ton Truck	\$10.00/hour

Agency shall have no obligation to Contractor with respect to Agency's decision whether or not to exercise Agency's options pursuant to this subsection.

ADD:

601-11 PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS).

Portable changeable message signs shall be furnished, placed, operated, and maintained as designated by the Engineer in conformance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the State Standard Specifications and these Provisions. The Contractor shall furnish **(2) (Two)** PCMS. PCMS shall be in place a minimum of two (2) weeks prior to start of construction.

601-11.1 Payment. Full compensation for conforming to the requirements for **PCMS**, including furnishing all labor, tools, equipment, materials and incidentals required for doing all the work involved in furnishing, installing, maintaining, relocating, changing sign message (regardless of the number of times directed by the Engineer), replacing, repairing, and when no longer required, removing of all PCMS as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, shall be made as part of the contract lump sum price for Bid Item No. 4 and no separate compensation will be allowed therefor.

601-12 FLASHING ARROW SIGNS.

Flashing arrow sign shall be mounted on a truck or on a trailer and shall be capable of operating while the vehicle is moving or as directed by the Engineer. Signs mounted on the cab of a truck shall be mounted to provide a minimum of 7 feet between the bottom of the sign and the roadway. Signs mounted on a trailer, or on anything other than the cab of a truck, shall be mounted to provide a minimum of 8 feet between the bottom of the sign and the roadway.

The total weight of trailer mounted flashing arrow sign including the trailer, sign, power source and other components shall not exceed 1,500 pounds and the height of the level trailer bed shall be no higher than 21 inches above the roadway. The trailer shall be equipped with a minimum of 3 leveling jacks.

Electrical energy to operate the sign shall be obtained from the vehicle on which the sign is mounted. The supply of electrical energy shall be capable of operating the sign in the manner specified. The electronic circuitry shall provide between 30 and 45 complete operating cycles of the sign per minute in each of the modes specified.

Alternative types of lamps may be used in flashing arrow signs if visibility is equal to the specified lamps. Each type AX flashing arrow sign shall be a minimum of 2 feet high and 4 feet wide, and shall be furnished with flat black enamel. A minimum of 13 No. 4414AX 12-volt, yellow or amber lamps shall be installed in the panel. The lamp configuration shall be for 3 arrowheads or an arrow shaft with 2 arrowheads, one pointing in each direction on the face of the sign with a minimum of 5 lamps forming each arrowhead. Each lamp shall be provided with a visor.

The lamp shall be activated by a switch on a control panel and shall be controlled by electronic circuitry to provide a minimum of 4 selectable modes of operation as follows:

Pass Left Mode – Sequencing of lighted arrowheads or sequencing the lamps forming the arrow shaft and arrowhead to the left or a flashing left arrow with the lamps in the arrow shaft and arrowhead flashing on and off simultaneously.

Pass Right Mode – Sequencing of lighted arrowheads or sequencing the lamps forming the arrow shaft and arrowhead to the right or a flashing right arrow with the lamps in the arrow shaft and arrowhead flashing on and off simultaneously.

Simultaneous Mode – Either the outside arrowheads pointing in opposite directions are continuously illuminated, except for the center lamp forming each arrowhead, while the arrow shaft lamps flash on and off simultaneously or the outside arrowhead pointing in opposite directions and the arrow shaft lamps all flash simultaneously to indicate passing on either side.

Travel Mode – Travel or caution mode shall flash in a manner not resembling any other mode.

Full compensation for conforming to the requirements of this section shall be considered as part of Bid Item **No. 4** and no additional compensation will be allowed therefor.

PART 8 – LANDSCAPING AND IRRIGATION

SECTION 800 – MATERIALS

REVISE as follows:

800-1 LANDSCAPING MATERIALS.

800-1.2 Soil Fertilizing and Conditioning Materials

800-1.2.3 Commercial Fertilizer. *DELETE entire section and SUBSTITUTE with the following:*

Commercial fertilizer for back fill mix shall be free-flowing material delivered in unopened sacks. Material which becomes caked or otherwise damaged shall not be used. Exact composition and type of fertilizer to be determined by the agronomic soils test and will be supplied by the Contractor at no additional cost to the City. Organic/JTM Complete is the city's preferred fertilizer.

Organic/JTM fertilizer application applied at the following rates:

For pre-plant landscape application (Turf and Groundcover)	Apply 30 pounds per 1000 square feet		
Container Size	1 gallon	5 gallon	15 gallon
Application Rates	2 oz.	6 oz.	19 oz.

800-1.2.4 Organic Soil Amendment. *DELETE entire section and SUBSTITUTE with the following:*

Organic Soil Amendment for back fill mix shall be Type 1. Nitrogen Stabilized Organic soil amendment shall be redwood sawdust free of shavings or particles of other woods such as fir or pine, supplied in bulk and 0.5% nitrogen stabilized by standard techniques. An acceptable substitute is nitrogen stabilized fir or cedar sawdust ground to 0-1/4" particle size and 1.0% nitrogen stabilized.

800-1.2.5 Mulch. *DELETE entire section and SUBSTITUTE with the following:*

Contractor shall install 2" thick layer of mulch in all planter areas. Install mulch per Irvine standard plan #601, 602, 606, and 607. Mulch to be installed after the planting of shrubs.

The Contractor shall maintain a 6" clear "no-mulch" zone around the base of each new and existing shrub and tree.

Mulch to be "Forest Floor" (0-2"), or approved equal:

a) Available from

Tierra Verde Industries
7913 Marine Way
Irvine, CA 92618
(949) 551-0363

- b) Product shall be woodchips ½" to 3" in length, meet Caltrans Standard Specifications 20-2.08 for Mulch, contain only toxic free mineral based colorant, **and contain reused City of Irvine Green Waste.**
- c) The Contractor shall submit one sample of mulch materials for City approval.
- d) The Engineer has the right to reject all samples and request additional samples until a suitable mulch material is approved.

800-1.4 Plants. ADD the following:

Contractor to provide 1-year guarantee for all shrubs.

800-1.4.1 General. DELETE entire section and SUBSTITUTE with the following:

Shrubs and ground covers shall be grown by an established nursery having been in the business of growing shrubs and ground covers a minimum of five (5) years. At the option of the Engineer, plants shall be inspected and tagged at the nursery prior to shipment to the planting site. Shrubs shall be of the specified type and size, selected from high quality, well-shaped nursery stock. Plant names indicated or listed in the "Plant Legend" on the Plans, conform to the approved names given in "An Annotated Checklist of Woody Ornamental Plants in California, Oregon, and Washington, Manual 4091", published by the University of California (1979), and in accordance with American Nurseryman standards. Except for names not covered therein, the established custom of the nursery shall be followed. Condition of plants shall be in accordance with the California State Department of Agriculture's regulations for nursery inspections, rules, and grading and shall be symmetrical, typical for variety and species, sound, healthy, vigorous, free from plant disease, insect pests, or their eggs, and shall have healthy normal root systems, well filling their containers, but not to the point of being root bound.

Plants shall not be pruned prior to delivery, except as authorized by the City. The size of the plants shall correspond with that normally expected for species and variety of commercially available nursery stock, or as specified on the Plans. The minimum acceptable size of all plants, measured before pruning with the branches in normal position, shall conform to the measurements, if any, specified on the Plans. Plants larger in size than specified may be used with the approval of the City, but the use of larger

plants shall not serve as the basis for a change order. All plant material shall be subject to the inspection and acceptance of the City before planting. A representative number of plants as determined by the City may be inspected for size and condition of root growth, insects, injuries and defects. Plants not accepted are to be removed from the site immediately and replaced with suitable plants. The City reserves the right to reject entire lots of plants represented by defective samples. The contractor shall provide a plant material order invoice to the Engineer at the preconstruction meeting.

800-1.6 Miscellaneous Landscape Materials. *ADD the following Section:*

800-1.6.1 General. Whenever a material or process is delineated or specified by patent, proprietary name or process, or manufacturer's name, such specifications are used for the purpose of facilitating the description of material or process desired. Approved equals are acceptable as approved by the engineer. Suppliers and manufacturer's directions, specifications and recommendations will be followed in all cases where the materials used furnish directions and cover points not delineated on the Plans or in the Specifications. The specifications only indicate the quality and workmanship to be performed rather than a detailed description of the performance of the work. In the event of any discrepancies between the Plans or Specifications, the final decision as to which will be followed shall be made by the Engineer. In the event the installation is contradictory to the direction of the Engineer, the installation shall be rectified by the Contractor at no additional cost to the City.

All workmanship and materials incorporated shall be the best available grade of their respective kind. Provide a sample of each material specified. Accepted samples may be used in the Work. Submit three (3) sets of a type written list of materials as specified to the Engineer within twenty-one (21) days after award of contract. This list shall give the name, material number, and the manufacturer, and shall be accompanied by cut sheets or reproductions of catalog pages for all of the material to be installed. Approval of substitutions will not relieve the Contractor from complying with the requirements of the Contract Documents, Plans and Specifications. Pay at Contractor's sole expense for all changes caused by approved substitution which affect other items of work.

800-1.6.2 Herbicide. All herbicides shall be organic. Organic herbicide for weed abatement shall be Suppress EC, or approved equal.

800-1.6.3 Pre-emergent. Pre-emergent weed control material shall be Organic.

800-2 IRRIGATION SYSTEM MATERIALS.

800-2.1.3 Plastic Pipe for Use with Solvent Weld Socket or Threaded Fittings.

DELETE 2nd Paragraph and REPLACE with the following:

All pressure supply lines downstream of the strainer assembly unit shall be Schedule 40 solvent weld PVC 1-1/2" or smaller and Class 315 solvent weld PVC for 2" or larger. Piping shall conform to ASTM 1785. All non-pressure lines downstream of the remote control valve shall be Schedule 40 solvent weld PVC conforming to ASTM D1785. Pipe shall be marked continuously with manufacturer's name, nominal pipe size,

schedule or class, PVC type and grade, National Sanitation Foundation approval, Commercial Standards designation, and date of extrusion. All plastic pipe shall be extruded of an improved PVC virgin pipe compound in accordance with ASTM D2241 or ASTM D1785.

All solvent weld PVC fittings shall be standard weight Schedule 80 and shall be injection molded of an improved virgin PVC fitting compound. Slip PVC fittings shall be the "deep socket" bracketed type. Threaded plastic fittings shall be injection molded. All tees and angled fittings shall be side gated.

All fittings shall conform to ASTM D2466. All threaded nipples shall be standard weight Schedule 80 with molded threads and shall conform to ASTM D1785.

All solvent cementing of plastic pipe and fittings shall be a two-step process, using primer and solvent cement applied per the manufacturer's recommendations. Cement shall be of a fluid consistency, not gel-like or ropy. Solvent cementing shall be in conformance with ASTM D2564 and ASTM D2855. When connection is plastic to metal, female adapters shall be hand tightened, plus one turn with a strap wrench. Joint compound shall be non-lead base Teflon paste, tape, or approved equal.

800-2.2.2 Gate Valves. *DELETE entire section and SUBSTITUTE with the following:*

Gate valves shall be of the manufacturer, size, and type indicated on the Plans.

800-2.2.4 Remote Control Valves. *DELETE entire section and SUBSTITUTE with the following:*

Automatic control valves shall be of the manufacturer, size, and type indicated on the Plans. Automatic control valves shall be electrically operated. Drip zone valves shall be accompanied with pressure regulators and filters per the manufacturer.

800-2.2.7 Valve Boxes. *DELETE entire section and SUBSTITUTE with the following:*

Valve boxes shall be fabricated from a durable, weather-resistant plastic material resistant to sunlight and chemical action of soils. The valve box cover shall be green in color and secured with dual locks to be supplied. The cover and box shall be capable of sustaining a load of 1,500 pounds. Valve box extensions shall be by the same manufacturer as the valve box. Automatic control valve boxes shall be rectangular and sized per plan. Valve box covers shall be marked "RCV" with the valve identification number "heat branded" onto the cover in 2 inch high letters / numbers. Gate valve boxes shall be 10" circular size. Valve box covers shall be marked with either "GV" "heat branded" onto the cover in 2 inch high letters. Line flushing valve boxes shall be 10" circular size. Valve box covers shall be marked with either "FV" "heat branded" onto the cover in 2 inch high letters. Heat branding method, craftsmanship, and lettering orientation to be approved by city prior to branding lids.

800-2.2.8 Line Flushing Valves. *ADD the following Subsection:*

Line flushing valves shall be the size and type as indicated on the plans.

800-2.4 Sprinkler Equipment. *DELETE entire section and SUBSTITUTE with the following:*

Irrigation heads and nozzles shall be of the manufacturer, size, type, with radius of throw, operating pressure, and discharge rate indicated on the Plans. Irrigation heads and nozzles shall be used as indicated on the Plans.

Drip line shall be of the manufacturer, size, type with discharge rate, emitter spacing and operating pressure as indicated on the Drawings. All fittings, line flushing valves and anchor staples shall be of the same manufacturer as the drip line.

800-2.5 Miscellaneous Landscape Materials. *ADD the following Section:*

All materials supplied for this project shall be new and free from any defects. All defective materials shall be replaced immediately at no additional cost to City. After award of contract and before any irrigation system materials are delivered to the job site, submit to the Engineer a complete list of all irrigation systems, materials, or processes proposed to be furnished and installed as part of this Contract. Show manufacturer's name and catalog number for each item, furnish complete catalog cuts and technical data, furnish the manufacturer's recommendations as to the method of installation. No substitutions will be allowed without prior written acceptance by the Engineer. Manufacturer's warranties shall not relieve the Contractor of liability under the guarantee. Such warranties shall only supplement the guarantee. If the Contractor wishes to substitute any equipment or materials for equipment or materials listed on the irrigation Drawings and Specifications, it may do so by providing the following information to the Engineer for approval:

- a) Provide a written statement indicating the reason for making the substitution.
- b) Provide catalog cut sheets, technical data, and performance information for each substitute item.
- c) Provide in writing the difference in installed price if the item is accepted.

The contractor shall furnish all materials as specified in the plans and specifications and turn over a fully functional irrigation system complete with programming as coordinated by the City and accommodating for the new irrigation controller within the new landscape.

Additionally, the contractor shall be responsible for repairing any landscape damaged or removed for the purpose of installation of the irrigation.

All irrigation materials provided and installed shall be specifically designed and manufactured for use within reclaimed irrigation systems.

800-3 ELECTRICAL MATERIALS.

800-3.2.2 Conductors. *DELETE entire section and SUBSTITUTE with the following:*

Remote control wire shall be direct-burial AWG-UF type, size as indicated on the Drawings, and in no case smaller than 14 gauge. Connections shall be Scotchlok 3M DBY Direct Bury Splice Kit per city std. plan 516. Kit shall include a Scotchlok Y Spring connector, a Polypropylene tube prefilled with waterproof sealing gel. Ground wires shall be white in color. Control wires shall be red (where two or more controllers are used, the control wires shall be a different color for each controller. These colors shall be noted on the "Record Drawings" Plans located on controller door). The Contractor shall provide 4 spare control wires per City of Irvine Landscape Manual, Section V Irrigation Specifications (under Products and Installation, item 24, item c).

800-3.3 Controller Unit. *DELETE entire section and SUBSTITUTE with the following:*

The Controller unit shall be of the manufacturer, and type indicated on the plans.

SECTION 801 – INSTALLATION

REVISE as follows:

801-2 EARTHWORK AND TOPSOIL PLACEMENT.

801-2.2 Topsoil Preparation and Conditioning.

801-2.2.1 General. *DELETE 1st sentence in the 4th paragraph, and ADD at end of section the following:*

WEED ABATEMENT OPERATIONS. The irrigation system, soil preparation operations, and finish grade shall be approved by the Engineer prior to weed abatement operations.

Contractor shall operate the irrigation system to keep planting areas uniformly moist for a period of two (2) weeks (14 calendar days). At the end of the two (2) week period, Contractor shall spray all visible weeds with an approved organic, non-selective, post emergent herbicide. Application rate and method shall be recommended by the manufacturer. After spraying, planting areas shall remain unwatered for a minimum of forty-eight (48) hours.

After seven (7) calendar days from the chemical application, weeds and debris shall be disposed of off-site.

Contractor shall apply spray chemicals when air currents are still; preventing drifting onto adjoining property and preventing any toxic exposure to persons whether or not they are in or near the project.

After weed abatement operations, and as determined by the Engineer, planting areas shall be scarified to a depth not to exceed one inch (1").

Weeds and debris shall be disposed of off-site.

801-2.2.2 Fertilizing and Conditioning Procedures. *ADD the following after the last paragraph:*

Fertilizing and soil amendment guidelines under agronomic soils testing shall be used for bidding purposes for planting areas, however, Contractor shall amend it as necessary per the soils test report at no additional cost to the City.

801-2.3 Finish Grading. *DELETE 2nd paragraph and ADD the following after the last paragraph:*

Finish grades are existing having been previously established the contractor shall maintain the existing finished grade elevations. Finish grading will only be required in raking out/feathering spoils from planting installations.

801-4 PLANTING.

801-4.1 General. *ADD the following after the last paragraph:*

Prior to excavation for planting or placing of stakes, locate all utilities, electric cables, conduits, underground irrigation lines, heads, valves and valve control wires, and all utility lines so that proper precautions may be taken not to damage such improvements. In the event of a conflict between utilities and plant locations, promptly notify the Engineer who will arrange for one or the other to be relocated. If contractor fails to follow this procedure it shall repair all damages resulting from the work at contractor's sole expense. Plant materials shall be furnished in the quantities and/or spacing as shown or noted for each location, and shall be of the species, kinds, sizes, etc., as symbolized, and/or described in the Plant Legend, as indicated on the Plans. Verify all sizes and quantities on the Plans. Promptly report any discrepancy to the Engineer.

Any plant material or any development materials specified by trade name or equal, shall be according to these Plans and Specifications. Installation and use of substitute items shall not be made until the Contractor is in receipt of written approval from the Engineer. Substitution proposals for plant material must be accompanied by written proof of non-availability within a five hundred mile radius of the project site for material originally specified and proof that material was ordered in a timely manner upon award of contract. Regularly water all nursery stock in containers and place them in a cool area protected from sun and drying winds. Do not allow plants to dry out before or while being planted. Keep exposed roots moist by means of wet sawdust, peat moss or burlap at all times during planting operations. Do not expose roots to the air except while being placed in the ground. Wilted or diseased plants, whether in place or not, will not be accepted and shall be replaced at the Contractor's sole expense. Moisten prepared surface immediately prior to installing plant material. Install plant material immediately after delivery to site, within 24 hours after delivering to prevent deterioration. Hand water landscaped areas immediately after installation with a minimum of 1" of water.

801-4.5 Tree and Shrub Planting. *DELETE 4th paragraph and REPLACE with the following:*

In the event that underground construction work or obstructions are encountered in the planting operation, alternate locations for plant material will be selected by the City. Operation shall be done at no extra cost to the City. The following material shall be thoroughly blended and used as a backfill mix:

- a) 6 parts by volume on-site soil
- b) 4 parts by volume Organic Amendment 1 lbs. 16-20-0 per cubic yard of mix
- c) 2 lbs. Iron Sulfate per cubic yard of mix

The actual material and amounts, as determined by the agronomic soils test, shall be supplied by the Contractor at no additional cost to the City. No mixing for individual planting holes is permitted. Mix planting soil prior to backfilling and stockpile at the site. Iron sulfate shall not contact cement surfaces because severe staining could occur; repair

or replace stained cement at Contractor's sole cost. Remove all plants from their containers and set so that, when settled, they bear the same relation to the required grade as they bore to the natural grade before being transplanted. Set the directed amount of plant fertilizer to be used with each plant on the top of the root ball so the required fertilizer amount to be used in each hole can be easily verified and approved by the Engineer. Improper planting may delay the maintenance period and extend working days causing liquidated damages. Planting holes shall be compacted with no more than 1" settlement from finished grade.

Add:

801-4.5.1 Mulch. *ADD the following Subsection:*

All shrubs and ground cover areas shall be mulched after planting with 2 inches of mulch. Maintain a 6 inch clear "no-mulch" zone around the base of each tree and shrub.

801-5 IRRIGATION SYSTEM INSTALLATION.

801-5.1 General. *ADD the following after the last paragraph:*

Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence. Verify that irrigation system may be installed in strict conformance with all pertinent codes and regulations, the original design, the referenced standards, and the manufacturer's recommendations. In the event of discrepancy, immediately notify the Engineer.

Do not proceed with installation in areas of discrepancy until all discrepancies have been resolved. Before starting work, carefully check all grades to determine that work may safely proceed, keeping within the specified material depths with respect to finish grade.

The Contractor shall request acceptance of and the Engineer will approve final grades before work on this Section will be allowed to begin. Make all necessary measurements in the field to ensure precise fit of items in accordance with the original design. Coordinate the installation of all irrigation materials with all other work.

All scaled dimensions are approximate. Check and verify all size dimensions prior to proceeding with work under this Section. Exercise extreme care in excavating and working near existing utilities. Repair damages to utilities, which are caused by Contractor's operations or neglect, at no additional cost to City. Prior to installation, stake out all pressure supply lines, routing and location of sprinkler heads, valves, and automatic controller. Layout irrigation system and make minor adjustments required due to differences between site and Drawings. Where piping is shown on Drawings under paved areas, but running parallel and adjacent to planted areas, install the piping in the planted areas. Connections to, or the installation of, the water supply shall be at the locations shown on the Drawings. Minor changes caused by actual site conditions shall be made at no additional expense to the City.

Existing irrigation equipment to be replaced including valves, spray heads, and rotors shall be salvaged and delivered to the City.

Verify and be familiar with the locations, size and detail of points of connection provided as the source of water and connection to the irrigation system. Irrigation design is based on the available static water pressure shown on the Drawings. Verify static water pressure on the project prior to the start of construction. Should a discrepancy exist, notify the Engineer's authorized representative prior to beginning construction. Prior to cutting into the soil, locate all cables, conduits, sewer septic tanks, and other utilities as are commonly encountered underground and take proper precautions not to damage or disturb such improvements. If a conflict exists between the obstacles and the proposed work, promptly notify the Engineer who will arrange for relocations. Proceed in the same manner if a rock layer or any other such conditions are encountered. Protect all existing utilities and features to remain on and adjacent to the project site during construction. Repair, at its sole cost, all damage resulting from its operations or negligence.

The Agency Representative shall have, at all times, safe access to the Work. Where the Specifications require work to be tested by the Contractor, it shall not be covered over until accepted by the Engineer. Notify the Engineer, a minimum of 48 hours in advance of where and when the work is ready for testing. Should any work be covered without testing or acceptance, it shall be, if so ordered, uncovered at the Contractor's sole expense. Inspections will be required for the following at a minimum:

- a) System layout
- b) Pressure test irrigation main line (Six hours at 125 PSI) lateral lines (2 hours at 100 psi).
- c) Coverage test of irrigation system
- d) Final inspection prior to start of maintenance period
- e) Final acceptance

Work that fails testing and is not accepted will be re-tested. Hourly rates and expenses of the Engineer for re-inspection or re-testing will be paid by the Contractor at no additional expense to City.

Use all means necessary to protect irrigation system materials before, during, and after installation and to protect the installation work and materials of all other trades. In the event of damage, immediately make all repairs and replacements necessary to the acceptance of the Engineer and at no additional cost to the City. Exercise care in handling, loading, unloading, and storing plastic pipe and fittings under cover until ready to install. Transport plastic pipe only on a vehicle with a bed long enough to allow the pipe to lay flat to avoid undue bending and concentrated external load. Dispose of waste, trash, and debris in accordance with applicable laws and ordinances and as prescribed by authorities having jurisdiction. Do not bury waste material and debris on the site. Burning of trash and debris will not be permitted. Remove and dispose of rubbish and debris generated by his work and workmen at frequent intervals or when ordered to do so by the Engineer. At the

time of completion the entire site will be cleared of tools, equipment, rubbish and debris which shall be disposed of off-site in a disposal area that is fully and legally licensed.

Temporary Repairs: The City reserves the right to make temporary repairs as necessary to keep the irrigation system in operating condition. The exercise of this right by the City shall not relieve the Contractor of his responsibilities under the terms of the guarantee as herein specified.

Supply the following items:

- a) Two (2) wrenches for disassembly and adjustment of each type of sprinkler head used in the irrigation system.
- b) Two (2) 30-inch sprinkler keys for manual operation of control valves.
- c) One (1) valve box cover key.
- d) Four (4) extra sprinkler heads of each size and type.
- e) 250 feet of additional drip line and 100 feet blank roll.
- f) 200 drip line staples.

The above equipment shall be turned over to the Engineer at the final inspection.

At the time of the pre-maintenance period inspection, the Engineer and governing agencies will inspect the work and, if not accepted, prepare a list of items to be completed by the Contractor. At the time of the post-maintenance period or final inspection the work will be re-inspected and final acceptance will be in writing by the Engineer. The City Engineer shall have final authority on all portions of the work.

801-5.3 Irrigation Pipeline Installation.

801-5.3.1 General. *ADD the following after the last paragraph:*

Excavations shall be straight with vertical sides, even grade, and support pipe per City Landscape Standard Plan No. 501. Trenching excavation shall follow layout indicated on Drawings to the depths below finished grade and as noted. Where lines occur under paved areas, these dimensions shall be considered below subgrade. Provide minimum cover of 24 inches on pressure supply lines. Provide minimum cover of 24 inches for control wires. Provide minimum cover of 12 inches for non-pressure lines unless lines are designated as "ON GRADE" per the plans. Backfill material on all lines shall be the same as adjacent soil free of debris, litter, and rocks over 1/2 inch in diameter. Backfill shall be tamped in 4-inch layers under the pipe and uniformly on both sides for the full width of the trench and the full length of the pipe. Backfill materials shall be sufficiently damp to permit thorough compaction, free of voids. Backfill shall be compacted to 90% relative compaction and shall conform to adjacent grades. Flooding in lieu of tamping is not allowed. Under no circumstances shall truck wheels be used to compact backfill. Provide sand backfill a minimum of 6 inches over and under all piping under paved areas.

Piping under existing pavement may be installed by jacking, boring, or hydraulic driving. No hydraulic driving is permitted under asphalt pavement. Cutting or breaking of existing pavement is not permitted. Carefully inspect all pipe and fittings before installation, removing dirt, scale, burrs, and reaming. Install pipe with all markings up for visual inspection and verification.

Remove all dented and damaged pipe sections. All lines shall have a minimum clearance of 6 inches from each other and 12 inches from lines of other trades. Parallel lines shall not be installed directly over each other. In solvent welding, use only the specified primer and solvent cement and make all joints in strict conformance with the manufacturer's recommended methods including wiping all excess solvent from each weld. Allow solvent welds at least 15 minutes setup time before moving or handling and 24 hours curing time before filling. PVC pipe shall be installed in a manner, which will provide for expansion and contraction as recommended by the pipe manufacturer. Center load all plastic pipe prior to pressure testing. All threaded plastic-to-plastic connections shall be assembled using Teflon tape or Teflon paste. For plastic-to-metal connections, work the metal connections first. Use a non-hardening pipe dope on all threaded plastic-to-metal connections, except where noted otherwise. All plastic-to-metal connections shall be made with plastic female adapters.

801-5.4 Installation of Valves, Valve Boxes, and Special Equipment. *ADD the following after the last paragraph:*

Automatic control valves, and gate valves shall be installed in the approximate locations indicated on the Drawings. Valves shall be installed in shrub areas whenever possible. Install all valves as indicated in the detail Drawings. Valves to be installed in valve boxes shall be installed one valve per box.

801-5.5.1 General. *ADD the following after the last paragraph:*

Irrigation heads shall be installed as indicated on the Drawings. Riser nipples shall be of the same size as the riser opening in the sprinkler body. Install all assemblies specified herein according to the respective detail Drawings or Specifications, using best standard practices.

801-5.6 Automatic Control System Installation. *ADD the following after the last paragraph:*

All Automatic Irrigation valves shall be connected to the existing irrigation controllers.

Three (3) sets of laminated 11"x17" new controller charts and 8.5"x11" data sheets shall be provided for all irrigations systems.

801-5.7.3 Sprinkler Coverage Test. *ADD the following after the last paragraph:*

Coverage testing shall be performed for overhead irrigation.

Adjust valves, align heads, and check the coverage of each system prior to coverage test. If it is determined by the Engineer that additional adjustments or nozzle changes will be required to provide proper coverage, make all necessary changes or adjustments prior to any planting. The entire system shall be operating properly before any planting operations commence.

Do not allow or cause any of the work of this Section to be covered up or enclosed until it has been observed, tested and accepted by the Engineer. Notify the Engineer a minimum of 48 hours in advance where and when the work is ready for testing. When the sprinkler system is completed, perform a coverage test of each system in its entirety to determine if the water coverage for the planted areas is complete and adequate in the presence of the Engineer.

Irrigation drip line to be installed per plans. The contractor shall be responsible for making field adjustments to provide proper drip coverage. Install drip line on finish grade per manufacturer's instructions. Immediately after installing drip line, flush system to the satisfaction of the Engineer. Drip line coverage to be observed, tested, and approved by the Engineer prior to burying with top soil. Notify the Engineer a minimum of 48 hours in advance where and when the work is ready for testing.

801-5.7.4 Operational Test. *ADD the following after the last paragraph:*

Furnish all materials and perform all work required to correct any inadequacies of coverage due to deviations from the Plans, or where the system has been willfully installed as indicated on the Drawings when it is obviously inadequate, without bringing this to the attention of the Engineer. This test shall be accepted by the Engineer and accomplished before starting any planting. Final inspection will not commence without record Drawings as prepared by the Contractor. During the maintenance period adjust and maintain the irrigation system in a fully operational condition providing complete irrigation coverage to all intended plantings. Clean-up shall be made as each portion of the work progresses. Refuse and excess dirt shall be removed from the site, all walks and paving shall be broomed, and any damage sustained on the work of others shall be repaired to original conditions.

801-6 MAINTENANCE AND PLANT ESTABLISHMENT.

DELETE entire section and SUBSTITUTE with the following:

Landscape maintenance and plant establishment period shall be a minimum of ninety (90) days after "Date of Acceptance of Installation" of all planting areas. Request in writing from the Engineer, notification of the date of the start of the maintenance and planting establishment period. At the acceptance of all planting areas, request in writing from the Engineer notification of the date of the completion of the maintenance period. The maintenance period shall not officially begin or end without written notification from the Engineer. Construction fencing shall remain until after the maintenance period is complete or as directed by the Engineer. Maintain all planted areas on a continuous basis as they are completed during the progress of the work and during the establishment and

maintenance period, and shall continue to maintain them until final acceptance in accordance with the following:

- a) Water, weed, fertilize, edge, prune, spray as necessary to promote a healthy growing condition. Maintain lawn at a mowing height recommended by the city. All planted areas shall be kept free of debris and weeds. Keep project neat and attractive throughout the maintenance period.
- b) Apply organic herbicides for weed control, as needed or directed by City, in accordance with manufacturer's instructions and applicable laws and regulations. Organic pre-emergent herbicide shall be required in all planter, shrub and ground cover areas. Remedy damage resulting from weed control.
- c) Exterminate rodents and insects as required and in accordance with applicable City of Irvine policies, State and Federal laws and regulations. Remedy damage from pest control.
- d) Adjust the irrigation system to sufficiently saturate root zone without rotting trees, shrubs, and ground cover. Do not exceed IRWD allocation.
- e) Repair or replace any damaged item caused by vehicles, vandals, rabbits, rodents, bicycles, or foot traffic during the maintenance period.
- f) Fertilize with "Organic/JTM Complete" at 30 lbs./1,000 s.f. at the beginning and end of the maintenance period (twice) or as indicated by the agronomic soils test.

All inspections herein specified shall be made by the City. Request inspection at least forty-eight (48) hours in advance of the time the inspection is required. Requested inspections, subsequently canceled without twenty-four (24) hours-notice, will be billed to the Contractor.

Inspection is required for, and not necessarily limited to, the following parts of the work:

- a) Incorporation of soil amendments and fine grading.
- b) Prior to digging plant pits for shrubs.
- c) During backfilling of plant pits with amended backfill.
- d) Final inspection at the end of the maintenance period.
- e) Irrigation Inspection / Coverage Test prior to planting.

801-8 PAYMENT.

DELETE entire section and SUBSTITUTE with the following:

Payment for **Clearing and Grubbing** shall be made as part of the contract lump sum price for Bid Item No. 4 and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing

and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **Weed Abatement** shall be made as part of the contract lump sum price for Bid Item No. 4 and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **Soil Preparation & Fine Grading** shall be made as part of the contract lump sum price for Bid Item No. 4 and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **Shrub – 1 gallon** shall be made as part of the contract lump sum price for Bid Item No. 4 and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **Shrub – 5 gallon** shall be made as part of the contract lump sum price for Bid Item No. 4 and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **24” Box Tree** shall be made as part of the contract lump sum price for Bid Item No. 4 and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **36” Box Tree** shall be made as part of the contract lump sum price for Bid Item No. 4 and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **48" Box Tree** shall be made as part of the contract lump sum price for Bid Item No. 4 and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **Irrigation System** shall be made as part of the contract lump sum price for Bid Item No. 4 and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **Wood Mulch – 2" Depth** shall be made as part of the contract lump sum price for Bid Item No. 4 and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **(90) Ninety Day Maintenance Period** shall be made as part of the contract lump sum price for Bid Item No. 4 and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

801-9 GUARANTEE.

ADD the following Subsection:

The guarantee shall be valid unless existing equipment utilized on the project fails within the guarantee period. Should any problem with the irrigation system be discovered within the guarantee period the Contractor shall correct it within ten (10) calendar days after receipt of written notice from City (and at no additional expense to City). When the nature of the repairs, as determined by the City, constitute an emergency (i.e. broken pressure line) the City may proceed to make repairs at the Contractor's expense. Any and all damages to existing improvement resulting either from faulty materials or workmanship, or from the necessary repairs to correct same, shall be repaired to the satisfaction of the owner by the Contractor, all at no additional cost to the City. Guarantee shall be submitted on Contractor's own letterhead as follows:

GUARANTEE FOR SPRINKLER IRRIGATION SYSTEM

We hereby guarantee that the sprinkler irrigation system we have furnished and installed is free from defects in materials and workmanship, and the work has been completed in accordance with the Drawings and Specifications, ordinary wear and tear and unusual

abuse, or neglect excepted. We shall repair or replace any defective material during the period of one year after date of filing of the Notice of Completion and also repair or replace any damage resulting from the repairing or replacing of such defects at no additional cost to the owner. We shall make such repairs or replacements within 10 calendar days following written notification by the owner. In the event of our failure to make such repairs or replacements within the time specified after receipt of written notice from owner, we authorize the owner to proceed to have said repairs or replacements made at our expense and we will pay the costs and charges therefore upon demand.

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Bid No. GP-26-0003

APPENDICES

The following Appendices are part of these specifications and all contents contained herein are a part of the project contract.

- Appendix A – Community Workforce Agreement**
- Appendix B – Standard Plans**
- Appendix C – Project Utility Plans**
- Appendix D – Fire Master Plan (OCFA)**
- Appendix E – Geotech Soils Report**

APPENDIX A

COMMUNITY WORKFORCE AGREEMENT ATTACHMENTS

COMMUNITY WORKFORCE AGREEMENT
CORE EMPLOYEES LIST
PRE-JOB CONFERENCE FORM

APPENDIX B

STANDARD PLANS

Copies of the following agency standard plans and/or details referenced by the plans and Specifications are made a part of these Special Provisions.

AGENCY:	STD. PLAN NO.:	DESCRIPTION:
City of Irvine	(https://cityofirvine.org/development-engineering/design-manuals)	Refer to latest standard plans available on City website

APPENDIX C

PROJECT UTILITY PLANS

Copies of the following utility plans and/or details referenced by the plans and Specifications are attached hereto and are made a part of these Special Provisions.

- DOMESTIC WATER & SANITARY SEWER IMPROVEMENT PLANS (6 SHEETS)
- PRELIMINARY EDISON PLANS (2 SHEETS)

APPENDIX D

FIRE MASTER PLAN (OCFA) – 2 SHEETS

APPENDIX E

GEOTECH SOILS REPORT

**SECTION 01 10 00
SUMMARY OF WORK**

PART 1 GENERAL

1.1 SUMMARY

A. Project consists of construction of **Operations & Maintenance Facility - Great Park, 901 Skyhawk, Irvine, CA 92618** as indicated in Contract Documents.

B. Description of Bid Line Items

1. Maintenance Building

This scope includes but is not limited to rough and finish grading for building pad, footings, slab, all underground utilities to within 5' of the building, structural framing, roofing, exterior enclosure with doors and windows, all interior "fit out", rough and finish "MEP" to create a fully functional building per plans and specifications.

2. Covered Yard Areas

This scope includes but is not limited to rough and finish grade for the covered yard. All underground infrastructure, concrete paving, footings, structure and canopy / roofing, exterior walls, roll up doors, rolling gate, rough and finish MEP to create a fully functional covered service yard.

3. Fuel Area System

This scope includes all work as shown in A40.2 / FMP2 Includes but not limited to all rough and finish grade, pads, containers, tanks, bollards, paving, canopy, southern enclosed area and all underground utilities within this area to create a fully functional fuel area.

4. All other area including parking lot, landscaping, and site utilities

This scope includes the un-highlighted areas within the plans, both inside the compound and outside per plans in accordance with the limits of the site per drawings, including but not limited to survey, all site prep, demolition, de-grub, rough and finish grading, whole site BMPs / SWPP, all underground utilities within zone 4 and stubbed to areas 1,2 and 3 accordingly, asphalt paving, concrete parking, striping, bunkers, trash areas, wash area, pallet areas, EV / Infrastructure, curbs, planters, landscape, irrigation as well as scope outside the perimeter walls and front parking lots to join / tie into existing concrete on the walkways, etc. This category shall include mobilization, site set up, site preparation, demolition and de-grub for the entire site.

City reserves the right to remove and retain possession of existing items prior to start of Contract.

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1.2 REQUIREMENTS INCLUDED

- A. This section includes administrative provisions:
 - 1. Work sequence.
 - 2. Contractors use of premises.
 - 3. Field engineering.
 - 4. Regulatory requirements and reference standards.
 - 5. Owner furnished Contractor installed products (OFCI).
 - 6. Owner pre-ordered products.

1.3 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Owner and Architect.
- B. Perform construction in phases as indicated.

1.4 CONTRACTORS USE OF PREMISES

- A. Limit use of premises for Work and construction operations and to allow for work by other contractors.
- B. Coordinate use of premises and access to site under direction of Owner and Architect.

1.5 FIELD ENGINEERING

- A. Provide field engineering services; establish lines and levels by use of recognized engineering survey practices.
- B. Locate and protect control and reference points.

1.6 REGULATORY REQUIREMENTS AND REFERENCE STANDARDS

- A. Regulatory Requirements:
 - 1. Architect has contacted governing authorities and reviewed design requirements of local, state and federal agencies for applicability to Project.
 - 2. Contractor shall be responsible for contacting governing authorities directly for necessary information and decisions bearing upon performance of Work.
- B. Reference Standards:
 - 1. For Products specified by association or trade standards, comply with requirements of referenced standard, except when more rigid requirements are specified or are required by applicable codes.
 - 2. Applicable date of each standard is that in effect as of date on proposal or date on Contract where no proposal is available, except when a specific date is specified.

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1.7 OWNER FURNISHED CONTRACTOR INSTALLED PRODUCTS (OFCI)

- A. Select products are to be furnished and paid for by Owner and installed by Contractor:
 - 1. Refer to Drawings and Specifications.
- B. Owner's Responsibilities:
 - 1. Arrange for and deliver shop drawings, product data, and samples to Contractor.
 - 2. Arrange and pay for product delivery to site.
 - 3. Inspect products jointly with Contractor on delivery.
 - 4. Submit claims for transportation damage.
 - 5. Arrange for replacement of damaged, defective, or missing items.
 - 6. Arrange for manufacturer's warranties, inspections, and service.
- C. Contractor's Responsibilities:
 - 1. Review shop drawings, product data, and samples.
 - 2. Receive and unload products at site.
 - 3. Inspect jointly with Owner for completeness and damage.
 - 4. Handle, store, and install products.
 - 5. Finish products as required after installation.
 - 6. Repair or replace items damaged by Work of this Contract.

1.8 OWNER PRE-ORDERED PRODUCTS

- A. Select products have been pre-ordered by Owner:
 - 1. Refer to Drawings.
- B. Owner has negotiated purchase orders for these products for incorporation into Project.
 - 1. Purchase orders are assigned to Contractor; costs shall be included into base bid.
 - 2. Contractor's responsibilities are same as if Contractor negotiated purchase orders.

END OF SECTION

**SECTION 01 20 00
PAYMENT PROCEDURES**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Special administrative and procedural requirements necessary to prepare and process Application for Payment. Each payment application shall be accompanied by an updated construction CPM schedule and appropriate releases. It is highly encouraged to provide a pencil draft. At least one week before the application is due to help facilitate the process.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in Schedule of Values with other required administrative forms and schedules, including application for Payment forms with Continuation Sheets, Submittals Schedule, and Contractor's Construction Schedule.
 - 2. Submit Schedule of Values to City and Architect at earliest possible date but no later than seven days before date scheduled for submittal of initial Application for Payment.
- B. Format and Content: Use Project Manual to establish line items for Schedule of Values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include following Project identification on Schedule of Values.
 - a. Project name and location.
 - b. City of Irvine Landscape Maintenance Facility
 - c. City Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Submit draft of SIMILAR TO AIA Document G703 Continuation Sheets for City review.
 - 3. Provide breakdown of Contract Sum in enough detail to facilitate continued evaluation of Application for Payment and progress reports. Coordinate with Project Manual table of contents and Construction Manager.
 - a. Provide several line items for principal subcontract amounts where appropriate.
 - 4. Round amounts to nearest whole dollar; total shall equal Contract Sum.
 - 5. Provide separate line item in Schedule of Values for each part of Work where Applications for Payment may include materials or equipment purchased or fabricated and stored but not yet installed.

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6. Provide separate line items in Schedule of Value for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of Work.
7. Each item in Schedule of Values and Application for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in Schedule of Values or distributed as general overhead expense at Contractor's option.
8. Schedule Updating: Update and resubmit Schedule of Values before next application for Payment when Change Orders or Construction Change Directives result in a change in Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by City matching the approved schedule of values.
 1. Initial Application for Payment: Application for Payment at time of Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Date for each progress payment is indicated in Agreement between City and Contractor. Period of construction Work covered by each Application for Payment is period indicated in Agreement.
- C. Payment Application Forms: SIMILAR TO AIA Document G702 and SIMILAR TO AIA Document G703 Continuation Sheets as form for Application for Payment.
- D. Application Preparation: Complete every entry on form. Execute by person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts of City approved Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal – via email.
 1. Contractor shall provide PDF copy of Application for Payment one week prior to Payment Request ("Draw") Meeting, for review by team members.
 2. Contractor shall email signed PDF of Application for Payment once finalized and approved by City.
 - a. Provide attachments and recording appropriate information about application.

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- b. PDF shall include waivers of lien and similar attachments if required.
- F. Waivers of Mechanic's Lien: With each Application for Payment submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of Contract and related to Work covered by payment.
- 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 - 2. City reserves right to designate which entities involved in Work must submit waivers.
 - 3. Waiver Forms: Submit waivers of lien on forms executed in manner acceptable to City.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following.
- 1. Schedule of Values.
 - 2. Schedule of unit prices where applicable
 - 3. Baseline Schedule
- H. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted including but not necessarily limited to following.
- 1. Evidence of completion of Project closeout requirements.
 - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 - 3. Updated final statement accounting for final changes to Contract Sum.
 - 4. SIMILAR TO AIA Document G706, Contractor's Affidavit of Payment of Debts and Claims.
 - 5. SIMILAR TO AIA Document G706A, Contractor's Affidavit of Release of Liens.
 - 6. SIMILAR TO AIA Document G707, Consent of Surety to Final Payment.
 - 7. Evidence that claims have been settled.
 - 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Completion.
 - 9. Final liquidated damages settlement statement.

END OF SECTION

**SECTION 01 25 00
SUBSTITUTION PROCEDURES**

PART 1 - GENERAL

1.1 SUMMARY

- A. General: Procedures are described for requesting substitution of unlisted materials in lieu of materials named in Specifications or approved for use in addenda. It is known that certain materials and equipment have in recent years, incurred longer lead times. It is critical and mandatory that Contractor advise the city within 20 working days of the notice to proceed, of any concerns with specified equipment and suggestions of suitable substitutions. Failure to comply shall result in all related costs to be borne by the Contractor. Proof of effort to investigate shall be required.
 - 1. Provide products listed in Contract Documents, products by manufacturers listed in Contract Documents, and products meeting specified requirements.
 - a. Contract Amount: Base on materials and products included in Contract Documents.
 - b. Where materials and products are listed in Contract Documents, materials and products by manufacturers not listed shall not be used without City's and Architect's approval of Contractor's written request for substitution.
 - 2. Purpose: After bidding, substitutions will only be considered where City will receive benefit or because specified materials are no longer available due to no fault of Contractor.
 - 3. Purpose: Substitutions will only be considered where City will receive benefit or because specified materials are no longer available due to conditions beyond Contractor control.
 - a. City benefits either from a Contractor proposed reduction of the Contract amount or from a reduction in Contract time based on acceptance of proposed substitution.
 - b. List proposed cost or time reductions on request for substitution.
 - c. Requests not including a proposed cost or time reduction will not be considered unless Contractor submits supporting information indicating specified materials are not available.
- B. Related Sections:
 - 1. Section 01 60 00: Product requirements.

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1.2 SUBSTITUTIONS

- A. Within a period of 35 days after award of Contract, City and Architect will consider formal requests for substitutions only from Contractor as specified in 1.1 Summary.
 - 1. City and Architect will consider only one request for substitution for each material; where requests are denied Contractor shall be required to provide specified materials.
 - 2. After initial 35-day period, requests will be considered only when a product becomes unavailable through no fault of Contractor; more than one request for substitution will be considered if necessary.
- B. Prior to submittal of second Request for Payment City and Architect will consider formal requests for substitutions from Contractor as specified in 1.1 Summary.
 - 1. City and Architect will consider only one request for substitution for each material; where requests are denied Contractor shall be required to provide specified materials.
 - 2. After payments begin, requests will be considered only when a product becomes unavailable through no fault of Contractor; more than one request for substitution will be considered if necessary.
- C. Submit each request with sequentially numbered "Substitution Request Transmittal" acceptable to City and Architect; submit separate request for each product and support each request with:
 - 1. Product identification with manufacturer's literature and samples where applicable.
 - 2. Name and address of similar projects on which product has been used, and date of installation.
- D. Submit itemized comparison of proposed substitution with product specified and list significant variations.
- E. Submit data relating to changes in construction schedule.
- F. Note effect of substitution on other work, products, or separate contracts.
 - 1. Note if acceptance of substitution could require revision of Contract Documents, Drawings, details or Specifications.
- G. Include accurate cost data comparing proposed substitution with product and amount of net change in Contract price.
 - 1. Include costs to other contractors and costs for revisions to Drawings, details or Specifications.
- H. Substitutions will not be considered for acceptance when:
 - 1. They are indicated or implied on submittals without a formal request from Contractor.

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2. They are requested directly by a subcontractor or supplier.
3. Acceptance will require substantial revision of Contract Documents.
- I. Substitute products shall not be ordered without written acceptance of City and Architect.
- J. City and Architect will determine acceptability of proposed substitutions and reserves right to reject proposals due to insufficient information.

1.3 CONTRACTOR'S REPRESENTATION

- A. Requests constitute a representation that Contractor:
 1. Has investigated proposed product and determined it meets or exceeds, in all respects, specified product.
 2. Will provide same warranty or longer warranty for substitution as for specified product.
 3. Will coordinate installation and make other changes that may be required for Work to be complete in all respects.
 4. Waives claims for additional costs that subsequently become apparent.
 5. Will pay costs of changes to Contract Documents, Drawings, details and Specifications required by accepted substitutions.

1.4 ARCHITECT'S DUTIES

- A. Review Contractor's requests for substitutions with reasonable promptness.
 1. Architect will recommend that City accept or reject substitution request.
 2. Upon request, Architect will provide cost for changes to Contract Documents, Drawings, details and Specifications required for substitutions.
- B. Notify Contractor in writing of decision to accept or reject requested substitution.

END OF SECTION

**SECTION 01 26 00
CONTRACT MODIFICATION PROCEDURES**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: This section specifies administrative and procedural requirements governing Contract modification procedures.
 - 1. Requests for Information (RFI).
 - 2. Change Order.
 - 3. Allowances.
 - 4. Construction Change Directive.
- B. Related Requirements:
 - 1. Section 01 25 00: Substitution procedures.
 - 2. Section 01 30 00: Administrative requirements.

1.2 MINOR CHANGES IN WORK

- A. City shall issue supplemental instructions authorizing minor changes in Work, not involving adjustment to Contract Sum or Contract Time, on forms similar to the AIA Form G710, Architect's Supplemental Instructions or similar form issued by the city.

1.3 REQUESTS FOR INFORMATION

- A. Contractor shall submit a written Request for Information (RFI) in format approved by Architect relating to perceived inconsistencies and omissions in Contract Documents. Contractor shall use electronic web base shared database such as Procore, for the entire team access and use.
 - 1. A record of RFI's is to be maintained by Contractor along with information regarding origin of request, date of request, and date request was received from Architect. Number RFI's sequentially based on date of request.
- B. Requests for Information shall be used only as a means of obtaining clarification of information not included in Contract Documents and shall not be used to assist Contractor in preparation of shop drawings or other information required by Contract.
 - 1. Contract Documents are intended to contain enough information to show aesthetic and design intent and to provide information such that construction procedures (means and methods) shall be reasonably inferred.
 - 2. Contract Documents are not intended to provide specific information related to means and methods of construction nor are they intended to be exhaustive in content.
- C. Contractor shall carefully review requests for information by subcontractors and suppliers to ascertain if information is in Contract Documents prior to submitting a Request for Information to Architect based on requests by others.

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1. Contractor shall suggest possible solutions to fit Project conditions where appropriate.
- D. Architect reserves right to return RFI's that do not reasonably relate to necessary clarification of intent of Contract Documents and to charge Contractor for time and materials involved in answering RFI's where information is in Contract Documents.
 1. RFI's shall not be used as a request for substitutions; refer to Section 01 25 00 – Substitution Procedures.

1.4 CHANGE ORDERS

- A. City-Initiated Proposal Requests: Architect will issue detailed description of proposed changes in Work that require adjustment to Contract Sum or Contract Time. If necessary, description will include supplemental or revised Drawings and Specifications.
 1. Proposal requests issued by Architect are for information only. Do not consider changer order proposal requests as instruction either to stop work in progress or to execute proposed change.
 2. Within 10 days of receipt of a proposal request, submit estimate of cost necessary to execute change to Architect for City's review.
 - a. Include list of quantities of products required and unit costs, with total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental and amounts of trade discounts.
 - c. Include a statement indicating effect of proposed change in Work will have on Contract Time.
- B. Contractor-Initiated Proposals: When latent or unforeseen conditions require modifications to Contract, Contractor shall propose changes by submitting a request for a change to Architect and City.
 1. Include statement of reasons for change and effect of change on Work. Provide a complete description of proposed change. Indicate effect of proposed change on Contract Sum and Contract Time.
 2. Include a list of quantities of products required and unit costs with total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental and amounts of trade discounts.
 4. Comply with requirements in Section 01 25 00 - Substitution Procedures if proposed change requires substitution of unspecified product or system for specified product or system.
- C. Proposal Request Form: Use forms similar to the AIA Document G709 for Change Order Proposal Requests; other substitute formats shall be submitted to City and Architect for approval prior to use.

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- D. Change Order Procedures: Contractor shall be directed to proceed with Work upon City's approval of Proposal.
 - 1. City will issue Change Order for signatures of City and Contractor on a form similar to the AIA Form G701 or similar form, including approved Change Order proposals for that time period.
 - 2. Amounts of each Change Order shall be indicated in each Request for Payment including payment status for each individual Change Order.

1.5 ALLOWANCES

- A. Allowance Adjustment: For Contract items bid based on allowance, submit Change Order Proposal on difference between actual purchase amount and allowance, based on work-in-place.
 - 1. Include installation cost in purchase amount only where indicated as part of allowance.
 - 2. When requested, prepare explanations and documentation to substantiate amounts claimed for work done based on allowances.
 - 3. Submit substantiation of a change in Scope of work claimed in Change Orders related to allowances.
 - 4. City reserves right to establish actual quantity of work-in-place by independent quantity survey, measure or count.
- B. Submit claims for increase costs because of a change in scope or nature of allowance described in Contract Documents, whether for purchase order amount or Contractor's handling, labor, installation, overhead and profit.
 - 1. Submit claims within 21 days of receipt of Change Order or Construction Change Directive authorizing work to proceed. City will reject claims submitted later than 21 days.
 - 2. Do not include Contractor's or subcontractor's indirect expense in Change Order cost amount unless it is clearly shown that nature or extent of work has changed from what could have been foreseen from information in Contract Documents.
 - 3. No change to Contractor's indirect expense is permitted for selection of higher or lower-priced materials or systems of same scope and nature as originally indicated.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: When City and Contractor disagree on terms of Proposal Request, the City shall issue a Construction Change Directive similar to an AIA Form G714 or similar form issued by city.
 - 1. Construction Change Directive instructs Contractor to proceed with change in Work, for subsequent inclusion in Change Order.
 - 2. Construction Change Directive contains a complete description of change in Work. It also designates method to be followed to determine change in Contract Sum or Contract Time.

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- B. Documentation: Maintain detailed records on a time and material basis of Work required by Construction Change Directive. Coordinate scheduling with Construction Manager to allow monitoring by City if desired.
 - 1. After completion of change, submit itemized account and supporting data necessary to substantiate cost and time adjustments to Contract.

END OF SECTION

**SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS**

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes general procedural requirements for ongoing submittals.

1. Schedule of values.
2. Product data and manufacturer's literature.
3. Shop drawings.
4. Samples.
5. Manufacturers' certificates.
6. Excess materials and attic stock.
7. Design build (delegated design) procedures.
8. Deferred approval requirements.

B. Related Requirements:

1. Section 01 31 00: Project management and coordination.
2. Section 01 32 00: Construction Schedule – Network Analysis.
3. Section 01 40 00: Quality Requirements.
4. Section 01 70 00: Execution Requirements
5. Section 01 77 00: Closeout Procedures.
6. Section 01 78 00: Warranties.

1.2 GENERAL SUBMITTAL PROCEDURES

A. Submittals: Transmit each item using form approved by Architect; submit sample to Architect for approval prior to use.

1. Identify Project, Contractor, subcontractor, major supplier.
 - a. Attach sequential identification number for each new submittal.
 - b. Identify each resubmittal using original submittal number and sequential identification clearly indicating item is resubmitted.
2. Identify pertinent Drawing sheet and detail number, and Specification section number as appropriate.
3. Identify deviations from Contract Documents.
4. Provide space for Contractor and Architect review stamps.
5. Contractor: Review and stamp submittals from subcontractors prior to submitting to Architect.
 - a. Review submittals and indicate where conflicts occur with Contract Documents and with work of other subcontractors.

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- b. Return submittals that vary significantly from Contract Documents for correction and resubmittal prior to submitting to Architect.
 - c. Submittals that vary significantly from Contract Documents and that fail to indicate thorough Contractor review prior to submission to Architect will be returned without review.
 - d. cursory review and stamping of subcontractor submittal by Contractor shall not be acceptable.
- B. Initial Schedules: Submit initial progress schedule and schedule of value in duplicate within 15 working days after award of Contract.
 - 1. After review by City and Architect revise and resubmit where required.
- C. Comply with progress schedule for submittals related to Work progress. Coordinate submittal of related items.
- D. After Architect review of submittal, revise and resubmit as required, identify changes made since previous submittal.
- E. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply.

1.3 TYPES OF SUBMITTALS

- A. General: Project requires various types of submittals to maintain communications, minimize misunderstandings, avoid unnecessary conflicts, and to ensure complete documentation for Project Record Documents.
 - 1. Maintain complete set of submittals including required revisions.
- B. Construction Schedules: Submit construction progress schedules for Design Team and City review and to maintain entire team up-to-date on construction activities.
- C. Schedule of Values: Submit Schedule of Values indicating division of Work, subcontractors to perform work, products being used, and values attributed to each to inform Design Team and City.
- D. Action Submittals: Submittals relating to product data and manufacturer's literature, shop drawings, and samples for Design Team review and comment; do not begin fabrication, delivery, or installation until Design Team review is complete.
- E. Information Submittals: Submittals relating to certifications, qualifications, reports, including test reports, and instructions are for information; Design Team may choose to comment but action is not generally anticipated.
 - 1. Manufacturer installation instructions and recommendations shall be considered information submittals.

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- F. Design/Build Submittals: Where portion of Work requires design by specialized professionals submit information necessary to ensure work complies with Contract Documents along with certifications signed by qualified professional.
 - 1. Calculations: Do not submit calculations unless specifically required by Contract Documents; submit calculations required by applicable authorities directly to applicable authorities;
 - a. Submit certification by qualified professional indicating required calculations have been prepared and work conforms to Contract Documents and applicable codes and regulations.
- G. Maintenance Materials Submittals: Compile maintenance information and materials during Work to ensure complete set of documents, maintenance manuals, and operation instructions.
- H. Closeout Submittals: Compile closeout submittals, organize, and submit to City prior to or at time of Substantial Completion. Project will not be considered Substantially Complete until closeout submittals have been received by City.
- I. Material Safety Data Sheets (MSDS): MSDS will only be reviewed by Architect when submitted to show compliance with LEED certification requirements.
 - 1. Non-LEED submittals that include material safety data sheets will be returned for resubmittal.

1.4 SCHEDULE OF VALUES

- A. Submit typed schedule on FORMS SIMILAR TO AIA Form G703 or another City and Architect pre-approved 8-1/2" by 11" paper format; Contractor's standard media-driven printout will be considered on request. Submit within 15 days after award of Contract.
- B. Format: Table of Contents of this Project Manual, with modifications as pre-approved by City and Architect; identify each line item with number and title of major Specification sections.
- C. Include in each line item a directly proportional amount of Contractor overhead and profit.
- D. Revise schedule to list change orders for each Application for Payment.
 - 1. Submit subschedule for each phase of Work.

1.5 PRODUCT DATA/MANUFACTURERS' LITERATURE

- A. Action Submittals: Mark each copy to identify applicable Products, models, options, and other data; supplement manufacturers' standard data to provide information unique to the Work.
- B. Information Submittals: Include manufacturers' installation instructions only when required by Specifications or specifically requested by Architect.

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1. Maintain copy of manufacturer installation instructions and recommendations in Contractor's field office for review.
- C. Product data shall be submitted as electronic PDF files unless otherwise noted or approved by Architect in advance.
 1. Where paper copies are permitted submit number of copies Contractor requires, plus one copy to be retained by Architect.
- D. Submit number of copies Contractor requires, plus one copy to be retained by Architect.

1.6 SHOP DRAWINGS

- A. Shop drawings shall be submitted as electronic PDF files unless otherwise noted or approved by Architect in advance.
 1. Where prints are permitted submit one reproducible print; minimum sheet size 8-1/2" by 11".
- B. Shop drawings shall be submitted in reproducible format acceptable to Architect and City; computerized PDF files will be acceptable unless otherwise directed.
 1. Prints: Submit one reproducible print; minimum sheet size 8-1/2" by 11".
 2. Prints: Submit three reproducible prints; minimum sheet size 8-1/2" by 11".
- C. Distribution: After review, reproduce and distribute.

1.7 SAMPLES

- A. Submit full range of manufacturers' standard colors, textures, and patterns for Architect's selection.
- B. Submit samples to illustrate functional characteristics of Product, with integral parts and attachment devices.
- C. Coordinate submittal of different categories for interfacing work.
- D. Include identification on each sample, giving full information.
- E. Submit number of samples required by Contractor plus one to be retained by Architect.
 1. Maintain one set of approved samples at Project Field Office.
- F. Sizes: Provide following sizes unless otherwise specified.
 1. Flat or Sheet Products: Minimum 6" square, maximum 12" by 12".
 2. Linear Products: Minimum 6", maximum 12" long.
 3. Bulk Products: Minimum one pint, maximum one gallon.
- G. Full size samples may be used in the Work upon approval.

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1.8 MANUFACTURERS' CERTIFICATES

- A. Submit certificates, in duplicate in accordance with requirements of each Specification section.

1.9 EXCESS MATERIALS AND ATTIC STOCK

- A. Excess Materials: Excess materials shall be considered property of City; inform City of extent of excess materials and methods required for handling and storage; remove from site excess materials not required by City for maintenance stock.
- B. Attic Stock: City may choose to obtain additional attic stock for maintenance purposes where excess materials are not considered adequate.
 - 1. City may require as much as 5% extra materials for maintenance purposes. Exact amount of each material shall be determined by City based on following meeting and additional costs determined by Contractor.
 - a. Contractor shall be prepared to order up to 5% extra materials on items that may not be readily available in future such as custom colors, off-shore manufacture, anticipated life span under 5 years, and potential for damage.
 - 1) Do not order extra attic stock until extent is determined and agreed to by City including which materials require extra stock and exactly how much those materials will cost including shipping and handling.
 - b. Excess Materials: Furnish excess materials only for materials that have a shelf-life of more than three years.
 - 2. Meeting: Conduct meeting prior to beginning Work to discuss extent of materials City would like to receive at Project Closeout for attic stock for maintenance materials; where available include personnel from City's maintenance crew.
 - a. Estimate amount of excess materials to be anticipated to be ordered in addition to materials for handling and storage and how those materials will be invoiced and identified regarding material and location in Project.
 - b. Determine area necessary for adequate storage, handling, and identifying excess materials and attic stock and discuss with City.
 - c. Submit information regarding equipment necessary for handling of excess materials and attic stock due to weight, size, and storage requirements.
 - d. Assist City in determining where on-site or off-site additional attic stock for maintenance purposes will be delivered and stored.
 - 3. Additional Costs: After meeting submit to City detailed listing of additional costs for each material City may like to receive for attic stock and assist City in modifying listing to determine acceptable final costs.
 - a. Include unit prices for desired attic stock where excess materials are not adequate for City maintenance stock.

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4. Substantial Completion: Submit Construction Bulletin at Substantial Completion indicating changes to Contract Amount for attic stock including unit price totals for materials where excess materials are not adequate.
5. Final Completion: Ensure attic stock has been received, identified, cataloged, and stored at locations agreed upon with City based on Change Order indicating amounts finally agreed to by City.

1.10 DESIGN/BUILD PROCEDURES

- A. Design as Part of Means and Methods of Construction: Select Project components require construction team design as part of means and methods of construction as described in various sections.
 1. Terms commonly used such as Design/Build, Delegated Design, and Design/Assist are applicable to these procedures as determined by law but shall be generally referred to in these documents as Design/Build.
 - a. In general Design/Build includes design by licensed professionals with expertise beyond that allowed under standard architectural licensure, and outside of scope of work of other design professionals on the design team.
 2. Contractor may be required to provide design services as part of construction for specific work defined as design or design-build where special expertise is required that is not available in the Project design team.
 3. Subcontractors, fabricators, and manufacturers may be required to provide design services as part of their work due to special expertise in design services for their specific components, refer to technical sections for Design/Build.
 4. Contractor, subcontractors, fabricators, manufacturers, and suppliers shall be responsible for attachments, anchors, fasteners, adhesives, and connectors suitable to applications unless specific items are listed in Contract Documents.
 - a. Where specific items are listed in Contract Documents Contractor, subcontractors, fabricators, manufacturers, and suppliers shall review and submit comments where items listed are not acceptable.
 - b. Where no comments are received, listed items shall be considered acceptable.
- B. Contractor acknowledges and accepts responsibility for specialty design as part of means and methods of construction, as well as coordination of parties involved to achieve architectural design intent indicated in Contract Documents.
 1. Design-build work includes sizing, sequencing, and detailing for construction by professional licensed or registered engineer or design professional with special expertise applicable to portion of Work involved.
 2. Design-build work shall be constructed in compliance with building codes and regulations in effect and shall be fit and proper for intended use.

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3. Design-build work shall include drawings, specifications, and calculations prepared, stamped, and signed by qualified professional licensed or registered engineer licensed in the Project location as appropriate to design-build work.
 - a. Plans, specifications, and calculations shall be acceptable to City, City's Representative, and applicable authorities.
- C. Where required by City Contractor shall submit copies of current insurance policies covering errors and omissions of persons designing design-build work with deductibles and limits per occurrence as mutually agreed by City and Contractor.
 1. Provide endorsement to insurance providing for 30-day notice to City prior to cancellation or material reduction in coverage.
 2. Insurance shall be maintained for not less than applicable statute of limitations for claims of latent defects, if such insurance is not written on an occurrence basis during time design-build work is designed and constructed.
- D. Review proposed layouts with Design Team and with various trades prior to commencing work related to design-build work.

1.11 DEFERRED APPROVAL REQUIREMENTS

- A. Installation of deferred approval items shall not be started until detailed plans, specifications, and engineering calculations have been accepted and signed by Architect or Engineer of Record responsible for Project design.
- B. Deferred Approval Items shall be signed by California registered architect or professional engineer delegated responsibility covering specific work shown requiring approval by Division of the State Architect.
 1. Deferred approval items for this Project include but may not be limited to following:
 - a. Translucent Walls and Roofs – Section 08 45 00.
 - b. Telescopic Bleachers – Section 12 66 01.
 - c. Grandstands – Section 13 34 16.
 - d. Hydraulic Elevators – Section 14 24 00.
 2. Deferred approval drawings and specifications become part of the approved submittal documents for the Project when they are submitted to and approved by Division of the State Architect.
 3. Submit four prints of each drawing. Drawings shall include empty 7" by 9" space on first sheet reserved for Architect to add "General Conformance Block" required for DSA.
 4. Submit four copies of calculations, product data and test reports.
 5. Identify and specify supports, fasteners, spacing, penetrations, etc., for each

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deferred approval items, including calculations for each fastener.

6. Submit documents to Architect of Record for review.
7. Deferred submittal documents shall bear stamp and signature of architect or engineer licensed in State of California and responsible for work shown on deferred submittal documents.
8. Architect of Record will forward submittal to appropriate Project Engineer.
9. Review of Project Architect or Engineer of Record is for conformance with design concept shown on Contract Documents. Neither Architect or Engineer of Project shall be responsible for review for correctness of deferred approval items.
10. After review by Architect/Engineer of Record, Architect of Record will forward two copies of submittal to Division of the State Architect for approval.
11. Respond to review comments made by Division of the State Architect and revise and resubmit submittal for final approval.
12. Architect of Record will forward two copies of final revised submittal to the Division of the State Architect for approval.
13. The Division of the State Architect will return one copy of final submittal to the Architect of Record.
14. Architect of Record will forward one copy of evidence of submittal approval by Division of the State Architect for final distribution by General Contractor.

END OF SECTION

**SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Description of Project management and coordination including but not necessarily limited to the following:
 - 1. General Project coordination procedures.
 - 2. Coordination drawings.
 - 3. Staff names.
 - 4. Administrative and supervisory personnel.
 - 5. Project meetings.
 - 6. Software
- B. Related Sections:
 - 1. Section 01 30 00: Administrative requirements.
 - 2. Section 01 79 00: Demonstration and training.

1.2 COORDINATION

- A. Coordination: Coordinate construction operations included in various Specifications sections to ensure efficient and orderly installation of each part of Work.
 - 1. Coordinate construction operations that depend on each other for proper installation, connection, and operation.
 - 2. Coordinate work to assure efficient and orderly sequence of installation of construction elements.
 - 3. Make provisions for accommodating items installed by City or under separate contracts.
- B. Prepare memoranda for distribution to each party involved as needed, outlining special procedures required for coordination.
 - 1. Include required notices, reports, and list of attendees at meetings; include Architect and City in distribution.
- C. Verify characteristics of interrelated operating equipment are compatible; coordinate work having interdependent responsibilities for installing, connection to, and placing such equipment in service.
- D. Coordinate space requirements and installation of mechanical and electrical work indicated diagrammatically on Drawings.
 - 1. Follow routing shown for pipes, ducts, and conduits as closely as possible; make runs parallel with lines of building.
 - 2. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

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- E. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated; coordinate locations of fixtures and outlets with finish elements.
- F. Administrative Procedures: Coordinate scheduling and timing of administrative procedures with other construction activities and activities of other contractors to avoid conflicts and ensure orderly progress of Work.

1.3 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings for areas where space availability is limited and necessitates maximum utilization of space for components and where separate entities, products, and materials require coordination.
 - 1. Require each subcontractor with items located in ceiling space to furnish coordination drawings of their items to assist in preparation of Contractor's Coordination Drawings.
 - 2. Indicate relationship of components shown on separate Shop Drawings.
 - 3. Indicate required installation sequences.
 - 4. Ceiling Spaces: Take special care to coordinate structure, ceiling systems, equipment located in ceiling spaces, fire protection systems, mechanical systems, and electrical systems.
- B. Staff Names: Immediately after receipt of notice to proceed or immediately after signing of Contract by City and Contractor, submit list of principal staff assignments, including superintendent and other personnel in attendance at Project site.
 - 1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

1.4 SUPERVISORY AND ADMINISTRATIVE PERSONNEL

- A. Provide supervisory personnel, in addition to Project Superintendent, as required for proper and timely performance of Work and coordination of subcontracts.
- B. Provide administrative staff as required to allow Project Superintendent and supervisory personnel to allocate maximum time to Project supervision and coordination.

1.5 PROJECT MEETINGS

- A. City shall schedule and administer Project meetings throughout progress of Work:
 - 1. Pre-construction meeting.
 - 2. Progress meetings at weekly intervals.
 - 3. Pre-installation conferences.
 - 4. Coordination meetings.
 - 5. Special meetings.
- B. Make physical arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes and distribute copies within two days to Architect, City, participants, and those affected.

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- C. Attendance: Job superintendent, major subcontractors and suppliers as appropriate to agenda; Architect, City, and City and Architect's consultants as appropriate to agenda topics for each meeting.
- D. Suggested Agenda: Review of Work progress, status of progress schedule and adjustments, delivery schedules, submittals, requests for information, maintenance of quality standards, pending changes and substitutions, and issues needing resolution.

1.6 SOFTWARE

- A. Contractor shall utilize web based software similar to Procore, for document controls for the entire project duration, with access to all city team including design team, city staff, inspectors, PM / CM and others requested. Software shall be used, but not limited for the below items.
 - 1. Submittals
 - 2. RFI's
 - 3. Plan Access.
 - 4. Change Orders
 - 5. Photographs
 - 6. Schedules
 - 7. Payment Applications
 - 8. And others as needed
- B. Contractor shall utilize scheduling software similar to Microsoft Project. This shall be used for
 - 1. Baseline Schedule
 - 2. Schedule Updates (Monthly and as requested)
 - 3. Two Week Look Ahead Schedule
 - 4. Fragnets as requested
 - 5. And others schedules as needed / requested

END OF SECTION

**SECTION 01 32 00
CONSTRUCTION SCHEDULE - NETWORK ANALYSIS**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. References.
- B. Performance requirements.
- C. Quality assurance.
- D. Qualifications.
- E. Project record documents.
- F. Submittals.
- G. Review and evaluation.
- H. Format.
- I. Cost and schedule reports.
- J. Early work schedule.
- K. Construction schedule.
- L. Short interval schedule.
- M. Requested time adjustment schedule.
- N. Recovery schedule.
- O. Updating schedules.
- P. Distribution.

1.2 REFERENCES

- A. Construction Planning and Scheduling Manual - A Manual for General Contractors and the Construction Industry, The Associated General Contractors of America (AGC).
- B. CSI - Construction Specifications Institute Master Format 2004 Edition and updates.
- C. National Weather Service - Local Climatological Data.

1.3 PERFORMANCE REQUIREMENTS

- A. Ensure adequate scheduling during construction activities so work may be prosecuted in an orderly and expeditious manner within stipulated Contract Time.

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- B. Ensure coordination of Contractor and subcontractors at all levels.
- C. Ensure coordination of submittals, fabrication, delivery, erection, installation, and testing of materials and equipment.
- D. Ensure on-time delivery of City furnished materials and equipment.
- E. Ensure coordination of jurisdictional reviews.
- F. Assist in preparation and evaluation of applications for payment.
- G. Assist in monitoring progress of work.
- H. Assist in evaluation of proposed changes to Contract Time.
- I. Assist in evaluation of proposed changes to Construction Schedule.
- J. Assist in detection of schedule delays and identification of corrective actions.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with Construction Planning and Scheduling Manual published by the AGC.
- B. Maintain one copy of document on site.
- C. In the event of discrepancy between the AGC publication and this section, provisions of this section shall govern.

1.5 QUALIFICATIONS

- A. Scheduler: Personnel or specialist consultant with 5 years minimum experience in scheduling construction work of a complexity and size comparable to this Project.
- B. Administrative Personnel: 5 years minimum experience in using and monitoring schedules on comparable projects.

1.6 PROJECT RECORD DOCUMENTS

- A. Submit record documents under provisions of Section 01 77 00.
- B. Submit one reproducible and two copies of final Record Construction Schedule which reflects actual construction of this Project.
- C. Record schedule shall be certified for compliance with actual way project was constructed.
- D. Receipt of Record Construction Schedule shall be a condition precedent to any retainage release or final payment.

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1.7 SUBMITTALS

- A. Within 7 days from the Notice of Award submit proposed Early Work Schedule and preliminary Cost Report defining activities for first 60 days of Work.
- B. Within 45 days from Notice of Award submit proposed Construction Schedule and final Cost Report.
- C. Submit updated Construction Schedule at least 10 days prior to each Application for Payment.
- D. Submit Short Interval Schedule at each Construction Progress Meeting.
- E. Submit Time Adjustment Schedule within 10 days of commencement of a claimed delay.
- F. Submit Recovery Schedules as required by completion of work.
- G. Submit one reproducible and two copies of each schedule and cost report.

1.8 REVIEW AND EVALUATION

- A. Early Work Schedule shall be reviewed during Preconstruction Conference with City and Architect.
- B. Within 5 days of receipt of City and Architect's comments provide satisfactory revision to Early Work Schedule or adequate justification for activities in question.
- C. Acceptance by City of corrected Early Work Schedule shall be a condition precedent to making any progress payments for first 60 days of Contract.
- D. Cost loaded values of Early Work Schedule shall be basis for determining progress payments during first 60 days of Contract.
- E. Participate in joint review of Construction Schedule and Reports with City and Architect.
- F. Within 7 days of receipt of City and Architect's comments provide satisfactory revision to Construction Schedule or adequate justification for activities in question.
- G. In the event that an activity or element of work is not detected by City or Architect review, such omission or error shall be corrected by next scheduled update and shall not affect Contract Time.
- H. Acceptance by City of corrected Construction Schedule shall be a condition precedent to making any progress payments after first 60 days of Contract.
- I. Cost-loaded values of Construction Schedule shall be basis for determining progress payments.
- J. Review and acceptance by City and Architect of Early Work Schedule or Construction Schedule does not constitute responsibility whatsoever for accuracy or feasibility of schedules nor does such acceptance expressly or impliedly warrant, acknowledge or admit reasonableness of activities, logic, duration, manpower, cost or equipment loading

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stated or implied on schedules.

1.9 FORMAT

- A. Prepare diagrams and supporting mathematical analyses using Precedence Diagramming Method, under concepts and methods outlined in AGC Construction Planning and Scheduling Manual.
- B. Listings: Reading from left to right, in ascending order for each activity.
- C. Diagram Size: 42 inches maximum height x width required.
- D. Scale and Spacing: To allow for legible notations and revisions.
- E. Illustrate order and interdependence of activities and sequence of work.
- F. Illustrate complete sequence of construction by activity.
- G. Provide legend of symbols and abbreviations used.

1.10 COST AND SCHEDULE REPORTS

- A. Activity Analysis: Tabulate each activity of network diagram and identify for each activity:
 - 1. Description.
 - 2. Interface with outside contractors or agencies.
 - 3. Number.
 - 4. Preceding and following number.
 - 5. Duration.
 - 6. Earliest start date.
 - 7. Earliest finish date.
 - 8. Actual start date.
 - 9. Actual finish date.
 - 10. Latest start date.
 - 11. Latest finish date.
 - 12. Total and free float.
 - 13. Identification of critical path activity.
 - 14. Monetary value keyed to Schedule of Values.

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15. Manpower requirements.
 16. Responsibility.
 17. Percentage complete.
 18. Variance positive or negative.
- B. Cost Report: Tabulate each activity of network diagram and identify for each activity:
1. Description.
 2. Number.
 3. Total cost.
 4. Percentage complete.
 5. Value prior to current period.
 6. Value this period.
 7. Value to date.
- C. Required Sorts: List activities in sorts or groups:
1. By activity number.
 2. By amount of float time in order of early start.
 3. By responsibility in order of earliest start date.
 4. In order of latest start dates.
 5. In order of latest finish dates.
 6. Application for payment sorted by Schedule of Values.
 7. Listing of activities on critical path.
 8. Listing of basic input data which generates schedule.

1.11 EARLY WORK SCHEDULE

- A. Shall establish scope of work to be performed during first 60 days of Contract.
- B. Shall designate critical path or paths.
- C. Shall contain the following phases and activities:
 1. Procurement activities to include mobilization, shop drawings and sample submittals.

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- 2. Identification of key and long-lead elements and realistic delivery dates.
- 3. Construction activities in units of whole days limited to 14 days for each activity except non-construction activities for procurement and delivery.
- 4. Approximate cost and duration of each activity.
- D. Shall contain seasonal weather considerations. Seasonal rainfall shall be 10 year average for the month as evidenced by Local Climatological Data obtained from U.S. National Weather Service.
- E. Activities shall be incorporated into Construction Schedule.
- F. No application for payment will be evaluated or processed until Early Work Schedule has been submitted and reviewed.
- G. Shall be updated on a monthly basis while Construction Schedule is being developed.
- H. Failure to submit an adequate or accurate Early Work Schedule or failure to submit on established dates will be considered a substantial breach of Contract.

1.12 CONSTRUCTION SCHEDULE

- A. Include Early Work Schedule as first 60 days of Construction Schedule.
- B. Shall be a computer-generated time scaled network diagram of activities.
- C. Indicate a completion date for project that is no later than required completion date subject to any time extensions processed as part of a change order.
- D. Conform to mandatory dates specified in the Contract Documents.
- E. Should schedule indicate a completion date earlier than any required completion date, City or Architect shall not be liable for any costs should project be unable to be completed by such date.
- F. Seasonal weather shall be considered in planning and scheduling of all work. Seasonal rainfall shall be 10 year average for the month as evidenced by Local Climatological Data obtained from U.S. National Weather Service.
- G. Level of detail shall correspond to complexity of work involved.
- H. Indicate procurement activities, delivery, and installation of City furnished material and equipment.
- I. Designate critical path or paths.
- J. Subcontractor work at all levels shall be included in schedule.
- K. As developed shall show sequence and interdependence of activities required for complete performance of Work.

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- L. Shall be logical and show a coordinated plan of Work.
- M. Show order of activities and major points of interface, including specific dates of completion.
- N. Duration of activities shall be coordinated with subcontractors and suppliers and shall be best estimate of time required.
- O. Shall show description, duration and float for each activity.
- P. Failure to include any activity shall not be an excuse for completing all work by required completion date.
- Q. No activity shall have a duration longer than 14 days or a value over \$20,000.00 except non-construction activities for procurement and delivery.
- R. An activity shall meet the following criteria:
 - 1. Any portion or element of work, action, or reaction that is precisely described, readily identifiable, and is a function of a logical sequential process.
 - 2. Descriptions shall be clear and concise. Beginning and end shall be readily verifiable. Starts and finishes shall be scheduled by logical restraints.
 - 3. Responsibility shall be identified with a single performing entity.
 - 4. Additional codes shall identify building, floor, bid item and CSI classification.
 - 5. Assigned dollar value (cost-loading) of each activity shall cumulatively equal total contract amount. Mobilization, bond and insurance costs shall be separate. General requirement costs, overhead, profit, shall be prorated throughout all activities. Activity costs shall correlate with Schedule of Values.
 - 6. Each activity shall have manpower-loading assigned.
 - 7. Major construction equipment shall be assigned to each activity.
 - 8. Activities labeled start, continue or completion are not allowed.
- S. For major equipment and materials show a sequence of activities including:
 - 1. Preparation of shop drawings and sample submissions.
 - 2. Review of shop drawings and samples.
 - 3. Finish and color selection.
 - 4. Fabrication and delivery.
 - 5. Erection or installation.
 - 6. Testing.

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- T. Include a minimum of 15 days prior to completion date for punch lists and clean up. No other activities shall be scheduled during this period.

1.13 SHORT INTERVAL SCHEDULE

- A. Shall be fully developed horizontal bar-chart-type schedule directly derived from Construction Schedule.
- B. Prepare schedule on sheet of sufficient width to clearly show data.
- C. Provide continuous heavy vertical line identifying first day of week.
- D. Provide continuous subordinate vertical line identifying each day of week.
- E. Identify activities by same activity number and description as Construction Schedule.
- F. Show each activity in proper sequence.
- G. Indicate graphically sequences necessary for related activities.
- H. Indicate activities completed or in progress for previous 2 week period.
- I. Indicate activities scheduled for succeeding 2 week period.
- J. Further detail may be added if necessary to monitor schedule.

1.14 REQUESTED TIME ADJUSTMENT SCHEDULE

- A. Updated Construction Schedule shall not show a completion date later than the Contract Time, subject to any time extensions processed as part of a Change Order.
- B. If an extension of time is requested, a separate schedule entitled "Requested Time Adjustment Schedule" shall be submitted to City and Architect.
- C. Indicate requested adjustments in Contract Time which are due to changes or delays in completion of work.
- D. Extension request shall include forecast of project completion date and actual achievement of any dates listed in Agreement.
- E. To the extent that any requests are pending at time of any Construction Schedule update, Time Adjustment Schedule shall also be updated.
- F. Schedule shall be a time-scaled network analysis.
- G. Accompany schedule with formal written time extension request and detailed impact analysis justifying extension.
- H. Time impact analysis shall demonstrate time impact based upon date of delay, and status of construction at that time and event time computation of all affected activities. Event times shall be those as shown in latest Construction Schedule.

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- I. Activity delays shall not automatically constitute an extension of Contract Time.
- J. Failure of subcontractors shall not be justification for an extension of time.
- K. Float is not for the exclusive use or benefit of any single party. Float time shall be apportioned according to needs of project.
- L. Float suppression techniques such as preferential sequencing, special lead/lag logic restraints, extended activity durations, or imposed dates shall be apportioned according to benefit of project.
- M. Extensions will be granted only to extent that time adjustments to activities exceed total positive float of the critical path and extends Contract completion date.
- N. City shall not have an obligation to consider any time extension request unless requirements of Contract Documents, and specifically, but not limited to these requirements are complied with.
- O. City shall not be responsible or liable for any construction acceleration due to failure of City to grant time extensions under Contract Documents should requested adjustments in Contract Time not substantially comply with submission and justification requirements of Contract for time extension requests.
- P. In the event a Requested Time Adjustment Schedule and Time Impact Analysis are not submitted within 10 days after commencement of a delay it is mutually agreed that delay does not require a Contract time extension.

1.15 RECOVERY SCHEDULE

- A. When activities are behind Construction Schedule a supplementary Recovery Schedule shall be submitted.
- B. Form and detail shall be sufficient to explain and display how activities will be rescheduled to regain compliance with Construction Schedule.
- C. Maximum duration shall be one month and shall coincide with payment period.
- D. Ten days prior to expiration of Recovery Schedule verification to determine if activities have regained compliance with Construction Schedule will be made. Based upon this verification the following will occur:
 - 1. Supplemental Recovery Schedule will be submitted to address subsequent payment period.
 - 2. Construction Schedule will be resumed.

1.16 UPDATING SCHEDULES

- A. Review and update schedule at least 10 days prior to submitting an Application for Payment.
- B. Maintain schedule to record actual prosecution and progress.

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- C. Approved change orders which affect schedule shall be identified as separate new activities.
- D. Change orders of less than \$20,000.00 value or less than 3 days duration need not be shown unless critical path is affected.
- E. No other revisions shall be made to schedule unless authorized by City.
- F. Provide narrative Progress Report at time of schedule update which details the following:
 - 1. Activities or portions of activities completed during previous reporting period.
 - 2. Actual start dates for activities currently in progress.
 - 3. Deviations from critical path in days ahead or behind.
 - 4. List of major construction equipment used during reporting period and any equipment idle.
 - 5. Number of personnel by craft engaged on Work during reporting period.
 - 6. Progress analysis describing problem areas.
 - 7. Current and anticipated delay factors and their impact.
 - 8. Proposed corrective actions and logic revisions for Recovery Schedule.
 - 9. Proposed modifications, additions, deletions and changes in logic of Construction Schedule.
- G. Schedule update will form basis upon which progress payments will be made.
- H. City will not be obligated to review or process Application for Payment until schedule and Progress Report have been submitted.

1.17 DISTRIBUTION

- A. Following joint review and acceptance of updated schedules distribute copies to City, Architect, and all other concerned parties.
- B. Instruct recipients to promptly report in writing any problem anticipated by projections shown in schedule.

END OF SECTION

**SECTION 01 35 15
CALGREEN ENVIRONMENTAL REQUIREMENTS**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Comply with CALGreen environmental requirements related to energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality.
 - 1. Comply with specific CALGreen requirements as adopted by authorities having jurisdiction and applicable to Project.

1.2 ENVIRONMENTAL REQUIREMENTS

- A. Mandatory Measures: Comply with CALGreen Mandatory Measures applicable to Project.
 - 1. Design team and construction team are each required to participate to maximum degree possible to achieve CALGreen environmental requirements.
 - 2. Contract Documents are not intended to limit alternative means of achieving environmental requirements.
 - a. Suggestions from Contractor, subcontractors, suppliers, and manufacturers for achieving environmental requirements are encouraged; team approach is also encouraged.
 - 3. Voluntary Tiers: Verify extent of Voluntary Tiers applicability to Project.
 - a. Construction team is encouraged to work with City and Design Team to incorporate additional measures as defined in CALGreen Appendixes.
 - b. Contact City and Architect regarding extent of intent of Project to reach Voluntary Tiers, additional work necessary to achieve enhanced Voluntary Tiers, and potential costs involved in achieving each Voluntary Tier.
 - c. Construction team is required to achieve Mandatory Measures and Voluntary Tiers as applicable, and to achieve as much as possible without unacceptable cost impact or schedule impact as determined by City.
- B. Requirements: Construction team is required to review CALGreen requirements relative to Project related to following.
 - 1. Energy Efficiency: Comply with California Energy Commission requirements.
 - 2. Water Efficiency and Conservation: Comply with requirements for both indoor and outdoor water use.
 - 3. Material Conservation and Resource Efficiency:

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- a. Nonresidential Projects: Provide weather-resistant exterior wall and foundation envelope including prevention of landscape irrigation spray on structures (if any) and prevent water intrusion at exterior entries.
 - b. Residential Projects: Seal openings and penetrations in building envelope
Construction Waste:
 - c. Provide construction waste management plan as defined by CALGreen with demolition and construction waste diverted from landfill by recycling or salvage for reuse.
 - d. Nonresidential Projects Building Maintenance and Operation: Provide for commissioning requirements as required by CALGreen including but not limited to testing, documentation and training, testing and adjusting.
 - e. Residential Projects Building Maintenance and Operation: Provide operation and maintenance data as required by CALGreen.
4. Nonresidential Projects Environmental Quality: Comply with following as adopted by authorities having jurisdiction and as applicable to Project.
- a. Fireplaces: Comply with requirement for fireplaces (if any) to be direct-vent sealed-combustion gas type or sealed wood-burning fireplace, woodstove, or pellet stove.
 - b. Mechanical Equipment Pollution Control: Cover duct and related air distribution component openings to prevent dust and debris accumulation.
 - c. Finish Material Pollution Control: Comply with CALGreen requirements for volatile organic compound (VOC) emissions including but not necessarily limited to following (as applicable):
 - 1) Adhesives, sealants and caulks.
 - 2) Paints and coatings.
 - 3) Carpet systems including carpet, carpet cushion, and adhesives.
 - 4) Resilient flooring systems.
 - 5) Composite wood products formaldehyde limitations.
 - d. Filters: Comply with requirements for mechanically ventilated buildings to have air filtration media for outside and return air prior to occupancy.
 - e. Environmental Tobacco Smoke (ETS) Control: Comply with CALGreen requirements for ETS.
 - f. Interior Moisture Control: Comply with California Building Code requirements and CALGreen requirements for vapor retarder at concrete slab foundations and capillary break (aggregate base).
 - g. Building Material Moisture Content: Do not use water damaged building materials, remove and place wet and high moisture content insulation, and do not enclose wall or floor framing when moisture content exceeds 19%.

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- h. Indoor Air Quality: Comply with CALGreen requirements for outside air delivery and carbon dioxide monitoring.
 - i. Environmental Comfort: Comply with CALGreen requirements for whole acoustical control and interior sound control.
 - j. Outdoor Air Quality: Comply with CALGreen requirements for reduction of greenhouse gases and ozone depletion.
- 5. Residential Projects Environmental Quality:
 - a. Fireplaces: Comply with requirement that gas fireplaces (if any) shall be direct-vent sealed-combustion type and woodstoves or pellet stoves (if any) comply with U.S. EPA Phase II emissions limits.
 - b. Mechanical Equipment Pollution Control: Cover duct and related air distribution component openings to prevent dust and debris accumulation.
 - c. Finish Material Pollution Control: Comply with CALGreen requirements for volatile organic compound (VOC) emissions including but not necessarily limited to following (as applicable):
 - 1) Adhesives, sealants and caulks.
 - 2) Paints and coatings.
 - 3) Carpet systems including carpet, carpet cushion, and adhesives.
 - 4) Resilient flooring systems.
 - 5) Composite wood products formaldehyde limitations.
 - d. Interior Moisture Control: Comply with CALGreen requirements for vapor retarder at concrete slab foundations and capillary break (aggregate base).
 - e. Building Material Moisture Content: Do not use water damaged building materials, remove and place wet and high moisture content insulation, and do not enclose wall or floor framing when moisture content exceeds 19%.
 - f. Indoor Air Quality: Provide humidistat-controlled bathroom exhaust fans with Energy Star compliance, ducted to terminate outside building.
 - g. Environmental Comfort: Comply with CALGreen requirements for whole house exhaust fan louvers to be insulated or have covers which close when fan is off, and with heating and air-conditioning system design requirements.
- C. Planning and Design: Construction team shall coordinate with Design Team regarding Project Planning and Design methods related to CALGreen requirements related to Project design and shall comply with requirements related to construction.

1.3 QUALITY ASSURANCE

- A. Project Management and Coordination: Contractor to identify one person on Contractor's staff to be responsible for CALGreen issues compliance and coordination.

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1. Experience: Environmental project manager to have experience relating to CALGreen building construction.
 2. Responsibilities: Carefully review Contract Documents for CALGreen issues, coordinate work of trades, subcontractors, and suppliers; instruct workers relating to environmental issues; and oversee Project Environmental Goals.
 - a. Submittals: Collect, compile, verify, and maintain sufficient information for submittals indicating compliance with applicable CALGreen requirements.
 3. Meetings: Discuss CALGreen Goals at following meetings.
 - a. Pre-construction meeting.
 - b. Pre-installation meetings.
 - c. Regularly scheduled job-site meetings.
- B. CALGreen Issues Criteria: Comply with requirements listed in CALGreen and various Specification sections.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General Issues: Do not use materials with moisture stains or with signs of mold or mildew.
1. Moisture Stains: Materials that have evidence of moisture damage, including stains, are not acceptable, including both stored and installed materials; immediately remove from site.
 2. Mold and Mildew: Materials that have evidence of growth of molds or of mildew are not acceptable, including both stored and installed materials; immediately remove from site.

2.2 SUBSTITUTIONS

- A. Substitutions Environmental Issues: Requests for substitutions shall comply with requirements specified in Section 01 25 00 – Substitution Procedures, with following additional information required where environmental issues are involved.
1. Indicate each proposed substitution complies with CALGreen requirements.
 2. City and Architect reserve right to reject proposed substitutions where CALGreen information is not provided and where substitution may impact mandatory requirements or Project voluntary tier requirements.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Environmental Issues: Protect interior materials from water damage; where interior products not intended for wet applications are exposed to moisture, immediately remove from site.
 - 1. Protect installed products using methods that do not support growth of molds and mildews. Immediately remove from site materials with mold and materials with mildew.

END OF SECTION

**SECTION 01 40 00
QUALITY REQUIREMENTS**

PART 1 - GENERAL

1.1 SUMMARY

- A. This section describes general quality control requirements.
 - 1. General quality control.
 - 2. Manufacturers' field services.
 - 3. Mock-ups.
 - 4. Independent testing laboratory services and inspections.
- B. Related Requirements:
 - 1. Refer to applicable codes and Specifications sections for test requirements.

1.2 QUALITY CONTROL, GENERAL

- A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

1.3 MANUFACTURER'S FIELD SERVICES

- A. When specified in respective Specification sections, require manufacturer or supplier to have qualified personnel provide on-site observations and recommendations.
 - 1. Observe field conditions, including conditions of surfaces and installation.
 - 2. Observe quality of workmanship.
 - 3. Provide recommendations to assure acceptable installation and workmanship.
 - 4. Where required, start, test, and adjust equipment as applicable.
- B. Representative shall submit written report to Architect or City listing observations and recommendations.

1.4 MOCK-UPS

- A. Erect field samples and field mock-ups at locations on site as approved in advance and in accordance with requirements where included in Specifications section.
 - 1. Test mock-ups requiring special equipment may be erected at location having access to necessary equipment, coordinate with Architect.
- B. Field samples and mock-ups not approved and not capable of being acceptably revised shall be removed from site.
- C. Approved field samples and mock-ups may be used as part of Project.

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1.5 TESTING LABORATORY SERVICES AND INSPECTIONS

- A. Testing laboratory services and inspections specified and required by applicable codes and regulations will be performed by firms independent of firms related to construction operations and shall be acceptable to applicable authorities.
 - 1. Notify City immediately where potential conflict of interest may be involved with testing laboratories or inspection services for Project.
 - 2. City or Architect may also require independent testing of items where doubts exist that product or system does not conform to Contract Documents.
 - 3. City will employ and pay for testing laboratory and special inspectors to provide Project specific testing and inspections under applicable codes and Specification sections except where indicated otherwise.
 - a. City employment of testing laboratory and inspectors shall not relieve Contractor of obligation to perform Work in accordance with requirements of applicable codes and Contract Documents.
 - 1) Laboratory and inspectors may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - b. Retesting required because of non-conformance to specified requirements shall be performed by City's testing laboratory.
 - 1) Payment for retesting shall be charged to Contractor by deducting inspection and testing charges from Contract amount.
 - c. City provided testing shall be limited to Project specific testing and shall not include general tests or approvals of materials, equipment or systems.
 - d. City provided inspections shall be limited to Project design team inspections and special inspectors required by applicable authorities.
- B. Services shall be performed in accordance with requirements of governing authorities and with specified standards.
- C. DSA Projects: Testing and inspections shall be performed in accordance with DSA 103 Form.
- D. Reports will be submitted to Architect in duplicate giving observations and results of tests and inspections, indicating compliance or non-compliance with specified standards and with Contract Documents.
 - 1. Where required, testing laboratory and inspectors will submit copy of tests and inspections directly to enforcing agency.

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- E. Contractor shall cooperate with testing laboratory and inspection personnel; furnish tools, samples of materials, design mix, equipment, storage and assistance as requested.
- 1. Notify City, Architect, inspectors, and testing laboratory sufficiently in advance of expected time for operations requiring inspection and testing services.

END OF SECTION

SECTION 01 41 10

SLIP-RESISTANT HARD SURFACES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Teamwork is required to establish requirements for slip-resistance for hard floor and paving surfaces.
 - 1. Authorities Having Jurisdiction: Upon publication of standards and tests by authorities having jurisdiction those standards and tests shall take precedence over this Section.
 - 2. Hard Surface Flooring and Paving: Construction team shall review Contract Documents for hard surface flooring and paving systems and work with Designer and City to ensure slip-resistant materials are appropriate to each situation.

1.2 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer recommendations for areas and locations where flooring and paving systems are considered to have appropriate slip-resistance and areas where flooring and paving systems are not considered appropriate.
 - 2. Submit information regarding special methods materials used to achieve slip-resistance such as integral abrasives, textures, and coatings.
- B. Test Results: Submit test results for each flooring and paving material indicating slip-resistance testing performed by manufacturer for material and as specified under Testing in this Section.
 - 1. Submit test data for slip-resistance on each flooring and paving system specified indicating which testing system was used and where it was installed.
 - 2. Where certain flooring or paving materials have not been tested previously, submit evidence material has been used successfully in similar applications without well-recorded issues of slip resistance.
 - a. Concrete and flooring and paving materials not by a specific manufacturer and with finishes successfully used for decades shall be considered acceptable unless otherwise directed by authorities having jurisdiction.
 - 1) Acceptable Finishes: Broom finish, medium salted finish.
- C. Maintenance Data: Submit manufacturer recommendations for periodic maintenance recommended to ensure continuance of slip-resistance under anticipated use.
 - 1. Indicate special maintenance procedures which might be required due to special circumstances such as special contaminants due to location of flooring or paving such as food preparation areas, auto repair areas, and other special conditions.

1.3 QUALITY ASSURANCE

- A. Manufacturer: Manufacturers of hard flooring and paving materials, including floor coatings, shall be responsible for laboratory testing of each type of flooring material, including each optional finish, to show suitability for each application indicated.
1. Where tests other than those listed below are used, manufacturer shall provide information indicating comparison of tests results with appropriate tests listed below presented in manner that can be understood by design team
 - a. Acceptable Testing: Following tests may be used where authorities having jurisdiction accept results based on comparisons with other standards.
 - 1) ANSI A326.3 Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials.
 - a) Limited to interior level hard flooring wet and dry surfaces for tile, stone, terrazzo, and brick.
 - b) Hard floor and paving shall be tested for wet conditions but only those with water and a soap solution comparable to that used in ANSI A326.3, not other contaminants.
 - 2) ASTM E303 Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester (laboratory or field test).
- B. Suppliers and Subcontractor: Review products specified, supplied, and installed to verify they are appropriate based on manufacturer information.

1.4 CLASSIFICATIONS

- A. Due to the complexity of the determination of slip resistance for hard floor and paving surfaces, several classification systems have been established and are presently being referenced by manufacturers.
- B. Wet Pendulum Test Classifications, ASTM E303 British Pendulum Test:

Classification	Slider 96 Rubber (Hard)	Slider 55 Rubber (Soft)
P5 (most slip-resistant)	>54	>44
P4	45-54	40-44
P3	35-44	35-39
P2	25-34	20-34
P1	12-24	<20
P0 (least slip-resistant)	<12	Not Reliable

1. Slider 96 Rubber (Hard): Best for surfaces with relatively low slip resistance (also known as Four S Rubber).

2. Slider 55 Rubber (Soft): Best for surfaces with relatively high slip resistance such as textured concrete, textured tiles, and thermal stone finishes (also known as TRL Rubber).
3. Above numbers in table are considered Mean British Pendulum Numbers (BPN).

1.5 SLIP-RESISTANCE REQUIREMENTS

- A. Where specifications include hard floor and paving surfaces materials shall comply with follow requirements for non-slip surfaces.
 1. Maintenance: Numbers are based on wet hard floors or paving surfaces using materials such as soap solutions where included as part of standard test procedure such as ANSI A326.3 SLS solution (wet).
 - a. All test results are to be based on dynamic coefficient of friction (DCOF).
- B. Slip-Resistant Surface Requirements for Dry Level Interior Locations: Note dry floor friction test is not appropriate for heavily profiled surfaces.
 1. Interior Level Surfaces (Dry): ANSI A326.3/0.20 to 0.42.
 2. Interior Level Surfaces (Dry): AS 4586 Dry Floor Friction Test/D1/≥0.40
- C. Slip-Resistant Surface Requirements based on Water Wet Level Interior Locations: Items 2 and higher are based on ASTM E303 British Pendulum Test hard rubber (12 to 55) and soft rubber (NS to 45) in format shown (R9/12-NS or R10/35 - 35).
 1. General Areas: Locations not anticipated to get wet beyond occasional spills.
 - a. ANSI A326.3: 0.42 or greater.
 - b. ASTM E303 Pendulum Tests: R9/25-20.
 2. Foyer, Transition from Exterior to Interior Space (Wet): R10/35-40.
 3. Mall, Food Court (Wet): R10/35-40.
 4. Shops (Dry): R9/25-20).
 5. Commercial Kitchen serving 100 Plus Meals (Wet): R12/55-50.
 6. Warming Kitchen and Kitchens serving less than 100 Meals (Wet): R11/45-40.
 7. Residential Kitchen (Wet): R10/35-30.
 8. Restaurant Seating Area (Dry): R9/25-20.
 9. Bar Seating Area (Wet): R10/35-30.
 10. Back Bar (Wet): R11/45-40.
 11. Market General Aisles (Dry): R9/25-20.
 12. Market Fresh Food, Meat, and Fish Areas (Wet): R10/35-30.

13. Market Fresh Fruit and Vegetable Area (Wet): R10/35-30.
14. Hospitals and Aged Care Facilities (Dry): R9/25-20.
15. Hospitals and Aged Care Facilities (Wet): R10/35-30.
16. General Public Toilet Facilities without Showers (Wet): R10/35-30.
17. General Public Toilet Facilities with Showers (Wet): R11/45-40.
18. Locker Rooms (Wet): R11/45-40.
19. Interior Stair Tread with Railing (Full tread to minimum 2" at nosing): P2/Hard Rubber 30/Soft Rubber 25.
20. Interior Stair Tread no Railing within 24" (Full tread to minimum 2" at nosing): P3/Hard Rubber 35/Soft Rubber 30.
21. Wet Barefoot Interior Areas (Pools, Showers, Changing Rooms): Limit to materials where manufacturer can provide not less than 5 years successful experience in interior pool, shower, and changing room areas.
 - a. At least 20 projects shall be included in 5-year period with no indication hard floor material involved resulted in recorded slip and fall incidents.

END OF SECTION

**SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS**

PART 1 - GENERAL

1.1 SUMMARY

- A. This section describes temporary construction facilities and temporary controls.
 - 1. Electricity and lighting.
 - 2. Heat and ventilation.
 - 3. Water and sanitary facilities.
 - 4. Construction aids.
 - 5. Temporary enclosures.
 - 6. Barriers.
 - 7. Cleaning during construction.
 - 8. Project identification.
 - 9. Field offices.
 - 10. Cellular telephone service.
 - 11. Storage.
- B. Related Requirements:
 - 1. Section 01 70 00: Execution Requirements.
 - 2. Section 01 74 10: Waste management.
- C. Provide temporary construction facilities and temporary controls as required to conform to applicable authorities and as required to complete Project in accordance with Contract Documents.
 - 1. Authorities: Contact governing authorities to establish extent of temporary facilities and temporary controls required by authorities.

1.2 ELECTRICITY AND LIGHTING

- A. Provide electrical service required for construction operations, with branch wiring and distribution boxes located to allow service and lighting by means of construction-type power cords.
 - 1. Connection to existing electrical service is permitted.
- B. Provide lighting for construction operations.
 - 1. Permanent lighting may be used during construction; maintain lighting and make routine repairs.
- C. City will pay costs of energy used from existing on-site services.

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1.3 HEAT AND VENTILATION

- A. Provide heat and ventilation as required to maintain specified conditions for construction operation, to protect materials and finishes from damage due to temperature and humidity.
- B. City will pay costs of energy used from existing on-site services.

1.4 WATER AND SANITARY FACILITIES

- A. Provide water service required for construction operations; extend branch piping with outlets located so water is available by use of hoses.
 - 1. Connection to existing facilities is permitted.
 - 2. City will pay for water used from existing on-site services.
- B. Provide and maintain required sanitary facilities and enclosures.

1.5 CONSTRUCTION AIDS

- A. Noise, Dust and Pollution Control: Provide materials and equipment necessary to comply with local requirements for noise, dust and pollution control.
- B. Fire Protection: Maintain on-site fire protection facilities as required by applicable authorities and insurance requirements.
- C. Security: Protect Site and Work; prevent unauthorized entry, vandalism, and theft.
 - 1. Coordinate with City's security program.
- D. Dewatering: Provide and operate drainage and pumping equipment; maintain excavations and site free of standing water.

1.6 ENCLOSURES

- A. Temporary Closures: Provide temporary weather-tight closures for exterior openings for acceptable working conditions, for protection for materials, to protect interior materials from dampness, for temporary heating, and to prevent unauthorized entry.
 - 1. Provide doors with self-closing hardware and locks.
- B. Temporary Partitions: Provide temporary partitions as required to separate work areas from completed areas, to prevent penetration of dust and moisture into completed areas, and to prevent damage to finished areas and installed equipment.
 - 1. Construction: Framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces; Flame Spread Rating of 25 in accordance with ASTM E84.

1.7 BARRIERS

- A. Barriers: Provide barriers as required to prevent public entry to construction areas and to protect adjacent properties from damage from construction operations.

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1. Fence: Provide minimum 8-foot-high commercial grade chain link or painted solid wood fence around construction site; equip with gates with locks. Consider wind load.
 2. Covered Walkways: Provide lighted covered painted walkways as required by governing authorities for public rights-of-way and for public access to existing building.
- B. Barricades: Provide barricades as required by governing authorities and city standards.
- C. Tree Protection: Provide barriers around trees and plants designated to remain; protect against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water. Barriers must have posts that avoid tree roots and be at least 8' away from the tree trunk. Use of snow fence is recommended. Protection also requires trees to be watered no less than twice per week and "soaked".

1.8 CLEANING DURING CONSTRUCTION

- A. Control accumulation of waste materials and rubbish; recycle or dispose of off-site.
- B. Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

1.9 PROJECT IDENTIFICATION

- A. Project Sign: Provide minimum 32-square foot Project identification sign of wood frame and exterior grade plywood construction, painted, with computer generated graphics by professional sign maker.
1. Design: As furnished by Architect.
 2. Submit to City and Architect additional names or changes proposed to Project sign for prior written approval.
 3. Erect on site at location established by Architect.
- B. Other Signs: Subject to approval of Architect and City.

1.10 FIELD OFFICES (For Contractor and separate office trailer for City)

- A. Field Office: Provide weather-tight field office, with lighting, electrical outlets, data outlets, heating, and ventilating equipment, and equipped with furniture.
1. Meeting Space: In addition, provide space for Project meetings with table and chairs to accommodate minimum six persons.
 2. Telephone Service: Provide telephone service to field office.
 3. Multi-Purpose Copier: Provide plain paper multi-purpose color and black-and-white copier with enlargement and reduction capability and with built-in printer, scanner, and facsimile capabilities.

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4. Pursuant to special provisions, details as follows: Provide a separate trailer for City team. Size to Include table and chairs to accommodate no less than 10 persons comfortably. Trailer shall have suitable power, 1 lockable office, 1 main common area for meetings and 1 functioning toilet. Include 1x two tier filing cabinet and 1x 3-level bookshelf. Must include a plan table to accommodate a full-size set of plans. Field office for city shall have full air conditioning and be secure.

1.11 WIFI

- A. Provide trailer with wifi service, no less than 200 mb/s download and 20 mb/s upload. If hard wire is not feasible, provide Starlink or equal.

1.12 STORAGE

- A. Storage for Tools, Materials, and Equipment: Limit on-site storage to Project area; provide weather-tight storage, with heat and ventilation for products requiring controlled conditions.
 1. Maintain adequate space for organized storage and access.
 2. Provide lighting for inspection of stored materials.

1.13 REMOVAL

- A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion Inspection.
- B. Clean and repair damage caused by installation or use of temporary facilities.
- C. Restore existing facilities used during construction to specified or original condition.

END OF SECTION

**SECTION 01 60 00
PRODUCT REQUIREMENTS**

PART 1 - GENERAL

1.1 SUMMARY

- A. This section describes basic product requirements governing material and equipment.
 - 1. General product requirements.
 - 2. Product list.
 - 3. Quality assurance.
 - 4. Delivery, storage, and handling.
- B. Related Requirements:
 - 1. Section 01 25 00: Substitution procedures.
 - 2. Section 01 30 00: Administrative requirements
 - 3. Section 01 77 00: Closeout Procedures

1.2 GENERAL PRODUCTS REQUIREMENTS

- A. Products include material, equipment, and systems.
- B. Comply with Specifications, referenced standards, and applicable codes and regulations as minimum requirements.
- C. Provide new materials except as specifically allowed by Contract Documents.
- D. Materials to be supplied in quantity within a Specification section shall be by one manufacturer, shall be the same, and shall be interchangeable.
- E. Provide equipment and systems composed of materials from a single manufacturer except where otherwise recommended by equipment or systems manufacturer or where otherwise indicated in Contract Documents.
- F. Contractor's Options: Comply with following options; requests for substitutions for named manufacturers and products shall comply with requirements specified in Section 01 25 00 – Substitution Procedures.
 - 1. Products Identified by Reference Standards: Select product meeting referenced standard for products specified only by reference standard.
 - a. Requests for Substitutions to be limited to products not complying with referenced standards.
 - 1) Submit justification for non-compliance with reference standards as part of Request for Substitutions; if product is foreign made submit rationale why foreign standards and basic materials indicates compliance.

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2. Named Manufacturers: Where names of manufacturers are specified select any named manufacturer product meeting Specifications for products specified by naming one or more manufacturers.
 - a. Submit Request for Substitution for any manufacturer not named.
 3. Named Manufacturers and Named Products: Select any named manufacturer named product meeting Specifications for products specified by naming one or more manufacturers and products.
 - a. Where only one manufacturer and product is named together with additional manufacturers without specific products, Requests for Substitutions to be limited to products not comparable to that specified.
 - 1) Contractors, subcontractors, suppliers, and manufacturers shall take special care to ensure comparable products are being supplied based on design, performance, quality, and longevity.
 - 2) Substitutions: Submit Request for Substitution for any manufacturer not named and for products not comparable to those specified in design, performance, quality, and longevity.
 4. Basis of Design: Where manufacturer or manufacturer and product both are indicated as Basis of Design, submit Request for Substitution for other manufacturers and products.
 5. "Or Equal" Clauses: Submit request for substitution for manufacturer or product not specifically named in Specifications where terms "or equal", "or approved equal", or similar references are made.
- G. Nameplates: Do not attach or imprint manufacturer or producer nameplates on exposed surfaces in occupied spaces except for required labels and operating data.
1. Equipment Nameplates: Provide permanent nameplate on service connected and power operated equipment located on easily accessible surface inconspicuous in occupied spaces.
 - a. Provide name of product and manufacturer, model and serial number, capacity, speed, rating, and similar information.

1.3 SUBMITTALS

- A. Product List: Within 35 days after award of Contract, submit to City and Architect a complete list of major products proposed for installation, with name of manufacturer, trade name, and model.
- B. Product List: Prior to submittal of second Request for Payment, submit to Architect complete list of major products which are proposed for installation, with name of manufacturer, trade name, and model.
 1. Tabulate products by Specification number and title.

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C. Substitutions: Refer to Section 01 25 00 – Substitution Procedures.

1.4 QUALITY ASSURANCE

- A. Comply with industry standards and applicable codes except when more restrictive tolerances or requirements indicate more rigid standards or precise workmanship.
- B. Perform work by persons qualified to produce workmanship of specified quality.
- C. Install products straight, true-to-line, and in correct relationship to adjacent materials, with hairline joints, free of rough, sharp and potentially hazardous edges.
- D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.
 - 1. Seismic Anchors: Conform to code requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Transport products by methods to avoid product damage, deliver in undamaged condition in manufacturer's unopened containers or packaging.
- B. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.
- C. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.
- D. For exterior storage of fabricated products, place on sloped supports above ground.
- E. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.
- F. Arrange storage to provide access for inspection; periodically inspect to assure products are undamaged and are maintained under required conditions.
- G. Provide equipment and personnel to handle products by methods to prevent soiling and prevent damage.
- H. Promptly inspect shipments to assure products comply with requirements, quantities are correct, and products are undamaged.
- I. Immediately remove from Project products damaged, wet, stained, and products with mold and products with mildew.
 - 1. Take special care to prevent absorbent products such as gypsum board and acoustical ceiling units from becoming wet.

END OF SECTION

**SECTION 01 70 00
EXECUTION REQUIREMENTS**

PART 1 - GENERAL

1.1 SUMMARY

- A. This section describes execution requirements.
 - 1. Installer qualifications.
 - 2. Examination.
 - 3. Manufacturer's instructions.
 - 4. Installation.
 - 5. Cleaning.
 - 6. Protection.
- B. Related Requirements:
 - 1. Section 01 50 00: Cleaning during construction (Temporary Facilities).
 - 2. Section 01 77 00: Closeout procedures.
 - 3. Section 01 79 00: Demonstration and training.

1.2 INSTALLER QUALIFICATIONS

- A. Experienced Installers: Installers to have minimum five-years successful experience installing items like those required for Project, except for individuals in training under direct supervision of experienced installer.

1.3 EXAMINATION

- A. Acceptance of Conditions: Beginning installation of a product signifies installer has examined substrates, areas, and conditions for compliance with manufacturer requirements for tolerances and other conditions affecting performance.
- B. Field Measurements: Take field measurements as required to fit Work properly; recheck measurements prior to installing each product.
 - 1. Where portions of Work are to fit to other construction verify dimensions of other construction by field measurements before fabrication; allow for cutting and patching to avoid delaying Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

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1.4 MANUFACTURERS' INSTRUCTIONS

- A. Manufacturer's Recommendations: When work is specified to comply with manufacturers' recommendations or instructions, distribute copies to persons involved and maintain one set in field office.
 - 1. Conform to requirements specified in Section 01 30 00 for submittal of recommendations or instructions to Architect; submit to Architect only where specified or where specifically requested; otherwise keep in Field Office.
- B. Perform work in accordance with details of recommendations and instructions and specified requirements.
 - 1. Should a conflict exist between Specifications and recommendations or instructions consult with Architect.
- C. Where manufacturer's information notes special recommendations in addition to installation instructions, comply with both recommendations and instructions.

1.5 INSTALLATION

- A. Pre-Installation Meetings: Installers and suppliers are to attend pre-installation meetings scheduled by Contractor.
- B. Comply with manufacturers written recommendations and installation instructions unless more restrictive requirements are specified.
- C. Locate Work and components accurately, in correct alignment and elevation.
 - 1. Make vertical work plumb and horizontal work level.
 - 2. Install components to allow space for maintenance and ease of removal for replacement.
- D. Install products at time and under conditions to ensure best possible results; maintain conditions required for product performance until Substantial Completion.
- E. Conduct operations so no part of Work is subject to damaging operations or excessive loads during normal conditions.
- F. Securely anchor permanent construction in place, accurately located and aligned with other portions of Work.
- G. Allow for building movement including thermal expansion and contraction.
- H. Make joints of uniform width; arrange joints as indicated, for best visual effect where not otherwise indicated; fit exposed connections together to form hairline joints except where otherwise indicated.

1.6 CLEANING

- A. Cleaning During Construction: Specified in Section 01 50 00 - Temporary Facilities and Controls.

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- B. Progress Cleaning: Keep installed areas clean using cleaning materials specifically recommended by manufacturers of product being cleaned; where not otherwise recommended use nontoxic materials that will not damage surfaces.
 - 1. Remove debris from concealed spaces before enclosing space.
 - 2. Supervise construction operations to assure no part of construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.
- C. Final Cleaning: Execute final cleaning at Substantial Completion.
 - 1. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances; polish transparent and glossy surfaces; vacuum carpeted and soft surfaces.
 - a. Vacuuming Equipment: Type with high efficiency particulate arrestor (HEPA) type filters; properly maintained.
 - 2. Clean equipment and fixtures to a sanitary condition, clean filters of mechanical equipment, replace filters where cleaning is impractical.
 - a. Clean ducts.
 - 3. Clean site; sweep paved areas.
 - 4. Remove waste, surplus materials and rubbish from Project and site; recycle to maximum extent feasible.

1.7 PROTECTION

- A. Protect products subject to deterioration with impervious cover. Provide ventilation to avoid condensation and trapping water.
- B. Take care to use protective covering and blocking materials that do not soil, stain, or damage materials being protected.
- C. After installation, provide coverings to protect products from damage from traffic and construction operations, remove when no longer needed.
- D. Protect interior materials from water damage; immediately remove wet materials from site to prevent growth of mold and mildew on site.

END OF SECTION

**SECTION 01 73 00
CUTTING AND PATCHING**

PART 1 - GENERAL

1.1 SUMMARY

- A. Contractor is responsible for cutting, fitting and patching to complete Work and to:
 - 1. Make its parts fit together properly.
 - 2. Uncover work to provide for installation of ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to Contract Documents.
 - 5. Remove samples of installed work as required for testing.
 - 6. Provide routine penetrations of non-structural surfaces for installation of piping.
 - 7. Provide routine penetrations of non-structural surfaces for installation of conduit.
- B. Related Requirements:
 - 1. Section 01 50 00: Temporary facilities and controls.

1.2 SUBMITTALS

- A. Submit written request well in advance of cutting or alteration which affects:
 - 1. Work of City or separate contractor.
 - 2. Structural value or integrity of any element of Project.
 - 3. Integrity of weather-exposed or moisture-resistant elements.
 - 4. Efficiency, operational life, maintenance or safety of operational elements.
 - 5. Visual qualities of sight-exposed elements.
- B. Request shall include:
 - 1. Identification of Project and description of affected work.
 - 2. Necessity for cutting or alteration.
 - 3. Effect on work of City or separate contractor.
 - 4. Effect on structural integrity, or weatherproof integrity of Project.
 - 5. Alternatives to cutting and patching.
 - 6. Cost proposal, when applicable.
 - 7. Written permission of separate contractor whose work will be affected.
 - 8. Description of proposed work including:
 - a. Scope of cutting, patching, alteration, or excavation.
 - b. Products proposed to be used.
 - c. Extent of refinishing to be included.
- C. Should conditions of Work or schedule indicate a change of products from original installation, Contractor shall submit request for substitution as specified in Section 01 25 00 – Substitution Procedures.
- D. Submit written notice to Architect designating date and time work will be uncovered.

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PART 2 - PRODUCTS**

2.1 MATERIALS

- A. Comply with Specifications and standards for each specific product involved.
- B. Where Specifications and standards have not been provided, provide materials and fabrication consistent with quality of Project and intended for commercial construction.
- C. Provide new materials for cutting and patching unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect existing conditions of Project, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect conditions affecting installation of products, or performance of work.
- C. Report unsatisfactory or questionable conditions to Architect in writing; do not proceed with work until Architect has provided further instructions.

3.2 PREPARATION

- A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work.
 - 1. Provide services of licensed engineer for designing temporary support where required by applicable authorities for temporary supports and for shoring; submit engineering calculations directly to applicable authorities upon request.
- B. Protect other portions of Project from damage.

3.3 PERFORMANCE

- A. Execute cutting by methods that provide proper surfaces to receive installation of repairs and finishes.
 - 1. Execute excavating and backfilling by methods which will prevent settlement, and which will prevent damage to other work.
- B. Employ same installer or fabricator to perform cutting and patching work as employed for new construction for:
 - 1. Weather-exposed or moisture resistant elements.
 - 2. Sight-exposed finished surfaces.
- C. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.

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- D. Restore work that has been cut or removed; install new products to provide completed Work in accordance with requirements of Contract Documents.
- E. Fit work tight to pipes, sleeves, ducts, conduit and penetrations through surfaces.
- F. Refinish entire surfaces as necessary to provide even finish to match adjacent finishes:
 - 1. For continuous surfaces, refinish to nearest intersection.
 - 2. For an assembly, refinish entire unit.

END OF SECTION

**SECTION 01 74 10
WASTE MANAGEMENT**

PART 1 - GENERAL

1.1 SUMMARY

- A. Project requires special Waste Management Program.
 - 1. LEED Waste Management Goals: N/A – Comply with #2 below.
 - 2. CALGreen Waste Management: As required in Section 01 35 15.
 - 3. Provide itemization of costs related to Waste Management Program.
 - 4. Effect optimum control of solid wastes.
 - 5. Prevent environmental pollution and damage.
- B. Related Work:
 - 1. Section 01 35 15: CALGreen environmental requirements.
 - 2. Section 01 50 00: Temporary facilities and controls.

1.2 DEFINITIONS

- A. Inert Fill: A permitted facility that accepts inert waste such as asphalt and concrete exclusively.
- B. Class III Landfill: A landfill that accepts non-hazardous waste such as household, commercial, and industrial waste, including construction, remodeling, repair, and demolition operations.
- C. Construction and Demolition Waste: Includes solid wastes, such as building materials, packaging, rubbish, debris, and rubble resulting from construction, remodeling, repair, and demolition operations.
 - 1. Rubbish: Includes both combustible and noncombustible wastes, such as paper, boxes, glass, crockery, metal and lumber scrap, tin cans, and bones.
 - 2. Debris: Includes both combustible and noncombustible wastes, such as leaves and tree trimmings that result from construction or maintenance and repair work.
- D. Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals and inorganic wastes.
- E. Sanitary Wastes:
 - 1. Garbage: Refuse and scraps resulting from preparation, cooking, distribution, or consumption of food.
 - 2. Sewage: Domestic sanitary sewage.

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1.3 SUBMITTALS

- A. Waste Management Program: Comply with Contract Documents and applicable code requirements for salvaging, recycling, and disposing of nonhazardous waste.
1. Prior to commencement of Work, schedule and conduct meeting with City and Architect to discuss proposed Waste Management Program.
 2. Develop mutual understanding relative to details of recycling, and rebate programs.
 3. Prepare and submit a written and graphic Waste Management Program including, but not limited to, the following:
 - a. Indicate procedures to be implemented.
 - b. Estimate total Project waste to be generated, and estimated cost of disposing of Project waste in landfills.
 - c. Estimate total cubic yards of following waste categories to be diverted from landfill.
 - 1) Clean dimensional wood, palette wood.
 - 2) Plywood, oriented strand board, and medium density fiberboard.
 - 3) Cardboard, paper, packaging.
 - 4) Other items as directed by City and Architect.
 - d. Estimate amounts of following waste categories in appropriate units (weight, feet, square yards, gallons).
 - 1) Metals.
 - 2) Gypsum board.
 - 3) Carpet.
 - 4) Paint.
 - 5) Other items as directed by City and Architect.
 - e. Submit permit or license and location of waste disposal areas.
 - f. Submit procedures for recycling/re-use program.
 - g. Submit procedures for rebate programs.
 - h. Revise and resubmit Waste Management Program as required by City and Architect.
 - 1) Review of Contractor's Waste Management Program will not relieve Contractor of responsibility for control of pollutants and other environmental protection measures.

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- B. Submit summary of solid waste generated by Project with each application for progress payment, on form acceptable to City and Architect; include manifests, weight tickets, receipts, and invoices identifying Project and waste delivered to following locations.
 - 1. Recycling Centers.
 - 2. Class III landfills.
 - 3. Inert fills.
- C. Prepare rebate information and product documentation as required for City to qualify for rebate programs; submit with final closeout submittals.
 - 1. Where feasible submit in electronic format, otherwise in 3-ring binder.

1.4 RECYCLING PROGRAM

- A. Recycling: Implement recycling program that includes separate collection of waste materials of following types as applicable to Project requirements; recycling program to be applied by Contractors and subcontractors.
 - 1. Land clearing debris.
 - 2. Asphaltic concrete.
 - 3. Concrete.
 - 4. Masonry materials.
 - 5. Ferrous metal.
 - 6. Non-ferrous metal.
 - 7. Clean dimensional wood and palette wood.
 - 8. Plywood, oriented strand board, and medium density fiberboard.
 - 9. Paper - bond.
 - 10. Paper - newsprint.
 - 11. Cardboard and paper packaging materials.
 - 12. Glass.
 - 13. Plastics.
 - 14. Gypsum board (unpainted).
 - 15. Paint.
 - 16. Rigid foam.
 - 17. Carpet and pad.
 - 18. Beverage containers.
 - 19. Porcelain plumbing fixtures.
 - 20. Insulation.
 - 21. Others as appropriate.
- B. Handling: Keep materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.
 - 1. Clean materials contaminated prior to placing in collection containers.
 - 2. Arrange for collection by or delivery to appropriate recycling center or transfer station that accepts construction and demolition waste for purpose of recycling.
- C. Participate in Re-Use Programs: Rebates, tax credits, and other savings obtained for recycled or re-used materials shall accrue to Contractor.

END OF SECTION

**SECTION 01 77 00
CLOSEOUT PROCEDURES**

PART 1 - GENERAL

1.1 SUMMARY

- A. This section describes Contract closeout procedures.
 - 1. Substantial Completion.
 - 2. Final Completion.
 - 3. Project record documents.
 - 4. Material and finish data.
 - 5. Operation and maintenance manuals.
- B. Related Requirements:
 - 1. Section 01 30 00: Administrative requirements (including attic stock).
 - 2. Section 01 78 00: Warranties.
 - 3. Section 01 79 00: Demonstration and training.

1.2 SUBSTANTIAL COMPLETION

- A. Immediately prior to Substantial Completion, schedule agency reviews as required for "temporary certificate of occupancy" or for "certificate of occupancy".
- B. When Contractor considers Work, or a designated portion thereof is substantially complete, submit written notice, with list of items to be completed or corrected.
 - 1. List ("Punch List"): Format pre-approved by City and Architect; tabular form with each space listed required.
- C. Within a reasonable time, City and Architect will inspect status of completion and may add to "Punch List".
 - 1. Contractor shall pay for Architect's time and direct expenses where more than one Substantial Completion inspection is required.
- D. Should City and Architect determine Work is not substantially complete, Contractor will be promptly notified in writing, giving reasons.
- E. Contractor shall remedy deficiencies and send a second written notice of substantial completion; Architect will reinspect Work.
 - 1. Contractor shall pay for Architect's time and direct expenses where more than one Substantial Completion inspection is required.
- F. When Work is determined to be substantially complete by Architect, a Certificate of Substantial Completion will be prepared in accordance with General Conditions.
- G. DSA Projects: Contractor shall complete DSA 6-C Form and upload electronically to DSAbox within three days of completion of Work.

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1.3 FINAL COMPLETION

- A. When Work is complete, submit written certification indicating:
 - 1. Work has been inspected for compliance with Contract Documents.
 - 2. Work has been completed in accordance with Contract Documents and deficiencies listed (in 'Punch List') with Certificate of Substantial Completion have been corrected.
 - 3. Equipment and systems have been tested in presence of City's representative and are operational.
 - 4. Work is complete and ready for final inspection.
- B. Special Submittals: In addition to submittals required by Contract, submit following.
 - 1. Provide submittals required by governing authorities to governing authorities with copies included in Project Record Documents.
 - 2. Submit final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.

1.4 PROJECT RECORD DOCUMENTS

- A. Keep documents current; do not permanently conceal any work until required information has been recorded.
 - 1. City will provide Contractor with a separate set of Drawings to maintain for Project Record Documents.
 - 2. Store reproducible Drawings, one set of Project Manual, and one copy of each Change Order separate from documents used for construction, for use as Project Record Documents.
 - 3. Indicate actual work on Drawings; indicate actual products used in Project Manual, including manufacturer, model number and options.
 - 4. Update Project Record Documents daily and allow for Architect inspection at least once a month.
- B. At Contract close-out submit documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.
- C. As-Built Documents: General Contractor shall have electronic "As Built" sets of Contract Documents (Project Drawings and Project Specifications) prepared prior to Final Completion.
 - 1. Contractor shall use one complete electronic set of Contract Documents (Drawings and Specifications) for use for "As-Built".

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2. As-Built Drawings: Revise Drawings based on Record Documents and field measurements made after installation and indicate actual locations of structural elements, ducts, piping, wiring, and equipment.
 - a. Professional draftspersons experienced in electronic media used for Contract Documents shall revise original Project Drawings based on information recorded on Project Record Documents.
3. As-Built Specifications: Revise Specifications to indicate manufacturers who provided materials specified along with specifics indicating accessories, options, and finishes used in Project.
 - a. Cross referencing Submittal records is acceptable for accessories only.
4. Review Submittal: Submit two copies of electronic media of "As-Built" Documents to Architect for review.
 - a. After Architect review, revise where indicated and submit final electronic media to City.
- D. Final Completion Submittal: At Project Completion submit both Project Record Documents and As-Built Documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.

1.5 MATERIAL AND FINISH DATA

- A. Provide data for primary materials and finishes.
- B. Submit two sets prior to final inspection, bound in 8-1/2" by 11" three-ring binders with durable plastic covers, clearly identified regarding extent of contents.
 1. Electronic Format: Where available in electronic format, submit USB 3.0 flash drives with information required for material and finish data.
- C. Arrange by Specification division and give names, addresses, and telephone numbers of subcontractors and suppliers. List:
 1. Trade names, model or type numbers.
 2. Cleaning instructions.
 3. Product data.
 4. Maintenance recommendations.

1.6 OPERATION AND MAINTENANCE MANUALS

- A. Provide manuals for:
 1. Electrically operated items.
 2. Electrical equipment and controls.
 3. Maintenance manuals provided as part of Submittals.
- B. Submit two sets prior to final inspection, bound in 8-1/2" by 11" three-ring binders with durable plastic covers, clearly identified regarding extent of contents.

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- C. Provide a separate volume for each system, with a table of contents and index tabs for each volume.
- D. Arrange by Specification division and gives names, addresses, and telephone numbers of Subcontractors and suppliers. List:
 - 1. Appropriate design criteria.
 - 2. List of equipment and parts lists.
 - 3. Operating and maintenance instructions.
 - 4. Shop drawings and product data.
- E. Electronic Format: Where available in electronic format, submit two USB 3.0 flash drives with information required for operation and maintenance manuals.

END OF SECTION

**SECTION 01 78 00
WARRANTIES**

PART 1 - GENERAL

1.1 SUMMARY

- A. Warranties: Compile required, and incidental warranties required by Contract Documents.
 - 1. Manufacturer Warranties: Provide manufacturer's standard warranties where specified including inspections and services included or required as part of manufacturer's standard warranty.
 - 2. Special Warranties: Provide special warranties as required by Specifications sections.
 - 3. These warranties shall be in addition to and not a limitation of other rights City may have against Contractor under Contract Documents and which may be prescribed by law, regardless of wording of warranty.
- B. Extended Correction Period: Contractor shall correct failure of materials and systems to perform in a manner consistent with their intended use including but not limited to failure of waterproofing and roofing systems to resist penetration from water.
 - 1. Standard Correction Period: One year after Substantial Completion or Beneficial Occupancy by City except where otherwise noted in Contract Documents; coordinate with General Conditions and Supplementary Conditions.
 - a. Items used by Contractor during construction operations shall not be considered substantially completed.
 - b. Correction of Work Period begins with City occupancy not completion of component.
 - 2. Extended Correction Period: Requirements are same as standard correction period but for an extended period as indicated in Specifications sections.
 - 3. Contractor Responsibilities: Bear cost of correcting failed work and replacing construction damaged by failure of materials and systems to perform in a manner consistent with their intended use during correction period.
 - a. Requirements for correction period shall apply to Subcontractors, suppliers, installers, and those responsible for failed work.
 - b. City and Design Team shall not be responsible for determining degree of responsibility of those involved.
 - 4. City's Rights under Law: Correction period shall be in addition to and not a limitation of other rights City may have against Contractor under Contract Documents and which may be prescribed by law.

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1.2 FORM OF SUBMITTAL

- A. Special Warranty and Extended Correction Period Forms: Provide duplicate copies, notarized or on Contractor and Manufacturer's letterhead without conditions or exceptions to requirements specified.
 - 1. Assemble documents executed by subcontractors, installers, suppliers, and manufacturers.
 - 2. Provide table of contents and assemble in binder with durable plastic cover, clearly identified regarding extent of contents.
 - 3. Electronic Format: Submit USB 3.0 flash drives of warranties, in Microsoft Word.
- B. Manufacturer Warranty Forms: Use manufacturer's standard forms unless otherwise directed in Contract Documents; completed form shall not detract from or confuse interpretations of Contract Documents.
 - 1. Manufacturer's authorized representative shall sign manufacturer warranties.
 - 2. Subcontractor and installer shall countersign warranty where specified.
 - a. Provide required warranties for waterproofing and roofing systems countersigned by subcontractor and installer.
- C. Submit final warranties prior to final application for payment.
 - 1. For equipment put into use with City's permission during construction, submit within ten days after first operation.
 - 2. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.
- D. Provide information for City's personnel regarding proper procedure in case of failure and instances that might affect validity of manufacturer warranty.
- E. Size: 8-1/2" by 11" for three-ring binder; fold larger sheets to fit.

1.3 WARRANTIES AND CORRECTION OF WORK DOCUMENTS

- A. Warranties and Correction of Work Documents are intended to protect City against failure of work and against deficient, defective and faulty materials and workmanship, regardless of sources.
- B. Limitations: Warranties and correction of work requirements are not intended to cover failures that result from:
 - 1. Unusual or abnormal phenomena of the elements.
 - 2. City's misuse, maltreatment or improper maintenance of work.
 - 3. Vandalism after substantial completion.

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4. Insurrection or acts of aggression including war.
- C. Related Damages and Losses: Remove and replace work which is damaged as result of failure, or which must be removed and replaced to provide access for correction of work.
- D. Reinstatement: After correction of work reinstate warranty or extended correction period for corrected work to date of original expiration, but not less than half original period.
 1. Correction of Work Period: The general correction of work period specified shall not be extended by corrective work except to extent required to correct failure and repair or replace materials damaged by failure.
- E. Replacement Cost: Replace or restore failing items without regard to anticipated useful service lives where part of correction of work period, extended correction of work period, and special warranty period unless otherwise noted.
- F. Rejection of Warranties: City reserves right to reject unsolicited and coincidental product warranties that detract from or confuse interpretations of Contract Documents.

END OF SECTION

**SECTION 01 79 00
DEMONSTRATION AND TRAINING**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide equipment and systems demonstration and instruction in accordance with Contract Documents.
 - 1. Video record seminars and system demonstrations.
- B. Related Sections:
 - 1. Section 01 31 00: Project management and coordination.
 - 2. Section 01 77 00: Closeout procedures.

1.2 DESCRIPTION

- A. Seminar Agenda and Outline:
 - 1. Prepare a seminar agenda and outline in consultation and cooperation with City. Include following:
 - a. Equipment and systems that will be included in seminars.
 - b. Name of companies and representatives presenting at seminars.
 - c. Outline of each seminar's content.
 - d. Time and date allocated to each system and item of equipment.
 - 2. Submit preliminary seminar agenda and outline for review and comment by City.
 - a. Revise and resubmit agenda and outline until all seminar requirements have been satisfied and seminar dates and presenters have been finalized.
 - 3. Submit final seminar agenda and outline no later than eight weeks before date of Acceptance of Work.
- B. Seminar Organization:
 - 1. Contractor's presentation leaders shall chair seminars.
 - a. Coordinate qualification of training personnel, seminar contents, and presentations with City.
 - 2. Coordinate individual presentations and ensure manufacturer's representatives scheduled to be at training seminars are present.
 - 3. Arrange for presentation leaders familiar with design operation, maintenance and troubleshooting of equipment and systems.
 - a. Where one person is not familiar with all aspects of equipment or system; arrange for specialists familiar with each aspect.

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4. Coordinate proposed seminar dates with City and select mutually agreeable dates.
5. Video Recording: Arrange for video recording (audio and video) of training seminars and system demonstrations, including seminar and demonstration questions and answers.

C. Seminar Content:

1. Architect's Consultants will explain design philosophy of primary systems.
2. Include following information in presentations dealing with specific systems.
 - a. An overview of how system is intended to operate.
 - b. Describe design parameters, constraints and operational requirements.
 - c. Describe system operation strategies.
 - d. Provide information to help in identifying and troubleshooting problems.
3. Include following information in presentations dealing with equipment.
 - a. Explanation of how equipment operates.
 - b. Recommended preventative and routine maintenance.

D. System Demonstration:

1. Demonstrate operation of equipment and systems when specified in individual technical sections. Include following in demonstration.
 - a. Start-up and shut down.
 - c. Operation.
 - d. Scheduled and preventative maintenance.
 - e. Troubleshooting.
2. Demonstration may be conducted at time of original starting with City's prior approval.

E. Seminar and Demonstration Questions:

1. Be prepared to answer questions raised by City's personnel at demonstrations and seminars.
2. If unable to satisfactorily answer questions immediately, provide written response within three days.

F. Use manufacturer's operation and maintenance data as basis of instruction.

1.3 SUBMITTALS

- A. Video Recording: Submit three copies of each video recording in DVD format acceptable to City; include label on each DVD and on each container identifying Project and Seminar content.

END OF SECTION

SECTION 03 10 00
CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Forms for all cast-in-place concrete indicated on the Drawings and subsequent removal of forms, except those earth forms described in this Section.

1.02 RELATED SECTIONS

- A. Section 03 20 00 - Concrete Reinforcing.
- B. Section 03 30 00 - Cast-in-Place Concrete.

1.03 QUALITY ASSURANCE

- A. Qualifications of workmen: All workmen shall be experienced mechanics. Provide one person who shall be present at all time during execution of this portion of the work who shall be thoroughly familiar with the type of material being installed, the referenced standards and the requirement of this Work and shall direct all Work performed under this Section.
- B. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with all pertinent recommendations contained in "Recommended Practice for Concrete Formwork," publication ACI 347R and ACI 318, Section 6.1.
- C. Where provisions of pertinent codes and standards conflict with the requirement of this Section, the more stringent provision shall govern.
- D. All Structural Concrete foundations, curbs, floors and any other structural component requiring structural forming or shoring shall be Engineer Designed Systems with calculations and erection drawings provided by the Contractor. Contractor is to secure the services of a California Registered Structural Engineer for the design of Forming Systems.

1.04 PRODUCT HANDLING

- A. Protection: Contractor is to protect all formwork materials before, during and after installation.
- B. Damaged Forms: In the event of damage or misalignment, immediately make all repairs and replacement necessary at no additional cost to the City.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Form lumber: All form lumber shall be new except as allowed for re-use of forms in Part 3 of this Specification, and all form lumber shall be one of the following, a combination thereof, or an equal approved in advance by the Architect.
 - 1. Plywood forms may be Plyform, Plyron, and bearing the label of the Douglas Fir Plywood Association.
 - 2. Form-lumber may be; fir, larch, hemlock, or approved equal seasoned lumber and surfaced on all four sides.

- 3. Form sealers shall be liquid form oil.
- B. Not used.
- C. Other form materials and/or forming systems may be used if approved by the City, Architect and Structural Engineer. A complete list of materials, manufacturers and methods of application are to be submitted to the Architect, in accordance with Division 01.

2.02 TIES AND SPREADERS

- A. Form ties shall be of proven types and shall be a type which does not leave an open hole through the concrete and which permits patching at every hole.
- B. When forms are removed, all metal ties shall be removed and shall be flush with the concrete surface. No metal ties shall be exposed on the exterior of the walls.

2.03 ALTERNATE FORMING SYSTEMS

- A. Not used.

2.04 OTHER MATERIALS

- A. All other form materials, not specifically described herein, but required for proper completion of concrete formwork, shall be as selected by the Contractor subject to approval by the City or Architect.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Contractor shall verify and be responsible for all-existing dimensions and elevations before any Work is done.
- B. Inspect the installed Work of all other trades; verify that all such Work is complete, and that the installation of Formwork may begin.
- C. Verify that forms have been constructed in accordance with all pertinent codes and regulations, referenced standards and the design.
- D. Discrepancies: Do not proceed with installation in areas of discrepancy. Notify the Architect of all discrepancies. All discrepancies are to be fully resolved before proceeding with installation.

3.02 CONSTRUCTION FORMS

- A. Forms are to be constructed sufficiently tight to prevent leakage of concrete, and able to withstand excessive deflection when filled with wet concrete. Forms shall be braced, anchored and properly aligned.
- B. Layout and form all required cast-in-place concrete to the required dimensions indicated on the Drawings.
- C. Care shall be exercised in the layout of forms to avoid the necessity for cutting, patching, or repair of concrete after it is in place.
- D. Make provisions for all openings, offsets, recesses, anchorage, blocking and other requirements of the Work.
- E. Perform all forming required for Work of other trades and do all cutting and repairing of forms required to permit such installations.

- F. Carefully examine the Drawing and Specifications and verify with other trades for openings, reglets, chases, and other items that are required in the forms.
- G. Forms for pre-cast concrete shall be constructed to provide for shrinkage of the concrete, and shall be adequately braced. All edges shall have chamfer strips except as noted on Drawings.
- H. Construct all forms true, plumb, and square within a tolerance of 1/8" in 12 feet.

3.03 EMBEDDED ITEMS

- A. Provide, install and check all required steel frames, angles, grilles, bolts, inserts and other such items required to be anchored in the forms before the concrete is placed.

3.04 BRACING

- A. Properly brace and tie the forms together so as to maintain size, shape, and alignment, and to provide safety to personnel.
- B. Construct all bracing and supporting members of ample size and strength to safely support, without excessive deflection, all dead and live loads to which they may be subjected.

3.05 PLYWOOD FORMS

- A. Plywood forms shall be designed for loads imposed. Nail the plywood panels directly to studs and apply in a manner to minimize the number of joints.
- B. Make all panel joints tight butt joints with all edges true and square, if necessary, use tape to prevent excessive leakage.

3.06 FOOTING FORMS

- A. Foundation forms are to be wood forms.
- B. Earth forms may be used for footings provided the soil will stand without caving, as determined by the Architect (Structural Engineer) and the sides of the bank are made with a neat cut to the minimum dimensions indicated.

3.07 REUSE OF FORMS

- A. Reuse of forms shall be subject to approval of the I.O.R.
- B. Reuse of forms shall not delay or change the schedule for placement of concrete from the schedule if all forms were new.
- C. Reuse of forms shall not affect the structural stability of the forms or the appearance of the finished concrete.

3.08 REMOVAL OF FORMS

- A. Side forms of foundations may be removed 48 hours after placement of concrete. Where foundations are supporting lateral loads, forms shall not be removed until approved by the I.O.R.
- B. Use care and diligence, and protect workmen, passers-by, and the installed work and materials of other trades. Forms shall not be removed until the concrete can support all loads.
- C. Cut nails, tie wires and form ties off flush, leave all surfaces smooth and clean.
- D. Remove metal spreader ties and fill in the resulting pockets to match the surrounding areas with grout or dry pack. Sack all exposed faces.

- E. Fill all holes resulting from the use of bolts, ties, spreaders and sleeve nuts with cement grout applied under pressure by means of a grouting gun; grout shall be one part Portland cement, to two parts sand; apply grout immediately after removing forms.

3.09 CLEANING

- A. Remove all forming material from the site and dispose of in approved dumps.
- B. Clean area of all left over debris including stakes, ties, form boards, wires, concrete spills, etc., and leave area in a neat clean condition.

END OF SECTION

SECTION 03 20 00
CONCRETE REINFORCING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Concrete steel reinforcement as indicated.
- B. Related Sections:
 - 1. Section 03 10 00 - Concrete Forming and Accessories.
 - 2. Section 03 30 00 - Cast-in-Place Concrete.

1.02 SYSTEM DESCRIPTION

- A. Regulatory Requirements: Fabrication and placement of reinforcing shall be in accordance with requirements of CBC, Chapter 19.

1.03 SUBMITTALS

- A. Shop Drawings: Submit steel reinforcement Shop Drawings in accordance with ACI 315. Include assembly diagrams, bending charts and slab plans. Indicate lengths and location of splices, size and lengths of reinforcing steel.
- B. Closeout Submittals: Record exact locations of reinforcing that vary from Shop Drawings.

1.04 QUALITY ASSURANCE

- A. Comply with the following as a minimum requirement:
 - 1. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice.
 - 2. American Welding Society (AWS).
 - 3. American Concrete Institute (ACI).
 - 4. CBC, Chapter 19, Concrete.
- B. Source Quality Control: Refer to Division 01 Sections for general requirements and to following paragraphs for specific procedures. Testing laboratory retained by the City shall perform following conformance testing, select test Samples of bars, ties, and stirrups from the material at the Project site or from the place of distribution, with each Sample consisting of not less than two 18 inch long pieces, and perform the following tests according to ASTM A 615.
 - 1. Identified Bars: If Samples are obtained from bundles as delivered from the mill, identified as to heat number, accompanied by mill analyses and mill test reports, and properly tagged with the identification certificate so as to be readily identified, perform one tensile and one bend test for each 10 tons or fraction thereof of each size of bars. Submit mill reports when Samples are selected.
 - 2. Unidentified Bars: When positive identification of reinforcing bars cannot be performed and when random Samples are obtained, perform tests for each 2.5 tons or fraction thereof, one tensile and one bend test from each size of bars.
- C. Certification of Welders: Shop and Project site welding shall be performed by certified welding operators.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Avoid exposure to dirt, moisture or conditions harmful to reinforcing.
- B. Reinforcing steel bars, wire, and wire fabric shall be stored on the Project site to permit easy access for examination and identification of each shipment. Material of each shipment shall be separated for size and shape.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide reinforcing of sizes, gages and lengths indicated, bent to indicated shapes.

2.02 MATERIALS

- A. Steel Reinforcing Bars: ASTM A 615 and A 706 for welding, grade 60 billet steel unless otherwise specified or indicated.
- B. Bars or Rod Mats: ASTM A 184.
- C. Wire Fabric for Reinforcement: ASTM A 185.
- D. Tie Wire: ASTM A 82, fully annealed, copper-bearing steel wire, 16 gage minimum.
- E. Chairs, Spacers, Supports, and Other Accessories: Standard manufacture conforming to ACI-315 fabricated from steel wire of required types and sizes. For reinforcement supported from grade, provide properly sized dense precast blocks of concrete.

2.03 FABRICATION OF REINFORCING BARS

- A. Comply with CRSI Manual of Standard Practice for Reinforced Concrete Construction for fabrication of reinforcing steel.
- B. Bending and Forming: Fabricate bars of the indicated sizes and bend and form to required shapes and lengths by methods not injurious to materials. Do not heat reinforcement for bending. Bend bars No. 6 size and larger in the shop only. Bars with unscheduled kinks or bends are not permitted. Provide only tested and permitted bar materials.
- C. Welding: Provide only ASTM A 706 steel where welding is indicated. Perform welding by the direct electric arc process in accordance with AWS D1.4 and specified low-hydrogen electrodes. Preheat 6 inches each side of joint. Protect joints from drafts during the cooling process; accelerated cooling is not permitted. Do not tack weld bars. Clean metal surfaces to be welded of loose scale and foreign material. Clean welds each time electrode is changed and chip burned edges before placing welds. When wire brushed, the completed welds must exhibit uniform section, smooth welded metal, feather edges without undercuts or overlays, freedom from porosity and clinkers, and good fusion and penetration into the base metal. Cut out welds or parts of welds deemed defective, using chisel, and replace with proper welding. Prequalification of welds shall be in accordance with CBC requirements.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Bars shall be bent cold. Bars partially embedded in concrete shall not be field bent except as indicated on reviewed Shop Drawings. Before installation, clean reinforcing of loose scale, rust, oil, dirt and any coating that could reduce bond.

- B. Accurately position, install, and secure reinforcing to prevent displacement during the placement of concrete.
- C. Provide metal chairs to hold reinforcement the required distance above form bottoms. Space chairs so that reinforcement will not be displaced during installation. Provide metal spacers to secure proper spacing. Stirrups shall be accurately and securely wired to bars at both top and bottom. At slabs, footings, and beams in contact with earth, provide concrete blocks to support reinforcement at required distance above grade.
- D. Install and secure reinforcement to maintain required clearance between parallel bars and between bars and forms. Lapped splices shall be installed wherever possible in a manner to provide required clearance between sets of bars. Stagger lapped splices. Dowels and bars extending through construction joints shall be secured in position against displacement before concrete is installed and subsequently cleaned of concrete encrustation's while they are still soft.
- E. Do not install reinforcing in supported slabs and beams until walls and columns have been installed to underside of slabs and beams or until construction joints have been thoroughly cleaned. Reinforcing shall be inspected before placement of concrete and cleaned as required.
- F. Use deformed bars unless otherwise indicated, except for spiral reinforcement.

3.02 CLEAN UP

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

3.03 PROTECTION

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

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Cast-in-place concrete placement and finishing.
 - 2. Related Sections:
 - a. Section 03 10 00 - Concrete Forming and Accessories.
 - b. Section 03 20 00 - Concrete Reinforcing.

1.02 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings indicating locations of cast-in-place concrete Work and accessory items such as vapor barriers. Include details and locations of reinforcing, embedded items, and interfacing with other Work.
- B. Product Data:
 - 1. Mix Design: Submit a concrete mix design for each mix that will be provided for the Work. Include water/ cement ratio, size of coarse aggregate and amount of any admixture. Predict minimum compressive strength, maximum slump and air content percentage.
 - 2. Manufacturer of ready-mixed concrete shall deliver to the SPECIAL INSPECTOR a certificate with each mixer truck. Certificate shall bear the signature of representative of the testing laboratory, and shall state quantity of cement, water, fine and coarse aggregate and admixtures.
- C. Material Samples: Submit Samples illustrating concrete finishes, minimum 12 inches x 12 inches in size.
- D. Certificates: Submit a notarized certificate that each of following conforms to standards indicated:
 - 1. Aggregates - ASTM Standards C33
 - 2. Admixtures - ASTM Standards C260
 - 3. Curing materials - ASTM Standards C171

1.03 QUALITY ASSURANCE

- A. Comply with the following as a minimum requirement.
- B. American Concrete Institute (ACI) Publication:
 - 1. ACI 211 - Recommended Practice for Selecting Proportions of Concrete.
 - 2. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
 - 3. ACI 305 - Recommended Practice for Hot Weather Concreting.
 - 4. ACI 306 - Recommended Practice for Cold Weather Concreting.
 - 5. ACI 308 - Recommended Practice for Curing Concrete.
 - 6. ACI 309 - Recommended Practice for Consolidation of Concrete.
- C. American Society for Testing and Materials (ASTM) Standards:

1. ASTM A 185 - Welded Steel Wire Fabric For Concrete Reinforcement.
 2. ASTM C 31 - Making and Curing Concrete Test Specimens in the Field.
 3. ASTM C 33 - Concrete Aggregates.
 4. ASTM C 39 - Compressive Strength of Cylindrical Concrete Specimens.
 5. ASTM C 88 - Soundness of Aggregates by use of Sulphate or Magnesium Sulphate.
 6. ASTM C 94 - Ready-Mixed Concrete.
 7. ASTM C 143 - Slump of Hydraulic Cement Concrete.
 8. ASTM C 150 - Portland Cement.
 9. ASTM C 171 - Sheet Materials for Curing Concrete.
 10. ASTM C 172 - Sampling Freshly Mixed Concrete.
 11. ASTM C 173 - Air Content of Freshly Mixed Concrete by the Volumetric Method.
 12. ASTM C 227 - Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method).
 13. ASTM C 231 - Air Content of Freshly Mixed Concrete by the Pressure Method.
 14. ASTM C 260 - Air-Entraining Admixtures for Concrete.
 15. ASTM C 289 - Potential Reactivity of Aggregates (Chemical Method).
 16. ASTM D 1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
- D. Not used.
- E. Inspection shall be performed by a representative of a testing laboratory selected by the City. City will pay for inspection costs. Notify the laboratory 24 hours in advance of time concrete is to be mixed. Notify the laboratory of postponement or cancellation of mixing within at least 24 hours of scheduling time.
- F. Not used.
- G. Strength Test of Concrete: Refer to Section 01 40 00 - Quality Requirements.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Mixing and Placing Concrete: Refer to Section 01 40 00 - Quality Requirements.
- B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
 2. Each batch of concrete delivered to the Project site shall be accompanied by a time slip bearing departure time and signature of batch plant supervisor. Concrete shall be placed within 90 minutes after start of mixing.
- C. Store cement and aggregate materials so as to prevent their deterioration or intrusion by foreign matter. Deteriorated or contaminated materials shall not be furnished.

1.05 JOB CONDITIONS

- A. Cold Weather Requirements:

1. Adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or near-freezing weather. Surfaces, in which concrete is to come in contact with, shall be free from frost or ice. No frozen materials or materials containing ice shall be furnished.
 2. When placing concrete during freezing or near-freezing weather the mix shall have a temperature of at least 50 degrees F., but not more than 90 degrees F. when cement is added. Concrete shall be maintained at a temperature of at least 50 degrees F. for at least 72 hours after placing or until it has thoroughly hydrated. When necessary, concrete materials shall be heated before mixing. Special precautions shall be provided for protection of transit-mixed concrete.
- B. Hot Weather Requirements:
1. During hot weather, proper attention shall be provided for ingredients, production methods, handling, placing, protection and curing, to prevent excessive concrete temperatures or water evaporation which could impair required strength or durability.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Ready-Mixed Concrete: Mix and deliver in accordance with requirements of CBC Chapter 1905.
- B. Strength of Concrete: Concrete, unless otherwise indicated or specified, shall be provided with a minimum ultimate 28-day strength of 4000 psi (f'c). For high-early-strength concrete, age for reaching the f'c shall be as indicated on Drawings.

2.02 MATERIALS

- A. Cement: ASTM C 150 Type II Portland Cement. Furnished cement shall be as selected and reviewed for concrete proportioning.
- B. Aggregates: Aggregates shall conform to ASTM C 33 and C 227 except as modified herein. Any suitable individual grading of coarse aggregate may be furnished, provided Grading of Combined Aggregate indicated in following table is obtained. Refer to Section 01 40 00 - Quality Requirements.

GRADING OF COMBINED AGGREGATE

Sieve Size or Size in inches	1-1/2"	1"	3/4"
	Maximum	Maximum	Maximum
Passing a 2"	-----	-----	-----
Passing a 1-1/2"	95-100	-----	-----
Passing a 1"	70-90	90-100	-----
Passing a 3/4"	50-80	70-95	90-100
Passing a 3/8"	40-60	45-70	55-75
Passing a No. 4	35-55	35-55	40-60
Passing a No. 8	25-40	27-45	30-46
Passing a No. 16	16-34	20-38	23-40
Passing a No. 30	12-25	12-27	13-28
Passing a No. 50	2-12	5-15	5-15
Passing a No. 100	0-3	0-5	0-5

- C. Water: Water shall be potable and free from deleterious matter.
- D. Admixtures:
 - 1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 - 2. Retarding Admixture: ASTM C494/C494M, Type B.
 - 3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
 - 5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
 - 7. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C494/C494M, Type C.
- E. Expansion Joint Fillers: Preformed strips, non-extruding and resilient bituminous type, of thickness indicated, conforming to ASTM D 1751.
- F. Curing Paper and Liquid Curing Compounds:
 - 1. Curing Paper: A standard brand conforming to ASTM C 171, Type 1 - Regular, Kure-N-Seal.
 - 2. Liquid Curing Compounds: A standard brand, clear liquid conforming to ASTM C 309, Master Builders, Grace, Antihydro.
- G. Abrasive Aggregate: Norton Alundum, Union Carbide Carborundum, or equal, graded #12 through #30 sizes, color as selected by Architect.
- H. Underlayment: Latex underlayment for filling low spots in concrete shall be Tile-Tex by Flintkote Co., Webtex #60 or Fixallatex by Dowman Products Co.
- I. Vapor Retarder: See Section 07 26 16 - Under-Slab Vapor Retarder.

PART 3 - EXECUTION

3.01 GENERAL

- A. Time of Placing: Do not place concrete until reinforcement, conduits, outlet boxes, anchors, hangers, sleeves, bolts, and other embedded materials are securely fastened in place. Contact the SPECIAL INSPECTOR at least 24 hours before placing concrete; do not place concrete until inspected by the SPECIAL INSPECTOR.
- B. Pouring Record: A record shall be kept on the Project site of time and date of placing concrete in each portion of structure. Such record shall be maintained on the Project site until Substantial Completion and shall be available for examination by the Architect and AUTHORITIES HAVING JURISDICTION.

3.02 PREPARATION

- A. Vapor Retarder: See Section 07 26 16 - Under-Slab Vapor Retarder.
- B. Reglets and Rebates:
 - 1. Form reglets and rebates in concrete to receive flashing, frames and other equipment as detailed and required. Coordinate dimensions and locations required with other related Work.

2. If concrete slabs on grade adjoin a wall or other perpendicular concrete surface, form a reglet in wall to receive and carry horizontal concrete Work. Reglet shall be full thickness of the slab and shall be 3/4 inch wide, unless otherwise indicated. Requirement does not apply to exterior walks, unless specifically indicated.
- C. Not used.
- D. Screeds: Install screeds accurately and maintain at required grade or slab elevations after steel reinforcement has been installed, but before starting to place concrete. Install screeds adjacent to walls and in parallel rows not to exceed 8 feet on centers.

3.03 INSTALLATION

A. Conveying and Placing:

1. Notify Architect and testing and inspection agencies a minimum of 24 hours prior to commencement of concrete placement.
2. Concrete shall be conveyed from mixer to location of final placement by methods, which will prevent separation or loss of materials.
3. Concrete shall be placed as nearly as practicable to its final position to avoid segregation due to re-handling or flowing. No concrete that has partially hydrated or has been contaminated by foreign materials shall be placed, nor shall re-tempered concrete or concrete which has been remixed after initial set be placed.
4. In placing concrete in thin sections, provide openings in forms, elephant trunks, tremies or other recognized devices, to prevent segregation and accumulation of partially hydrated concrete on forms or metal reinforcement above level of concrete being placed. Such devices shall be installed so that concrete will be dropped vertically. Unconfined vertical drop of concrete from end of such devices to final placement surface shall not exceed 6 feet.
5. Concrete shall be placed as a continuous operation until placing of panel or section is completed. Top surfaces of vertically formed lifts shall be level.
6. Concrete shall be thoroughly consolidated during placement, and shall be worked around reinforcement and embedded fixtures with mechanical vibrators.
7. Where conditions make consolidation difficult, or where reinforcement is congested, batches of mortar containing same proportions of cement, sand, and water as provided in the concrete, shall first be deposited in the forms to a depth of at least one inch.

B. Compaction and Screeding:

1. Tamp freshly placed concrete with a heavy tamper until at least 3/8 inch of mortar is brought to surface. Concrete shall then be tamped with a light tamper and screeded with a heavy straightedge until depressions and irregularities are eliminated, and surface is true to finish grades or elevations. Remove excess water and debris.
2. Where slabs are to receive separate cement finish or mortar setting bed, continued tamping to raise mortar to surface is not performed. Laitance shall be removed by brushing with a stiff brush or by light sandblasting to expose clean top surface of coarse aggregate.

C. Floating and Troweling:

1. When concrete has hydrated sufficiently, it shall be floated to a compact and smooth surface. After floating, wait until concrete has reached proper consistency before troweling. Top surfaces shall receive at least 2 troweling operations with

steel hand trowel. Prior to and during final troweling, apply a fine mist of water frequently with an atomizing type fog sprayer. Omit troweling for slabs to receive a separate cement finish.

2. For interior finish slabs, final troweling shall provide a hard, impervious, and non-slip surfaces, free from defects and blemishes. Finished surface shall be within a tolerance of 1/8 inch in 10 feet. Avoid burnishing. Do not add cement or sand to absorb excess moisture.
3. Exterior Paving and Cement Walks: Finish as specified above, except surface shall be given a non-slip broom finish to match Sample reviewed by the Architect.
4. Vertical concrete surfaces shall be finished smooth and free from marks or other surface defects.

D. Curing:

1. Concrete shall be maintained above 50 degrees F., and in a moist condition for 7 days after placing, except that high early strength concrete shall be maintained in a moist condition for 3 days.
2. Before applying curing paper, interior floor treated with colored hardener shall be given a heavy protective coat of colored wax left unpolished, and then immediately covered with paper. If wax is not applied within two hours after final troweling, concrete shall be sprayed with a fine water mist and maintained continuously moist until wax is applied, unless spraying is not recommended by hardener manufacturer. After other Work such as plastering and painting has been completed, curing paper shall be removed and waxed floors cleaned of protective wax coating.
3. Forms containing concrete, top of concrete between forms, and exposed concrete surfaces after removal of forms shall be maintained in a thoroughly wet condition for at least 7 consecutive days after placing.
4. If weather is hot or surface has dried out, spray surface of concrete slabs and paving with fine mist of water, starting not later than 2 hours after final troweling and continuing until sunset. Surface of finish shall be kept continuously wet until curing medium has been installed.
5. Immediately after finishing, roof slabs and monolithic floor finish to receive resilient floor covering shall be uniformly and completely coated with liquid curing compound.
 - a. Install compound in a manner and quantity sufficient to produce a uniform continuous thin film of water-impervious membrane. Compound shall be installed in accordance with manufacturer's directions.
 - b. Protect adjoining surfaces from damage during installation. If curing compound is not applied immediately, cover finished concrete with wet burlap or curing paper and keep concrete surface wet for a period not to exceed thirty hours following finishing of concrete. At end of that time, burlap or paper shall be removed and curing compound installed as specified above.
 - c. Immediately after finishing, monolithic floor slabs not scheduled to receive resilient floor covering shall be covered with curing paper. Paper shall be lapped 3 inches at joints and sealed with waterproof sealer. Edges shall be cemented to finish. Repair or replace paper damaged during construction operations.

- d. Within 24 hours after finishing, exterior slabs and paving, and interior slabs to receive cement topping or mortar setting beds, shall be covered with sand to a depth of 2 inches and kept thoroughly wet for 7 days.
 - 1) Instead of sand covering, exterior walks and paving where no other surface treatment is specified, may be cured with clear liquid curing compound immediately installed in accordance with manufacturer's directions.
- E. Filling, Leveling and Patching:
 - 1. Concrete slabs exhibiting high or low spots and indicated to receive resilient floor covering or soft floor covering, shall have surfaces repaired. High spots shall be honed, or ground with power-driven machines to required tolerances. Low spots shall be filled with latex underlayment, installed in strict accordance with manufacturer's written recommendations.
 - 2. Holes resulting from form ties or sleeve nuts shall be solidly packed, through exterior walls, by pressure grouting with cement grout, as specified. Grouted holes on exposed surfaces shall be screeded flush and finished to match adjoining surfaces.
- F. Cement Base: Cement base shall be of the height, thickness, and shape detailed. Base shall be reinforced with one inch mesh, 18 gage, zinc-coated wire fabric. Base finish mixture shall be one part Portland cement, 2 parts of fine aggregate and one part pea gravel. Colored cement base shall include a chemically inert mineral oxide pigment in the mix.

3.04 FINISHING

- A. Soda and Acid Wash: Concrete surfaces to receive plaster, paint or other finish, and which have been formed by oil coated forms, shall be scrubbed with a solution of 1-1/2 pounds of caustic soda to one gallon of water. Surfaces where smooth wood or waste molds have been furnished shall be scrubbed with a solution of 20 percent muriatic acid. Wash with clean water after scrubbing.
- B. Sacking: Exposed concrete curbs, walls, and other surfaces shall be sacked by an application of Portland cement grout, floated, and rubbed. Sacking shall not be performed until patching and filling of holes has been completed. Entire sacking operation for any continuous area shall be started and completed within the same day.
 - 1. Mix one part Portland cement and 1-1/2 parts fine sand with sufficient water to produce a grout having consistency of thick paint. Wet surface of concrete sufficiently to prevent absorption of water from grout. Apply grout uniformly with a brush or spray gun, then immediately float surface with a cork or other suitable float, scouring wall vigorously.
 - 2. While grout is still plastic, finish surface with a sponge-rubber float, removing excess grout. Allow surface to dry thoroughly, then rub vigorously with dry burlap to completely remove dried grout. No visible film or grout shall remain after rubbing with burlap.
- C. Sandblasting: Exterior concrete surfaces to receive stucco dash coat finish, where plywood or other smooth forms have been furnished, shall be uniformly sand-blasted with sharp quartz sand under sufficient air pressure to remove dirt, form oil and other foreign materials, and roughen surface to provide a proper bond. Such surfaces shall be thoroughly washed with clean water after sandblasting.
- D. Abrasive: Concrete stair treads, landings, ramps and steps on interior and exterior of buildings, and interior exposed concrete floors in shop buildings shall receive an

abrasive finish. Abrasive grains in amount of 30 pounds per 100 square feet shall be evenly installed by dust-on method and embedded into surface during first troweling operation. Additional abrasive grains, in amount of 30 pounds per 100 square feet, shall then be evenly installed and embedded into surface during final troweling operation.

- E. Floor Hardener: Exposed interior concrete floors throughout shall be treated with floor hardener, as specified. Install hardener after surface of concrete has reached the point where no excess moisture is present, but while it is still plastic. Hardener shall be installed as follows:
 - 1. Colored Hardener: Install at rate of 40 pounds per 100 square feet of surface for initial application.
 - 2. Gray (natural) Hardener: Install at rate of 20 pounds per 100 square feet of surface for initial application.
 - 3. Hardener shall be evenly distributed and thoroughly floated into surface mortar with a wood float. An additional 20 pounds of hardener, colored or gray, specified as above, shall be installed over each 100 square feet, and troweled to an even surface having uniform color and texture.
- F. Cement Grout and Dry-Pack Concrete: Cement grout shall be mixed at the Project site and shall be composed of one volume of Portland cement and 2-1/2 volumes of fine aggregate. Materials shall be mixed dry with sufficient water added to make mixture flow under its own weight. When grout is used as a dry pack concrete, add sufficient water to provide a stiff mixture, which can be molded into a sphere.
- G. Broom Finish: Exterior stair treads and landings shall be provided with a non-slip broom finish in addition to abrasive finish specified.
- H. Abrasive Stair Nosing: Nosing shall be installed according to manufacturers written recommendations.

3.05 EXPANSION AND CONSTRUCTION JOINTS

- A. Construction Joints: Details and proposed location of construction joints shall be as indicated on the Drawings, located to least impair strength of structure, in accordance with the following:
 - 1. Thoroughly clean contact surface by sand blasting entire surface not earlier than 5 days after initial placement.
 - 2. A mix containing same proportion of sand and cement provided in concrete plus a maximum of 50 percent of coarse aggregate shall be placed to a depth of at least one inch on horizontal joints. Vertical joints shall be wetted and coated with a neat cement grout immediately before placing of new concrete.
 - 3. Should contact surface become coated with earth, sawdust, or deleterious material of any kind after being cleaned, entire surface shall be re-cleaned before applying mix.
- B. Expansion Joints: Provide expansion joints where indicated in walks and exterior slabs. Space approximately 20 feet apart, unless otherwise indicated. Joints shall extend entirely through slab with joint filler in one piece for width of walk or slab. Joint filler shall be 3/8 inch thick, unless otherwise indicated.
- C. Tooled Joints: Slabs, walks and paving shall be marked into areas as indicated with markings made with a V-grooving tool. Marks shall be round-edged, free from burrs or obstructions, with clean cut angles and shall be straight and true. Walks, if not

indicated, shall be marked off into rectangles of not more than 12 square feet and shall have a center marking where more than 5 feet wide.

3.06 TESTING

A. Molded Cylinder Tests:

1. City Consultant will prepare cylinders. Each cylinder shall be dated, given a number, point in structure from which sample was obtained, mix design number, mix design strength and result of accompanying slump test noted.
2. Separate tests of molded concrete cylinders obtained at same place and time shall be made at age of 3 days, 7 days, and 28 days. A strength test shall be the average of the compressive strength of 2 cylinders, obtained from the same sample of concrete and tested at 28 days or at test age designated for determination of f'c.
3. Test cylinders shall be prepared at the Project site and stored in testing laboratory in accordance with ASTM C 31, and tested in accordance with ASTM C 39.

B. Core Test: At request of the Architect, cores of hardened concrete shall be cut from portions of hydrated structures for testing, in accordance with CBC and ASTM C 42.

1. Provide 4 inch diameter cores at representative places throughout the structure as designated by the Architect.
2. In general, provide sufficient cores to represent concrete placed with at least one core for each 4,000 square feet of building area, and at least 3 cores total for each Project.
3. Where cores have been removed, fill voids with drypack, and patch the finish to match the adjacent existing surfaces.

C. Concrete Consistency: Measure consistency according to ASTM C 143. Test twice each day or partial day's run of the mixer.

D. Adjustment of Mix: If the strength of any grade of concrete for any portion of Work, as indicated by molded test cylinders, fall below minimum 28 days compressive strength specified or indicated, adjust mix design for remaining portion of construction so that resulting concrete meets minimum strength requirements.

E. Defective Concrete:

1. Should strength of any grade of concrete, for any portion of Work indicated by tests of molded cylinders and core tests, fall below minimum 28 days strength specified or indicated, concrete will be deemed defective Work and shall be replaced or adequately strengthened in a manner acceptable to the Architect and SEOR.
2. Concrete Work that is not formed as indicated, is not true within 1/250 of span, not true to intended alignment, not plumb or level where so intended, not true to intended grades and levels, contains sawdust shavings, wood or embedded debris, or does not fully conform to Contract provisions, shall be deemed to be defective Work and shall be removed and replaced.

F. Concrete for Equipment Pads, Mechanical and Electrical Work: Unless otherwise indicated, strength shall be 3,000 psi concrete. Exposed concrete shall be provided with a hand trowel finish with radius corners and edges. Form and place concrete where necessary as described in Section 30 10 00: Concrete Forms and Accessories, and reinforced as described in Section 03 20 00: Concrete Reinforcement. Calcium chloride shall not be furnished in any concrete mix provided for the installation of

underground electrical conduits. For concrete encasement of more than one conduit, furnish 3/4 inch to 1 inch aggregate as specified for concrete mix.

3.07 CLEAN UP

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

3.08 PROTECTION

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

END OF SECTION

SECTION 03 35 15

SEALED CONCRETE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide applied curing, hardener, sealer type curing compound to concrete flooring including preparation of concrete as required for complete installation.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Meeting: Convene not less than one week prior to commencing applying hardener sealer at areas indicated to have a hardener sealed finish.
 - 1. Require attendance of those directly affecting work of this Section.
 - 2. Review concrete installation and coordinate required preparation.

1.3 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature for each type of material involved in curing, hardener, sealer for concrete.
- B. Samples: Furnish sample panels of concrete with curing, hardener, sealer applied to half of surface; indicate which half has hardener sealer.
- C. Maintenance Instructions: Provide written instructions for recommended periodic maintenance.

1.4 QUALITY ASSURANCE

- A. Curing, Hardener, Sealer Installers: Firms with not less than five years successful experience applying specified curing, hardener, sealer and acceptable to system manufacturer.
- B. Mock-Up: Erect minimum 100 square feet of concrete flooring with curing, hardener, sealer at location as approved. Approved mock-up may be incorporated into Project.

PART 2 - PRODUCTS

2.1 SYSTEM MANUFACTURERS

- A. Nox-Crete Products Group
- B. W.R. Meadows, Inc.
- C. PROSOCO, Inc.
- D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide applied curing, hardener, sealer to concrete flooring.
- B. Regulatory Requirements, VOC Emissions: Comply with applicable limitations for volatile organic compound (VOC) emissions for concrete sealing materials.
- C. Accessibility Regulatory Requirements: Provide for assuring access for persons with disabilities in accordance with state and federal regulations for slip resistance.
 - 1. California Regulations: Comply with California Building Standards Code.
 - 2. Federal Regulations: Comply with Americans with Disabilities Act (ADA) Standards.
 - 3. Slip-Resistant Hard Surfaces: Hard surface finishes to comply with requirements of authorities having jurisdiction for slip-resistant hard surfaces, including general code requirements and requirements for access for persons with disabilities.
- D. Hardener, Sealer, Densifier: Provide water borne penetrating lithium silicate system designated by system manufacturer as hardener, sealer, densifier.
 - 1. Basis of Design: Nox-Crete Products Group/Duro-Nox LS.
 - 2. Basis of Design: W. R. Meadows, Inc./Liqui-Hard Ultra.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Ensure surfaces to receive hardener sealer are clean and well cured.
- B. Do not commence work until surface conditions are within tolerances required for proper finishing based on manufacturer recommendations.
- C. Start of work indicates acceptance of conditions.

3.2 PREPARATION

- A. Clean concrete slab free from foreign matter and prepare concrete for sealing in accordance with system manufacturer recommendations.

3.3 INSTALLATION

- A. Comply with curing, hardener, sealer manufacturer recommendations and application instructions for application of concrete hardener sealer densifier as required to match approved samples and mock-up.

3.4 PROTECTION

- A. Comply with system manufacturer recommendations for protecting floors until ready for use. Keep surface dry for minimum 48 hours after application.

- B. Do not permit traffic on floors with curing, hardener, sealer for at least 72 hours.
- C. Protect floors with curing, hardener, sealer until Substantial Completion.

END OF SECTION

SECTION 04 22 00
CONCRETE MASONRY UNITS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Reinforcing steel.
3. Mortar, grout and grouting.
4. Bolts, anchors, hardware, metal frames, and other insert items.
5. Provide concrete masonry unit construction, with mortar, reinforcement, anchorage, and accessories as required for complete installation.

a. Cut and fit concrete masonry for work of other trades.

6. Work Installed But Not Furnished: Build in items supplied by other trades and suppliers.

B. Related Sections:

1. Section 01 40 00 - Quality Requirements.
2. Section 03 10 00 - Concrete Forming and Accessories.
3. Section 03 20 00 - Concrete Reinforcing.
4. Section 03 30 00 - Cast-in-Place Concrete.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Meeting: Convene not less than one week prior to commencing work of this section. Require attendance of parties directly affecting work of this section.

1. Review installation procedures and coordination required with related work.

1.03 SUBMITTALS

- A. Mix Design: Submit grouting mix design.

B. Product Data:

1. Submit manufacturer's Product Data for assembly components, materials, and accessories.
2. Furnish manufacturer's certificate concrete masonry units conform to specified standards.

- C. Shop Drawings: Furnish drawings for reinforcing; show bar schedules, diagrams of bent bars, ties and arrangements and assemblies.

- D. Samples: Submit Samples for each type of required masonry unit, including reinforcement and accessories. Furnish section of exposed concrete masonry face indicating texture and color along with each type of colored mortar.

1.04 QUALITY ASSURANCE

- A. Perform the Work in accordance with CBC, Chapter 21. Refer to Section 01 40 00 - Quality Requirements.
- B. Comply with requirements of TMS 402/602-16.
- C. Concrete Masonry Units: Sample and test in accordance with ASTM C 140.
 - 1. Notify the testing laboratory a minimum of 45 days in advance of installing Concrete Masonry Unit, to allow for testing of the units for compression, shrinkage, and absorption. Absorption test requires 40 days.
 - 2. The retained material testing laboratory shall receive five concrete masonry units per test from masonry unit manufacturer, as designed or specified by the Architect, and shall perform and send required test results to the Architect and SPECIAL INSPECTOR.
- D. Portland Cement: Obtain sample and test in accordance with ASTM C 150.
- E. Mortar: Obtain sample and test in accordance with ASTM C 780.
- F. Grout: Obtain sample and test in accordance with ASTM C 404.
- G. Compressive Tests: Obtain sample and test to verify compliance with the following minimum values:
 - 1. Mortar: At least 800 psi at 7 days and 1,800 psi at 28 days.
 - 2. Grout: At least 1,200 psi at 7 days and 2,000 psi at 28 days.
 - 3. Do not test 28-day specimen when 7-day tests exceed 28-day requirements.
- H. Inspection During Installation: SPECIAL INSPECTOR will continuously observe the installation of reinforced masonry.
- I. The City will be responsible for the costs of original tests and inspection.
- J. If core testing is required, masonry removed by coring operations shall be replaced to match adjoining Work. Core testing shall conform with CBC, Chapter 21.
- K. Mock-Up: Provide minimum 4'-0" by 6'-0" sample panel of concrete masonry construction, clearly indicating joints and methods of reinforcing. Erect mock-up at Project Site, in location as approved by Architect.
 - 1. Approved mock-up will be used for quality control as minimum standard of work acceptable for Project.
 - 2. Approved mock-up may be incorporated into Project.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Store units above grade on level platforms to allow air circulation under stacked units.
- B. Cover and protect against wetting before installation.
- C. Handle units on pallets or flat bed barrows. Free discharge from conveyor units or transportation in mortar trays is not permitted.

1.06 SITE CONDITIONS

- A. Temperature: Maintain materials to minimum 50 degrees F prior to, during and 48 hours after completion of masonry work.
 - 1. Do not place masonry units when air temperature is below 40 degrees F.

2. During colder weather, work may continue where equipment is used to maintain constant temperature above 40 degrees F and masonry work completed and in progress is kept covered.
 3. Protect masonry construction from direct wind and sun exposure when temperatures exceed 99 degrees F and relative humidity is less than 50 percent.
- B. Bracing: Provide temporary bracing during erection of masonry work, maintain in place until building structure provides permanent bracing.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. System Description Includes: Provide concrete masonry unit construction, with mortar, reinforcement, anchorage, and accessories as required for complete installation.
 - B. Regulatory Requirements: Perform Concrete Masonry Unit work in accordance with requirements of California Building Standards Code except where more restrictive requirements are specified.
 1. Fire Rated Materials: Provide materials and systems which have passed ASTM E119 tests and are approved for fire ratings indicated on Drawings.
- C.1 Concrete Masonry Units: Hollow loadbearing units conforming to ASTM C90.
1. Concrete Masonry Manufacturers:
 - a. Angelus Block, Co., Inc.
 - b. Basalite Concrete Products.
 - c. Orco Block Co., Inc.
 - d. RCP Block and Brick, Inc.
 - e. Substitutions: Refer to Section 01 25 00.
 2. Weight: Provide normal, medium, or light weight units unless specific weight classification is indicated.
 - a. Normal Weight, 125 pcf or more.
 - b. Medium Weight, 105 to 125 pcf.
 - c. Light Weight, less than 105 pcf.
 3. Compressive Strength: Comply with ASTM C90, with minimum 1900 psi per unit when tested in accordance with ASTM C140.
 4. Size: Nominal 8" by 16" face measurement with thickness as indicated on Drawings.
 5. Exposed Face Surfaces: Dense with uniform texture and color throughout Project.

6. Exposed Face Surfaces: Dense with finish as approved by Architect prior to manufacturing; uniform texture and color throughout Project.
 - a. Texture: Split face and precision (smooth) as indicated on Drawings.
 - b. Colors: Where integral color is not indicated on Drawings or Finish Schedule, provide custom integral color as directed by Architect.
7. Special Shapes: Provide proper specially shaped units for bond beams, lintels, corners and jambs.
 - a. Exposed Special Shapes: Design bond beams, lintels, corners and jambs and fillers to match and compliment block units; where required perform cutting with masonry saw.

C.2 Concrete Masonry Unit: Modular medium weight conforming to ASTM C 90, hollow load-bearing Concrete Masonry Unit.

1. Provide open-end units at walls to be grouted.
 2. Provide closed-end units at walls and at openings where ends will be exposed in finish Work; provide bond beam blocks where horizontal reinforcing is indicated.
 3. Provide special shapes and accessory units at locations indicated on Drawings.
 4. Except as otherwise specified, provide units in standard gray color.
 5. Masonry unit shall have been cured for a minimum of 28 days.
 6. Masonry unit shall have maximum linear shrinkage or 0.065 percent from saturated to oven dry.
- B. Portland Cement: ASTM C 150, Type II, from one source.
- C. Mortar: Conform to ASTM C270, Type S.
1. Masonry Cement/Premix Mortar: Acceptable only if manufacturer certifies product is made of cement and lime, with no limestone or pulverized material used in lieu of hydrated lime.
- D. Grout: ASTM C 476.
- E. Mortar and Grout Materials:
8. Portland Cement: ASTM C150, Type I.
 9. Hydrated Lime: ASTM C207, Type S. Minimum compressive strength 2,000 psi.
 10. Aggregates: Standard masonry mortar and grout type; clean, dry and protected against dampness, freezing and foreign matter.
 - a. Mortar Aggregates: Conform to ASTM C144.
 - b. Grout Aggregates: Conform to ASTM C404.
 11. Water: Clean, drinkable, free of injurious amounts of oil, alkali, organic matter or other harmful materials.
 12. Exposed Mortar Colors: Integral color as indicated, as directed by Architect where not otherwise indicated.

F. Admixture for Grout: Grout Aid Type 2, complying with CBC requirements; as manufactured by Sika Chemical Corp. Refer to Section 01 40 00: Quality Requirements.

G. Color Admixtures: Pure mineral oxide colors conforming to ASTM C979 as required for approved colors.

Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

H. Reinforcement and Anchorages: Provide reinforcing and anchorages as indicated on Drawings.

13. Deformed Bars: ASTM A615, Grade 60 for bars No. 3 and larger, unless otherwise indicated.

14. Plain Bars: ASTM A675, Grade 80 for No. 2 bars, unless otherwise indicated.

15. Joint Reinforcement: ASTM A82, free from mill scale and excess or loose rust deposits.

I. Control Joints: Closed cell neoprene or PVC factory fabricated solid sections, resistant to oils and solvents, flexible at temperatures from 40-degree F after five hours exposure; ASTM D2240 minimum durometer 70.

J. Water: Potable and fresh.

K. Cleaning Materials: Shure Klean No. 600 detergent by ProSoCo.

L. Miscellaneous Materials: As required to complete the Work.

M. Sampling and Testing of Mortar: Refer to Section 01 40 00: Quality Requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Discard units with cracked faces, chipped surfaces, or other defects not complying with requirements of ASTM C 216.

3.02 PREPARATION

A. Supply metal anchors required for concrete masonry to appropriate trades for placement; provide in quantities required for Project and direct placement.

1. Ensure items built in by other trades are properly located and sized.

B. Establish lines, levels and coursing, protect from disturbance.

C. Clean surfaces to receive masonry free from dirt, debris, and laitance.

3.03 MORTAR AND GROUT MIXING

A. Mortar: Dry, loose volumes. Mix proportions shall be verified by material testing laboratory.

1. Portland Cement: 1 part.

2. Hydrated lime: 1/4 to 1/2 part.
 3. Mortar sand: 2-1/4 to 3 parts.
 4. Water: to provide required consistency.
 5. Mixing time for Silotec Mortar System shall be in accordance with Silotec Mortar System recommendations instead of those indicated in Section 01 40 00: Quality Requirements.
- B. Grout: Shall provide a minimum strength of 2000 psi unless noted otherwise. Grout strengths in excess of more than 2000 psi shall be verified by a material testing laboratory.
1. Fine Grout: Portland Cement 1 part; sand 2 1/4 to 3 parts; water to attain a slump of 8 to 10 inches.
 2. Coarse Grout: Portland Cement 1 part; pea gravel 2 1/4 to 3 parts; water to attain a slump of 8 to 10 inches.
- C. Measurements: Proportion by accurate volume measurements. Measure in calibrated devices that can be checked at any time.
1. Add water for workable consistency.
 2. Shovel measurements are not permitted.
- D. Mixing: Place sand, cement, and water in mixer in that order, while mixer is running; mix for 3 minutes, add lime, and admixture (for grout), and continue mixing until a uniform mass is provided, but in no case less than 10 minutes.
1. Not used.
 2. Batches of less than one sack of cement, and fractional sack batches are not permitted.
- E. Re-tempering Time Limit: Re-temper on mortar boards, for at least 3 minutes, but not more than 10 minutes when required, by adding water into a basin formed by mortar, and installing mortar into it. Dashing, or pouring of water over mortar is not permitted.
1. Do not re-temper mortar which has become hard or non-plastic.
 2. Discard mortar, which has not been installed within one hour after original mixing.
 3. Ready-Mix Grout: Grout batched off the Project site and delivered by mixer truck shall be subject to same procedures and controls as prescribed by building code requirements. Refer to Section 01 40 00 - Quality Requirements.

3.04 INSTALLATION OF MASONRY UNITS

3.2 INSTALLATION

- A. Do not wet concrete masonry units; lay units in mortar with full bed and head joints, properly jointed with other work.
1. Fully bond corners and intersections.
 2. Align cells of units to maintain clear, unobstructed space for reinforcing and grout, keep cells free of mortar and debris.
- B. Do not shift or tap masonry units after mortar has taken initial set, where adjustment must be made, remove mortar and replace.

- C. Buttering corners of joints and deep or excessive furrowing of mortar joints is not acceptable.
- D. Perform job site cutting with proper power tools to provide straight, true, unchipped edges.
- E. Provide structural anchorage or retention in accordance with applicable code requirements.
- F. Ensure masonry courses are of uniform height, make vertical and horizontal joints equal and of uniform thickness.
 - 1. Lay Concrete Masonry Unit in running bond.
 - 2. Course one block unit and one mortar joint to equal 8".
- G. Remove excess mortar and projections, take care to prevent breaking block corners.
- H. Tolerances:
 - 1. Maximum allowable variation from masonry unit to adjacent masonry unit is 1/32" where masonry units are exposed in finished construction and where waterproofing is applied over masonry units.
 - 2. Maximum allowable variation from plane of wall is 1/4" in 10 feet, and maximum 1/2" in 20 feet or more.
 - 3. Maximum allowable variation from plumb is 1/4" per story, non-cumulative, and maximum 1/2" in two or more stories.
 - 4. Maximum allowable variation of level coursing is 1/8" in 3 feet, 1/4" in 10 feet and 1/2" in 30 feet.
- I. Mortar Joints: Compress joints with a round or curved metal tool.
 - 1. Compress mortar joints with jointing tool with minimum diameter three times width of mortar joint, to provide a flush surface where resilient base or waterproofing is to be applied over masonry.
- J. Reinforcement and Anchorage: Fully reinforce corners and intersections. Lap splices minimum 6". Extend splices minimum 16" each side of openings.
 - 1. Support and secure reinforcing bars to maintain within 1/2" of dimensioned position.
 - 2. Retain vertical reinforcement in position at top and bottom of cells and at intervals not to exceed 192 bar diameters.
- K. Lintels: Provide reinforced concrete masonry unit lintels over openings where steel lintels are not scheduled.
 - 1. Use full length reinforcing bars.

- L. Grouting: Place grout when concrete masonry units are surface dry; consolidate and reconsolidate by mechanical vibration.
 - 1. Fine Grout: Use for spaces less than 2" in width using low lift grouting techniques.
 - 2. Coarse Grout: Use for spaces 2" or more in width.
 - 3. When grouting is stopped for more than one hour, terminate grout approximately 2" below top of upper masonry unit to form positive key for subsequent grout placement.
 - 4. Low-Lift Grouting: Place first lift of grout at 16" and place subsequent lifts at 8" increments.
 - 5. Hi-Lift Grouting: Use only where specifically approved by Architect and only where grout spaces are 3" or greater in width.
 - a. Provide minimum 4" high cleanouts at bottom of each cell to be grouted, clean out cells and inspect prior to grouting.
 - b. Pump grout into cells with maximum 48" lifts.
- M. Built-In Work: As work progresses, build in frames, lintels, nailing strips, anchor bolts, plates, and other items supplied by other trades.
 - 1. Build in items plumb and true.
 - 2. Do not build in organic materials which will be subject to rot or deterioration.
 - 3. Bed anchors of frames in mortar joints; fill frame voids solid with mortar; fill masonry cores with grout minimum 12" from framed openings.
- N. Cutting and Fitting: Cut and fit for chases, pipes, conduit, sleeves, and grounds; coordinate with work of other Specification sections to ensure correct size, shape and location.
- O. Workmanship: Install masonry plumb and true to line with straight level joints of uniform thickness. Maintain masonry clean during and after installation.
 - 1. Lay-out and incorporate embedded hardware items.
 - 2. Assist other trades with built-in items, which require cutting and fitting of masonry.
 - 3. Cut block units with a diamond saw or carborundum wheel. Trowel or chisel cutting is not permitted.
 - 4. Keep cavities clear of droppings and debris. Remove promptly.
- P. Reinforcing Steel: Install as indicated on Drawings. Except as otherwise indicated, install reinforcement in accordance with standards of Concrete Reinforcing Steel Institute and to requirements specified in Section 03 20 00 - Concrete Reinforcing. Do not splice vertical reinforcing except where indicated on the Drawings.
- Q. Shoring: Provide temporary shoring for lintels with sufficient strength to carry load without deflecting. Remove temporary shoring 28 days after masonry has been installed.

- R. Block Installation: Clean dirt and dust from surfaces before installation. Do not wet masonry units except in very dry weather.
 - 1. Foundation preparation: Sandblast tops of concrete starting surfaces, wash-off by high pressure water jet, and slurry coat surfaces with neat cement grout for bond to masonry.
 - 2. Install masonry with mortar to required joint thickness. Install blocks with 3/8-inch mortar bed on entire horizontal surface. Fill head joints solid, install tightly to adjoining units. Provide 3/8-inch joint thickness.
 - a. Hold racking to a minimum.
 - b. No toothing is permitted.
 - c. If it becomes necessary to move a unit after it has been installed, remove the unit, discard the mortar, and install the unit in fresh mortar.
 - 3. Anchor Bolts: Provide one-inch minimum grout space around protruding bolts.
 - 4. Bond: Unless otherwise indicated, install units in common running bond.
 - 5. Finish Joint Treatment: Unless otherwise indicated, cut both interior and exterior joints flush, and tool slightly concave to a dense, uniform surface.
 - 6. Grouting: Unless noted otherwise on Drawings, completely fill cells with grout.
- S. Steel Door Frames:
 - 1. Locate doorframes accurately, install plumb, "Ram-set" or "Rawlplug" to floor surface and brace in position before start of masonry installation.
 - a. Frames are specified to be furnished with adjustable anchors.
 - b. Fill interior of frames solid with mortar or grout as walls are constructed.
 - 2. Provide temporary wood spreaders from jamb to jamb and from head to floor to ensure that jambs do not bow-in, distort from a straight line, or deflect from superimposed loads during construction.

3.05 LOW-LIFT GROUTING FOR HOLLOW MASONRY UNITS

- A. After mortar joints have set, cores are cleaned of mortar and debris, and reinforcing is installed and inspected, grout cells in 2 feet maximum lifts, providing specified pea gravel grout mix. Refer to Section 01 40 00 - Quality Requirements.
- B. Grouted walls shall be solid and without voids.
- C. Grout may be installed by pump, tremie or bucket, using hoppers to avoid spilling on exposed surfaces.
- D. Place an initial 2 feet high lift around, thoroughly compact, then place balance of each lift, compacting again through total lift, with hardwood spading sticks or pencil vibrators.
- E. Stop grout pours 1-1/2 inches below top of each lift.
- F. Remove and discard spilled grout from upper units before grout can harden.
- G. Bracing: Adequately brace walls against wind and other forces during and after construction.
- H. Re-puddle top of grout after initial set.

3.06 HIGH-LIFT GROUTING OPTION FOR HOLLOW MASONRY UNITS

- A. High-lift grouting method is permitted provided following qualifications and requirements are met. High-lift grouting shall apply only to cell sizes available with 8 inch and wider block units.
- B. Provide bond beam units, inverted for start course, and omit alternate blocks or cut openings in alternate face shell on bottom course for cleanouts.
- C. Remove projecting mortar fins. Wash out every cell thoroughly using a water jet, which has sufficient force to remove mortar from the interior of the cells, and from reinforcing steel.
- D. Plug each cleanout by setting a "soap" in mortar into opening and securely bracing it in place to prevent displacement. If masonry is not exposed in finish Work, cleanouts may be formed.
- E. Grouting:
 - 1. Grout masonry cells solid, free from voids.
 - 2. Do not install grout until masonry has set a minimum of 3 days in warm weather (50 degrees to 85 degrees F.) or 5 days in cool, damp weather (35 degrees to 50 degrees F.).
 - 3. Pump grout into grout cell space as rapidly as practical. Discard grout not in place within one hour after water was first added to batch.
 - 4. Install grout with maximum slump without segregation. Place in a continuous pour, in maximum lifts of 4 feet, with approximately 20 minutes elapsed time between any 2 successive lifts.
- F. Consolidating:
 - 1. Consolidate and reconsolidate grout using 3/4 inch lightweight flexible cable vibrators.
 - 2. First consolidation shall be performed to bottom of lift immediately after placement, and in case of subsequent lifts, through previously placed lift.
 - 3. Top lift shall be reconsolidated no sooner than 30 minutes after grout has been installed.
 - 4. Vibrating of reinforcing steel is not permitted.
- G. Bracing: Adequately brace walls against wind and other forces during and after construction.

3.07 CURING

- A. Remove efflorescence, stains, debris, excess grout, and foreign matter.
- B. During curing, or for any other purpose, do not saturate masonry with water.
- C. For low-humidity conditions, dampen the wall surface with a very light fog spray continuously for 3 days to cure mortar in joints.

3.08 PARGE COAT

- A. Apply parge coat to the earth side of surfaces that are to receive waterproofing.
- B. A Portland cement and sand mix (1:3.5 by volume), or Type M or S mortar may be used for the parge coat.
- C. Parging should be applied to damp (not saturated) concrete masonry in two 1/4" (6mm) thick layers. The first coat should be roughened when partially set, hardened for 24

hours, and then moistened before second coat is applied. The second coat should be trowelled to a smooth, dense surface.

- D. The parge coat should be beveled at the top to form a wash, and thickened at the bottom to form a cove between the base of the wall and the top of footing.

3.09 CLEANING

- A. At completion of masonry Work, remove misplaced mortar, grout or other foreign substances, and clean surfaces which will be exposed in finish Work with specified cleaner, or with clean water and stiff fiber brushes.
- B. Point or replace defective mortar, match adjacent work.
- C. Clean soiled surfaces using a non-acidic solution which will not harm masonry or adjacent materials, consult masonry manufacturer for acceptable cleaners.
- D. Use non-metallic tools in cleaning operations.
- F. Remove rubbish, debris, and waste materials and legally dispose off of the Project site.

3.10 PROTECTION

- A. Maintain protective boards at exposed external corners which may be damaged by construction activities; protect without damaging completed work.
- B. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Structural steel.
- B. Related Sections:
 - 1. Section 01 40 00 - Quality Requirements.
 - 2. Section 03 30 00 - Cast-in-Place Concrete.
 - 3. Section 05 31 00 - Steel Decking.
 - 4. Section 05 50 00 - Metal Fabrications.
 - 5. Section 09 90 00 - Painting and Coating.
 - 6. Section 09 96 70 - High Performance Coating.
 - 7. Section 09 96 80 - Elastomeric Coating.

1.02 REFERENCES

- A. AISC – Steel Construction Manual:
 - 1. AISC 360 Specifications for Structural Steel Buildings.
 - 2. RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts.
- AA. AISC 341 - Seismic Provisions for Structural Steel Buildings, including Supplements.
- B. AISC S323 - Quality Criteria and Inspection Standards.
- C. AISC - American Institute of Steel Construction, Code of Standard Practice for Steel Buildings and Bridges, for Architecturally Exposed Structural Steel.
- D. ASTM A36 - Structural Steel.
- E. ASTM A53 - Hot Dipped, Zinc-Coated Welded and Seamless Steel Pipe.
- F. ASTM A108 - Standard Specification for Steel Bars, Carbon, Cold-Finish, Standard Quality.
- G. ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.
- H. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.
- I. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.
- J. ASTM A325 - High Strength Bolts for Structural Steel Joints.
- K. ASTM A500 - Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- L. ASTM A572 - Grade 50 - Structural Steel.
- M. ASTM A653 - Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated by the Hot-Dip Process.
- N. ASTM A780 - Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
- O. ASTM A992 - Steel for Structural Shapes For Use in Building Framing.
- P. ASTM C1107 - Packaged Dry, Hydraulic Cement Grout (Non-Shrink).
- Q. ASTM F1554 - Standard Specification for Anchor Bolts.

- R. AWS A2.4 - Standard Welding Symbols.
- S. AWS D1.1 - Structural Welding Code.
- SS. AWS D1.8 - Structural Welding Code – Seismic Supplement.
- T. AWS WHB-1 - Qualification and Certification.
- U. AWS A5.1 - Carbon Steel Covered Arc-Welding Electrodes.
- V. CBC Chapter 22
- W. SSPC - Steel Structures Painting Council, SP-2, Hand Tool Cleaning.
- X. Federal Emergency Management Agency (FEMA)
 - 1. FEMA 353 - Recommended Specification and Quality Assurance Guidelines for Steel Moment Frame Construction for Seismic Application, July 2000.

1.03 SYSTEM DESCRIPTION

- A. Regulatory Requirements:
 - 1. Structural steel shall conform to CBC requirements, except that steel manufactured by acid Bessemer process is not permitted for structural purposes.
 - 2. Sheet and strip steel other than those listed in CBC, if provided for structural purpose, shall comply with CBC requirements.

1.04 SUBMITTALS

- A. Shop Drawings:
 - 1. Submit Shop Drawings, including complete details and schedules for fabrication and shop assembly of members, and details, schedules, procedures and diagrams showing the sequence of erection. Fully detail minor connections and fastenings not shown or specified in the Contract Documents to meet required conditions using similar detailing as shown in the Contract Documents. Include a fully detailed, well controlled sequence and technique plan for shop and field welding that minimizes locked in stresses and distortion; submit sequence and technique plan for review by the Architect.
 - a. Include details of cuts, connections, camber, and holes in accordance with Figure 4.5 of AWS D1.1-02 or AISC Section J1.8, weld position plan and other pertinent data. Indicate welds by standard AWS symbols, and show size, length and type of each weld.
 - b. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed for Work specified in other section.
 - c. Erection and Bracing Plan and Erection Procedure: Submit an erection and framing plan, including columns, beams, and girders, prepared, signed and sealed by a structural engineer registered in the State of California in accordance with Title 8 CCR, Section 1710. Maintain a copy at the Project site as required by the California Division of Industrial Safety.
 - d. Submit a list of steel items to be galvanized.
 - 2. Product Data:
 - a. Submit copies of fabricator's specifications and installation instructions for the following products. Include laboratory test reports and other data required demonstrating compliance with these Specifications:
 - 1) Structural steel, each type; including certified copies of mill reports covering chemical and physical properties.
 - 2) Welding electrodes.

- 3) Welding gas.
 - 4) Unfinished bolts and nuts.
 - 5) Structural steel primer paint.
 - 6) High-strength bolts, including nuts and washers.
3. Manufacturer's Mill Certificate:
 - a. Submit, certifying that products meet or exceed specified requirements.
4. Mill Test Reports:
 - a. Submit manufacturer's certificates, indicating structural yield and tensile strength, destructive and non-destructive test analysis.
5. Charpy-V-Notch (CVN) Impact Test: Submit certified copies of Charpy-V-Notch (CVN) Impact Test by the manufacturer for applicable steel members and components.
 - a. Charpy-V-Notch (CVN) Impact Test for Base Metal: hot rolled shapes with flanges 1_1/2 in. thick and thicker and plates 2 in. thick and thicker shall be subjected to Charpy-V-Notch impact test in accordance with "Seismic Provisions for Structural Steel Buildings", Part A3.3
 - b. Not used
 - c. Charpy-V-Notch test shall be performed by the manufacturer employing Test Frequency (P) in accordance with ASTM A 673 and utilizing standard specimen sizes shown in Figure 6 of ASTM E 23. The absorbed energy in a CVN impact test shall not be less than that specified in "Seismic Provisions for Structural Steel Buildings", Part A3.3
6. Submit certified copies of tests by manufacturer for fine grain practice. Structural steel base material, as described above, shall be manufactured using fully killed fine grain practice having grain size number 5 or better as determined by ASTM E 112.
7. Weld Procedure Specifications (WPS): Submit weld procedures according to AWS D1.1 for each welded joint on project (whether prequalified or qualified by testing) to City's testing laboratory for approval. After approval by testing laboratory, submit to Architect for record. Weld procedures shall indicate joints details and tolerances, preheat and interpass temperature, post-heat treatment, single or multiple stringer passes, peening of stringer passes for groove welds except for the first and the last pass, electrode type and size, welding current, polarity and amperes and root treatment. The welding variables for each stringer pass shall be recorded and averaged, from these averages the weld heat input shall be calculated. Submit the manufacturer's product data sheet for all welding material used.
8. Welder's Certificates: Field welders shall be Project certified in accordance with AWS D1. 1-15. Shop welders shall be Project certified for FCAWS in accordance with AWS D1. 1-15.
9. Test Reports: Submit reports of tests conducted on shop and field welded and bolted connections. Include data on type of test conducted and test results.
10. Welding Material Certification: Comply with AWS D1.8 Section 1.22. Submit to City's testing laboratory.

1.05 QUALITY ASSURANCE

- A. Comply with the following as a minimum requirement, except as otherwise indicated:

1. American Institute of Steel Construction (AISC) "Code of Standard Practice for Steel Buildings and Bridges,
 2. Perform welding in accordance with AWS Standards, AWS D1.1, and California Building Code Section 1705A.2.5 and approved weld procedure.
- B. Shop fabrication shall be inspected in accordance with CBC.
- C. Erect mock-up panel of fabricated structural steel meeting Architecturally Exposed Structural Steel tolerances for exposed areas. Approval by Architect is required. Mock-up to remain for comparison but may not be left as part of the work.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Store structural steel above grade on platforms, skids or other supports.
- B. Protect steel from corrosion.
- C. Store welding electrodes in accordance with AWS D 12.1.
- D. Store other materials in a weather-tight and dry place until installed into the Work.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Stock Materials: Provide exact materials, sections, shapes, thickness, sizes, weights, and details of construction indicated on Drawings. Changes because of material stock or shop practices will be considered if net area of shape or section is not reduced thereby, if material and structural properties are at least equivalent, and if overall dimensions are not exceeded.

2.02 MATERIALS

- A. Structural Steel: All wide flange shapes shall conform to ASTM A992 Grade 50. Brace Frame Base Plate shall be ASTM A572 Grade 50. Other steel shall conform to ASTM A36.
- B. Unfinished Threaded Fasteners: ASTM A307, Grade A, regular low carbon bolts and nuts.
- C. High-Strength Threaded Fasteners: ASTM A325, ASTM A490 or ASTM F1852 quenched and tempered, steel bolts, nuts and washers.
- D. Primer: Lead-free metal primer, Tnemec 10-99, Rust-Oleum X-60, or equal.
- E. Steel Pipe: ASTM A53, Type E or S, Grade B.
- F. Structural Tubing:
1. Hot-formed, ASTM A501.
 2. Cold-formed, ASTM A500, Grade B.
- G. Galvanizing: ASTM A123.
- H. Welding Electrodes: Provide electrodes recommended by manufacturer for seismic connections.
1. Comply with latest AISC Seismic Provision.
- I. Shear stud connectors: ASTM A108, Grade 1015 forged steel, headed, uncoated, granular flux filled shear connector or anchor studs by Nelson Stud Welding Division of TRW, Lorain, OH, or equal.

- J. Grout: ASTM C1107, non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 7 days; of consistency suitable for application and a 30 minute working time.
- K. Threaded Rods: ASTM F1554, grade as noted per plan.

2.03 FABRICATION

- A. Cleaning and Straightening Materials: Materials being fabricated shall be thoroughly cleaned of scale and rust, and straightened before fabrication. Cleaning and straightening methods shall not damage material. After punching or fabrication of component parts of a member, twists or bends shall be removed before parts are assembled.
- B. Cutting, Punching, Drilling and Tapping: Unless otherwise indicated or specified, structural steel fabricator shall perform the cutting, punching, drilling and tapping of Work so that Work of other trades will properly connect to steel Work.
- C. Milling: Compression joints depending on contact bearing shall be furnished with bearing surfaces prepared to a common plane by milling.
- D. Use of Burning Torch: Oxygen cutting of members shall be performed by machine. Gouges greater than 3/16 inch that remain from cutting shall be removed by grinding. Reentrant corners shall be shaped notch free to a radius of at least 1/2 inch. Gas cutting of holes for bolts or rivets is not permitted.
- E. Galvanizing: After fabrication, items indicated or specified to be galvanized shall be galvanized in largest practical sizes. Fabrication includes operations of shearing, punching, bending, forming, assembling or welding. Galvanized items shall be free from projections, barbs, or icicles resulting from the galvanizing process.
- F. Welding:
 - 1. Type of steel furnished in welded structures shall provide chemical properties suitable for welding as determined by chemical analysis. Welds shall conform to the requirements of CBC Chapter 17. Conform to AWS D1.1 and D1.8, and CBC Chapter 22.
 - 2. Materials and workmanship shall conform to the requirements specified herein and to CBC requirements, modified as follows:
 - a. No welded splices shall be permitted except those indicated on Drawings unless specifically reviewed by the Architect.
 - b. Drawings will designate joints in which it is important that welding sequence and technique be controlled to minimize shrinkage stresses and distortion.
 - 3. Welding shall be performed in accordance with requirements of the AWS Structural Welding Code.
 - a. Welded Joint Details: comply with AISC Seismic Provisions.
 - 4. Architecturally Exposed Structural Steel: Verify that weld sizes, fabrication sequence, and equipment used for Architecturally Exposed Structural Steel will limit distortions to allowable tolerances. Prevent surface bleeding of back-side welding on exposed steel surfaces. Grind smooth exposed fillet welds 1/2 inch (13 mm) and larger. Grind flush butt welds. Dress exposed welds.
 - 5. Remove erection bolts on welded, Architecturally Exposed Structural Steel; fill holes with plug welds; and grind smooth at exposed surfaces.
- G. Shop Finish:

1. Notify the SPECIAL INSPECTOR when Work is ready to receive shop prime coat. Work shall be inspected by the SPECIAL INSPECTOR before installation of primer.
 2. Structural steel and fittings, except galvanized items, which will be exposed when building is completed, shall receive a coat of primer.
 3. The primer specified shall be spray applied, filling joints and corners and covering surfaces with a smooth unbroken film. The minimum dry film thickness of the primer shall be 2.0 mils.
 4. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete or high strength bolted.
- H. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.
- I. Fabricate Architecturally Exposed Structural Steel with exposed surfaces smooth, square, and free of surfaces blemishes, including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness.
1. Remove blemishes by filling, grinding, or by welding and grinding, prior to cleaning, treating and shop priming.
 2. Comply with fabrication requirements, including tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for Architecturally Exposed Structural Steel.
- J. Not used.

2.04 SHOP AND FIELD QUALITY CONTROL

- A. A special inspector, approved by AUTHORITIES HAVING JURISDICTION to inspect the Work of this section, shall inspect high-strength bolted connections. The City will provide a AUTHORITIES HAVING JURISDICTION approved independent testing laboratory to perform tests and prepare test reports in accordance with CBC 2213. The SPECIAL INSPECTOR shall be responsible for monitoring the work of the special inspector and testing laboratories to ensure that the testing program is satisfactorily completed.
- B. An AWS CWI certified special inspector, approved by AUTHORITIES HAVING JURISDICTION to inspect the Work of this section, shall inspect welded connections. The City will provide a AUTHORITIES HAVING JURISDICTION approved independent testing laboratory to perform tests and prepare test reports in accordance with CBC 1704.2.4. The SPECIAL INSPECTOR shall be responsible for monitoring the work of the special inspector and testing laboratories to ensure that the testing program is satisfactorily completed.
- C. The independent testing laboratory shall conduct and interpret test and state in each report whether test specimens comply with requirements, and specifically state any deviations there from.
- D. Provide access to all places where structural steel Work is being fabricated or produced so required inspection and testing can be performed.
- E. The independent testing laboratory may inspect and/or test structural steel at plant before shipment; however, Architect reserves the right at any time before Final Completion to deem materials not in compliance with the specified requirements as defective Work.

- F. Correct defects in structural Work when inspections and laboratory test reports indicate noncompliance with specified requirements. Perform additional tests as may be required to reconfirm noncompliance of original Work, and as may be required to show demonstrate compliance of corrected Work.
- G. Welding: Inspect and test during fabrication and erection of structural steel assemblies as follows:
 - 1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in the Work. Record Work required and performed to correct deficiencies.
 - 2. Inspect welds. Welds shall be visually inspected before performing any non-destructive testing. Groove weld shall be inspected by ultrasonic or other approved non-destructive test methods. Testing shall be performed to AWS D1.1 Table 6.3 cyclically loaded non-tubular connections.
 - 3. Ultrasonic testing shall be performed by a specially trained and qualified technician who shall operate the equipment, examine welds, and maintain a record of welds examined, defects found, and disposition of each defect. Repair and test defective welds.
 - 4. Rate of Testing: Completed welds contained in joints and splices shall be tested 100 percent either by ultrasonic testing or by radiography.
 - 5. Welds, when installed in column splices, shall be tested by either ultrasonic testing or radiography.
 - 6. Base metal thicker than 1-1/2 inches, when subjected to through-thickness weld shrinkage strains, shall be ultrasonically inspected by shear wave methods for discontinuities directly behind such welds. Tests shall be performed at least 48 hours after completed joint has cooled down to ambient air temperature.
 - 7. Any material discontinuities shall be reviewed based on the defect rating in accordance with the criteria of AWS D1.1 table 6.3 by the Architect and AUTHORITIES HAVING JURISDICTION.
 - 8. Other method of non-destructive testing and inspection, for example, liquid dye penetrate testing, magnetic particle inspection or radiographic inspection may be performed on weld if required.
 - 9. Lamellar Tearing: Lamellar-tearing resulting from welding is a crack (with ero tolerance) and shall be repaired in accordance with AWS D1.1.
 - 10. Lamination: The rejection criteria shall be based on ASTM A 435.
 - 11. Where testing reveals lamination or conditions of lamellar tearing in base metal, the steel fabricator shall submit a proposed method of repair for review by the Architect. Test repaired areas as required.
 - 12. Magnetic Particle Testing: Magnetic particle testing when required shall be provided in accordance with AWS D1.1 for procedure and technique. The standards of acceptance shall be in accordance with AWS D1.1 - Qualification.
- H. Lamellar Tearing: Prior to welding plates 1 to 1-1/2 inches thick and greater and rolled shapes within the distance from 6 inches above the top of the joint to 6 inches below the bottom of the joint shall be checked by ultrasonic testing for laminations in base metal which may interfere with the inspection of the completed joint. Should these defects occur, members will be reviewed by the Architect and AUTHORITIES HAVING JURISDICTION. Welding procedure specifications in sub-section 1.5G specify welding practices to minimize lamellar tearing.

- I. Prior Testing of Base Material: Test material before fabrication.
- J. Lines and levels of erected steel shall be certified by a State of California licensed surveyor as set forth in related Division 01 section.
- K. Welded studs shall be tested and inspected by the special inspector in accordance with requirements of AWS D1.1 - Stud Welding.
- L. Record Drawings: After steel has been erected, correct or revise Shop Drawings and erection diagrams to correspond with reviewed changes performed in the field.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Verify governing dimensions and conditions of the Work before commencing erection Work.
 - 1. Report discrepancies between drawings and field dimensions to Architect before commencing work.
 - 2. Beginning of installation means erector accepts existing conditions and surfaces underlying or adjacent to work of this section.
- B. Provide temporary shoring and bracing, and other support during performance of the Work. Remove after steel is in place and connected, and after cast-in-place concrete has reached its design strength.

3.02 ERECTION

- A. Install structural steel accurately in locations, to elevations indicated, and according to AISC specifications and CBC requirements.
- B. Clean surfaces of base plates and bearing plates.
 - 1. Install base and bearing plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims; cut off flush with edge of base or bearing plate before packing with grout.
- C. Maintain erection tolerances of structural steel within AISC Code of Standard Practice for Steel Buildings and Bridges.
 - 1. Members and components, plumbed, leveled and aligned to a tolerance not to exceed one-half the amount permitted for structural steel. Contractor to provide adjustable connections between Architecturally Exposed Structural Steel and the structural steel frame or the masonry or concrete supports, in order to provide the erector with means for adjustment.
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact after assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
- E. Do not permit thermal cutting during erection of structural steel.
- F. Where indicated for field connections, provide standard bolts complying with ASTM A 307.

- G. Install high strength steel bolts at locations indicated. Assembly and installation shall be in accordance with CBC requirements.
 - 1. Allowable hole sizes: 1/16 inch larger than bolt size.
 - 2. Use friction type connection with standard hardened steel circular, square or rectangular washer under bolt nut.
 - 3. Thoroughly clean area under bolt head, nut and washer. Remove all paint, lacquer, oil or other coatings except organic zinc-rich paints in accordance with SSPC, SP-2.
 - 4. Tighten bolts by power torque wrench or hand wrench until twist-off.
- H. Contractor shall be responsible for correcting detailing and fabrication errors and for correct fitting of all members and components.
- I. Erect structural steel plumb and level and to proper tolerances as set forth in the AISC Manual. Provide temporary bracing, supports or connections required for complete safety of structure until final permanent connections are installed.
- J. Install column bases within a tolerance of 1/8 inch of detailed centerlines, level at proper elevations. Support bases on double nuts and solidly fill spaces under bases with dry-pack cement grout.
- K. Provide anchor bolts with templates and diagrams. Contractor shall be responsible for proper location and installation of bolts. Correct deficiencies and errors.
- L. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and apply galvanizing repair paint according to ASTM A780.

3.03 FITTING

- A. Closely fit members, finished true to line and in precise position required to allow accurate erection and proper joining in the field.
- B. Drilling to enlarge unfair holes will not be allowed. Allow only enough drifting during assembly to bring parts into position, but not sufficient enough to enlarge holes or distort the metal. Do not heat rolled sections, unless approved by Architect.

3.04 PUNCHING AND DRILLING

- A. Punch material 1/16 inch larger than nominal diameter of bolt, wherever thickness of metal is equal to or less than the diameter of the bolt plus 1/8 inch.
- B. Drill or sub-punch and ream where metal is equal to or more than the diameter of the bolt plus 1/8 inch. Make diameter for sub-punched and sub-drilled holes 1/16 inch larger than nominal diameter of bolt.
- C. Precisely locate holes to ensure passage of bolt through assembled materials without drifting. Enlarge holes when necessary to receive bolts by reaming; flame cutting to enlarge holes is not acceptable. Structural Steel members with poorly matched holes will be rejected.

3.05 FINISHING

- A. After erection, spots or surfaces where paint has been removed, damaged, or burned off and field rivets, bolts, and other field connections not concealed in the work, shall be cleaned of dirt, oil, grease, and burned paint and furnished with a spot coat of the same primer installed during shop priming.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Install paint to exposed areas with the same

material installed during shop painting. Install by brush or spray to provide a minimum dry film thickness of 1.5 mils.

3.06 FIELD QUALITY CONTROL

- A. City will provide a special inspector and independent testing laboratory to perform field inspections and tests and to prepare test reports.
- B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.

3.07 CLEAN UP

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

3.08 PROTECTION

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

3.09 HANDLING

- A. Both in shop and in the field, transport, handle and erect to prevent damage or overstressing of any component.

END OF SECTION

SECTION 05 31 00

STEEL DECKING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Metal decking.
 - 2. Shear connectors.
- B. Related Requirements:
 - 1. Division 01 - General Requirements.
 - 2. Section 01 40 00 - Quality Requirements.
 - 3. Section 05 12 00 - Structural Steel Framing.

1.02 REFERENCES

- A. AISI - Specifications for the Design of Cold-Formed Steel Structural Members.
- B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
- C. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.
- E. ASTM D1056 - Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
- F. AWS D1.3 - Structural Welding Code Sheet - Steel.

1.03 PERFORMANCE REQUIREMENTS

- A. Compute properties of deck sections on basis of effective design width as limited by provisions of the AISI specifications. Provide no less than deck section properties specified, including section modulus and moment of inertia per foot of width.
- B. Regulatory Requirements:
 - 1. Requirements of Regulatory Agencies: AUTHORITIES HAVING JURISDICTION and Underwriters Laboratories Inc. (UL) approval for the decking when installed as a part of an assembly indicated on Drawings in which fire resistive construction ratings are required.
 - 2. Work of this section shall be in accordance with CBC.
- C. Manufacturers shall be members of Steel Deck Institute (SDI).

1.04 SUBMITTALS

- A. Shop Drawings: Drawings, sections and details indicate type of decking, location, finish, gage of metal, arrangement of sheets, necessary fabrication to incorporate decking into the Work, and relationship to openings and flashing.

1.05 QUALITY ASSURANCE

- A. General: Metal decking steel shall conform to requirements of strengths and properties of standards specified.

- B. Qualifications of Welders: Properly certified for the type of Work involved in compliance with CBC requirements.
- C. Continuous inspection of welding will be performed by a special inspector. Refer to Section 01 40 00 - Quality Requirements. The Project Inspector shall be responsible for monitoring the work of the special inspector to ensure that the inspection program is satisfactorily completed.
- D. Identification of metal decking steel shall conform to the standards specified in Section 01 40 00 - Quality Requirements.
 - 1. Fabricator shall furnish sufficient evidence to the Architect attesting compliance with specified requirements.
 - 2. Conform to CBC requirements. Unclassified or unidentified decking is not permitted. Furnish deck manufacturer's certified mill analyses and test reports for each heat covering decking having a minimum Fy of 33 Ksi. In addition, for decking having Fy greater than 33 Ksi, testing laboratory shall perform one tension and elongation test and one bend or flattening test for each gage.
- E. Unidentifiable Steel: Steel which is not readily identifiable as to grade from markings and test records is not permitted to be provided as part of the Work of this section.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. ASC Steel Deck. (IAPMO # 0329)
- B. OR equal with valid IAPMO or ICC report that meets/exceeds minimum section properties noted on plan.

2.02 MATERIALS

- A. Metal Decking: Roll-formed sheets conforming to ASTM A653, with G90 zinc coating.
 - 1. Section properties shall conform to applicable provisions of latest edition of AISI - Specification for the Design of Cold-Formed Steel Structural Members.
- B. Flexible Closure Strips for Deck: Vulcanized, closed-cell, expanded chloroprene elastomer, complying with ASTM D1056, Grade SCE #41.
 - 1. Brittleness Temperature: Minus 40 degrees F, ASTM D746.
 - 2. Flammability Resistance: Self-extinguishing,
- C. Metal Flashing and Closures: 22 gage minimum, with ASTM A653, G90 zinc coating.
- D. Shear Connectors: Headed stud type, ASTM A108 Grade 1015, cold-finished carbon steel complying with AISC specifications.

2.03 FABRICATION

- A. Corrugated sheets or sections shall be designed to support required live load between supporting members.
- B. Provide decking in lengths to span over three or more supports.
- C. Except as detailed otherwise, provide decking with interlocking side laps, 2 ½-inch minimum end bearing, and 1 ½-inch minimum side bearing.
- D. Welding: Provide materials and methods in accordance with recommendations of steel decking manufacturer and reviewed submittals. Hold decking tight to the supporting elements with screws or other means for proper welding or crimping of the

decking edges. Conform to AWS D1.3, and to the patterns and weld types indicated, with welds free from sharp edges and protrusions. Field coat welds and abraded surfaces at completion with an anodic type galvanizing repair paint. Omit the field paint coating where welds or abrasions are covered by concrete fill or sprayed fireproofing.

PART 3 - EXECUTION

3.01 OPENINGS

- A. Cut and reinforce units to provide openings which are located and dimensioned on the structural and mechanical Drawings.
- B. Provide openings, or other Work not indicated on the Drawings.

3.02 INSTALLATION

- A. Install metal decking in accordance with decking manufacturers' recommendations, requirements of Drawings, Shop Drawings, and Specifications.
- B. Install metal decking on supporting steel framework and adjust to final position before permanently fastening in place.
 - 1. Install each unit to proper bearing on supports.
 - 2. Install units in straight alignment for entire length of run of cells with close registration of cells of one unit with those of abutting unit.
- C. Fasten decking to steel framework at ends of units and at intermediate supports. Welding shall be as indicated on Drawings.
- D. Fasten side laps between supports as indicated on Drawings.
- E. Perform field cutting parallel with cells in area between cells, leaving sufficient horizontal material to permit welding to support steel.
- F. Weld shear connectors to supports thru decking units as required by Drawings. Weld only on clean, dry surfaces. Do not weld shear connectors thru two layers of decking units.

3.03 METAL FLASHINGS AND CLOSURES

- A. Furnish, install, and weld in position, sheet metal closure flashing, closure angles, closure plates, profile plates, and shear plates.
- B. Close open ends of cell runs at columns, openings, walls, similar interruptions and termination.

3.04 FIELD QUALITY CONTROL

- A. Inspection: Install steel decking under continuous inspection according to CBC Chapter 1705.2.2.
 - 1. Not used.

3.05 CLEAN UP

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

3.06 PROTECTION

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

END OF SECTION

SECTION 05 40 00
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Not used.
- B. Interior load-bearing wall framing.
- C. Exterior non-load-bearing, curtain-wall framing.
- D. Not used.

1.02 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads without deflections greater than the following:
 - 1. Exterior Load-Bearing Wall Framing: Horizontal deflection of $L/240$ of the wall height.
 - 2. Interior Load-Bearing Wall Framing: Horizontal deflection of $L/240$ of the wall height.
 - 3. Exterior Non-Load-Bearing, Curtain-Wall Framing: Horizontal deflection of $L/360$ of the wall height.

1.03 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include layout, spacing, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners as noted on drawings.
- C. Mill certificates.
- D. Welder certificates.
- E. Research/evaluation reports.

1.04 QUALITY ASSURANCE

- A. Not used.
- B. Mill certificates signed by steel sheet producer
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
- D. Fire-Test-Response Characteristics: Where metal framing is part of a fire-resistance-rated assembly, provide framing identical to that of assemblies tested for fire resistance per ASTM E119 by a testing agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by GA File Numbers in GA-600, "Fire Resistance Design Manual," or by design designations from UL's "Fire Resistance Directory" or from the listings of another testing agency.
- E. Comply with HUD's "Prescriptive Method for Residential Cold-Formed Steel Framing."

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers listed in ICC ESR 3064P.

2.02 MATERIALS

- A. Steel Sheet: ASTM A 653/A 653M, structural steel, G60 (Z180) zinc coating, Grade 33 for minimum uncoated steel thickness of 0.0428 inch and less; Grade 50 for minimum uncoated steel thickness of 0.0538 inch and greater.
- B. Wall Framing: Manufacturer's standard steel studs, of web depths indicated, with stiffened flanges, complying with ASTM C 955.
- C. Joist Framing: Manufacturer's standard C-shaped steel joists, of web depths indicated, punched, with stiffened flanges, complying with ASTM C 955.

2.03 ACCESSORIES AND MISCELLANEOUS MATERIALS

- A. Fabricate steel-framing accessories of the same material and finish used for framing members, with a minimum yield strength of 33,000 psi, of manufacturer's standard thickness and configuration, unless otherwise indicated.
- B. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123.
- C. Anchor Bolts: ASTM F1554, Grade 55, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A153/A153M, Class C.
- D. Expansion Anchors: Fabricated from corrosion-resistant materials, size, spacing, and embedment per plan.
- E. Power-Actuated Anchors: Fabricated from corrosion-resistant materials, size, spacing, and embedment per plan.
- F. Mechanical Fasteners: Corrosion-resistant-coated, self-drilling, self-threading steel drill screws.
- G. Cement Grout: Portland cement, ASTM C150, Type I; and clean, natural sand, ASTM C404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- H. Thermal Insulation: ASTM C665, Type I, unfaced mineral-fiber blankets produced by combining glass or slag fibers with thermosetting resins.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Preparation: Grout bearing surfaces uniform and level to ensure full contact of bearing flanges or track webs on supporting concrete or masonry construction. contact of bearing flanges or track webs on supporting concrete or masonry construction.

- B. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to ASTM C1007, manufacturer's written recommendations, and requirements in this Section.
 - 1. Cut framing members by sawing or shearing; do not torch cut.
 - 2. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
 - 3. Install framing members in one-piece lengths.
 - 4. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed.
 - 5. Install insulation in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
 - 6. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- C. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
 - 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
- D. Load-Bearing Wall Installation: Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends. Squarely seat studs against webs of top and bottom tracks. Space studs as indicated, set plumb, align, and fasten both flanges of studs to top and bottom tracks.
 - 1. Align studs vertically where wall-framing continuity is interrupted by floor framing. Where studs cannot be aligned, continuously reinforce track to transfer loads.
 - 2. Align floor and roof framing over studs. Where framing cannot be aligned, continuously reinforce track to transfer loads.
 - 3. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.
 - 4. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
 - 5. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings.
 - 6. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.
 - 7. Install horizontal bridging in stud system, spaced as indicated on Shop Drawings. Fasten at each stud intersection.
 - 8. Install miscellaneous framing and connections, including supplementary framing, blocking, bracing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.
- E. Non-Load-Bearing, Curtain-Wall Installation: Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure. Space

studs as indicated; set plumb, align, and fasten both flanges of studs to track, unless otherwise indicated.

1. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 2. Install horizontal bridging in curtain-wall studs, spaced in rows indicated on Shop Drawings. Fasten at each stud intersection.
 3. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable curtain-wall-framing system.
- F. Joist Installation: Install, align, and securely anchor perimeter joist track sized to match joists as indicated on Shop Drawings. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten to both flanges of joist track.
1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches. Reinforce ends and bearing points of joists as indicated on Shop Drawings.
 2. Space joists not more than 2 inches from abutting walls and at spacings indicated.
 3. Frame openings with built-up joist headers consisting of joist and joist track, nesting joists, or another combination of connected joists if indicated.
 4. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement, or as indicated. Install web stiffeners to transfer axial loads of walls above.
 5. Install bridging at each end of joists and at intervals indicated. Fasten bridging at each joist intersection as indicated.
 6. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.
 7. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.
- G. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A780 and manufacturer's written instructions.

3.02 FIELD QUALITY CONTROL

- A. Testing: City will engage a qualified independent testing agency to perform field quality-control testing.
1. Field and shop welds will be subject to testing and inspection.
 2. Remove and replace Work that does not comply with specified requirements.
 3. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.01 SUMMARY

SECTION INCLUDES:

- A. Provide stock and custom fabricated metal items scheduled at end of this Section, complete in respect to function as intended.
 - 1. Metal fabrications includes items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or metal systems specified elsewhere.
- B. Shop fabricated steel items.
- C. Steel framing and supports for applications where framing and supports are not specified in other sections.
- D. Shop Fabricated metal ladders; with cage.
- E. Ladder safety systems.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04 22 00 - Concrete Masonry Units: Placement of metal fabrications in masonry.
- C. Section 05 12 00 - Structural Steel Framing: Structural steel column anchor bolts.
- D. Section 05 12 13 - Architecturally Exposed Structural Steel: Finish requirements of exposed metal items.
- E. Section 05 31 00 - Steel Decking: Bearing plates for metal deck bearing, including anchorage.
- F. Section 05 52 13 - Pipe and Tube Railings.
- G. Section 09 91 13 - Exterior Painting: Paint finish.
- H. Section 09 91 23 - Interior Painting: Paint finish.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1910.23 - Guarding floor and wall openings and holes; current edition.
- B. 29 CFR 1910.28 - Duty to have Fall Protection and Falling Object Protection; Current Edition.
- C. 29 CFR 1910.29 - Fall Protection Systems and Falling Object Protection - Criteria and Practices; Current Edition.
- D. ALI A14.3 - Ladders - Fixed - Safety Requirements; 2008.
- E. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008.
- F. ANSI/ASSP Z359.11 - Safety Requirements for Full Body Harnesses; 2014.

- G. ANSI/ASSP Z359.12 - Connecting Components for Personal Fall Arrest Systems; 2009.
- H. ANSI/ASSP Z359.15 - Safety Requirements for Single Anchor Lifelines and Fall Arresters for Personal Fall Arrest Systems; 2014.
- I. ANSI/ASSP Z359.16 - Safety Requirements for Climbing Ladder Fall Arrest Systems; 2016.
- J. ASME B18.2.1 - Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series); 2012, Including July 2013 Errata.
- K. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016.
- L. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
 - 1. Use 2008 as indicated in 2022 CBC Referenced Standards.
- M. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- N. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- O. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.
 - 1. Use 2012a as indicated in 2022 CBC Referenced Standards.
- P. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.
- Q. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- R. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
 - 1. Use 2011 as indicated in 2022 CBC Referenced Standards.
- S. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2015.
- T. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2009 (Reapproved 2015).
- U. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process; 2016a.
- V. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011 (Reapproved 2015).
- W. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.
- X. ASTM D1187/D1187M - Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal; 1997 (Reapproved 2011).
- Y. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- Z. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015 (Errata 2016).
 - 1. Use 2010 w/Errata as indicated in 2022 CBC Referenced Standards.

- AA. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; International Accreditation Service, Inc; 2011.
- AB. SSPC-PA 1 - Shop, Field, and Maintenance Painting of Steel; 2004.
- AC. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- AD. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- AE. SSPC-SP 10 - Near-White Blast Cleaning; 2007.
- AF. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).
- AG. SSPC-SP 3 - Power Tool Cleaning; 1982 (Ed. 2004).
- AH. SSPC-SP 5 - White Metal Blast Cleaning; 2007.
- AI. SSPC-SP 6 - Commercial Blast Cleaning; 2007.
- AJ. American Welding Society (AWS): D1.1, Structural Welding Code.
- AK. National Association of Architectural Metal Manufacturers (NAAMM): Pipe Rail Manual.
OR.
National Association of Architectural Metal Manufacturers (NAAMM):
Pipe Rail Manual.
Heavy Duty Metal Bar Grating Manual.
- AL. Comply with California Fire Code (CFC) Chapter 35.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's literature for products used in metal fabrications, including paint, grout and manufactured items.
- C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- D. Certificate: Provide documentation that ladder safety system products of this section meet or exceed cited 29 CFR 1910.28, 29 CFR 1910.29, ANSI/ASSP Z359.16, and ANSI A14.3 requirements.
- E. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.
- F. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited.

1.05 QUALITY ASSURANCE

- A. Regulatory Requirements: Conform to applicable requirements of California Building Code (CBC), Title 24, Part 2, as amended and adopted by authorities having jurisdiction.
 - 1. Comply with Title 24, Part 9, California Fire Code Chapter 35 "Welding and Other Hot Work."

- B. Coordination: Provide templates and sleeves for incorporation of embedded items into the Work specified in other Sections.
- C. Field-Verified Dimensions: Prior to fabrication, field verify dimensions and details of construction. Immediately report variances in writing to Construction Manager and Architect.
- D. Design indicated items under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in California.
- E. Fabricator's Qualifications: Fabricator of light structural steel framing members and other miscellaneous metal fabrications of structural character shall be approved by the authorities having jurisdiction in accordance with applicable Code provisions.
- F. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel or equal.
- G. Welder's Qualifications:
 - 1. Welding shall be performed by certified welders qualified in accordance with procedures specified in applicable referenced AWS standard, using materials, procedures and equipment of the type required for the Work.
 - 2. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone re-certification.

1.06 PACKAGING, DELIVERY, STORAGE AND HANDLING

- A. Storage, General: Store products in enclosed, well-ventilated spaces, not in contact with soil or vegetation and not subject to inclement weather.
- B. Delivery, Storage and Handling, Galvanized Products:
 - 1. Stack and bundle during transport and store to allow air flow between galvanized surfaces.
 - 2. Load for transport to permit continuous drainage should wetting occur.
 - 3. Do not rest galvanized products on cinders or clinkers.

1.07 PROJECT CONDITIONS

- A. Field Inspection of Fabricated Products: Prior to installation, inspect products for damage and verify markings and dimensions against reviewed submittals.
- B. Environmental Conditions: Do not install products intended for interior locations when spaces are uncovered and unprotected from inclement weather.
- C. Coordination: Coordinate metal fabrications Work with Work specified in other Sections so that related Work shall be accurately and properly joined.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: Steel plates, bars, angles, channels, and H-sections; ASTM A 36/A 36M.
 - 1. Galvanized Steel: Structural shapes, plates and bars: From fully killed or semi-killed steel, ASTM A992/A992M, except silicon content in the range 0 to 0.4 percent or 0.15 to 0.25 percent, as applicable, only.
- B. Steel Tubing: ASTM A500/A500M, Grade B cold-formed structural tubing.

- C. Plates: ASTM A283/A283M.
- D. Steel Sheet:
 - 1. For structural uses: Hot-rolled, ASTM A1011/A1011M; cold-rolled, ASTM A1008/A1008M.
 - 2. For nonstructural uses: Cold-rolled, ASTM A1008/A1008M; hot-rolled, ASTM A1011/A1011M.
 - 3. Galvanized Sheet steel: ASTM A653/A653M, with ASTM A924/A924M, Coating Designation G90, for precoated sheet; ASTM A1011/A1011M for sheet used in fabrications.
- E. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.
- F. Slotted Channel Framing: ASTM A653/A653M, Grade 33.
- G. Slotted Channel Fittings: ASTM A1011/A1011M.
- H. Fasteners: See Article Anchors, Fasteners and Accessory Materials below.
- I. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- J. Galvanizing: See requirements specified below.
- K. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- L. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- M. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.
- N. Castings: Gray iron, ASTM A48, Class 30; malleable iron, ASTM A47.
- O. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron ASTM A47, or cast steel ASTM A27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A153.
- P. Grout: Non-shrink meeting ASTM C1107, non-metallic, pre-mixed, factory-packaged, non-staining, non-corrosive; type specifically recommended by manufacturer as applicable to job condition.
- Q. Fasteners and Rough Hardware: Type required for specific usage; provide zinc-coated fasteners for exterior use or where built into exterior walls.
- R. Welding Materials: AWS D1.1, type required for materials being welded.
- S. Paint: Provide primers as recommended by paint manufacturers for substrates and paints specified in Section 09 90 00 – Painting and Coating.
- 1. Galvanizing Repair Paint: High zinc-dust content paint for regalvanizing welds in galvanized steel.

2.02 ACCESSORIES

- A. Anchors and Fasteners, General: Same material, color and finish as the metal to which applied, unless otherwise indicated.
- B. Exterior Exposure: Provide stainless steel.

- C. Type, Size and Spacing: Unless otherwise indicated, provide fasteners of type, grade and class required for intended use and sized and spaced as required for loads and substrate.
- D. Screw Head, Typical: Unless otherwise noted, exposed screws shall be phillips oval or flat head, countersunk.
- E. Standard Bolts and Nuts, Steel: ASTM A307, Grade A, hexagonal head.
- F. Lag Screws and Bolts, Steel: ASME B18.2.1, type and grade best suited for the purpose, hexagonal or square head.
- G. Plain Steel Screws: FS FF-S-85, FS FF-S-92 and FS FF-S-111; type and grade best suited for the purpose.
- H. Self-Drilling Metal Screw Fasteners: TEKS by Buildex Division, Illinois Tool works, Inc.; ICC Report ESR-1976; www.itwbuildex.com.
- I. Plain Steel Washers: FS FF-W-92, round, carbon steel.
- J. Lock Washers: FS FF-W-84, helical spring, carbon steel.
- K. Fiber Plugs, Lead Expansion Shields and Screws: Not permitted.
- L. Anchors and/or Dowels Installed with Adhesives: See notes on Structural Drawings.
- M. Threaded Welded Stud Anchors: Nelson Stud Welding Division, TRW, Inc., or approved equal; type and size according to manufacturer's instructions and recommendations, except where otherwise indicated.
 - 1. Nelson Stud Welding, Inc. ; Nelson Shear Connector Studs (ICC Report ESR-2856); www.nelsonstud.com.
 - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- N. Welding Rods and Bare Electrodes: Select according to AWS specifications for the metal alloy to be welded.
- O. Shop Primer Paint:
 - 1. Shop primer, general: Coordinate primer with finish paint and coating, as applicable, to provide sound foundation for field-applied topcoats despite prolonged exposure during construction.
 - 2. Shop primer for ferrous metal at exposed exterior locations: Fabricator's standard zinc-rich two-part catalyzed epoxy coating.
 - 3. Shop primer for ferrous metal at concealed exterior locations and for interior locations: Manufacturer's or fabricator's standard, fast-curing, lead-free, universal modified alkyd primer, complying with performance requirements of FS TT-P-645.
 - 4. Shop primer for galvanized steel, for exposed exterior locations: Fabricator's standard two-part catalyzed epoxy coating, compatible with specified finish paints.
- P. Field Primer and Finish Paints: As specified in Section 09 91 23 - Interior Painting.
- Q. Bituminous Coating: High-build mineral-filled coal tar pitch coating, or a cold-applied asphalt mastic complying with ASTM D1187/D1187M, except containing no asbestos fibers.
 - 1. Basis of Design Product: H.B. Tnemecol Series 46-465 as manufactured by Tnemec, Inc., www.tnemec.com, or approved equal.
 - 2. Acceptable Manufacturers:
 - a. BASF (24 g/L).
 - b. Chemmasters.

- c. Euclid Chemical.
 - d. Henry.
 - e. Polyguard.
 - f. W.R. Meadows, Inc.; Sealmatsic Type II (Brush-on/Spray Grade):
www.wrmeadows.com
 - g. Substitutions: See Section 01 60 00 - Product Requirements.
- R. Bond Breaker Tape: Isolate dissimilar metals with Pecora 531 Bond Breaker Tape or equal.

2.03 FABRICATION

- A. Ferrous Metal Surfaces, General:
- 1. For metal fabrications exposed to view upon completion of the Work: Provide ferrous metals materials selected for their surface flatness, smoothness, and freedom from surface blemishes.
 - 2. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.
- B. Preparation Before Fabrication: Remove loose mill scale and rust and remove twists and bends in manners not injurious to materials and finishes.
- C. Fabrication: Fabricate and finish metal items in accordance with the Drawings and reviewed shop drawings.
- 1. Contractor shall verify measurements before fabrication.
 - 2. Galvanize all exterior steel members to comply with ASTM A123/A123M. Provide minimum 1.7 oz/sq ft galvanized coating.
 - 3. Hot-dip galvanize fabricated ferrous items, indicated as remaining unpainted, after fabrication. Field connections shall be bolted or screwed where possible. Avoid field cutting and welding which damage galvanized coating.
 - 4. Fit and shop assemble items in largest practical sections, for delivery to site.
 - 5. Prepare and reinforce fabrications as required to receive applied items and transport to site.
- D. Cutting and Fitting: Fabricate with accurate angles and surfaces, true to the required lines and levels and as required to suit installation conditions.
- 1. Fabricate items with joints tightly fitted and secured.
 - 2. Continuously seal joined members by intermittent welds and plastic filler.
 - 3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
 - 4. Punch, drill and reaming in manner to leave clean, true lines and surfaces.
 - a. Oversize hole 1/16 inch by punching, when material thickness is equal to or less than bolt diameter plus 1/8 inch.
 - b. Sub-punch 1/16 inch smaller than bolt and drill or ream to oversize by 1/16 inch, when material thickness is thicker than bolt diameter plus 1/8 inch.
 - 5. Gas cutting of non-structural steel items may be acceptable where stress is not transmitted through flame-cut surfaces.
 - a. Make cuts clean and to contour.

- b. Deduct 1/8 inch from effective width of members cut by torch.
- E. Connections, General:
 - 1. Component parts of built-up members shall be well-pinned with closely-fitted contact.
 - 2. Conceal connections where possible.
 - 3. Otherwise, make countersinks for concealment after fabrication, except where noted.
- F. Bolted and Screwed Connections:
 - 1. Provide holes and connections for work specified in other Sections.
 - 2. Use bolts for field connections only.
 - 3. Provide washers under heads and nuts bearing on wood.
 - 4. Draw all nuts tight and nick threads of permanent connections.
 - 5. Use beveled washers where bearing is on sloped surfaces.
 - 6. Where screws must be used for permanent connections in ferrous metal, use flat head type, countersunk, with screw slots filled and finished smooth and flush.
- G. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- H. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- I. Welding: Conform to AWS D1.1/D1.1M recommendations.
 - 1. Do not field weld galvanized components to remain unfinished.
 - 2. Provide continuous welds at welded corners and seams.
 - 3. Grind exposed welds smooth and flush with base material.
 - 4. Re-weld to fill holes. Putties and fillers are not acceptable.
- J. Joints on Finished Surfaces: Provide welds ground smooth and filled.
- K. Joints Exposed to Weather or Water: Fabricate to keep water out, or provide adequate drainage of water that penetrates.
- L. Mechanical Finishes: Complete finishing prior to fabrication wherever possible.
 - 1. After fabrication, finish all joints, bends, abrasions, and other surface blemishes to match finish.
 - 2. Protect finish on exposed surfaces by using temporary protective covering.
- M. Coordination: Make provisions to connect metal fabrications with or to receive work specified in other Sections.
- O. Fabricate items with joints neatly fitted and properly secured.
- P. Grind exposed welds continuous, smooth and flush with adjacent finished surfaces, and ease exposed edges to approximate 1/32" uniform radius.
- Q. Exposed Mechanical Fastenings: Flush countersunk fasteners unobtrusively located, consistent with design of structure.
- R. Fit and shop assemble in largest practical sections for delivery.
- S. Make exposed joints flush butt type, hairline joints where mechanically fastened.
Fabricate joints exposed to weather in manner to exclude water or provide weep holes where water could accumulate.

- T. Supply components required for proper anchorage of metal fabrications; fabricate anchorage and related components of same material and finish as metal fabrication.
Substitutions: Refer to Section 01 25 00.
Cable: Nominal 1/8" diameter multistrand corrosion resistant nonmagnetic stainless-steel cable.
- U. Steel Bollards: Minimum Schedule 80 seamless steel piping, filled with minimum 2000 psi concrete.
Removable Bollards: As indicated; provide steel piping without concrete fill, fitted with hasp and eye to allow for City furnished padlocks to prevent unauthorized removal; cap top end of pipe with flush, welded end cap; bottom open.
- V. Pre-Engineered Support Systems: Provide manufactured pre-engineered support system consisting of channel supports with anchors, attachments, and accessories as required for complete installation. Sizes to support anticipated loads.
Manufacturers:
Unistrut Inc./Unistrut.
Grinnell Corp./PowerStrut.
Thomas & Betts, Inc./Superstrut.
Substitutions: Refer to Section 01 25 00.
Finish: Manufacturer's standard prime paint finish for channel supports; galvanized or similar plated anchors and fasteners; hot dip galvanized where at exterior and exterior exposed applications.
- W. Finishes: Galvanize and prime paint exterior work and prime paint interior work unless otherwise noted in Schedule; comply with requirements of Section 09 90 00 - Painting and Coating for preparation and priming.
Thoroughly clean surfaces of rust, scale, grease and foreign matter prior to applying finish.
Do not shop prime surfaces in contact with concrete or requiring field welding; shop prime in one coat.
Galvanized Coating: Provide coating comparable to ASTM A924 and A653, minimum G90 hot dip galvanized coating.

2.04 FABRICATED ITEMS

- A. Rough Hardware
1. Provide bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as indicated on Drawings.
 2. Fabricate items to sizes, shapes, and dimensions required. Provide malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.
- C. Ledge Angles Not Attached to Structural Framing: For support of metal decking; galvanized finish.
1. Drill plates to receive anchor bolts and for grouting as required.
- D. Frames for Wall Openings: Channel and Angle sections; prime paint finish.
- E. Recessed Mat Frames : As detailed; steel, galvanized finish.
- F. Elevator Hoistway Divider Beams: Beam sections; prime paint finish.
- G. Slotted Channel Framing: Fabricate channels and fittings from structural steel complying with the referenced standards; factory-applied, rust-inhibiting thermoset acrylic enamel finish.
- H. Enclosure Gates

1. Fabricated steel shapes as detailed on Drawings, hot-dipped galvanized finish after fabrication, with galvanized perforated steel panel infill.
 2. All welded construction.
 3. Hardware: Welded on heavy duty butt hinges, minimum 4-hinges per leaf, latch device mounted 40 inches above finish surface and including padlock eye, drop rod with steel pipe receivers cast into concrete at both open and closed positions (both leafs).
 4. At Pedestrian Gate: Provide 16 gage steel sheet kick plate on push side of gate up to a minimum of 10 inches above finish surface.
 - a. Connect kick plates with a 16 gage closure placed on top of kick plates; from front to back plates and side to side. Overlap to outside on top of kick plates a minimum 1/2 inch. Tack or spot weld as required.
 - b. Kick plate to have drain holes in back face to minimize collection of water in bottom of angle frame.
 - c. See also Section 32 31 13 - Chain Link Fences and Gates or 32 31 19 - Decorative Metal Fences and Gates.
- I. Other Products and Fabrications
1. Other Products and Fabrications: Provide all materials not specifically described but required for a complete and proper installation, as selected by the Contractor, subject to review and acceptance by Construction Manager and Architect.

2.06 FINISHES - STEEL

- A. Prime paint all steel items. Conform to SSPC Painting Manual. Shop primer paint after fabrication all metal fabrications.
1. Exceptions: Galvanize items to be embedded in concrete.
 2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
 3. Exceptions:
 - a. Do not prime stainless steel, plated steel, and anodized aluminum fabrications, unless specifically noted.
 - b. Do not shop prime galvanized fabrications, unless specifically noted.
 - c. Do not shop prime fabrications for which an entirely field-applied coating system is indicated.
- B. Prepare surfaces to be primed in accordance with minimum SSPC-SP2.
1. Exterior fabrications: Clean in accordance with SSPC-SP 5, SSPC-SP 6, 8, or SSPC-SP 10.
 2. Interior fabrications: Clean in accordance with SSPC-SP 2, SSPC-SP 3, SSPC-SP 5, SSPC-SP 6, 8, or SSPC-SP 10.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat where finish painting is to be applied.
1. Shop Priming: Comply with SSPC-PA 1. Coordinate with requirements specified in Section 09 91 23 - Interior Painting .
 - a. Coordinate primer with finish paint and coating, as applicable, to provide sound foundation for field-applied topcoats despite prolonged exposure during construction.

- 1) Shop primer for ferrous metal at exposed exterior locations: Tnemec 90E-92, ethyl silicate zinc primer, or equal.
 - 2) Tnemec Series V10, or approved equal, modified alkyd rust-inhibitive primer, or manufacturer's or fabricator's standard, fast-curing, lead-free, universal modified alkyd primer, complying with performance requirements of FS TT-P-645.
 - b. Apply primer immediately following surface preparation.
 - c. Do not prime surfaces to be welded.
 - d. Do not prime surfaces in direct contact bond with concrete or mortar.
 - e. Spray apply shop prime without holidays, drips, runs.
 - f. Provide two coats where product is not to be finish painted or is to be concealed in completed work.
 - g. Apply an additional coat to corners, welds, edges, and fasteners.
 - h. Allow primer to dry and cure before handling.
- E. Shop Painting
1. Shop Painting: Comply with SSPC-PA 1. Shop paint fabrications where feasible.
 - a. Apply thermosetting enamel paint, gloss or semi-gloss, of a type and color as selected and approved by Architect, if not otherwise specified.
 - b. Shop applied finish paint shall be baked to set and cure.
 - c. Allow finish paint to thoroughly dry and cure before handling.
 2. Steel Embedded in Concrete: Coat concealed faces with bituminous coating.
 3. Galvanized Pre-Treatment: Where zinc-coated surfaces are specified to be shop primed, chemically treat surfaces to provide bond for paint before applying primer.
- F. Galvanizing of All Exterior Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
- G. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.07 FABRICATION TOLERANCES

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

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible; do not delay job progress; allow for trimming and fitting where necessary.

3.02 PREPARATION

- A. Obtain Architect's review prior to site cutting or making adjustments not indicated on Drawings and reviewed shop drawings.
- B. Clean and strip primed steel items to bare metal where site welding is required.
- C. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.
- D. Make provision for erection loads with temporary bracing. Keep work in alignment.
- E. Clean and prime field welds. Touch up galvanized steel with cold galvanizing compound.

3.03 ERECTION

- A. Obtain Architect's review prior to site cutting and adjusting which are not part of scheduled work.
 - 1. Perform necessary cutting and altering for installation and coordination with other work.
- B. Install items square and level, accurately fitted and free from distortion or defects detrimental to appearance or performance.
 - 1. Supply items required to be cast into or embedded in other materials to appropriate trades.
 - 2. Ensure alignment with adjacent construction; coordinate with related work to ensure no interruption in installation.
- C. Make provision for erection stresses by temporary bracing; keep work in alignment.
- D. Field bolt and weld to match standard of shop bolting and welding; hide bolts and screws whenever possible, where not hidden, use flush countersunk fastenings.
 - 1. Perform field welding in accordance with AWS D1.1.
- E. After installation, touch-up field welds and scratched and damaged surfaces; use primer consistent with shop coat or recommended for galvanized surfaces, as applicable.
- F. Replace items damaged in course of installation and construction.

3.04 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Install ladder safety system in accordance with manufacturer's instructions.
- C. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- D. Field weld components as indicated on drawings.
- E. Perform field welding in accordance with AWS D1.1/D1.1M.
- F. Obtain approval prior to site cutting or making adjustments not scheduled.
- G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.05 TOLERANCES

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

3.06 CLEANING AND TOUCH-UP

- A. Cleaning: Perform initial cleaning immediately after completion of installation. Prepare surfaces for finish painting.
- B. Galvanizing Touch-Up: Touch up galvanizing immediately after installation, including field welding.
 - 1. Prepare surface and apply cold galvanizing compound in compliance with ASTM A780/A780M and the manufacturer's instructions and recommendations.
- C. Primer Paint Touch-Up: Touch up shop paint immediately after erection. Use products compliant with Section(s) 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting.
 - 1. Clean exposed areas of rust, field welds, bolted joints, and areas where primer is damaged by SSPC-SP 2 hand tool cleaning or SSPC-SP 3 power-tool cleaning.
 - 2. Paint with SSPC-Paint 15 (interior) or SSPC-Paint 20 (exterior) compliant material used for shop painting, minimum 3 mils dry film thickness.

END OF SECTION

SECTION 06 10 50

MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide miscellaneous wood blocking and plywood, including blocking for roofing system and related flashing.
 - 1. Provide plywood panel boards.
 - 2. Preservative treat wood members as indicated.
- B. Related Sections:
 - 1. Section 06 40 00: Architectural woodwork.

1.2 REFERENCES

- A. Forest Products Society (FPS): National Design Specification for Stress Grade Lumber and its Fastening.

1.3 SUBMITTALS

- A. Product Data: Submit wood treatment certifications and instructions for proper use of each type of treated material.
- B. Wood Product Certification: Furnish certification indicating wood products are from "well-managed" forests.

1.4 QUALITY ASSURANCE

- A. Lumber Grades: Provide visible grade stamp of an agency certified by FPS.
- B. Lumber Standard: Comply with US Product Standard PS20 for each indicated use, including moisture content and actual sizes related to indicated nominal sizes.
- C. Plywood Standard: Comply with PS1 (ANSI A199.1).
- D. Certified Wood Products: Wood products to be from forests certified "well-managed" by an agency accredited by Forest Stewardship Council (FSC) including SmartWood Program and Forest Conservation Program.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. System Requirements: Provide miscellaneous wood blocking and plywood, including blocking for roofing system and related flashing.
- B. Regulatory Requirements: Comply with applicable code requirements for miscellaneous rough carpentry.

- C. Blocking: Provide dimensional lumber graded in accordance with FPS Grading Rules; Construction Grade, Douglas Fir; minimum S-Dry.
- D. Plywood: Provide minimum APA C-D exterior (CDX) plywood; stress rated where spanning between supporting members; fire retardant treated; minimum 3/4" thick unless otherwise indicated.
- E. Plywood Panel Boards: Provide panel boards for electrical and communication panel boards; APA C-D plugged, interior type plywood with exterior glue, fire retardant treated; minimum 1/2" thick.
- F. Nails, Spikes and Staples: Galvanized; size and type to suit application.
- G. Bolts, Nuts, Washers, Lags, Pins and Screws: Medium carbon steel; galvanized; size and type to suit application.
- H. Fasteners: Provide fasteners as required for complete, secure installation of miscellaneous rough carpentry.
 - 1. Solid Masonry or Concrete: Expansion shield and lag bolt type.
 - 2. Steel: Bolts or powder activated type.

2.2 FABRICATION

- A. Wood Preservation: Treat lumber and plywood to comply with applicable requirements of American Wood Preservers Association and applicable codes.
 - 1. Decay Resistance Treatment: Pressure treat wood in accordance with AWP A U1 using preservative chemicals acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 - a. Treat wood members based on AWP A U1 Use Categories as appropriate to Project location and exposure.
 - b. Kiln-dry wood to a maximum moisture content of 19% after treatment with water-borne preservative.
 - 2. Fire Retardant Treatment: Comply with AWP A standards for pressure impregnation with fire-retardant chemicals to achieve flame-spread rating of not more than 25 in accordance with ASTM E84 or UL Test 723.
 - a. Treat interior wood and plywood complying with applicable code requirements for Interior FRTW.
 - 1) Exterior Type: Where indicated for exterior applications, provide fire treated wood passing ASTM D2898 rain test.
 - b. Provide UL label on each piece of fire-retardant wood and plywood.
 - c. Kiln-dry treated items to maximum moisture content of 19%.

3. Complete fabrication of treated items prior to treatment, wherever possible; if cut after treatment, coat cut surfaces with heavy brush coat of same chemical used for treatment.
4. Inspect each piece after drying and discard damaged and defective pieces.

PART 3 - EXECUTION

3.1 PLACEMENT

- A. Place miscellaneous rough carpentry true to lines and levels.
- B. Correlate location so attached work will comply with design requirements and be properly located.
- C. Construct members of continuous pieces of longest possible lengths.
- D. Fit carpentry work to other work; scribe and cope as required for accurate fit.
- E. Shim with metal or slate for bearing on concrete and masonry.
- F. Securely attach carpentry work to substrates by anchoring and fastening as required by recognized standards.
 1. Provide washers under bolt heads and nuts in contact with wood.
- G. Wood Blocking: Provide blocking of S4S lumber not less than 1-1/2" wide and of thickness required to provide adequate support or to properly locate attached material.
 1. Provide attachment to other work; form to shapes shown.
 2. Countersink bolts and nuts flush with surfaces.
 3. Remove temporary blocking when no longer needed.
 4. Anchor to formwork before concrete placement.
 5. Build into masonry as work progresses, cutting to fit masonry unit size involved.
- H. Plywood: Comply with recommendations of American Plywood Association (APA) for fabrication and installation of plywood work.

END OF SECTION

SECTION 06 40 00

ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide mill fabricated architectural woodwork with accessories as required for complete finished installation including cabinetwork hardware.
 - 1. Provide custom plastic laminate clad cabinetwork.
 - 2. Provide solid surface countertops.
- B. Related Sections:
 - 1. Section 06 10 50: Miscellaneous rough carpentry.

1.2 REFERENCES

- A. North American Architectural Woodwork Standards, 3.1 (NAAWS).

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's literature for manufactured items.
- B. Shop Drawings: Indicate materials and wood species, component profiles, fastening, joining details, finishes, and accessories.
 - 1. Certification: Provide Woodwork Institute Certified Compliance Label on shop drawings.
- C. Samples: Furnish samples of each exposed finish.
- D. Wood Product Certification: Furnish certification indicating wood products are from FSC "well-managed" forests.

1.4 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for adhesives, sealants, and caulks, for composite wood products formaldehyde limitations, and for paints and coatings.
- B. Fabricator Qualifications: Member of Sponsor of North American Architectural Woodwork Standards with minimum five years successful experience fabricating woodwork like that required for Project.
- C. Standards: Perform architectural woodwork in accordance with North American Architectural Woodwork Standards (NAAWS).
 - 1. Monitored Compliance Program (MCP): Comply with Woodwork Institute "Monitored Compliance Program (MCP)" as defined in NAAWS.

- 2. Certified Seismic Installation Program (CSIP): Comply with Woodwork Institute Certified Seismic Installation Program.
 - a. Seismic Anchorage: Provide seismic anchorage for wall cabinets as required by California Code of Regulations (CCR), Title 24, Part 2.
- D. Certified Wood Products: Wood products to be from forests certified "well-managed" by an agency accredited by Forest Stewardship Council (FSC).
- E. Seismic Anchorage: Provide seismic anchorage for wall cabinets as required by California Code of Regulations (CCR), Title 24, Part 2.
- F. Operable Parts for all accessible casework shall comply with CBC Section 11B-309.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver architectural woodwork until site conditions are adequate to receive work; protect items from weather while in transit.
 - 1. Allow architectural woodwork shop finish to completely dry prior to delivery to site; allow materials to off-gas volatile organic compound (VOC) emissions off site.
- B. Store materials indoors, in ventilated areas with constant but minimum temperature of 60-degrees F and maximum relative humidity of 25% to 55%.
- C. Do not begin installation of architectural woodwork until space is fully enclosed and mechanical systems are fully operational.
 - 1. Maintain interior installation areas at 70 degrees F and 50% to 55% relative humidity.
- D. Immediately remove from site materials with visible mold and materials with mildew.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. System Description: Provide mill fabricated architectural woodwork with accessories as required for complete finished installation including cabinet hardware.
- B. Plastic Laminate Finished Casework and Countertops:
 - 1. Quality: NAAWS/Custom Grade frameless, flush overlay, unless otherwise indicated.
 - a. Special: Provide each single length section of casework in largest such sections as access and openings allow.
 - 1) Multiple self-supporting units fastened together to form larger unit allowed only where access and openings do not allow single lengths.
 - 2. Plastic Laminates:

- a. Types: NEMA LD-3.1 high pressure laminates.
 - 1) Horizontal Surfaces: General Purpose Type, nominal 0.050".
 - 2) Vertical Surfaces: Vertical Surface Type, nominal 0.032".
 - 3) Unexposed Surfaces: Balanced with 0.030" melamine backing sheet.
 - 4) Formed Surfaces: Postforming Type, nominal 0.042".
 - b. Manufacturers:
 - 1) Formica Corp.
 - 2) Wilsonart, Wilsonart Engineered Surfaces.
 - 3) Nevamar Corp.
 - 4) Abet Laminati Co.
 - 5) Substitutions: Refer to Section 01 25 00.
 - c. Solid Color Laminates:
 - 1) Formica Corp./ColorCore2.
 - 2) Wilsonart, Wilsonart Engineered Surfaces/Solicore.
 - 3) Abet Laminati Co/Solid Colors.
 - 4) Substitutions: Refer to Section 01 25 00.
 - d. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
3. Wood Core: Plywood or medium density fiberboard (MDF) or particleboard, with no added formaldehyde and free of toxic materials.
- C. Casework Hardware: Provide casework hardware items as required for complete installation as indicated; provide types as listed in North American Architectural Woodwork Standards for casework, but no less than following types.
- 1. Plug-In Pin Type Shelf Supports (Transparent Finished Casework): Match BHMA A156.9 B04013 spoon type plug-in supports; provide holes 1" on center.
 - 2. Adjustable Shelf Standards and Supports (Plastic Laminate and Opaque Painted Casework): Match BHMA A156.9 B04073 adjustable standards and B04083 closed shelf rest brackets for mortis mounting; flush mounted in cabinet.
 - 3. Cabinet Hinges: Blum Clip Top frameless European concealed type, minimum 170 degree opening, with spring closer. Nickel plated steel.
 - 4. Cabinet Pulls: Back mounted wire type, 4" center to center, satin nickel; as approved by Architect.
 - 5. Drawer Slides: Full extension, rail mounted type, minimum 100 lb. capacity with ball-bearing rollers; self-closing.
 - a. Manufacturers:
 - 1) Accuride.(Basis of Design)
 - 2) Substitutions: Refer to Section 01 25 00.

6. Cabinet Locks: Manufacturer: Schlage Model: CL Series 626, Master Keyed Schlage , Cylinders (No Cam Locks), Finish: US 26D Satin chrome, two keys each. Provide at all classroom and mailroom cabinets.
 7. Magnetic Catches: BHMA 156.9 B03141.
- D. Solid Polymer Countertops: Manufacturer's standard polymer system with color throughout thickness; provide manufacturer recommended joint adhesive; exposed surfaces finished to match top.
1. Manufacturers:
 - a. DuPont Co./Corian.
 - b. Avonite, Inc./Avonite.
 - c. Formica Corp./Surell.
 - d. Chemcore Industries/Dovae.
 - e. Substitutions: Refer to Section 01 25 00.
 2. Quality: NAAWS/Premium Grade.
 3. Type: Not less than 1/2" thick sheet; coordinate with bowls as indicated and as specified in Division 22.
 4. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
- E. Quartz-Based Solid Polymer Countertops: Manufacturer's standard quartz-based polymer system with color throughout thickness; provide manufacturer recommended joint adhesive; exposed surfaces finished to match top.
1. Manufacturers:
 - a. CaesarStone USA/CaesarStone.
 - b. Silstone USA/Silstone Countertops.
 - c. DuPont Co./Zodiaq.
 - d. Cambria USA/Cambria Countertops.
 - e. Substitutions: Refer to Section 01 25 00.
 2. Quality: NAAWS/Premium Grade.
 3. Type: Not less than 1/2" thick sheet; coordinate with bowls as indicated and as specified in Division 22.
 4. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
 5. Edges: Finish exposed edges.
 6. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
 7. Wood Core: Plywood, medium density fiberboard (MDF) or particleboard, with no added formaldehyde and free of toxic materials.

- F. Anchors, Nails and Screws: Select material, type, size and finish required by each substrate for secure anchorage; provide toothed steel or lead expansion bolt screws for drilled-in-place anchors.
- G. Wood Filler: Color to match wood being filled.

2.2 FABRICATION

- A. General: Fabricate architectural woodwork in accordance with specified North American Architectural Woodwork Standards.
- B. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Make corners and joints hairline; slightly bevel arises.
 - 1. Locate butt joints at least 2'-0" from cutouts.
 - 2. Cap exposed edges with plastic laminate of same finish and pattern.
 - 3. Apply laminate backing sheet to reverse side of laminate surfaces.
 - 4. Provide cutouts for inserts, fixtures and fittings; verify locations from on-site dimensions.
 - 5. Prime paint contact surfaces of cutouts.
- C. Countertops: Provide maximum sizes available. Locate butt joints at least 2'-0" from cutouts where more than one-piece countertops are required.
 - 1. Make corners and joints hairline; slightly bevel arises.
 - 2. Provide cutouts for inserts, fixtures and fittings; verify locations from on-site dimensions.
 - 3. Splashes and edges as indicated or as directed by Architect where not otherwise indicated.
- D. Use exposed fastening devices or nails only when approved and unavoidable; arrange neatly.
- E. Assemble woodwork in shop in sizes easily handled and to ensure passage through building openings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible; do not delay job progress, allow for trimming and fitting.

3.2 INSTALLATION

- A. Install work consistent with Architectural Woodwork Standards specified quality grade, plumb, level, true and straight with no distortions.
 - 1. Shim as required, using concealed shims.
- B. Ensure mechanical and electrical items affecting architectural woodwork are properly placed, complete, and have been inspected by Architect prior to commencement of installation.
- C. Secure work to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation.
- D. Scribe and cut for accurate fit to other finished work.
- E. Install architectural woodwork under supervision of factory-trained mechanics.
- F. Attach architectural woodwork securely in place with uniform joints providing for thermal and building movements.
- G. Paneling: Provide fire-treated wood stops eight feet on center at paneling where required by applicable codes when paneling is not direct applied to substrate.
- H. Acceptable Tolerances:
 - 1. Variation from True Position: Maximum 1/16" at any position and maximum 1/8" in any 10'-0" length.
 - 2. Adjoining Surfaces of Same Material: No variation permitted.
 - 3. Offset with Abutting Materials: Maximum 1/32".

END OF SECTION

SECTION 07 18 00

TRAFFIC COATING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide traffic-bearing, fluid applied, waterproof, elastomeric urethane coating with accessories as required for complete weather-tight traffic coating.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's literature including recommendations for surface conditioner, elastic flashing, joint cover sheet and crack sealants, and temperature range for application of traffic coating.
- B. Samples: Submit fully cured exposed finish materials in colors selected, with aggregate topping.
- C. Manufacturer Certifications:
 - 1. Installer: Submit certification indicating Installer is an approved applicator.
 - 2. Materials: Submit certification indicating materials comply with Contract Documents and are suitable for applications indicated.
 - 3. Manufacturer's Representative: Submit manufacturer's representative's field report indicating traffic coating has been installed in accordance with manufacturer's recommendations and installation instructions.
- D. Maintenance Instructions: Submit manufacturer's maintenance instructions.

1.3 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for paints and coatings.
- B. Installer Qualifications: Firm with minimum five years successful experience in application of traffic deck covering on projects of comparable size and acceptable to traffic coatings manufacturer.
- C. Pre-Installation Meeting: Convene not less than one week prior to commencing work of this section. Require attendance of parties directly affecting work of this section.
 - 1. Review installation procedures and coordination required with related work.

1.4 SITE CONDITIONS

- A. Comply with manufacturer recommendations for site conditions. Do not apply traffic coating during inclement weather or when air temperature is below 40-degrees F.

- B. Do not apply traffic coating to damp, dirty, dusty and unsuitable surfaces.
 - 1. Allow concrete surfaces to cure minimum 28 days.
 - 2. Moisture Content: Determine substrate moisture content using methods recommended by system manufacturer.

1.5 WARRANTY

- A. Extended Correction Period: Provide for correcting failure of system to resist water penetration except where failure is result of structural failure of building. Repair system and pay for or replace damaged materials and surfaces.
 - 1. Hairline cracking due to temperature or shrinkage is not considered structural failure.
 - 2. Period: Two years.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Gaco Western Ltd./GW-15-UBU (U-64C).
- B. The Neogard Corp./Peda-Gard and Auto-Gard.
- C. Dex-O-Tex Div. Crossfield Products Corp./Dex-O-Tex Elastatex 500.
- D. Substitutions: Refer to Section 01 25 00.
 - 1. Option: Siplast/Terapro PMMA Liquid-Applied Traffic Bearing Waterproofing reinforced pedestrian system over occupied space.

2.2 MATERIALS

- A. System Requirements: Provide traffic-bearing, fluid applied, waterproof, elastomeric urethane coating with accessories.
- B. Regulatory Requirements, General:
 - 1. Fire Ratings: Provide Underwriters Laboratories listed products with Class A rating for roofing assemblies, based on ASTM E108.
 - 2. Volatile Organic Compound (VOC) Emissions: Comply with applicable requirements limiting volatile organic compound (VOC) emissions.
 - a. Comply with applicable Air Quality Management District limitations for volatile organic compound (VOC) emissions.
- C. Regulatory Requirements, Slip-Resistance:

1. Slip-Resistant Hard Surfaces: Hard surface finishes to comply with requirements of authorities having jurisdiction for slip-resistant hard surfaces, including general code requirements and requirements for access for persons with disabilities.
 - a. Refer to Section 01 41 10 – Slip-Resistant Hard Surfaces. Hard surfaces include flooring and paving.
 - b. Manufacturer Representatives to verify each hard surface material provided for Project complies with Section 01 41 10 for slip-resistance based on each location hard surface materials are indicated in Project.
 - c. Subcontractor/Installer to verify hard surface material being installed has either manufacturer testing information indicating materials are suitable for locations indicated, or experience indicates such materials are appropriate.
 - d. Notify Architect where hard surface materials may not be appropriate for applications indicated.
- D. Traffic Coating: One or two-part, solvent free low or no VOC 100 percent polyurethane elastomer without asphalt or tar modifiers, cold applied.
 1. System: Provide manufacturer's standard system recommended for light vehicular or pedestrian type traffic.
 2. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
- E. Surface Conditioner: Primer compatible with membrane compound; as recommended by traffic coating manufacturer.
- F. Reinforcing Mesh: Woven uncoated glass fiber mesh or comparable reinforcing recommended by system manufacturer and designed for and compatible with traffic coating.
- G. Joint and Crack Sealant: As recommended by traffic coating manufacturer.
- H. Non-Slip Aggregate: Manufacturer's standard aggregate of size and gradation recommended for application indicated.
- I. Accessories: Types recommended by traffic coating manufacturer to ensure complete, watertight installation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces and conditions affecting traffic coating.
- B. Beginning installation indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Ensure drains, sleeves, curbs and projections which pass through traffic coating are properly and rigidly installed.
- B. Ensure surfaces are free of cracks, depressions, waves and projections which may be detrimental to proper installation of traffic coating; repair surfaces as required.
- C. Seal cracks and joints with recommended backup material and sealant; ensure proper depth-width ratio as recommended by sealant manufacturer.
 - 1. Rout or saw-cut cracks exceeding 1/16" wide and fill with sealant.
- D. Clean surfaces of dust, dirt and foreign matter detrimental to proper installation of traffic coating.
- E. Metal Surfaces: Remove contaminants that may adversely affect adhesion or performance of traffic coating; apply metal primer.
- F. Use drop cloths or masking to protect adjacent surfaces; close off drains to prevent spillage and migration of materials into drains.

3.3 APPLICATION

- A. Apply traffic coating in accordance with manufacturer's recommendations and installation instructions.
 - 1. Apply primer/surface conditioner to surfaces indicated to receive traffic coating.
- B. Apply bond breaker tape over joints in accordance with manufacturer's instructions.
- C. Apply and spread traffic coating to thickness recommended by manufacturer for specific application indicated.
- D. Seal items projecting through traffic coating.
- E. Install membrane flashings and seal into traffic coating.
- F. Embed aggregate in top course of system, using procedure recommended by manufacturer.
- G. After complete installation, close off area to prevent unauthorized traffic or work over traffic coating.

3.4 SITE QUALITY CONTROL

- A. Site Tests: Test traffic coating with 2" depth of water maintained for 24 hours; do not overload structure, if necessary, section off areas as approved by Architect.
 - 1. Repair leaks revealed by examination of substructure and repeat test until no leakage is observed.

- B. Manufacturer's Field Services: Manufacturer's representative to inspect traffic coating on regular basis and provide certification traffic coating has been installed in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 07 19 00

WATER REPELLENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide clear liquid penetrating type water repellent coating.
 - 1. Location: Apply water repellent to following exterior exposed surfaces.
 - a. Architectural precast concrete.
 - b. Concrete unit masonry.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Meeting: Convene not less than one week prior to commencing work of this Section. Require attendance of those directly affecting work of this Section.
 - 1. Review installation procedures and coordination required with related work.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's literature.
- B. Samples: Submit sample units with water repellent coating applied to half of each sample face; indicate which half has coating.

1.4 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for paints and coatings.
- B. Qualification of Installers: Firm with minimum five years successful experience in projects of similar scope.
- C. Mock-Up: Prior to commencing work, including bulk purchase and delivery of material, prepare small application in unobtrusive location of typical substrate in manner acceptable to Architect.
 - 1. Proceed only after Architect's acceptance of test application or as otherwise directed.

1.5 SITE CONDITIONS

- A. Do not apply coating during inclement weather, when air temperature is below 50-degrees F, or when rain or temperatures below 40-degrees F are predicted for a period of 24 hours.
- B. Do not apply coating earlier than 3 days after surfaces became wet.

- C. Do not apply coating to damp, dirty, dusty, or otherwise unsuitable surfaces.
 - 1. Allow concrete surfaces to cure minimum 28 days unless otherwise approved in writing by coating manufacturer.
- D. Protect glass, glazed products, and landscaping from contact with water repellent coating; replace materials damaged by water repellent coating.

1.6 WARRANTY

- A. Extended Correction Period: Provide for correcting failure of water repellent coating to resist penetration of water.
 - 1. Period: Two years.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. ProSoCo/Sure Klean SL 100.
- B. BASF Master Builders/MasterProtect H 1000 System.
- C. Chemprobe Products Industries Inc./CP-500W.
- D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide silane or siloxane based clear liquid water repellent coating which does not affect appearance of coated material.
- B. Performance Requirements: Provide products which are recommended by manufacturer to be fully compatible with indicated substrates and joint sealers which are in contact with water repellent coating.
- C. Regulatory Requirements: Provide materials maximum volatile organic compound (VOC) emissions as required by applicable codes and regulations.
 - 1. Comply with applicable air quality management authority.
- D. Water Repellent Coating: Manufacturer's standard penetrating type silane or siloxane-based sealers specified conforming to applicable limitations on volatile organic compounds.
 - 1. Provide specific systems as recommended by manufacturer for substrates involved.
 - 2. Finish: Water repellent coating shall not alter appearance, color, or texture of substrate under any lighting conditions.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates and apply coating in strict accordance with manufacturer's recommendations.
- B. Clean surfaces of dust, dirt and foreign matter detrimental to proper installation of water repellent coating.
- C. Assure coating compatibility with each type of joint sealer within or adjacent to surfaces receiving waterproof coating.
 - 1. Mask surfaces indicated to receive joint sealers which would be adversely affected by coating.

3.2 APPLICATION

- A. Apply coating in accordance with manufacturer's instructions including maximum allowable coverage.
- B. Take special care to prevent damage to adjacent materials from application of coating; repair or replace materials damaged due to application of coating.

END OF SECTION

SECTION 07 21 00

THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide insulation and accessories as required for complete installation.
 - 1. Provide thermal batt insulation with integral vapor retarder.
 - 2. Provide poly-scrim faced batt insulation for exposed interior applications.
 - 3. Provide thermal board insulation with integral vapor retarder.
 - 4. Provide extruded polystyrene thermal insulation.
 - 5. Provide vapor retarder at interior of exterior surfaces with no other vapor retarder.
- B. Related Work:
 - 1. Section 07 53 10: Insulation integral with elastomeric PVC membrane roofing.
 - 2. Section 09 21 00: Acoustical insulation concealed in gypsum board systems.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Interior Vapor Retarders: Where specifications require foil faced vapor retarders as part of building thermal insulation system, intent is to prevent migration of spores from mold and mildew into interior building spaces.
 - 1. Intent is to provide air barrier and vapor retarder on interior surface while allowing vapor to move through exterior wall vapor permeable surfaces, while vapor permeable water barriers are maintained at exterior side of wall.

1.3 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature for each type of insulation.
 - 1. Submit Underwriter's Laboratory approval numbers for required fire ratings; approvals of other laboratories contingent upon acceptance of applicable authorities.

1.4 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to energy efficiency.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. System Description: Provide thermal insulation with accessories.

- B. Thermal Batt Insulation: Preformed slag mineral or glass fiber with thermosetting resin binders, conforming to ASTM C665; formaldehyde-free.
 - 1. Manufacturers:
 - a. Johns Manville/FSK-25 Thermal-Shield Insulation.
 - b. Owens-Corning Fiberglas Corp./Fiberglas FS-25 Insulation.
 - c. CertainTeed/Thermafiber FS25 Insulation.
 - d. Substitutions: Refer to Section 01 25 00.
 - 1. R-Value: Batt Insulation: R-14 at 4" furred walls, R-19 at 6" furred walls, R-38 at roof horizontal surfaces, unless otherwise indicated. Roof assembly has R value from rigid foam in addition to R-38 Batt.
 - 2. Flame Spread/Smoke Developed Rating: Maximum 25/450, ASTM E84.
 - 3. Vapor Retarder: Type III, aluminum vapor retarder on one side.
 - 4. Vapor Retarder: Type I: No vapor retarder.
 - 5. Combustibility: Pass ASTM E136.
- C. Hi Density R-40 Thermal Batt Insulation: Preformed slag mineral or glass fiber with thermosetting resin binders, conforming to ASTM C665; formaldehyde-free.
 - 1. Manufacturers:
 - a. Knauf Insulation/High Density EcoBatt ECOSE FSK-25 Insulation.
 - b. Substitutions: Refer to Section 01 25 00.
 - 2. R-Value: Minimum R-40.
 - 3. Flame Spread/Smoke Developed Rating: Maximum 25/450, ASTM E84.
 - 4. Vapor Retarder: Type III, aluminum vapor retarder on one side.
- D. Thermal Batt Exposed Ceiling Insulation: Preformed batt insulation with white poly-scrim-kraft or similar vapor retarder facing meeting specified fire rating and intended for exposed applications.
 - 1. Manufacturers:
 - a. CertainTeed/Post Frame Poly-Scrim-Kraft (PSK) Fiber Glass Insulation.
 - b. Substitutions: Refer to Section 01 25 00.
 - 2. R-Value: Minimum R-38, unless otherwise indicated.
 - 3. Flame Spread/Smoke Developed Rating: Maximum 25/450, ASTM E84.
- E. Thermal Board Insulation: Preformed slag mineral or glass fiber with thermosetting resin binders forming rigid board, conforming to ASTM C612.
 - 1. Manufacturers:

- a. Johns Manville/Insul-Shield Insulation.
 - b. Owens-Corning Fiberglas Corp./Fiberglas 700 Series Insulation.
 - c. CertainTeed/CertaPro Commercial Board Insulation.
 - d. Substitutions: Refer to Section 01 25 00.
 2. Thickness: Minimum 1" unless otherwise indicated; fill furring channel space between wall and gypsum board.
 3. Flame Spread/Smoke Developed Rating: Maximum 25/450, ASTM E84.
 4. Combustibility: Pass ASTM E136.
 5. Vapor Retarder: Type I, unfaced.
 6. Vapor Retarder: Type III: Aluminum vapor retarder on one side.
 7. Thermal Resistance: Not less than R-40 total Long-Term Thermal Resistance (LTTR) unless otherwise indicated.
- F. High Density Mineral Wool: Semi-rigid insulation, non-combustible, non-corrosive, moisture-resistant, non-deteriorating, and mold resistant for exterior rain screen applications.
1. Manufacturers:
 - a. Owens Corning/Thermafiber Rainbarrier
 - b. Johns Manville/CladStone Water & Fire Block
 - c. Substitutions: Refer to section 01 25 00
 2. Thickness: Minimum required to achieve minimum R-12 insulation value
 3. Combustibility: Non-combustible per ASTM E136
 4. Thermal Resistance: Not less than R-12
- G. Separate Vapor Retarder (Interior of Exterior Walls): Provide reinforced polyethylene or foil-polyester film vapor retarder; maximum permeance rating of 0.13 perm.
1. Manufacturers:
 - a. Raven Industries, Inc./Dura-Skrim 6ww.
 - b. Reef Industries, Inc./Griffolyn T-65.
 - c. Alumiseal Corp./Zero Perm.
 - d. Substitutions: Refer to Section 01 25 00.
- H. Accessories: Furnish as recommended by insulation manufacturer for insulation types, substrates, and conditions involved.
1. Fasteners and Attachment Devices: Comply with insulation manufacturer recommendations for attachment of insulation.
 2. Fasteners to withstand loads specified for system.

3. Vapor Retarder Tape: Minimum 2" wide self-adhering type designed to maintain vapor retarder integrity and complying with fire resistance ratings as required by applicable codes.
4. Penetration Type Insulation Supports: Galvanized or electroplated steel penetration supports with adhesive attachment to substrate and support disc.
5. Hat Channels for Special Fibrous Continuous Insulation: Types as indicated and as recommended by insulation manufacturer for applications indicated.
6. Thermal Break Insulation Supports for Continuous Insulation: Provide attachment system designed specifically for supporting both continuous insulation and exterior building cladding systems indicated.
 - a. Manufacturers:
 - 1) Armatherm (844.360.1036)/Armatherm Z Girt Structural Thermal Break.
 - 2) Knight Wall Systems (855.597.9255)/MFI System.
 - 3) Substitutions: Refer to Section 01 25 00.
 - b. Provide system recommended by manufacturer for applications indicated with accessories as required for complete thermally-broken continuous insulation system in configurations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify substrate and adjacent materials are dry and ready to receive insulation; beginning installation signifies acceptance of conditions.
- B. Ensure mechanical and electrical items affecting work are properly placed, complete, and have been inspected by Architect prior to commencement of installation.

3.2 INSTALLATION

- A. General: Install insulation in accordance with manufacturer's instructions and applicable code requirements. Cut and trim insulation neatly, to fit spaces.
 1. Fit insulation tight within spaces and tight to and behind mechanical and electrical services within insulation plane; leave no gaps or voids; maintain integrity of thermal barrier.
 2. Backed Insulation: Use insulation free of ripped backs and edges.
 3. Insulations with Vapor Retarder Facing: Install insulation with integral vapor retarder with vapor retarder toward inside of building.
- B. Batt Insulation: Friction fit batt insulation in place; use tape or penetration supports as necessary to assure permanent installation.
 1. Taping: Tape joints and tears in integral vapor retarder, including joints between insulation and surrounding construction, to ensure vapor-tight installation.

2. Taping: Tape tears in integral vapor retarder.
3. Penetration Supports: Cut or bend pins in locations accessible to maintenance personnel, to eliminate potential hazards from exposed pin points.
- C. Nailable Surface Roof Insulation: Secure using fasteners recommended by insulation manufacturer for application indicated and capable of resisting wind loads specified for roofing systems applied over nailable surfaced roof board insulation.
- D. Continuous Insulation Installation: Comply with manufacturer recommendations and installation instructions for continuous insulation for use in systems indicated.
- E. Separate Vapor Retarder: Install vapor retarder in accordance with manufacturer's recommendations and installation instructions for complete vapor retarder installation.
 1. Tape joints and tears in vapor retarder.
 2. Seal vapor retarder to penetrations.

END OF SECTION

SECTION 07 26 00

BELOW-GRADE VAPOR RETARDER

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide vapor retarder system for below grade and slab-on-grade concrete, including sealing joints and protrusions through vapor retarder and sand bed below vapor retarder.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's literature.

1.3 SITE CONDITIONS

- A. Do not apply vapor retarder during inclement weather or when air temperature is below 40 degrees F.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Fortifiber Corp./Ultra 15.
- B. Raven Industries, Inc./Vapor Block # VB 15 (15 mil Blue).
- C. Stego Industries, Inc./Stego Wrap (15 mil).
- D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description Includes: Provide vapor retarder system for below grade and slab-on-grade concrete, including sealing joints and protrusions through vapor retarder and sand bed below vapor retarder.
- B. Vapor Retarder: ASTM E1745, Class A vapor retarder consisting of 15 mil polyolefin film.
 - 1. Permeance: Maximum 0.025 perms, ASTM F1249 and E154 tests.
 - 2. Resistance to Puncture: Minimum 2200 grams, ASTM D1709, Method B.
 - 3. Tear Resistance: Minimum 8.74 lbs., ASTM D1004.
 - 4. Tensile Strength: Minimum 35 lbs/in., ASTM E154, Section 9, Method D-882, in both directions.

- C. Joint Sealer: Pressure sensitive tape as recommended by vapor retarder manufacturer and providing comparable permeance to vapor retarder.
- D. Sand Bed: Clean natural sand; free from silt, clay, loam, friable or soluble materials, and organic matter.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Ensure sleeves, curbs and projections that penetrate vapor retarder are properly and rigidly installed.
- B. Ensure substrate is free of projections and irregularities that may be detrimental to proper installation of vapor retarder.

3.2 INSTALLATION

- A. Spread and roll sand to provide smooth, even bed for vapor retarder.
- B. Apply vapor retarder in accordance with manufacturer's recommendations and installation instructions and in accordance with ASTM E1643; comply with most restrictive where conflicts occur.
 - 1. Seal items projecting through vapor retarder with pressure sensitive tape.
- C. Seams: Minimum 12" overlap, sealed with pressure sensitive tape for vapor tight seal.
- D. Lay vapor retarder membrane smooth with no fish-mouths or bunches of material.
- E. Inspect and repair vapor retarder prior to application of concrete slab; tape tears and repair damage.

END OF SECTION

SECTION 07 28 00

WEATHER BARRIER/UNDERLAYMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide weather barrier/underlayment air and water barrier systems for siding, sloped roofing, flashing and sheet metal, and penetrations with accessories as required for complete watertight installation.
 - 1. Wall Underlayment: Provide vapor permeable fluid applied underlayment and flashing for exterior wall applications, with related concealed metal flashings and accessories as required for complete airtight and watertight installation.
 - 2. Flashings and Sheet Metal Underlayment: Provide self-adhering sheet membrane underlayment at flashings and sheet metal, with accessories as required for complete watertight installation.
 - 3. Self-Adhering Sheet Membrane (SASM) Flashing at Penetrations: Provide SASM flashing for around penetrations through building paper including windows and doors, with accessories as required for complete watertight installation.
- B. Related Sections:
 - 1. Section 07 21 00: Interior Vapor Retarders
 - 2. Section 07 60 00: Exposed Metal Flashing

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Weather Barriers: Provide weather barrier/underlayment systems which, with other building components, comply with applicable code requirements for air barriers and water barriers.
 - 1. Air Barriers: Air barriers shall be as defined by applicable Energy Code requirements and shall include standard exterior wall components and air seal joint sealants specified in Section 07 90 00 – Joint Sealants.
 - 2. Water Barriers: Water barriers shall be as defined by applicable Building Code requirements and shall include vapor permeable systems with or without rainscreen barriers intended to extend amount of water drained to exterior.
 - a. Rainscreen systems can also provide protection from ultra-violet degradation of underlayment where open joint systems are used.

3. Interior Vapor Retarders: Where specifications require foil faced vapor retarders as part of building thermal insulation system, intent is to prevent migration of spores from mold and mildew into interior building spaces.
 - a. Intent is to provide air barrier and vapor retarder on interior surface while allowing vapor to move through exterior wall vapor permeable surfaces, while vapor permeable water barriers are maintained at exterior side of wall.
 4. Self-Adhering Flexible Flashings: Intent of flexible flashings at window openings, door openings, and other wall penetrations is to ensure water cannot move from exterior surface past water barriers and into building.
- B. Pre-Installation Meeting: Convene one week prior to commencing work; require attendance of parties directly affecting underlayment.
1. Review procedures and coordination required with related work.

1.3 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature for each type of underlayment.
- B. Samples: Furnish samples of each material.

1.4 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for adhesives.

1.5 WARRANTY

- A. Extended Correction Period: Provide for correcting failure of system to resist damage from anticipated sources including damage from water penetration. Repair system and pay for or replace damaged materials and surfaces.
 1. Period: Two years.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. System Description: Provide weather barrier/underlayment air and water barrier systems for siding, sloped roofing, flashing and sheet metal, and penetrations with accessories.
- B. Regulatory Requirements: Provide materials conforming to applicable air quality management district limitations on volatile organic compound (VOC) emissions.
- C. Regulatory Requirements: Provide materials with minimum volatile organic compound (VOC) emissions available.

- D. Wall Underlay: Unperforated asphalt saturated organic felt, conforming to ASTM D226, Type I, and ASTM D4869 commonly referred to as No. 15.
- E. Wall Underlay: Provide vapor permeable fluid applied air and water barrier underlayment system for complete watertight installation as recommended by manufacturer for substrates and applications indicated.
 - 1. Manufacturers:
 - a. GCP Applied Technologies (Grace)/Perm-A-Barrier VPO Fluid Applied.
 - b. Henry Company/Air-Bloc VP.
 - c. Carlisle Corp./CCW LiquiFiber-W.
 - d. Substitutions: Refer to Section 01 25 00.
 - 2. Provide specific membrane types as recommended by system manufacturers for each type of application.
- F. Sheet Metal and Flashing Underlayment: Self-adhering rubberized sheet membrane with primers and seam sealers as required for complete watertight installation; type as recommended by manufacturer for substrate and for applications indicated.
 - 1. Manufacturers:
 - a. GCP Applied Technologies (Grace).
 - b. Henry Company.
 - c. Carlisle Corp.
 - d. Protecto Wrap Company.
 - e. Substitutions: Refer to Section 01 25 00.
 - 2. Provide specific membrane types as recommended by system manufacturers for each type of application.
- G. Self-Adhering Sheet Membrane (SASM) Flashing at Penetrations: SASM with primers and seam sealers as required for complete watertight installation; type as recommended by manufacturer for substrate and for applications indicated.
 - 1. Manufacturers:
 - a. GCP Applied Technologies (Grace).
 - b. Henry Company.
 - c. Carlisle Corp.
 - d. Protecto Wrap Company.
 - e. Substitutions: Refer to Section 01 25 00.
 - 2. Provide specific membrane types as recommended by system manufacturers for each type of application.
- H. Concealed Metal Flashings Integral with Underlayment: Minimum 26 gage thick steel with minimum 0.90 oz/sf galvanized coating; ASTM A653.

1. Fasteners: Standard round wire type of hot dipped galvanized steel; minimum 19/64" head diameter and 0.104" shank diameter; minimum 7/8" long.
- I. Bituminous Paint: Acid and alkali resistant type; black color.
- J. Accessories: Provide as recommended by underlayment manufacturers for specific applications.
 1. Plastic Cement: Cutback asphaltic type with mineral fiber components, for sealing and coating flashings; free of toxic solvents and free of asbestos. Capable of setting within 24 hours at temperatures of approximately 75 degrees F and 50% R.H.

2.2 FLASHING FABRICATION

- A. Fabricate metal flashings as recommended by Sheet Metal and Air Conditioning Contractors National Association (SMACNA) "Sheet Metal Manual".
- B. Form flashings to drain water to exterior at roofing and siding construction for penetrations, sill and header flashings.
- C. Form sections square, true and accurate to size, in maximum possible lengths and free from distortion and other defects detrimental to appearance or performance.
- D. Hem exposed edges of metal flashings minimum 1/4" on underside.
- E. Apply bituminous paint on concealed surfaces of metal flashings.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Install underlayment over surfaces that are dry, free of ridges, warps and voids that could damage paper.
- B. Coordinate installation with installation of components and items projecting through underlayment.

3.2 FLASHINGS INSTALLATION

- A. Install flashings as recommended by Sheet Metal and Air Conditioning Contractors National Association (SMACNA) "Sheet Metal Manual".
- B. Weatherlap joints minimum 2" and seal with plastic cement; secure in place.
- C. Fastenings: Concealed in completed installation.

3.3 UNDERLAYMENT INSTALLATION

- A. Install weather barrier/underlayment in accordance with installation instructions and recommendations of each manufacturer and of manufacturers of products to cover weather barrier/underlayment; comply with applicable code requirements.
 - 1. Wall Underlayment: Provide fluid applied underlayment.
 - a. At Alucobond wall panels provide rainscreen type fluid applied underlayment.
 - 2. Penetrations: Apply one-layer of self-adhering sheet membrane extending minimum 18" from penetrations, including windows and doors; start at bottom of penetration and weatherlap joints.
 - a. Apply top layer over metal flashing to direct water to exterior.
 - 3. Weatherlap joints as recommended by system manufacturer.
 - a. Weatherlap joints not less than 2" at building paper.
 - 4. Secure underlayment in place, stagger joints between sheet membrane layers; lap ends minimum 6"; stagger end joints.
- B. Sheet Membranes: Weatherlap items projecting through sheet membrane underlayment and seal with sealer recommended by sheet membrane underlayment manufacturer.

END OF SECTION

SECTION 07 46 46

FIBER CEMENT WALL PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Fiber cement siding systems, including:
 - 1. Siding panels and planks.
 - 2. Accessories and trim.

1.2 REFERENCES

- A. ASTM C1185 - Standard Test Methods for Sampling and Testing Non-Asbestos Fiber-Cement Flat Sheet, Roofing and Siding Shingles, and Clapboards.
- B. ASTM C1186 - Standard Specification for Flat Fiber Cement Sheets.
- C. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
- F. ASTM G155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
 - 1. Manufacturer's requirements for related materials to be installed by others.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Manufacturer's detailed installation manual, including requirements for all installation methods, including fastening requirements, flashing requirements, and termination details.
- C. Maintenance Instructions: Periodic inspection recommendations and maintenance procedures.
- D. Warranty: Submit copy of manufacturer's warranty, made out in City's name, showing that it has been registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified in this Section with minimum three years of experience.
- B. Basis of Design: Specifications are based on wall panel systems by specified basis of design manufacturer. Wall panel systems manufactured by other acceptable manufacturers are permitted, subject to compliance with specified requirements, and provided that deviations in design, composition, and profile are minor, and do not detract substantially from the indicated design intent.
 - 1. Comply with requirements specified in Section 01 4000 and Section 01 6000.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. See Section 01 74 10 - Construction Waste Management and Disposal for packaging waste requirements.
- B. Deliver and store materials in manufacturer's unopened packaging, with labels intact, until ready for installation.
- C. Store products under waterproof cover and elevated above grade, on a flat surface.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Provide manufacturer's standard limited, transferable warranties for each system component specified.
 - 1. Fiber Cement Siding System Components and Standard Trim Profile, Factory Primed: 50 years.
 - 2. Fiber Cement Siding Trim, 4/4 and 5/4 Profiles: 25 years.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. EQUITONE, Inc./[tectiva] Fiber Cement Panel
- B. Allura, a division of Plycem USA, Inc.
- C. GAF
- D. Nichiha USA, Inc.
- E. Substitutions: See Section 01 25 00.

2.2 WALL PANELS

- A. Panel Siding System: Wall panels with machined edges, for concealed clip attachment.
 - 1. Texture: Smooth.
 - 2. Thickness: 7/16 inch, nominal.
 - 3. Finish: Factory applied primer, unless otherwise indicated on Drawings.
- B. Factory Finish: Topcoat system applied to specified panel products in factory.
 - 1. Colors and Textures: As selected by Architect from topcoat system manufacturer's full line for each specified finish system.

2.3 ACCESSORIES

- A. Fiber Cement Trim: Fiber cement board, provided in nominal sizes as indicated on Drawings, cut edges primed; 5/4 inch nominal thickness.
 - 1. Same material and texture as siding.
 - 2. Finish: Factory applied primer, unless otherwise indicated on Drawings.
- B. Metal Reveal System: Extruded aluminum, 6063-T5 alloy-temper; nominal 1 inch face width with 1/2 inch reveal; channels designed to accept siding panels of specified thickness.
 - 1. System Components: Include horizontal reveals, vertical reveals, outside corners, intersection profiles, and other trim profiles as indicated on Drawings.
 - 2. Dimension and Layout: As indicated on Drawings.
 - 3. Finish: Powder coating.
 - 4. Color: As selected by Architect.
 - 5. Acceptable Manufacturer:
 - a. Easytrim Reveals, Inc.; EZ-Series Trim: www.easytrimreveals.com.
 - b. Substitutions: See Section 01 25 00.
- C. Fasteners: Galvanized or corrosion resistant type; length as required to penetrate minimum 1-1/4 inch into solid backing, except as otherwise specified.
 - 1. Use of siding manufacturer's recommended fasteners is required, to establish and maintain specified warranty, and for proper and complete installation.
- D. Sealant: Elastomeric, polyurethane or silyl-terminated polyether/polyurethane, or as otherwise recommended by siding system manufacturer; capable of being painted. Comply with general requirements specified in Section 07 90 00.
- E. Insect Screen Mesh: Vinyl-coated fiberglass, 18 x 16 mesh.
- F. Sheet Metal Flashing: Specified in Section 07 60 00.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrate, clean and repair as required to eliminate conditions that would be detrimental to proper installation.
- B. Verify that weather barrier system has been installed over substrate completely and correctly.
- C. Do not begin until unacceptable conditions have been corrected.
- D. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Protect surrounding areas and adjacent surfaces during execution of this work.
- B. Prime or pre-paint field-cut edges prior to installation.
- C. Install sheet metal flashing properly lapped with other components of the weather barrier system, and properly sloped to drain and weep moisture to the exterior.
 - 1. Above door and window trim and casings.
 - 2. Above horizontal trim in field of siding.
 - 3. Components specifically required or recommended by siding manufacturer for installation conditions indicated.
 - 4. Install insect screen mesh at bottom and open edges of installations.

3.3 INSTALLATION

- A. Install siding system in accordance with manufacturer's instructions and recommendations, including wood furring strips if required to establish and maintain specified warranty.
 - 1. Read warranty and comply with terms necessary to maintain warranty coverage.
 - 2. Install in accordance with conditions stated in model code evaluation report applicable to location of project.
 - 3. Use trim details indicated on Drawings; if trim details are not indicated, comply with siding manufacturer's standard details in all respects for conditions indicated.
 - 4. Touch up field cut edges before installing.
 - 5. Pre-drill nail holes if necessary to prevent breakage.
- B. Over Gypsum Board, Wood, and Wood-Composite Sheathing: Fasten siding through sheathing into studs.
- C. Allow space for thermal movement between both ends of siding panels that butt against trim; seal joint between panel and trim with specified sealant.
- D. Joints in Horizontal Siding: Avoid joints in lap siding except at corners; where joints are inevitable stagger joints between successive courses.

1. Provide sheet flashing behind joints, extending minimum 1 inch above top of siding course, minimum 3 inch each side of joint, and minimum 1 inch overlap with previous siding course, or as otherwise required by siding manufacturer.
- E. Minimum Fastener Penetration: Comply with applicable code, but at minimum as follows:
 1. Wood Studs: 1 inch.
 2. Metal Studs: 3 full threads.
- F. Do not install siding less than 6 inches from surface of ground nor closer than 2 inches to roofs, patios, porches, sidewalks, and other surfaces where water may collect, unless otherwise specifically allowed by siding manufacturer or otherwise detailed on Drawings to comply with siding manufacturer's recommendations.
- G. Sealants: After siding system installation, seal all joints except lap joints of lap siding and other joints not required to be sealed according to system manufacturer's installation instructions. Seal around all penetrations through panel system.
 1. Exceptions: Do not seal joints between siding components and sheet metal flashings, between bottom edge of siding panels and adjacent materials, and similar locations where moisture must be allowed to weep out from behind siding system.

3.4 CLEANING

- A. At completion of work, remove debris caused by siding installation from project site.

3.5 PROTECTION

- A. Protect installed products until Date of Substantial Completion.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 07 53 10

ELASTOMERIC PVC MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide reinforced polyvinyl chloride (PVC) type elastomeric sheet membrane roofing system with base flashings, insulation, roof deck board, and accessories for complete, weather-tight installation.
- B. Related Sections:
 - 1. Section 06 10 50: Miscellaneous Rough Carpentry for wood blocking and plywood in conjunction with roofing.
 - 2. Section 07 60 00: Flashing and sheet metal.

1.2 REFERENCE STANDARDS

- A. National Roofing Contractors Association: The NRCA Roofing and Waterproofing Manual.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Meeting: Convene not less than one week prior to commencing work of this section. Require attendance of parties directly affecting roofing work.
 - 1. Review procedures and coordination required with related work.

1.4 SUBMITTALS

- A. Product Data: Submit membrane manufacturer's literature for membrane and base flashing materials; provide specific recommendations of insulation system manufacturer.
 - 1. Submit membrane manufacturer's recommendations for surface conditioning, flashing, joint cover and crack sealants, and temperature range for application of materials.
- B. Shop Drawings: Submit for PVC sheet seams and insulation layout; indicate location and insulation type; provide cross section indicating layers of insulation along with R-value calculations.
- C. Samples: Submit samples of each exposed material.
- D. Certifications:
 - 1. Installer: Submit certification installer is approved for roof system installation.

2. Materials: Submit certification materials and components conform to Specifications and are compatible with each other, roof substrate, and related work.
3. Fire and Wind: Submit manufacturer's certification system conforms to fire and wind requirements.
4. Manufacturer Representative: Submit certification by manufacturer's representative indicating work has been installed in accordance with manufacturer's recommendations and installation instructions.

1.5 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to energy efficiency.
- B. Qualification of Installers: Company with minimum five years successful experienced in PVC membrane roof application on projects of similar scope.
 1. Installer: Roofing and insulation manufacturer certified or approved.
- C. Supervisor: Installer to maintain full-time supervisor/foreman who is on jobsite during roofing work who is experienced in installation of roofing system specified.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect foam insulation from direct sunlight exposure.

1.7 SITE CONDITIONS

- A. Do not apply roofing membrane during inclement weather or when air temperature may fall below 40 degrees F.
 1. Do not allow materials to be exposed to moisture during transportation, storage, handling or installation.
 2. Mark damp or wet materials, including felts which froth or foam during installation, and remove from site within 24 hours.
- B. Do not apply materials to damp, dirty, dusty, or otherwise unsuitable surfaces.
 1. Allow concrete surfaces to cure minimum 28 days.
- C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

1.8 WARRANTY

- A. Extended Correction Period: Provide for correcting failure of system to resist damage from anticipated sources including damage from wind and water penetration. Repair system and pay for or replace damaged materials and surfaces.
 1. Period: Two years.

- B. Manufacturer's Warranty: Submit manufacturer's warranty including special manufacturer services as required for manufacturer's warranty.
 - 1. Period: 20 years.
 - 2. Manufacturer's warranty shall not detract from requirements of extended correction period nor from City's rights under implied and expressed warranties regardless of wording of manufacturer's warranty.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Carlisle SynTec Systems.
- B. Sarnafil Inc. Basis of Design
- C. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide reinforced polyvinyl chloride (PVC) type elastomeric sheet membrane roofing system with base flashings, and accessories.
 - 1. System: Fully adhered exposed membrane.
 - 2. Provide roofing system materials by a single manufacturer, except where materials of other manufacturers are specified or approved by Architect.
 - 3. Provide roof insulation, double layer, or more, application where indicated.
 - 4. Provide tapered insulation as required to ensure positive 1/4" per foot slopes to drains.
 - 5. Provide roof deck board to separate insulation from roof membrane.
- B. Regulatory Requirements
 - 1. Cool Roof System: Comply with California Building Standards Code requirements for "Cool Roof" system including three-year aged solar reflectance value requirements.
 - a. Label: System to have Cool Roof Rating Council (CRRC) label.
 - 2. Fire and Wind Resistance: Conform to California Building Standards Code requirements for Underwriters Laboratory (UL) Class A roof system, with UL Class 60 wind resistance classification.
- C. Roof Membrane: ASTM D4434, Polyvinyl Chloride (PVC) Elastomeric membrane, reinforced, thickness as recommended by roof membrane manufacturer for application involved, but no less than 48 mils.
 - 1. Scrim Reinforcing: Manufacturer's standard fleece, fiberglass, or polyester scrim.

2. Corners and Elastomeric Membrane Flashing: Provide products using same base material as roof membrane; corners preformed.
 3. Seams: Solvent welded and seam sealant finished.
 4. UV Resistance: Provide materials with demonstrated resistance to ultraviolet light with no visible surface cracking or discoloration based on industry accepted accelerated test methods.
 5. Provide materials compounded specifically for application methods and substrates indicated on Drawings; comply with requirements for fire rated materials.
 6. Color: Reflective Gray
- D. Insulation: Provide materials approved for use with specified membrane and suitable for application indicated; provide tapered insulation where insulation is indicated to provide roof slopes.
1. Polyisocyanurate Insulation: ASTM C1289, Type II, Class 1, Grade 2 glass fiber faced isocyanurate, with ASTM C1303 Long Term Thermal Resistance (LTTR).
 2. Other Types of Insulation: Acceptable subject to manufacturer's recommendations, application involved, and total thickness required for specified thermal resistance.
 3. Thermal Resistance: Minimum R-38.
- E. Roof Deck Board: ASTM C1278 with moisture and mold resistant core. Provide as indicated, as required for uniform surface for membrane adherence, and as required for fire and wind ratings.
1. Manufacturers:
 - a. Georgia Pacific/DensDeck Prime.
 - b. Johns Manville/Securock.
 - c. Substitutions: Refer to Section 01 25 00.
- F. Vapor/Air Barrier
1. Use: to protect insulation and reduce moisture accumulation within an insulated roofing
 2. Where insulation is adhered to the vapor retarder, adhesive must be compatible and shall be fully adhered to the substrate.
 3. Material: Vapor barrier as recommended by the roofing membrane manufacturer or an acceptable product compatible with the roofing membrane.
- G. Accessories: Provide as recommended by membrane manufacturer and system manufacturer as required for complete weather-tight installation, including, but not limited to:
1. Bonding adhesives, splicing cement, and lap sealants and mastics.

2. Seam plates.
 3. Molded pipe flashing.
 4. Temporary sealing, for end of day closing of membrane.
 5. Mechanical fasteners.
- H. Integral Coated Metal Flashings: Provide not less than 24-gage galvanized steel flashings, minimum G90 coating, coated with PVC materials for compatibility with direct bonding to roof membrane, as recommended by system manufacturer.
- I. Roof Protection Pads: Provide protection materials as recommended by membrane manufacturer where maintenance traffic is anticipated over membrane.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify deck is dry, clean and smooth, free of depressions, waves and projections detrimental to roofing membrane, and properly sloped for drainage.
- B. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set and that cant strips, nailing strips, and reglets are in place.
- C. Beginning installation indicates acceptance of substrate.
- D. Metal Surfaces: Remove contaminants which may adversely affect adhesion or performance of roofing system; apply metal primer.

3.2 INSTALLATION

- A. Install membrane roofing system in accordance with manufacturer's recommendations and instructions and as required to meet requirements for warranty and applicable codes.
 1. Comply with NRCA Specification Guide for Thermoset Roof Membranes as applicable; where conflicts exist comply with manufacturer's recommendations.
- B. Insulation: Install insulation in accordance with insulation manufacturer's recommendations and roof membrane manufacturer's recommendations for installation indicated.
 1. Place insulation boards butted in close contact; stagger joints between insulation board layers.
 2. Bevel insulation to allow snug fit at penetrations; cut neatly around protrusions through roof.
 3. Mechanical fasteners as indicated on drawings.

- C. Roof Deck Board: Install in accordance with manufacturer recommendations and as required to ensure suitable substrate for membrane roofing over insulation, fire ratings, and wind ratings; secure to roofing deck.
 - 1. Place roof deck boards butted in close contact; stagger joints between roof deck board and insulation board joints.
 - 2. Cut to allow snug fit at penetrations; cut neatly around protrusions through roof.
- D. Roof Membrane: Apply membrane in accordance with membrane manufacturer's recommendations and installation instruction. Provide heat welded seams.
 - 1. Apply sheet membrane smooth, free from air pockets, wrinkles, fish-mouths, un-lapped joints, or tears, over first layer insulation.
 - 2. Extend roof membrane up vertical surfaces minimum 8" wherever possible and secure to nailing strips or reglets; reinforce corners with double applications of membrane.
 - 3. Install membrane flashings and seal into membrane.
 - a. Coordinate installation of roof drains and related flashings.
 - 4. Seal flashings and items projecting through membrane; seal terminations with additional layer of membrane and mastic.
 - 5. Prevent compounds from entering and clogging drains, and from spilling or migrating onto surface of other work.
- E. Roof Protection Pads: Secure roof protection pads in place in accordance with membrane manufacturer recommendations and as required to ensure protection of membrane from roof maintenance traffic.
 - 1. Set pads to allow roof drainage; where pads cross drainage path set with not less than 4" and not more than 8" between pads.

3.3 FIELD QUALITY CONTROL

- A. Site Tests: Flood test roofing prior to installation of insulation and ballast; if defects are revealed, repair and repeat flood test until no defects are revealed.
 - 1. Do not overload structure with flood test; if necessary, section off areas as necessary.
 - 2. Test for leaks with 2" depth of water maintained for 24 hours.
- B. Manufacturer's Field Services: Manufacturer's representative shall inspect work of Project on regular basis and provide certification roofing system has been installed in accordance with manufacturer's recommendations.
 - 1. Provide unobstructed access to roofing work.
 - 2. Correct defects and irregularities as advised by manufacturer's representative.

3.4 CLEANING

- A. Remove roofing membrane markings from finished surfaces.
- B. In areas where finished surfaces are soiled by roofing work, consult manufacturer of finished surfaces for recommended cleaning methods.
- C. Leave completed roof free from debris and uniform in appearance.

3.5 PROTECTION

- A. Where work must continue over finished roofing membrane, protect surface in accordance with manufacturer recommendations.

END OF SECTION

SECTION 07 60 00

FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide metal flashings and sheet metal including accessories as required for complete weathertight installation.
 - 1. Flashing and sheet metal includes copings, fascias, gutters, reglets, and similar fabricated components as applicable to Project.
 - 2. Provide concealed sealants used in conjunction with installation of metal flashing and sheet metal.
 - 3. Provide miscellaneous sheet metal flashing and reglets not provided by other trades or suppliers.
 - a. Where reglets are to be installed in conjunction with other work, provide in adequate time for installation.
 - b. Where reglets are to be surface applied, provide continuous gasket between reglet and surface.
- B. Related Sections:
 - 1. Section 06 10 50: Miscellaneous rough carpentry.
 - 2. Section 07 28 00: Weather Barrier/Underlayment for concealed flashing at weather barrier/underlayment.
 - 3. Section 07 53 10: Integral coated metal flashings

1.2 REFERENCES

- A. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Architectural Sheet Metal Manual.

1.3 SUBMITTALS

- A. Product Data: Furnish literature for manufactured products.
- B. Shop Drawings: Clearly indicate dimensioning, layout, general construction details including closures, flashings, locations and types of sealants, anchorages, and method of anchorage.
- C. Samples: Furnish samples of typical metal flashing fabrication indicating standard soldered joints and edge conditions.

1.4 QUALITY ASSURANCE

A. Sustainability Requirements:

- 1) two years' successful experience with CAL/Green requirements.
2. CALGreen Requirements: Refer to Section 01 35 15 – CALGreen Environmental Requirements and comply with applicable CALGreen Checklist indicating requirements applicable to Project.

1.5 DELIVERY, STORAGE AND HANDLING

- ##### A. Provide strippable film protective covering on shop finished flashing materials to protect materials through shipping, fabrication and installation.

1.6 WARRANTY

- ##### A. Extended Correction Period: Provide for correcting failure of system to resist damage from anticipated sources including damage from wind and water penetration. Repair system and pay for or replace damaged materials and surfaces.

1. Period: Two years.

PART 2 - PRODUCTS

2.1 MATERIALS

- ##### A. System Description: Provide flashing and sheet metal including reglets and accessories as required for complete weathertight installation.

- ##### B. Design Criteria: Allow for movement of components without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to 100-year seasonal temperature ranges.

C. Flashing and Sheet Metal:

1. Galvanized Steel: ASTM A924 and A653 G90 galvanized steel; minimum 24-gage.
 - a. Mill phosphatized where indicated to be field painted.
 - b. Location (Concealed from view): Where indicated, if not otherwise indicated, provide where flashing will not be exposed to view from exterior of building and where not exposed to view from spaces within building.
2. Shop Finished Galvanized Steel Flashing and Sheet Metal: ASTM A924 and A653 G90 galvanized steel; minimum 24-gage; with factory applied fluoropolymer coating based on Kynar 500 or Hylar 5000.
 - a. Manufacturers:
 - 1) Ryerson Building Products (800.328.7800)/ColorKlad.
 - 2) Metal Sales Manuf. Corp.(800.406.7387)/PVDF (Kynar 500).
 - 3) K&M Sheet Metal (888.567.7778)/Kynar Steel.

- 4) Substitutions: Refer to Section 01 25 00.
 - b. Location (Exposed): Where indicated, if not otherwise indicated, provide where flashing will be exposed to view from exterior of building, and where exposed to view from spaces within building.
 - c. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
 - d. Touch-up Paint for Prefinished Sheet Metal: Type recommended by fluoropolymer manufacturer for field touch-up.
3. Zinc Alloy: Zinc/copper/titanium alloy conforming to DIN EN 988; not less than 0.025" thick.
- a. Manufacturers:
 - 1) Rheinzink America, Inc./Rheinzink.
 - 2) VM Building Solutions/VM Quartz Zinc.
 - 3) Substitutions: Refer to Section 01 25 00.
 - b. Color: As selected by Architect from manufacturer's full range of colors including bright, bluegray, and graphite gray.
4. Anodized Aluminum Sheet: ASTM B209, 5005-H14, with minimum thickness of 0.050" unless otherwise indicated.
- a. Clear Anodized Coating: AAMA 607.1 clear anodized, Architectural Class I 0.018mm or thicker coating.
 - b. Color Anodized Coating: AAMA 608.1, Architectural Class I 0.018mm or thicker coating; color as indicated on Drawings.
5. Extruded Aluminum: ASTM B221, alloy 6063-T52, with minimum thickness of primary legs 0.080" unless otherwise indicated; clear anodized unless otherwise indicated.
6. Prefinished High-Performance Coated Aluminum: Manufacturer's standard two coat thermocured fluoropolymer system containing not less than 70-percent polyvinylidene fluoride resin by weight; AAMA 2605 and AA-C12C42R1x.
- a. Manufacturers:
 - 1) Ryerson Building Products (800.328.7800)/AlumaKlad.
 - 2) Merchant & Evans Industries, Inc.(800.257.6215)/Custom.
 - 3) Substitutions: Refer to Section 01 25 00.
 - b. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
 - c. Touch-up Paint for Prefinished Sheet Metal: Type recommended by fluoropolymer manufacturer for field touch-up.

7. Lead Flashing: ASTM B749, type L51121, copper-bearing sheet lead, minimum four pound per square foot (1/16" thick) lead with 6% to 7% antimony content.
 8. Accessories: Provide strainers, outlet tubes, screens, baffles, hangers and gutter ends as required for a complete system and complying with SMACNA Manual.
 9. Provide heavier gage metal where recommended by SMACNA Manual for size of component.
- D. Manufactured Reglets: Snap-on type, for two-piece flashing; metal to match flashing and sheet metal.
1. Manufacturers:
 - a. Fry Reglet Corp./Springlok System.
 - b. W.P. Hickman Co./The Leading-Edge Drive Lock System.
 - c. Substitutions: Refer to Section 01 25 00.
- E. Solder and Fasteners: As recommended by SMACNA and complying with applicable codes and regulations; hot dipped galvanized minimum coating comparable to G90.
- F. Concealed Sealant: Butyl type for use in conjunction with sheet metal; non-staining; non-corrosive; non-shrinking and non-sagging; ultra-violet and ozone resistant for exterior concealed applications.
- G. Bituminous Paint: Acid and alkali resistant type; black color; asbestos free.
- H. Plastic Cement: Cutback asphaltic type; asbestos free.
- I. Sealing Compound: Type recommended by roofing manufacturer; asbestos free.
- J. Gaskets: Type suitable for use in conjunction with sheet metal; non-staining, non-corrosive, non-shrinking, non-sagging, ultra-violet resistant, and ozone resistant; for exterior concealed applications.
1. Manufacturers:
 - a. Emseal USA, Inc./Emseal MST Multi-Use Sealant Tape.
 - b. Substitutions: Refer to Section 01 25 00.

2.2 FABRICATION

- A. Fabricate sheet metal in accordance with SMACNA Architectural Sheet Metal Manual.
- B. Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
 1. Fabricate corners and intersections in shop with solder joints; watertight fabrication.
- C. Form sections in maximum 10'-0" lengths; make allowance for expansion at joints.
- D. Hem exposed edges on underside 1/2".

- E. Back-paint flashings with heavy bodied bituminous paint where in contact with cementitious materials or dissimilar metals.
- F. Form pitch pans watertight, with minimum 4" upstand and 4" flanges; form pans minimum 6" wider than item passing through roof membrane.
- G. Form umbrella flashings with minimum 2" overhang, to shed water away from pitch pans.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install metal flashing and sheet metal in accordance with SMACNA Architectural Sheet Metal Manual.
 - 1. Install tight in place, with corners square, surfaces true and straight in planes, and lines accurate to profiles as indicated on Drawings.
 - 2. Lap joints in direction of water flow.
- B. Exercise care when cutting materials on site, to ensure cuttings do not remain on finished surfaces.
- C. Provide expansion joints concealed within system.
- D. Use concealed fasteners, continuous cleat type, except where specifically approved by Architect.
 - 1. Exposed fasteners may be used, where clearly indicated on shop drawings and approved by Architect, at areas not exposed at exterior walls nor in sight of interior spaces.
- E. Apply sealing compound at junction of metal flashing and felt flashing.
- F. Lock seams and end joints; fit flashing tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- G. Counter-flash mechanical and electrical items projecting through roof membrane.
- H. Install sealants where required to prevent direct weather penetration.
 - 1. Install continuous gasket behind surface applied reglets.
- I. Completed installation shall be free of rattles, noise due to thermal and air movement, and wind whistles.
- J. Install pitch pans and fill with plastic cement.
- K. Install umbrella flashing with draw band collars with sheet metal sealant between penetrating item and flashing; use wood blocking at angle type penetrations and cover blocking with sealant.

- L. Install splash blocks at locations to interrupt fall of water and direct water flow as indicated on Drawings.

3.2 CLEANING

- A. Remove protective coating from shop finished sheet metal when no longer required to protect roofing and flashing from construction.
- B. Touch-up scratched and damaged finish to match new; remove and replace sheet metal units that cannot be repaired to look identical to adjacent sheet metal when viewed from 15'-0" away.

END OF SECTION

SECTION 07 90 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide joint sealants, for interior and exterior joints not specified elsewhere, with backing rods and accessories as required for complete installation.
 - 1. Joint sealants include joint sealers and calking as indicated.
- B. Related Sections:
 - 1. Section 07 60 00: Flashing and sheet metal concealed sealants.
 - 2. Section 08 80 00: Glazing sealants.
 - 3. Section 09 21 00: Sealants used for acoustical treatment at gypsum board.

1.2 SUBMITTALS

- A. Product Data: Furnish manufacturer's descriptive literature.
- B. Samples: Furnish samples of each type of exposed joint sealer in required colors.
- C. Certifications:
 - 1. Furnish manufacturer's certification joint sealers comply with Contract Documents and are suitable for Project applications.
 - 2. Furnish certification indicating installers are trained in proper use of specified products, qualified, and familiar with proper installation techniques.

1.3 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for adhesives, sealants, and caulks.
 - 1. Provide joint sealants as required by applicable codes and regulations to fill joints and openings in building envelope separating conditioned space from unconditioned space.
- B. Installer Qualifications: Firm with minimum five years successful experience on projects of similar type and size, using specified products.
- C. Installers shall be familiar with proper application procedures to ensure maximum joint sealer expansion and contraction capabilities.
- D. Mock-Up: Provide exterior joint sealers where required for mock-ups of other systems.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, cure time, and mixing instructions.

1.5 SITE CONDITIONS

- A. Do not proceed with installation of joint sealers under unfavorable weather conditions.
- B. Install elastomeric sealants when temperature is in lower third of temperature range recommended by manufacturer.

1.6 WARRANTY

- A. Extended Correction Period: Extend correction period to two years.
 - 1. Repair or replace joint sealers which fail to perform as intended, because of leaking, crumbling, hardening, shrinkage, bleeding, sagging, staining, loss of adhesion, and loss of cohesion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. System Description: Provide joint sealants with backing rods and accessories.
- B. Performance Requirements:
 - 1. Select materials for compatibility with joint surfaces and indicated exposures.
 - 2. Where not indicated, select modulus of elasticity and hardness or grade recommended by manufacturer for each application indicated.
 - 3. Comply with applicable limitations on volatile organic compound (VOC) emissions.
- C. Regulatory Requirements: Comply with applicable regulatory requirements regarding limitations on volatile organic compound (VOC) emissions limitations.
- D. Elastomeric Sealants:
 - 1. Single Component Low Modulus Silicone Sealant: ASTM C920 Type S, Class 25, Grade NS; minimum 50% expansion and compaction capability.
 - a. Provide at exterior locations not exposed to traffic.
 - b. Manufacturers:
 - 1) GE (Momentive Performance Materials)/Silpruf, Silglaz or GESIL.
 - 2) Dow Corning Corp./790 or 795.
 - 3) Pecora Corp./864 Architectural Silicone.
 - 4) Tremco/Spectrem 3.
 - 5) Substitutions: Refer to Section 01 25 00.

2. Multi-Component Polyurethane Sealant: ASTM C920, Type M, Grade NS, Class 25, non-sag; minimum 25% expansion and compaction capability.
 - a. Provide at exterior locations not exposed to traffic.
 - b. Manufacturers:
 - 1) Pecora Corp./Dynatrol II.
 - 2) Tremco/Dymeric 240.
 - 3) BASF/MasterSEal NP 2.
 - 4) Substitutions: Refer to Section 01 25 00.
3. Single Component Low Modulus Sealant: ASTM C920 Type S, Class 35, Grade NS; minimum 50% expansion and compaction capability.
 - a. Provide at exterior locations not exposed to traffic.
 - b. Manufacturers:
 - 1) Henry/Moistop Sealant.
 - 2) Sika Group/SikaFlex 1A+.
 - 3) Substitutions: Refer to Section 01 25 00.
4. Multi-Component Polyurethane Sealant: ASTM C920, Type M, Grade P, Class 25, self-leveling; minimum 25% expansion and compaction capability.
 - a. Provide at traffic bearing locations.
 - b. Manufacturers:
 - 1) Pecora Corp./Urexpan NR-200, or Dynatrol II-SG.
 - 2) Tremco/THC 900-901, or Vulkem 445 SSL.
 - 3) BASF/MasterSeal SL 2
 - 4) Substitutions: Refer to Section 01 25 00.
5. Mildew-Resistant Silicone Rubber Sealant: ASTM C920, Type S, Grade NS, Class 25, compounded with fungicide, specifically for mildew resistance and recommended for interior joints in wet areas.
 - a. Provide at interior joints in damp areas.
 - b. Manufacturers:
 - 1) GE (Momentive Performance Materials)/SCS 1702 Sanitary Sealant.
 - 2) Dow Corning Corp./786 Bathtub Caulk.
 - 3) Pecora Corp./898 Sanitary Mildew Resistant Sealant.
 - 4) Tremco/Tremsil 200.
 - 5) Substitutions: Refer to Section 01 25 00.

E. Non-Elastomeric Sealants:

1. Acrylic-Emulsion Sealant: ASTM C834 acrylic or latex-rubber-modified acrylic sealant, permanently flexible, non-staining and non-bleeding; recommended for general interior exposure; compatible with paints specified in Section 09 90 00.
 - a. Provide at general interior applications.
 - b. Manufacturers:
 - 1) Pecora Corp./AC-20.
 - 2) Tremco/Tremflex 834.
 - 3) Substitutions: Refer to Section 01 25 00.
2. Air Seals: Provide non-staining and non-bleeding sealers, calks, or foams appropriate to specific applications for filling openings between conditioned and unconditioned spaces.
 - a. Type: As recommended by manufacturer for each specific application; compatible with adjacent materials.
 - b. Manufacturers:
 - 1) Dow/Great Stuff.
 - 2) Owens Corning/EnergyComplete Air Sealant.
 - 3) Hilti/Foam Filler CF 812.
 - 4) Substitutions: Refer to Section 01 25 00.
 - c. Pest Control Mesh: Openings subject to pest infiltration to have 304 stainless steel wool, material stuffed in joint before application of air seals using methods to ensure blocking of gap from pests.
 - d. Exception: Annular spaces around pipes, electric cables, conduits and other openings in exterior walls shall be protected against passage of rodents by closing with cementitious grout.
 - 1) Cementitious Grout: ASTM C1107 non-shrink, non-metallic, pre-mixed, factory-packaged, non-staining, non-corrosive; type specifically recommended by manufacturer as applicable to job condition.

F. Miscellaneous Materials:

1. Primers/Sealers: Non-staining types recommended by joint sealer manufacturer for joint surfaces to be primed or sealed.
2. Joint Cleaners: Non-corrosive types recommended by joint sealer manufacturer; compatible with joint forming materials.
3. Bond Breaker Tape: Polyethylene tape as recommended by joint sealer manufacturer where bond to substrate or joint filler must be avoided for proper performance of joint sealer.

4. Sealant Backer Rod: Compressible polyethylene foam rod or other flexible, permanent, durable non-absorptive material as recommended by joint sealer manufacturer for compatibility with joint sealer.
 - a. Oversize backer rod minimum 30% to 50% of joint opening.
- G. Colors: As indicated, as selected by Architect from manufacturer's full range of colors where not indicated.
 1. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare joint surfaces in accordance with ASTM C1193 and as recommended by joint sealer manufacturer.
- B. Clean joint surfaces immediately before installation of joint sealer; remove dirt, insecure materials, moisture and other substances which could interfere with bond of joint sealer.
- C. Prime or seal joint surfaces where recommended by joint sealer manufacturer; do not allow primer/sealer to spill or migrate onto adjoining surfaces.
- D. Ensure protective coatings on surfaces in contact with joint sealers have been completely stripped.

3.2 INSTALLATION

- A. Comply with manufacturer's printed instructions and ASTM C1193, except where more stringent requirements are shown or specified.
- B. Pest Control: Install stainless steel wool prior to application of backer rods and bond breakers at air seal and as required to ensure complete pest blockage at joints where pest intrusion is a potential.
- C. Set sealant backer rods at proper depth or position in joint to coordinate with other work, including installation of bond breakers and sealant; do not leave voids or gaps between ends of backer rods.
 1. Do not stretch, twist, puncture or tear backer rods.
- D. Install bond breaker tape as required to avoid three-sided bond of sealant to substrate and where required by manufacturer's recommendations to ensure joint sealers will perform properly.
- E. Size materials to achieve required width/depth ratios.
- F. Employ installation techniques that will ensure joint sealers are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of bond surfaces equally on opposite sides.

- G. Joint Configuration: Fill sealant joint to a slightly concave surface, slightly below adjoining surfaces, unless otherwise indicated.
- H. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture or dirt.
- I. Install joint sealers to depths recommended by joint sealer manufacturer but within the following general limitations, measured at center (thin) section of bead.
 - 1. Horizontal Joints: 75% width with minimum depth of 3/8".
 - 2. Elastomeric Joints: 50% width with minimum depth of 1/4".
 - 3. Non-Elastomeric Joints: 75% to 125% of joint width.
- J. Spillage: Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surfaces.
 - 1. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.
- K. Cure joint sealers in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength and surface durability.
- L. Maintain finished joints free of embedded matter, ridges and sags.

END OF SECTION

SECTION 08 11 10

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide full flush steel (hollow metal) doors and pressed steel frames, including anchors and silencers.
 - 1. Pressed steel frames include both door and window framing.
- B. Related Sections:
 - 1. Section 08 71 00: Door hardware.
 - 2. Section 08 80 00: Glazing.

1.2 REFERENCES

- A. Steel Door Institute (SDI): SDI-100 (ANSI/SDI A250.8) - Recommended Specifications - Standard Steel Doors and Frames.
- B. National Association of Architectural Metal Manuf. (NAAMM): Hollow Metal Manual.
- C. Underwriters Laboratories: Standards as applicable to fire rated doors and frames.
 - 1. Materials tested, labeled and inspected by Warnock Hersey International are acceptable upon approval of authorities.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate hardware installation with Section 08 71 00 – Door Hardware.
 - 2. Coordinate glass installation with Section 08 80 00 - Glazing.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturers' literature.
- B. Shop Drawings: Indicate general construction, configuration, jointing methods, reinforcement, anchorage methods, hardware locations, and locations of cut-outs.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Amweld Building Products Inc.

- B. Ceco Door Division Assa Abloy Door Group.
- C. Curries Division Assa Abloy Door Group.
- D. Door Components, Inc.
- E. Republic Doors and Frames.
- F. Krieger Steel Products Co.
- G. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide full flush steel (hollow metal) doors and pressed steel frames, including anchors and silencers.
- B. Doors: Hollow metal flush steel door, 1-3/4" thick.
 - 1. Typical: Full flush with steel channel or welded edge; close top with flush end closer treatment, bottom optional flush or recessed channel; steel stiffened core, insulated at exterior doors; continuous welded seam.
 - 2. Interior Doors: Minimum 0.042" (18-gage).
 - 3. Exterior Doors: Minimum 0.053" (16-gage).
 - 4. Glazed and Louver Doors: Provide systems as indicated on Drawings.
- C. Frames:
 - 1. Exterior Frames: Welded (pre-assembled) type.
 - 2. Interior Frames: Knockdown (field-assembled) type; provide 3/8" back bend return on frames at gypsum board.
 - 3. Gage: Minimum 0.053" (16-gage) interior frames, 0.067" (14-gage) exterior frames.
 - 4. Door Silencers: Manufacturer's standard resilient type; removable for replacement.
 - 5. Mortar Guard Boxes: Minimum 0.026" (22-gage) mortar guard boxes welded in place; provide where frames may be grouted.
- D. Glazing Stops: Full flush type with glass centered in opening, unsecured side integral with unit, secured side fastened with flush, countersunk Allen type fasteners; minimum 0.053" (16-gage).
- E. Door Louvers:
 - 1. Interior Doors: Stationary, sight-proof hood or Y type blades of 24-gage steel inserted into door panels full door thickness; no exposed trim.

2. Exterior Doors: Weatherproof Z-shaped blades with U-shaped frames; 1-3/8" thick; blades 1-1/2" on center; 0.053" (16 gage) welded construction.
 - a. Provide removable insect screens on interior faces

2.3 FABRICATION

- A. Conform to requirements of SDI (ANSI A250 Series) or NAAMM.
- B. Reinforce and prepare doors and frames to receive hardware.
 1. Refer to Section 08 71 00 for hardware requirements.
- C. Frames:
 1. Welded Frames: Accurately form and cut mitered corners of welded type frames; continuously weld on inside surfaces (fully welded); grind welded joints to smooth uniform finish.
 2. Knocked Down Frames: Accurately form and miter interlocking joints of knocked down frames to maintain hairline alignment of parts when field assembled.
 3. Head Reinforcement: Reinforce frames wider than 4'-0" with minimum 0.093" (12 gage) formed steel channels welded in place, flush with top of frames.
 4. Doors at Glazed Panels: Reinforce jambs and heads of frames for doors which occur adjacent to glazed sidelights and partitions.
- D. Door Silencers:
 1. Place three single bumpers on single door frames; space equally along strike jambs.
 2. Place two single bumpers on double door frames; place on frame heads.
 3. Place three single bumpers for each door on door frames with removable mullions, spaced equally along strike jambs, and in addition place two single bumpers on frame heads to cushion door when mullion is removed.
- E. Provide jamb anchors per SDI-100 (ANSI/SDI 250.8) and NAAMM; weld floor jamb anchors in place.
- F. Provide double doors tested and approved without astragals.
 1. Provide astragals for double doors when required to meet UL requirements for Class A, 3-hour rated doors only.
- G. Edge Clearances:
 1. Between Doors and Frames: Maximum 1/8" at head and jambs.
 2. Door Sills (No Threshold): Maximum 1/2".
 3. Door Sills (Threshold): Maximum 3/8" above finished floor.
 4. Between Edges of Pairs of Doors: Maximum 1/8".

- H. Finish: Comply with requirements of Section 09 90 00 – Painting and Coating for primer including application and compatibility with specified finishes.
 - 1. Interior Units: Prime paint.
 - 2. Exterior Exposed Units: Apply minimum A60 non-spangle galvanized coating, ASTM A924 and A653.
 - a. Surface treat after galvanizing to remove oils and prepare for painting and apply one coat of primer; comply with requirements in Section 09 90 00.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install doors and frames in accordance with SDI-100 (ANSI/SDI A250.8) and ANSI/SDI A250.11 or NAAMM "Hollow Metal Manual" and with manufacturer's recommendations and installation instructions.
 - 1. Install fire rated units in conformance with fire label requirements and NFPA 80.
- B. Install doors and frames plumb and square within 1/16", and with maximum diagonal distortion of 1/32".
- C. Remove and replace doors and frames damaged during delivery, storage, installation and construction.
 - 1. Paste filler repair shall not be permitted.
- D. After installation, touch-up scratched paint surfaces.

END OF SECTION

SECTION 08 14 00

WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide flush wood doors as indicated.
 - 1. Contractor Option: Provide shop finished wood doors.
- B. Related Work
 - 1. Section 08 71 00: Door hardware.
 - 2. Section 08 80 00: Glazing.

1.2 REFERENCES

- A. North American Architectural Woodwork Standards – 3.1, (NAAWS).
- B. Window and Door Manufacturer's Association (WDMA): Guide Specifications.
- C. Underwriters Laboratories Inc. (UL): Building Materials Directory.
 - 1. Materials tested, labeled and inspected by Warnock Hersey International are acceptable upon approval of authorities.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Hardware: Coordinate hardware installation with Section 08 71 00 – Door Hardware.
 - 2. Glazing: Coordinate glazing with Section 08 80 00 – Glazing.
 - 3. Painting: Coordinate with Section 09 90 00 – Painting and Coating whether wood doors are to be shop finished or field painted.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's literature.
- B. Shop Drawings: Indicate general construction, jointing methods, hardware locations, and locations of cut-outs.
- C. Samples: Submit samples of wood doors indicating construction, veneering, and finish.
 - 1. Submit shop finish for wood doors where doors are furnished shop finished.

- D. Certificates: Submit manufacturer certification indicating compliance to applicable requirements of either NAAWS or WDMA Standards; note which standards were followed or if both standards have been met.

- 1. Wood Product Certification: Furnish certification indicating wood products are from FSC “well-managed” forests.

1.5 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for composite wood products formaldehyde limitations and paints and coatings.
- B. Certified Wood Products: Wood products to be from forests certified “well-managed” by an agency accredited by Forest Stewardship Council (FSC).

1.6 SITE CONDITIONS

- A. Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized in accordance with referenced standards requirements applicable to Project location.

1.7 WARRANTY

- A. Extended Correction Period: Provide for replacing, rehanging, and refinishing wood doors exhibiting defects in materials or workmanship including warp and delamination.
 - 1. Period: Two years.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Algoma Hardwoods, Inc.
- B. Eggers Industries Architectural Door Division.
- C. Marshfield Door Systems, Inc.
- D. VT Industries.
- E. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide flush wood doors as indicated.

- B. Solid Core Flush Wood Doors: NAAWS/Premium Grade, 5 Ply Hot Press, 1-3/4" thick solid wood framed glued block construction or particleboard core five ply construction; Contractor option to use WDMA comparable standards.
 - 1. Transparent/Stained Wood Veneers: NAAWS/Premium Grade veneers for transparent/stained finish; nominal 1/40" thick before sanding, not less than 1/50" after sanding.
 - a. Wood Veneers: Types as indicated, as directed by Architect where not otherwise indicated.
 - 2. Opaque Painted Wood Veneers: NAAWS/Custom Grade White Birch veneers for opaque finish; nominal 1/40" thick before sanding, not less than 1/50" after sanding.
 - 3. Edges: Stile edges to match face veneer, minimum 1-1/8" thick after trim.
 - 4. Core: Bond stiles and rails to core and sand prior to assembly of face veneers.
 - 5. Bond Type: Provide Type II Bond for interior doors.
- C. Hollow Core Flush Wood Doors: NAAWS/Custom Grade, 5 Ply Hot Press, 1-3/8" thick standard hollow core five-ply construction; Contractor option to use WDMA comparable standards.
 - 1. Transparent/Stained Wood Veneers: NAAWS/Premium Grade veneers for transparent/stained finish; nominal 1/40" thick before sanding, not less than 1/50" after sanding.
 - a. Wood Veneers: Types as indicated, as directed by Architect where not otherwise indicated.
 - 2. Opaque Painted Wood Veneers: NAAWS/Custom Grade White Birch veneers for opaque finish; nominal 1/40" thick before sanding, not less than 1/50" after sanding.
 - 3. Edges: Stile edges to match face veneer, minimum 1-1/8" thick after trim.
 - 4. Bond Type: Type II Bond, interior.

2.3 FABRICATION

- A. Fabricate doors in accordance with requirements of specified standards.
 - 1. Pre-fit wood doors.
 - 2. Prepare doors to receive hardware in shop, refer to Section 08 71 00 for hardware requirements and templates.
 - 3. Factory machine doors for mortise hardware.
- B. Bevel strike edge of single-acting doors, 1/8" in 2".

1. Radius strike edge of double-acting swing doors 2-1/8".
- C. Make cut-outs and provide matching wood stops for glass; profiles as indicated, type as selected by Architect where not otherwise indicated.
- D. Shop Finished Doors (Contractor Option): Conform to requirements specified in Section 09 90 00 – Painting and Coating.
 1. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wood doors in accordance with manufacturer's recommendations and installation instructions, and reference standards, plumb and square, and with maximum diagonal distortion of 1/16".
 1. Install fire rated wood doors in accordance with requirements for specified fire label and requirements of NFPA 80.
 - a. Field cutting of fire rated doors shall not be acceptable.
- B. Rehang or replace doors which do not swing or operate freely.

3.2 PROTECTION

- A. Protection: Protect doors as recommended by door manufacturer to ensure doors are without damage at time of Substantial Completion.
 1. Shop Finished Doors: Refinish or replace damaged doors.

END OF SECTION

SECTION 08 31 00

ACCESS DOORS AND PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide access doors set in finished surfaces.
 - 1. Provide access doors and panels as required for access to controls and valves behind finished surfaces.
 - 2. Coordinate with various trades for controls and valves which may be concealed.

1.2 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature.
- B. Shop Drawings: Indicate locations of access doors required but not indicated on Architectural Drawings.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Milcor Inc.
- B. Karp Associates, Inc.
- C. J.L. Industries.
- D. Nystrom Building Products.
- E. Elmdor Manufacturing Co.
- F. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide access doors and panels set in finished surfaces.
- B. Regulatory Requirements: Where doors and panels are in fire rated assemblies provide assemblies listed in Underwriters Laboratories, Inc. "Classified Building Materials Index" for rating shown.
 - 1. Provide UL label on each rated access door.
 - 2. Materials tested, labeled and inspected by Warnock Hersey International are acceptable upon approval of authorities.

- C. Access Doors and Panels: Provide access door and panel assemblies consisting of an integral unit with flush metal doors and panels, complete and ready for installation.
 - 1. Wall Units: Match Milcor/Style M flush panel style; prime painted unless otherwise indicated. Stainless steel at restrooms.
 - 2. Units Mounted in Plaster: Match Milcor/Style K, flush panel style.
 - 3. Gypsum Board Ceilings: Match Milcor/Style ATR recessed panel style to receive gypsum board insert with edges filled and taped.
- D. Frames: Fabricate from not less than 16-gage steel.
- E. Doors: Flush panel type, fabricate from not less than 14-gage steel.
- F. Hinges: Provide continuous piano type hinge.
- G. Locking Devices: Provide flush, key-operated cylinder lock for each access door; provide two keys per lock and key locks alike, custom keying for district standard.
- H. Finish: Finish with manufacturer's factory-applied enamel prime coat applied over phosphate coating on steel.
 - 1. Stainless Steel: at restrooms, provide Type 304 corrosion resistant nonmagnetic stainless-steel access doors and frames.

2.3 FABRICATION

- A. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units which may vary slightly from sizes shown or scheduled.
- B. Fabricate units of continuous welded steel construction; grind welds smooth and flush with adjacent surfaces.
- C. Provide attachment devices and fasteners of type required for specific job conditions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which access doors are to be installed.
 - 1. Do not proceed with work until unsatisfactory conditions are corrected; installation signifies acceptance of conditions.
- B. Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment; coordinate installation with work of other trades.

3.2 INSTALLATION

- A. Comply with manufacturer's installation instructions for access doors.
 - 1. Install fire rated access doors in accordance applicable code requirements and with requirements of NFPA 80.
- B. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.
- C. Adjust hardware and doors after installation for proper operation.

3.3 PROTECTION

- A. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION

SECTION 08 33 00

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide overhead coiling (roll-up) door systems with curtains, guides, counterbalance, hardware, and accessories as required for complete, operational installation.
 - 1. Provide electrical wiring from make-up box to electrical operators and control stations at electrically operated units.
- B. Related Sections:
 - 1. Section 05 50 00: Steel frames at openings.
 - 2. Division 26: Electrical service to make-up box located on electric door operators; empty conduit from control stations to door operators.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's literature.
- B. Shop Drawings: Indicate pertinent dimensioning, general construction, component connections and details, anchorage methods, and hardware locations.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Cornell Iron Works.
- B. The Cookson Co.: Thermiser Max., Low U, Basis of Design
- C. Overhead Door Corp.
- D. Wayne Dalton Corp.
- E. Raynor Garage Doors.
- F. Windsor Door.
- G. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide overhead coiling (roll-up) door systems with curtains, guides, counterbalance, hardware, and accessories.

- B. Regulatory Requirements (Fire Rated Doors): Where indicated provide assemblies that comply with NFPA 80, tested in accordance with ASTM E152, and listed in Underwriters Laboratories (UL) Building Materials Directory, and bearing UL label.
 - 1. Materials tested, labeled and inspected by Warnock Hersey International are acceptable upon approval of authorities.
 - 2. Oversized Doors: Doors exceeding 120-sf or 24-feet in any length, shall have UL "Certificate of Inspection for Oversize Doors", in lieu of label.
- C. Design Criteria
 - 1. Exterior Doors: Design and reinforce to withstand loads as required by applicable codes but not less than minimum 20-psf positive and 15-psf negative wind force.
- D. Overhead Coiling Doors: Fabricate doors of continuous length for width of door without splices.
 - 1. Electrically Operated Doors: Provide complete assembly with electric motor sized as recommended by door manufacturer for size and application indicated.
 - a. Power Failure Backup: Provide overhead concealed crank socket for operation in case of power failure; provide removable crank.
- E. Components:
 - 1. Curtain: Thermariser, 22 gauge, internally insulated slats. Flat-faced interlocking slats, ends of alternate slats fitted with end locks; bottom fitted with angles to provide reinforcement and positive contact with floor when curtain is closed.
 - a. Slats: Galvanized steel
 - 1) Exterior Slat Finish:
 - a. GalvaNex™ Coating System
 - 1) ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation for chemical bonding baked-on base coat and [gray] [baked-on polyester enamel finish coat]
 - 2) Interior Slat Finish:
 - a. GalvaNex™ Coating System
 - 1) ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation for chemical bonding baked-on base coat and [white] baked-on polyester finish coat
 - 2. Curtain Guides: Formed steel angles of required sizes and configurations.
 - 3. Roller Shaft (Counterbalance): Steel pipe and helical steel spring system capable of producing torque to assure easy operation of curtain from any position; adjustable spring tension.
 - 4. Housing: Minimum 24-gage steel, internally reinforced to maintain rigidity and form.
 - 5. Weatherstripping (Exterior Doors): Waterproof and rotproof, resilient type; located along jamb edges, bottom of curtain, and within housing.

6. Metal Finish: Hot dip galvanize minimum G90 and prime paint; do not shop prime surfaces in contact with concrete or requiring field welding; shop prime in one coat; comply with requirements of Section 09 90 00 – Painting and Coating.
 - a. Touch up field welds with zinc-rich primer.
 - b. Other methods of providing protective zinc coating on steel surfaces comparable to G90 hot dip galvanizing will be acceptable.
- F. Hardware: Manufacturer's standard hardware for door types specified.
 1. Locks: Cylindrical.
 - a. Keying: Keyed in accordance with Section 08 71 00 – Door Hardware.
- G. Electric Operators: UL approved; minimum 1/2 HP Class A insulated electric motor; fully enclosed magnetic cross-line reversing starter; with overload protection; voltage as indicated on Electrical Drawings.
 1. Speed: Minimum 2/3' per second, maximum 1' per second.
 2. Control Station: Key operated (open-close-stop) type, for each electric operator, 24-volt circuit, flush mounted.
 - a. Cylinders: Provided in Section 08 71 00 – Door Hardware.
 3. Brake System: Adjustable friction clutch double-shoe brake system actuated by independent full line voltage solenoid controlled by motor starter.
 4. Safety Switches: Located at bottom of doors, full width; electromechanical type; wired to stop or reverse door upon striking object; neoprene covered to provide weather seal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install overhead coiling doors, complete, in accordance with manufacturer's instructions and recommendations.
 1. Install fire rated doors in accordance with requirements for indicated fire label and NFPA Bulletin No. 80.
 2. Coordinate installation of electric operators and controls with electrical service.
- B. Fit, align, lubricate, and adjust complete door assembly level and plumb. Provide smooth operation.

3.2 FIELD QUALITY CONTROL

- A. Test door closing systems operation by smoke detector fire release system.

END OF SECTION

SECTION 08 41 00

ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide aluminum-framed entrances and storefront systems, with stock non-automatic doors, hardware, anchorage, glazing, and accessories as required for complete installation.
- B. Related Sections:
 - 1. Section 07 90 00: Joint Sealants for perimeter sealants and back-up materials
 - 2. Section 08 71 00: Door hardware
 - 3. Section 08 80 00: Glazing

1.2 REFERENCES

- A. American Architectural Metal Manufacturers (AAMA): Aluminum Store Front and Entrance Manual.
- B. Glass Association of North America (GANA): Glazing Manual.
- C. National Association of Architectural Metal Manuf. (NAAMM): Metal Finishes Manual.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Design/Build: Provide special engineering for entrances and storefronts to ensure they comply with applicable codes and Contract Documents.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's literature.
- B. Shop Drawings: Indicate pertinent dimensioning, general construction, component connections and locations, anchor methods and locations, hardware locations, and relevant details.
- C. Samples: Furnish samples of metal finish, glass and glazing gasket.
- D. Design/Build Certificates: Submit certification signed by California licensed structural engineer indicating compliance with Contract Documents and code requirements.

1.5 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to energy efficiency.

- B. Installer Qualifications: Manufacturer or firm with minimum five years successful experience in the installation of systems similar to type and size required for Project and approved by manufacturer.

1.6 WARRANTY

- A. Extended Correction Period: Provide for correcting failures including wind damage and water penetration to interior surfaces, excessive deflections, and deterioration of finishes, weather-stripping and accessories.

- 1. Period: Two years.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Kawneer, an Arconic Company.
- B. Oldcastle Building Envelope.
- C. Arcadia, Inc.
- D. EFCO Corporation.
- E. TRACO.
- F. C.R. Laurence, United States Aluminum Div.
- G. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide aluminum-framed entrances and storefront systems, with stock non-automatic doors, hardware, anchorage, glazing, and accessories.
- B. Regulatory Requirements, General: Comply with requirements of applicable codes.
 - 1. Safety Glass Standard: Comply with applicable codes and CPSC 16 CFR 1201 and pass ANSI Z97.1.
- C. Regulatory Requirements, California Energy Code: Comply with California Energy Commission requirements regarding energy performance of aluminum framed storefronts.
 - 1. Manufacturer shall be responsible for providing information required by authorities necessary to verify conformance.
 - 2. Entire assembly, including glass and glazing, shall be certified by the National Fenestration Rating Council (NFRC) and shall bear NFRC Label indicating energy performance technical information.

- D. Regulatory Requirements, Accessibility: Comply with requirements of California Building Code and Americans with Disabilities Act (ADA) Standards to ensure access to persons with disabilities.
- E. Design Criteria: Comply with recommendations of AAMA Aluminum Store Front and Entrance Manual except where more stringent requirements are specified.
 - 1. Deflection: Maximum $L/175$, ASTM E330.
 - a. Safety Factor: Design for specified pressures with no glass breakage, no permanent damage to fasteners, and no permanent deformation of framing in excess of 0.2% of member clear span.
 - 2. Water Penetration: No uncontrolled water penetration, ASTM E331, with no water on exposed interior components; static pressure differential of 20% of inward wind load, with minimum 6-psf load.
 - 3. Air Leakage: Maximum 0.06 cfm/sf, ASTM E283, at differential static pressure of 6.24-psf at fixed glazing and not more than 0.3 cfm/sf at doors.
- F. Performance Criteria: Design assemblies capable of withstanding minimum uniform test pressures as required by applicable codes when tested in accordance with ASTM E330.
- G. Aluminum-Framed Entrance and Storefront Systems: Systems with profiles as indicated on Drawings; provide extruded aluminum security type glass stops of profile to suit frame design.
 - 1. Aluminum Type: As recommended by manufacturer for application indicated, but not less than extruded aluminum, ASTM B221, 6061 or 6063 alloy and T5 or T6 temper.
 - 2. Finish, High Performance Organic Coating: AA-C12C42R1x, prepared, pretreated, and coated with minimum two coat Kynar 500 or Hylar 5000 system; AAMA 2605.
 - a. Color: As indicated, as selected by Architect from manufacturer's full line of colors (non-metallic), where not indicated.
 - 3. Finish, High Performance Organic Coating: AA-C12C42R1x, prepared, pretreated, and coated with minimum two coat system; AAMA 2605.
 - a. PVDF Manufacturers:
 - 1) Arkema Group/Kynar 500.
 - 2) Solvay/Hylar 5000.
 - 3) Substitutions: Refer to Section 01 25 00.
 - b. Paint Manufacturers:
 - 1) PPG Industries.
 - 2) Valspar Corp.
 - 3) Akzo Nobel.

- 4) Substitutions: Refer to Section 01 25 00.
- 4. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
- 5. Finish, Clear Anodized: Clear anodized coating conforming with NAAMM Metal Finishes Manual, Architectural Class I, 0.7 mil or greater.
- 6. Finish, Color Anodized: Color anodized coating conforming with NAAMM Metal Finishes Manual, Architectural Class I, 0.7 mil or greater.
 - a. Color: As indicated, as directed by Architect where not otherwise indicated.
 - b. Architect reserves right to reject units of color or texture variations which are visually objectionable, but only where variation exceeds range established by manufacturer prior to work.
- H. Doors, Frames, and Hardware: Barrier-free entry doors meeting code requirements for providing access for people with physical disabilities; by entrance manufacturer.
 - 1. Type: Medium stile, nominal 3-1/2" wide stiles and head rail with 10" bottom rail.
 - 2. Metal and Finish: Match entrance system.
 - 3. Hardware: Provide complete hardware system except as indicated; match window wall system finish unless otherwise directed by Architect. Coordinate with Section 08 71 00 – Door Hardware.
 - a. Pivots/Closers: Center-hung pivots with concealed adjustable type closer, maximum 5-pound operating pressure when installed in final application.
 - b. Hinges: Extra heavy-duty ball bearing full mortise (butt) hinges complying with requirements specified in Section 08 71 00.
 - c. Closers: Concealed adjustable type closer, maximum 5-pound operating pressure when installed in final application.
 - d. Push/Pulls: Types as indicated on Drawings; where not otherwise indicated manufacturer's standard types as selected by Architect; match finish of similar hardware as specified in Section 08 71 00.
 - e. Security Locks: Manufacturer's standard.
 - 1) Cylinders: Provided under Section 08 71 00.
 - f. Weather-Stripping, Sweep Strips: Manufacturer's recommended standard type, to suit application.
 - g. Thresholds: Maximum 1/2" height above adjacent surfaces, with maximum 1/4" vertical section and remainder maximum 1:2 slope.
- I. Glass: Provide minimum thicknesses specified, but no less than thicknesses required based on window size and configuration and anticipated wind loading.

1. Manufacturers:
 - a. Vitro Architectural Glass (formerly PPG).
 - b. Oldcastle Glass.
 - c. Guardian Industries Corp.
 - d. Viracon.
 - e. Substitutions: Refer to Section 01 25 00.
2. Float Glass: Select glazing quality, clear float glass, ASTM C1036; nominal thickness 1/4".
3. Tempered Glass: Select glazing quality, clear float glass, fully tempered, ASTM C1048; nominal thickness 1/4"; safety glass.
4. Tinted Glass: Manufacturer's standard tint as directed by Architect.
 - a. Use one thickness of tinted glass throughout unless otherwise indicated or approved in advance by Architect.
5. Spandrel Glass: Double density ceramic frit, heat strengthened spandrel glass; nominal 1/4" thickness.
6. Laminated Glass: ASTM C1172, Kind LA, two sheets of clear float glass laminated with polyvinyl butyral film; safety glass; laminated layers free of air pockets and foreign substances.
 - a. Glass Thickness: Nominal 1/4", unless otherwise indicated.
 - b. Polyvinyl Butyral Core Thickness: Not less than 30 mil.
7. Insulated Glass: Preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space with minus 20-degree F dew point.
 - a. Performance: Certified to ASTM E2190 by Insulating Glass Certification Council.
 - b. System: Manufacturer's standard dual seal system compatible with glazing system, and including spacers, desiccant, and standard corner construction.
 - c. Glass:
 - 1) Float Glass (Typical): Select glazing quality, clear float glass, ASTM C1036; nominal thickness 1/4".
 - 2) Tempered Glass (Where Indicated and Where Safety Glazing is Required): Select glazing quality, clear float glass, fully tempered, ASTM C1048, Kind FT; nominal thickness 1/4"; safety glass.
 - 3) Low Emissivity Coating: Provide high performance low e coating, not less than Vitro (PPG)/SolarBan 60, on Number 2 surface.

- 4) Tinted Glass: As indicated, where not otherwise indicated manufacturer's standard tint as directed by Architect.
 - 5) Use one thickness of tinted glass throughout unless otherwise indicated or approved in advance by Architect.
 - 6) Spandrel Glass: Double density ceramic frit, heat strengthened spandrel glass, ASTM C1048, Kind HS; nominal 1/4" thickness.
- d. Total Unit Thickness: 1".
- J. Glazing Accessories: Of type recommended by manufacturer to suit security locations and applications for dry glazing installation.
1. Setting Blocks: Neoprene or EPDM, 80-90 Shore A durometer hardness; 4" long by 3/8" thick by 1/4" high; ASTM C864.
 2. Spacer Shims: Neoprene or EDPM; 45-55 Shore A durometer hardness; 3" long by 3/32" thick by 1/4" high; ASTM C864.
 3. Edge Blocks: Neoprene or EPDM, 60-70 Shore A durometer hardness; 4" long with minimum two per jamb located at top and bottom edges of glass; ASTM C864.
 4. Glazing Gaskets: Exterior neoprene or EDPM; interior neoprene, EPDM or vinyl; miter corner joints; ASTM C509 or C864.
- K. Miscellaneous Materials:
1. Fasteners: Aluminum or non-magnetic stainless steel of type which will not cause electrolytic action or corrosion.
 - a. Do not use exposed fasteners except where unavoidable for assembly or for application of hardware.
 - b. Indicate exposed fasteners on shop drawings for specific approval; exposed fasteners shall be Phillips flat-head screws or Allen screws with finish matching item fastened.
 - c. Provide concealed fasteners for glazing stops.
 2. Steel Reinforcement and Brackets: Manufacturer's standard with minimum 2 oz. hot-dip zinc coating, ASTM A123, applied after fabrication.
 3. Bituminous Paint: Cold-applied mastic, SSPC Paint 12, compounded for 30 mil thickness per coat.
 4. Flashing: Provide sub-sill flashing members; minimum 22 gage sheet aluminum of sizes and shapes indicated and as required to drain water to exterior; match adjacent aluminum member finish.

5. Anchoring Devices: Corrosion resistant type capable of supporting entrance system and superimposed design loads; design to allow adjustments of system prior to being permanently fastened in place.

2.3 FABRICATION

- A. Fabricate aluminum entrance and storefront system to allow for clearances and shim spacing around perimeter of assemblies to enable installation; provide for thermal movement.
- B. Provide anchorage devices to securely and rigidly fit entrance assemblies in place.
- C. Non-Automatic Doors: Comply with California Building Code and Americans with Disabilities Act (ADA) Standards relating to access for persons with disabilities.
 1. Clear Opening Width: Minimum 32" clear opening width for each door.
- D. Accurately fit together joints and corners; match components ensuring continuity of line and design; ensure joints and connections are flush, hairline and weatherproof.
- E. Provide structural reinforcing within framing members where required to maintain rigidity and as required to accommodate design loads.
- F. Allow moisture entering joints and condensation occurring within frame construction to drain to exterior.
- G. Complete cutting, fitting, forming, drilling and grinding of metal work prior to cleaning, finishing, treatment, and application of coating.
- H. Finishing: After fabrication, prepare surfaces for finishing in accordance with recommendations of aluminum producer and finish manufacturer.
 1. Finish components of each assembly simultaneously to attain uniformity of color.
- I. Weld by methods recommended by metal manufacturer and AWS; grind exposed welds smooth and restore mechanical finish; remove arises from cut edges and corners to a radius of approximately 1/64".
- J. Fit and assemble work at shop to greatest extent possible; disassemble only as required for shipment and erection.
- K. Reinforce work as necessary for performance requirements and for support.
- L. Provide internal reinforcing for hardware.
- M. Separate dissimilar materials with bituminous paint or preformed separators which will prevent corrosion.
- N. Separate metal surfaces at moving joints with plastic inserts or other non-abrasive concealed inserts which permanently prevent "freeze-up" of joint.
- O. Fabricate doors and apply hardware in shop. Disassemble only as required for transportation and installation.

- P. Apply coat of bituminous paint on concealed aluminum surfaces to be in contact with cementitious and with dissimilar materials.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install aluminum framed storefront assemblies, including entrances, in accordance with manufacturer's recommendations and installation instructions and to meet design criteria and performance criteria indicated, for weather-tight installation.
 - 1. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- B. Ensure assemblies are plumb, level and free of warp or twist; maintain dimensional tolerances and alignment with adjacent work.
 - 1. Maximum Variation from Plane or Location: 1/8" in 12'-0", with maximum 1/2" variation in total length.
 - 2. Maximum Offset Between Members: 1/16".
- C. Use sufficient anchorage devices to securely and rigidly fasten assemblies to building.
- D. Install hardware in accordance with manufacturer's recommendations, using proper templates.
 - 1. Install doors to operate freely and smoothly, with a maximum operating pressure of 5 pounds in accordance with California Building Standards Code.
 - 2. Coordinate installation of cylinders with Section 08 71 00 – Door Hardware.
 - 3. Install sill members and thresholds in bed of compound, joint fillers or gaskets to provide weathertight construction.
- E. Glass Installation: Comply with GANA Glazing Manual and glazing manufacturer instructions.
 - 1. Do not allow glass to touch metal surfaces.

3.2 CLEANING

- A. Clean aluminum surfaces promptly after installation of components, exercising care to avoid damage of finish.
- B. Mark glass after installation by crossed streamers attached to framing and held away from glass; do not apply markers to surface of glass.
- C. Remove nonpermanent labels immediately after sealant cures; cure sealants for high early strength and durability.

3.3 PROTECTION

- A. Remove and replace glass which is broken, chipped, cracked, abraded or damaged during construction period, including natural causes, accidents and vandalism.

END OF SECTION

SECTION 08 62 10

TUBE SKYLIGHTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide tube type factory fabricated acrylic glazed skylights, with tube connecting exterior acrylic or polycarbonate dome, tubing, interior ceiling diffuser, flashing, and accessories for complete, weathertight installation.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's literature.

1.3 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to energy efficiency.

1.4 WARRANTY

- A. Extended Correction Period: Repair or replace tube skylights which leak or fail to comply with specified requirements.
 - 1. Period: Two years.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Solatube International, Inc./Solatube.
- B. Daylighting Technologies, Inc./Sun-Dome.
- C. Sun-Tek Manufacturing, Inc./Tube Skylights.
- D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide tube type factory fabricated acrylic glazed skylights, with tube connecting exterior acrylic or polycarbonate dome, tubing, interior ceiling diffuser, flashing, and accessories.
- B. Performance Requirements: Fabricate and install components capable of withstanding thermal expansion and contraction movements for ambient temperatures from 20-110 degrees F. without failure, leaks, or noise.

- C. Design Requirements: Fabricate and install skylights capable of withstanding California Building Code required loads acting on skylight without failure, leaks, or permanent distortion.
- D. Tube Skylights: Provide manufacturer's standard tube skylights as indicated.
 - 1. Diameter: 16".
 - 2. Construction: Manufacturer's standard construction for tube skylights.
 - 3. Options: Provide as indicated, as recommended by skylight manufacturer and as indicated.
 - a. Light Kit: Provide manufacturer's standard UL approved light kit including switches matching building light switches.
 - b. Ventilation Kit: Provide manufacturer's standard UL approved ventilation kit capable of moving air at up to 150 cubic feet per minute.
 - c. Accessories: Provide as indicated and as required for complete operational installation as indicated; comply with applicable UL listings and applicable codes.
- E. Fasteners: Aluminum, cadmium-plated steel, or austenitic stainless steel.
 - 1. Provide anodic corrosion isolation where required and provide neoprene washer or gasket where fastener penetration is subject to water penetration.
- F. Corrosion Isolation: Bitumastic paint of alkali-resistant type with minimum 15-mil dry-film thickness.

2.2 FABRICATION

- A. Fabricate skylights to profiles and dimensions indicated.
- B. Fabricate skylights with integral flashing for mounting on substrates indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install special tube skylights in accordance with manufacturer's recommendations and installation instructions.
- B. Set units plumb and true to line without warp or rack.
- C. Anchor securely to curbs with manufacturer's recommended fasteners and with neoprene-gasket heads.
- D. Provide heavy coat of bituminous paint on aluminum surfaces in contact with dissimilar materials.

3.2 CLEANING

- A. Clean aluminum and glazed surfaces in accordance with manufacturer's instructions.
 - 1. Glazing Plastic: Leave in scratch-free condition, inside and out, with labels removed.
- B. Repair or replace damaged units, including those with excessive scratches on acrylic, as determined by Architect.

END OF SECTION

**SECTION 08 71 00
DOOR HARDWARE**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Door hardware.
 - 2. Storefront and entrance door hardware.
 - 3. Cylinders for doors fabricated with locking hardware.
- B. Related Divisions:
 - 1. Division 06 – door hardware installation
 - 2. Division 07 – Section “Joint Sealants” for sealant requirements applicable to threshold installation specified in this section.
 - 3. Division 08 – metal doors and frames, wood doors, storefront and glazed curtainwall systems.
 - 4. Division 10 – operable partitions.
- C. Specific Omissions: Hardware for the following is specified or indicated elsewhere.
 - 1. Windows.
 - 2. Cabinets, including open wall shelving and locks.
 - 3. Signs.
 - 4. Toilet accessories, including grab bars.
 - 5. Installation.
 - 6. Rough hardware.
 - 7. Access doors and panels.

1.2 REFERENCES:

- A. Use date of standard in effect as of Bid date.
 - 1. American National Standards Institute
 - a) ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties.
 - 2. BHMA – Builders Hardware Manufacturers Association
 - 3. 2022 California Building Code.
 - a) Chapter 11B – Accessibility To Public Buildings, Public Accommodations, Commercial Buildings and Public Housing.
 - 4. DHI – Door and Hardware Institute.
 - 5. UL – Underwriters Laboratories
 - a) UL 305 – Panic Hardware
 - 6. WHI – Warnock Hersey Incorporated State of California Building Code
 - 7. Local applicable codes
 - 8. SDI – Steel Door Institute

9. WI – Woodwork Institute
10. AWI – Architectural Woodwork Institute
11. NAAMM – National Association of Architectural Metal Manufacturers

B. Abbreviations

1. Manufacturers: see table at 2.1.A of this section.
2. Finishes: see 2.7 of this section.

1.3 SUBMITTALS & SUBSTITUTIONS

- A. **SUBMITTALS:** Submit electronic copy of schedule. Organize vertically formatted schedule into “Hardware Sets” with index of doors and headings, indicating complete designations of every item required for each door or opening. Minimum 10pt font size. Include following information:
1. Type, style, function, size, quantity, and finish of hardware items.
 2. Use BHMA Finish codes per ANSI A156.18.
 3. Name, part number and manufacturer of each item.
 4. Fastenings and other pertinent information.
 5. Location of hardware set coordinated with floor plans and door schedule.
 6. Explanation of abbreviations, symbols, and codes contained in schedule.
 7. Mounting locations for hardware.
 8. Door and frame sizes, materials, and degrees of swing.
 9. List of manufacturers used and their nearest representative with address and phone number.
 10. Catalog cuts.
- B. Bid and submit manufacturer’s updated/improved item if scheduled item is discontinued.
- C. **Deviations:** Highlight, encircle or otherwise identify deviations from “Schedule of Finish Hardware” on submittal with notations clearly designating those portions as deviating from this section.
- D. If discrepancy between drawings and scheduled material in this section, bid the more expensive of the two choices, note the discrepancy in the submittal and request direction from Architect for resolution.
- E. **Substitutions per Division 1.** Include product data and indicate benefit to the Project. Furnish operating samples on request.
- F. Items listed with no substitute manufacturers have been requested by Owner to meet existing standard.
- G. **Furnish as-built/as-installed schedule** with closeout documents, including keying schedule, riser and point-to-point wiring diagrams, manufacturers’ installation, adjustment and maintenance information, and supplier’s final inspection report.

1.4 QUALITY ASSURANCE:

A. Qualifications:

1. **Hardware supplier:** direct factory contract supplier who employs a hardware consultant, available at reasonable times during course of work for project hardware consultation to Owner, Architect and Contractor.

- a) Responsible for detailing, scheduling, and ordering of finish hardware. Detailing implies that the submitted schedule of hardware is correct and complete for the intended function and performance of the openings.
- B. Hardware: Free of defects, blemishes, and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges, and closers) from one manufacturer.
- C. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
- D. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions and code requirements.

1.5 DELIVERY, STORAGE AND HANDLING:

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

1.6 PROJECT CONDITIONS AND COORDINATION:

- A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect's approval.
- B. Coordination: Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents. Furnish related trades with the following information:
 - 1. Location of embedded and attached items to concrete.
 - 2. Location of wall-mounted hardware, including wall stops. Note: Careful coordination required for reinforcement/blocking for wall stop support. If random inspection yields an unsupported wall stop, all locations will be rebuilt at no expense to the Owner or Architect.
 - 3. Location of finish floor materials and floor-mounted hardware.

4. At masonry construction, coordinate with the anchoring and hollow metal supplier prior to frame installation by placing a strip of insulation, wood, or foam, on the back of the hollow metal frame behind the rabbet section for continuous hinges, as well as at rim panic hardware strike locations, silencers, coordinators, and door closer arm locations. When the frame is grouted in place, the backing will allow drilling and tapping without dulling or breaking the installer's bits.
5. Locations for conduit and raceways as needed for electrical, electronic, and electro-pneumatic hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
6. Coordinate: flush top rails of doors at out swinging exteriors, and throughout where adhesive-mounted seals occur.
7. Manufacturers' templates to door and frame fabricators.
- C. Check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation.
- D. Environmental considerations: segregate unused recyclable paper and paper product packaging, uninstalled metals, and plastics, and have these sent to a recycling center.

1.7 WARRANTY:

- A. Part of respective manufacturers' regular terms of sale. Provide manufacturers' written warranties.
- B. Include factory order numbers with close-out documents to validate warranty information, required for Owner in making future warranty claims:
- C. Minimum warranties:
 1. Mortise Locksets: Ten years mechanical
 2. Exit Devices: Ten years mechanical
 3. Closers: Twenty five years mechanical
 4. Hinges: One year
 5. Other Hardware Two years

1.8 COMMISSIONING:

- A. Conduct these tests prior to request for certificate of substantial completion:
 1. With installer present, test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.

1.9 REGULATORY REQUIREMENTS:

- A. Locate latching hardware between 34 inches to 44 inches above the finished floor, per-2022 California Building Code, Section 11B-404.2.7.
 1. Panic hardware: locate between 36 inches to 44 inches above the finished floor.

- B. Handles, pull, latches, locks, other operable parts:
 - 1. Readily openable from egress side with one hand and without tight grasping, tight pinching, or twisting of the wrist to operate. 2022 California Building Code Section 11B-309.4.
 - 2. Force required to activate the operable parts: 5.0 pounds maximum, per 2022 California Building Code Section 11B-309.4.
- C. Adjust doors to open with not more than 5.0-pounds pressure to open at exterior doors and 5.0-pounds at interior doors. As allowed per 2022 California Building Code Section 11B-404.2.9, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15-pounds.
 - 1. Exception: exterior doors' pressure-to-open may be increased to 8.5-pounds if: at a single location, and one of a bank of eight leaves or fraction of eight, and one leaf of this bank is fitted with a low- or high-energy operator.
- D. Adjust door closer sweep periods so that from an open position of 90 degrees, the door will take at least 5 seconds to move to a point 12 degrees from the latch, measured to the landing side of the door, per 2022 California Building Code Section 11B-404.2.8.
- E. Smooth surfaces at bottom 10 inches of push sides of doors, facilitating push-open with wheelchair footrests, per 2022 California Building Code Section 11B-404.2.10.
 - 1. Applied kickplates and armor plates: bevel the left and right edges; free of sharp or abrasive edges. Cavities created by kickplates to be capped per 2022 California Building Code Section 11B-404.2.10.
 - 2. Tempered glass doors without stiles: bottom rail may be less than 10 inches if top leading edge is tapered 60 degrees minimum.
- F. Door opening clear width no less than 32 inches, measured from face of frame stop, or edge of inactive leaf of pair of doors, to door face with door opened to 90 degrees. Hardware projection not a factor in clear width if located above 30 inches and below 80 inches, and the hardware projects no more than 4 inches. 2022 California Building Code Section 11B-404.2.3.
 - 1. Exception: In alterations, a projection of 5/8 inch (15.9 mm) maximum into the required clear width shall be permitted for the latch side stop.
 - 2. Door closers and overhead stops: not less than 78 inches above the finished floor or ground, per 2022 California Building Code 11B-307.4.
- G. Thresholds: floor or landing no more than 0.50 inches below the top of the threshold of the doorway, per 2022 California Building Code Section 11B-404.2.5. Vertical rise no more than 0.25 inches, change in level between 0.25 inches and 0.50 inches: beveled to slope no greater than 1:2 (50 percent slope). 2022 California Building Code Section 11B-303.2 & ~.3.
- H. Floor stops: Do not locate in path of travel. Locate no more than 4 inches from walls, per DSA Policy #99-08 (Access).
- I. Pairs of doors with independently activated hardware both leaves: limit swing of right-hand or right-hand-reverse leaf to 90 degrees to protect persons reading wall-mounted tactile signage, per 2022 California Building Code Section 11B-703.4.2.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

- A. Listed acceptable alternate manufacturers: these will be considered; submit for review products with equivalent function and features of scheduled products.

ITEM:	MANUFACTURER:	ACCEPTABLE ALTERNATE:
Hinges	(IVE) Ives	Stanley,
Key System	(BES) Best	Owner standard
Mechanical Locks	(SCH) Schlage	Owner standard
Exit Devices	(VON) Von Duprin	Owner standard
Closers	(LCN) LCN	Owner standard
Auto Flush Bolts	(TRM) Trimco	DCI, Ives
Coordinators	(TRM) Trimco	DCI, Ives
Push & Pull Plates	(TRM) Trimco	DON, Ives
Kickplates	(TRM) Trimco	Ives, DON
Stops & Holders	(TRM) Trimco	Ives, ABH
Overhead Stops	(GLY) Glynn-Johnson	ABH
Thresholds	(ZER) Zero	NGP, Reese
Seals & Bottoms	(ZER) Zero	NGP, Reese

2.2 HINGING METHODS:

- A. Drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.
- B. Conform to manufacturer's published hinge selection standard for door dimensions, weight and frequency, and to hinge selection as scheduled. Where manufacturer's standard exceeds the scheduled product, furnish the heavier of the two choices, notify Architect of deviation from scheduled hardware.
- C. Conventional Hinges: Steel or stainless-steel pins and approved bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.
1. Out-swinging exterior doors: non-ferrous with non-removable (NRP) pins and security studs.

2. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.

2.3 LOCKSETS, LATCHSETS, DEADBOLTS:

- A. Mortise Locksets and Latchsets: as scheduled.
 1. Chassis: cold-rolled steel, handing field-changeable without disassembly.
 2. Universal lock case – 10 functions in one case.
 3. Floating mounting tabs automatically adjusts to fit a beveled door edge.
 4. Latchbolts: 0.75 inch throw stainless steel anti-friction type.
 5. Lever Trim: through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable.
 - a) Spindles: security design independent breakaway. Breakage of outside lever does not allow access to inside lever's hubworks to gain wrongful entry.
 - b) Inside lever applied by screwless shank mounting – no exposed trim mount screws.
 - c) Levers rotate up or down for ease of use.
 6. Furnish solid cylinder collars with wave springs. Wall of collar to cover rim of mortise cylinder.
 7. Turnpieces: accessible offset turn-lever design not requiring pinching or twisting motions to operate.
 8. Strikes: 16 gage curved steel, bronze or brass with 1-inch-deep box construction, lips of sufficient length to clear trim and protect clothing.
 9. Scheduled Lock Series and Design: Schlage L series, 03A design.
 10. Certifications:
 - a) ANSI A156.13, 1994, Grade 1 Operational.
 - b) ANSI/ASTM F476-84 Grade 31 UL Listed.
 11. Accessibility: Require not more than 5 lb to retract the latchbolt or deadbolt, or both, per CBC 2022 11B-404.2.7 and 11B-309.4.
 12. Accepted substitutions: None.

2.4 EXIT DEVICES / PANIC HARDWARE

- A. General features:
 1. Independent lab-tested 1,000,000 cycles.
 2. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
 3. Deadlocking latchbolts, 0.75-inch projection.
 4. End caps: impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
 5. No exposed screws to show through glass doors.
 6. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.

7. Accessibility: Require not more than 5 lb. to retract the latchbolt, per CBC 2022 11B-404.2.7 and 11B-309.4.

- a) Mechanical method: Von Duprin "AX - feature", where touchpad directly retracts the latchbolt with 5 lb. or less of force. Provide testing lab certification confirming that the mechanical device is independent third-party tested to meet this 5 lb. requirement.

B. Specific features:

1. Non-Fire Rated Devices: cylinder dogging with security indicator.
2. Lever Trim: breakaway type, forged brass or bronze escutcheon min. 0.130-inch thickness, compression spring drive, match lockset lever design.
3. Removable Mullions: Removable with single turn of building key. Securely reinstalled without need for key. Furnish storage brackets for securely stowing the mullion away from the door when removed.
4. Accepted substitutions: None.

2.5 CLOSERS

A. Surface Closers: 4040XP

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with cast aluminum cylinder.
3. Closer Body: 1-1/2-inch (38 mm) diameter with 11/16-inch (17 mm) diameter heat-treated pinion journal and full complement bearings.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and all weather requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back check.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide stick on templates, special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.
9. Accepted substitutions: None.

2.6 OTHER HARDWARE

- A. Automatic Flush Bolts: Low operating force design.
- B. Overhead Stops: Non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
- C. Kick Plates: Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.
- D. Door Stops: Provide stops to protect walls, casework, or other hardware.

1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.
 2. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum: 90deg stop / 95deg dead stop. Note degree of opening in submittal.
- E. Seals: Four-fingered type at head & jambs. Inelastic, rigid back, not subject to stretching. Self-compensating for warp, thermal bow, door settling, and out-of-plumb. Adhesive warranted for life of installation.
1. Proposed substitutions: submit for approval.
 2. Three-fingered type at hinge jambs of doors fitted with continuous hinges where jamb leaf of hinge is fastened to the frame reveal.
- F. Thresholds: As scheduled and per details. Comply with CBC 2022 11B-404.2.5. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval.
1. Saddle thresholds: 0.125 inches minimum thickness.
 2. Exteriors: Seal perimeter to exclude water and vermin. Use sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Minimum 0.25-inch diameter fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors. National Guard Products' "COMBO" or Pemko Manufacturing's "FHSL".
 3. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.
 4. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full thread. Sleeve nuts: full length to prevent door compression.
- G. Through-bolts: Do not use. Coordinate with wood doors; ensure provision of proper blocking to support wood screws for mounting panic hardware and door closers. Coordinate with metal doors and frames; ensure provision of proper reinforcement to support machine screws for mounting panic hardware and door closers.
1. Exception: surface-mounted overhead stops, holders, and friction stays.
- 2.7 FINISH:
- A. Generally: BHMA 626 Satin Chromium.
1. Areas using BHMA 626: furnish push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise scheduled.
- B. Door closers: factory powder coated to match other hardware, unless otherwise noted.

2.8 KEYING REQUIREMENTS:

- A. Key System: (Best key system). Key blanks available only from factory-direct sources, not available from after-market key blank manufacturers. For estimate use factory GMK charge. Initiate and conduct meeting(s) with Owner to determine system keyway(s). Furnish Owner's written approval of the system; do not order keys or cylinders without written confirmation of actual requirements from the Owner. Contractor will install permanent cylinders/cores.
- B. Keys
 - 1. Existing factory registered master key system.
 - 2. Construction keying: furnish temporary keyed-alike cores. Remove at substantial completion and install permanent cylinders/cores in Owner's presence. Demonstrate that construction key no longer operates.
 - 3. Furnish 10 construction keys.
 - 4. Furnish 2 construction control keys.
 - 5. Furnish 2 Emergency keys per each L9485 Faculty Restroom Lock
- C. Key Cylinders: Best, 7-pin solid brass construction.
- D. Cylinder cores: furnish keyed at factory of lock manufacturer where permanent records are maintained. Locks and cylinders same manufacturer.
- E. Permanent keys: use secured shipment direct from point of origination to Owner.
 - 1. For estimate: 3 keys per change combination, 5 master keys per group, 5 grand-master keys, 3 control keys.
 - 2. For estimate: VKC stamping plus "DO NOT DUPLICATE".
 - 3. Bitting List: use secured shipment direct from point of origination to Owner upon completion.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS:

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

3.2 PREPARATION:

- A. Ensure that walls and frames are square and plumb before hardware installation. Make corrections before commencing hardware installation. Installation denotes acceptance of wall/frame condition.
- B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.
 - 1. Notify Architect of code conflicts before ordering material.
 - 1. Locate latching hardware between 34 inches to 44 inches above the finished floor, per California Building Code, Section 1008.1.9.2 and 11B-404.2.7.

2. Locate panic hardware between 36 inches to 44 inches above the finished floor.
- C. Overhead stops: before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.

3.3 INSTALLATION

- A. Install hardware per manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.
 1. Gaskets: install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
 2. Use manufacturers' fasteners furnished with hardware items or submit Request for Substitution with Architect.
 3. Replace fasteners damaged by power-driven tools.
- B. Locate floor stops no more than 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.
- C. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers shall not be visible in corridors, lobbies and other public spaces unless approved by Architect.
- D. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- E. Locate overhead stops for minimum 90 degrees at rest and for maximum allowable degree of swing.
- F. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants".
- G. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- H. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- I. Drill pilot holes for fasteners in wood doors and/or frames.

3.4. ADJUSTING

- A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.
 1. Hardware damaged by improper installation or adjustment methods: repair or replace to Owner's satisfaction.
 2. Adjust doors to fully latch with no more than 1 pound of pressure.

- a) Door closer valves: turn valves clockwise until at bottom – do not force. Turn valves back out one and one-half turns and begin adjustment process from that point. Do not force valves beyond three full turns counterclockwise.
- 3. Adjust door closers per 1.9 this section.
- B. Final inspection: Installer to provide letter to Owner that upon completion installer has visited the Project and has accomplished the following:
 - 1. Has re-adjusted hardware.
 - 2. Has evaluated maintenance procedures and recommend changes or additions and instructed Owner's personnel.
 - 3. Has identified items that have deteriorated or failed.
 - 4. Has submitted written report identifying problems.
- 3.5 DEMONSTRATION:
 - A. Demonstrate mechanical hardware and electrical, electronic, and pneumatic hardware systems, including adjustment and maintenance procedures.
- 3.6 PROTECTION/CLEANING:
 - A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.
 - B. Clean adjacent wall, frame and door surfaces soiled from installation / reinstallation process.
- 3.7 SCHEDULE OF FINISH HARDWARE
 - A. See door schedule in drawings for hardware set assignments.
 - B. Do not order material until submittal has been reviewed, stamped, and signed by Architect's door hardware consultant.
 - C. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

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142257 OPT0458425 Version 1

Legend:

📄 Link to catalog cut sheet

⚡ Electrified Opening

Hardware Group No. 1.0

For use on Door #(s):

102

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112XY EPT	628	IVE
1	EA	POWER TRANSFER	EPT10 CON	⚡ 689	VON
1	EA	RIM CYLINDER	1E72	626	BES
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-NL-OP-4'-110MD 24 VDC	⚡ 626	VON
1	EA	LOCKDOWN SWITCHES	432KLDUR	630	SDC
1	SET	LADDER PULL	AP421 X 72" (SQUARE END) ONE SIDE ONLY	630	TRM
1	EA	OH STOP	100S	630	GLY
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	547A OR DETAILED	A	ZER
1	EA	DOOR CONTACT	679 SERIES	⚡ BLK	SCE
1	EA	POWER SUPPLY	PS902 900-2RS	⚡	VON

WEATHER SEAL BY ALUMINUM DOOR AND FRAME MANUFACTURER

CARD READER AND WIRING BY ACCESS CONTROL SYSTEM

LOCKDOWN KEY SWITCH

LADDER PULL

Hardware Group No. 2.0

For use on Door #(s):

109

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	RIM CYLINDER	1E72	626	BES
1	EA	PANIC HARDWARE	LD-PA-AX-98-NL-OP-110MD	626	VON
1	EA	ANTI VANDAL PULL	1097 VD98-99 (NL-OP)	630	TRM
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	SET	SET SEAL	429AA-S (@ HEAD & JAMBS)	AA	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	547A OR DETAILED	A	ZER

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Hardware Group No. 3.0

For use on Door #(s):

111A 112A 114 128

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	✓ 689	VON
1	EA	MORTISE CYLINDER	1E74 X SCHLAGE CAM	626	BES
1	EA	EU MORTISE LOCK	L9092LEU 03A RX CON 12/24 VDC	✓ 626	SCH
1	EA	LOCKDOWN SWITCHES	432KLDUR	630	SDC
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	SET	SET SEAL	429AA-S (@ HEAD & JAMBS)	AA	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	547A OR DETAILED	A	ZER
1	EA	WIRE HARNESS	CON X LENGTH AS REQ'D	✓	SCH
1	EA	WIRE HARNESS	CON-6W	✓	SCH
1	EA	DOOR CONTACT	679 SERIES	✓ BLK	SCE
1	EA	POWER SUPPLY	PS902 120/240 VAC	✓	VON

CARD READER AND WIRING BY ACCESS CONTROL SYSTEM
LOCKDOWN KEY SWITCH

Hardware Group No. 4.0

For use on Door #(s):

115

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW SH 4.5 X 4.5 NRP	630	IVE
1	SET	AUTO FLUSH BOLT	3800 SERIES	626	TRM
1	EA	MORTISE CYLINDER	1E74 X SCHLAGE CAM	626	BES
1	EA	STOREROOM LOCK	L9080L 03A	626	SCH
1	EA	CYLINDER GUARD	K-24	626	KEE
1	EA	DUST PROOF STRIKE	3910/3910N /3911	630	TRM
1	EA	COORDINATOR X FILLER BAR X BRACKETS	3094 SERIES	600	TRM
2	EA	MOUNTING BRACKET	3095/3096	689	TRM
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	SET	SET SEAL	429AA-S (@ HEAD & JAMBS)	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	OVERLAPPING ASTRAGAL	44STST 188SBK PSA	STST	ZER
1	EA	THRESHOLD	547A OR DETAILED	A	ZER

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Hardware Group No. 5.0

For use on Door #(s):

113A 118

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	MORTISE CYLINDER	1E74 X SCHLAGE CAM	626	BES
1	EA	STOREROOM LOCK	L9080L 03A	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	SET	SET SEAL	429AA-S (@ HEAD & JAMBS)	AA	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	547A OR DETAILED	A	ZER

Hardware Group No. 6.0

For use on Door #(s):

116 117

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	MORTISE CYLINDER	1E74 X SCHLAGE CAM	626	BES
1	EA	PRIVACY W/DB & IND	L9496L 03A 09-544 XL11-986	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	SET	SET SEAL	429AA-S (@ HEAD & JAMBS)	AA	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	103A OR AS DETAILED	A	ZER

Hardware Group No. 7.0

For use on Door #(s):

110

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	✓ 689	VON
1	EA	MORTISE CYLINDER	1E74 X SCHLAGE CAM	626	BES
1	EA	EU MORTISE LOCK	L9092LEU 03A RX CON 12/24 VDC	✓ 626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	GASKETING	188FSBK PSA	BK	ZER
1	EA	WIRE HARNESS	CON X LENGTH AS REQ'D	✓	SCH
1	EA	WIRE HARNESS	CON-6W	✓	SCH
1	EA	DOOR CONTACT	679 SERIES	✓ BLK	SCE
1	EA	POWER SUPPLY	PS902 120/240 VAC	✓	VON

CARD READER AND WIRING BY ACCESS CONTROL SYSTEM

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Hardware Group No. 8.0

For use on Door #(s):

106

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	MORTISE CYLINDER	1E74 X SCHLAGE CAM	626	BES
1	EA	STOREROOM LOCK	L9080L 03A	626	SCH
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	WALL BUMPER	1270CV	626	TRM
1	EA	GASKETING	188FSBK PSA	BK	ZER

Hardware Group No. 9.0

For use on Door #(s):

113B

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1HW SH 4.5 X 4.5 NRP	630	IVE
1	SET	AUTO FLUSH BOLT	3800 SERIES	626	TRM
1	EA	MORTISE CYLINDER	1E74 X SCHLAGE CAM	626	BES
1	EA	STOREROOM LOCK	L9080L 03A	626	SCH
1	EA	DUST PROOF STRIKE	3910/3910N /3911	630	TRM
1	EA	COORDINATOR X FILLER BAR X BRACKETS	3094 SERIES	600	TRM
2	EA	MOUNTING BRACKET	3095/3096	689	TRM
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	K0050 10" X 1" LDW	630	TRM
2	EA	SILENCER	1229		TRM
1	EA	OVERLAPPING ASTRAGAL	44STST 188SBK PSA	STST	ZER

Hardware Group No. 10.0

For use on Door #(s):

103

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	MORTISE CYLINDER	1E74 X SCHLAGE CAM	626	BES
1	EA	OFFICE/ENTRY LOCK	L9050L 03A 09-544	626	SCH
1	EA	WALL BUMPER	1270CV	626	TRM
1	EA	GASKETING	188FSBK PSA	BK	ZER

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Hardware Group No. 10.2

For use on Door #(s):

104

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	MORTISE CYLINDER	1E74 X SCHLAGE CAM	626	BES
1	EA	CLASSROOM LOCK	L9070L 03A	626	SCH
1	EA	WALL BUMPER	1270CV	626	TRM
1	EA	GASKETING	188FSBK PSA	BK	ZER

Hardware Group No. 11.0

For use on Door #(s):

111B

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	MORTISE CYLINDER	1E74 X SCHLAGE CAM	626	BES
1	EA	CLASSROOM LOCK	L9070L 03A	626	SCH
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	FLOOR STOP	1211	626	TRM
1	EA	GASKETING	188FSBK PSA	BK	ZER
1	EA	DOOR BOTTOM	355AA	AA	ZER
1	EA	THRESHOLD	547A OR DETAILED	A	ZER

Hardware Group No. 11.2

For use on Door #(s):

112B

112D

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	MORTISE CYLINDER	1E74 X SCHLAGE CAM	626	BES
1	EA	CLASSROOM LOCK	L9070L 03A	626	SCH
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	WALL BUMPER	1270CV	626	TRM
1	EA	GASKETING	188FSBK PSA	BK	ZER
1	EA	DOOR BOTTOM	355AA	AA	ZER
1	EA	THRESHOLD	547A OR DETAILED	A	ZER

180 DEGREE SWING

DOOR CLOSER TO BE MOUNTED ON PUSH SIDE

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Hardware Group No. 11.3

For use on Door #(s):

112C

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	MORTISE CYLINDER	1E74 X SCHLAGE CAM	626	BES
1	EA	CLASSROOM LOCK	L9070L 03A	626	SCH
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	FLOOR STOP	1211	626	TRM
1	EA	GASKETING	188FSBK PSA	BK	ZER

Hardware Group No. 12.0

For use on Door #(s):

105

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCK	L9040 03A 09-544	626	SCH
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	MOP PLATE	K0050 4" X 1" LDW	630	TRM
1	EA	WALL BUMPER	1270CV	626	TRM
1	EA	GASKETING	188FSBK PSA	BK	ZER

Hardware Group No. 13.0

For use on Door #(s):

108

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	L9010 03A	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	GASKETING	188FSBK PSA	BK	ZER

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Hardware Group No. 14.0

For use on Door #(s):

G1 G2 G3

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	RIM CYLINDER	1E72	626	BES
1	EA	PANIC HARDWARE	OUT-PA-AX-98-NL-OP-110MD-WH	626	VON
1	EA	ANTI VANDAL PULL	1097 VD98-99 (NL-OP)	630	TRM
1	EA	GATE CLOSER/HINGE	MAMOTH180-ZILV		LOX
1	EA	KICK PLATE	K0050 10" X 2" LDW	630	TRM
1	EA	FLOOR STOP	7280	630	TRM

EXIT GATE

GATE FABRICATOR TO PROVIDE HINGE REINFORCEMENT FOR HINGE CLOSER AND RIM PANIC REINFORCEMENT AND MOUNTING PLATE

Hardware Group No. 15.0

For use on Door #(s):

111R 113R 114R

Provide each RU door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
ALL HARDWARE BY ROLL UP DOOR MANUFACTURER					

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Provide miscellaneous glass and glazing not provided elsewhere including accessories as required for complete installation.
 - a. Provide glazing for metal doors and frames.
 - b. Provide glazing for aluminum frames.
 - c. Provide glazing for wood doors.

B. Related Sections:

1. Section 08 11 10: Hollow metal doors
2. Section 08 14 00: Wood doors
3. Section 08 41 00: Glazed storefront assemblies glazing.

1.2 REFERENCES

- A. Glass Association of North America (GANA): Glazing Manual and Sealant Manual.**

1.3 SUBMITTALS

- A. Product Data:** Furnish for each type of glass and exposed glazing material.
- B. Samples:** Furnish samples of exposed glazing accessories.

1.4 WARRANTY

- A. Extended Correction Period:** Extend correction period to two years for following.
1. Replacing insulated glass which exhibits signs of moisture on sealed glass surfaces.
 2. Replacing mirrors which exhibit signs of desilvering or signs of distortion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. System Description:** Section includes miscellaneous glass and glazing materials for items typically furnished without glazing and where glazing is not an integral part of the assembly.

- B. Regulatory Requirements:
 - 1. Safety Glass Standard: Comply with applicable codes, CPSC 16 CFR 1201, and pass ANSI Z97.1.
- C. Float Glass: Select glazing quality, clear annealed glass, ASTM C1036; nominal thickness 1/4".
 - 1. Manufacturers:
 - a. Vitro Architectural Glass (formerly PPG).
 - b. Oldcastle Glazing.
 - c. Guardian Industries Corp.
 - d. Substitutions: Refer to Division 01.
 - 2. Locations: Provide where indicated as clear glass.
- D. Tempered Glass: Select glazing quality, clear float glass, fully tempered, ASTM C1048, Kind FT; nominal thickness 1/4"; safety glass.
 - 1. Manufacturers:
 - a. Vitro Architectural Glass (formerly PPG).
 - b. Oldcastle Glazing.
 - c. Guardian Industries Corp.
 - d. Substitutions: Refer to Section 01 25 00.
 - 2. Locations: Provide at doors and at window openings where required by applicable codes and federal requirements.
- E. Insulated Glass: Preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space with minus 20-degree F dew point.
 - 1. Manufacturers:
 - a. Vitro Architectural Glass (formerly PPG). Basis of Design
 - b. Oldcastle Glazing.
 - c. Guardian Industries Corp.
 - d. Viracon.
 - e. Substitutions: Refer to Section 01 25 00.
 - 2. Performance: Certified to ASTM E2190 by Insulating Glass Certification Council.
 - 3. System: Manufacturer's standard dual seal system compatible with glazing system, and including spacers, desiccant, and standard corner construction.
 - 4. Basis of Design IGU: *Solarban®* R100 (2) *Acuity™* + *Acuity™*
 - 5. Glass: ASTM C1036, select glazing quality clear float glass; nominal 1/4" thick glass.

6. Safety Glass: ASTM C1048, Kind FT, fully tempered select glazing quality clear float glass; nominal 1/4" thick glass; provide at doors and impact areas where safety glass is required by applicable codes and regulations.
7. Total Unit Thickness: 1".
8. Locations: Provide at exterior windows and doors unless otherwise indicated.
9. Glazing Materials: Type approved for use in applications indicated for required fire ratings; refer to fire label requirements.
- F. Spacer Shims: Silicone compatible, 50 durometer hardness; 3" long by 3/32" thick by 1/4" high.
- G. Setting Blocks: 70-90 durometer hardness; 4" long by 3/8" thick by 1/4" high standard setting blocks.
- H. Glazing Sealant: ASTM C920, Type S, Grade NS, elastomeric one-component silicone glazing sealants as recommended by sealant manufacturer for application involved.
 1. Manufacturers:
 - a. Dow Corning Corp.
 - b. General Electric Co.
 - c. Pecora Corp.
 - d. Substitutions: Refer to Section 01 25 00.
 2. Structural and Butt Glazing: Provide high-modulus structural silicone glazing materials recommended by sealant manufacturer for applications where sealant bonds glass to metal system and where sealant bonds glass to glass.
 3. Color: As selected by Architect from manufacturer's full range of available colors.
- I. Glazing Putty: Linseed oil putty, ASTM C570, Type II; oil and resin base caulking compound for building construction; knife grade.1.
 1. Manufacturers:
 - a. DAP, Inc.
 - b. Substitutions: Refer to Section 01 25 00.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean glazing channels and framing members to receive glass immediately before glazing; remove coatings not firmly bonded to substrate.
- B. Apply primer to joint surfaces where recommended by sealant manufacturer.

3.2 INSTALLATION

- A. Comply with GANA Glazing Manual and Sealant Manual and glazing manufacturer recommendations and installation instructions.
 - 1. Do not allow glass to touch metal surfaces.
 - 2. Comply with applicable code requirements and NFPA 80 for glass in fire rated openings.
- B. Place setting blocks at quarter points in thin course of sealant.
- C. Install removable stops with glass centered in space with spacer shims at 2'-0" intervals on both sides of glass, 1/4" below sightline.
- D. Sealant Glazing: Fill gap between glass and stops with sealant to depth equal to bite of frame on glass but not more than 3/8" below sightline.
 - 1. Apply sealant to uniform and level line, flush with sightline; tool or wipe sealant surface for smooth appearance; at exterior locations tool sealant so water is carried away from glass.

3.3 CLEANING

- A. At areas subject to potential impact mark glass after installation by crossed streamers attached to framing and held away from glass; do not apply markers to surface of glass.
- B. Remove nonpermanent labels immediately after sealant cures; cure sealants for high early strength and durability.
- C. Remove and replace glass which is broken, chipped, cracked, abraded or damaged during construction period, including natural causes, accidents and vandalism.

END OF SECTION

SECTION 08 83 00

FRAMELESS MIRRORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Typical: Provide frameless glass mirrors with accessories as required for complete installation.
2. Impact Locations: Provide laminated frameless glass mirrors with accessories as required for complete installation.

B. Related Sections:

1. Section 08 80 00: One-way mirrors and polycarbonate mirrors.

1.2 REFERENCES

- A. Glass Association of North America (GANA): Glazing Manual and Sealant Manual.**

1.3 SUBMITTALS

- A. Product Data:** Furnish for mirror glass.

- B. Samples:** Furnish samples of mirror glass with finished edges and corners.

1.4 WARRANTY

- A. Special Warranties:** Replace mirrors which exhibit signs of desilvering or signs of distortion.

1. Special Warranty Period: Two years.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. System Description:** Provide frameless mirrors with accessories as required for complete installation.

1. Provide ballet barres where indicated.

- B. Safety Glass Standard:** Comply with applicable codes, CPSC 16 CFR 1201, and pass ANSI Z97.1.

- C. Typical Frameless Glass Mirrors: Mirror quality q1 or q2, clear float glass; 1/4" thick; full silver coating, copper coating and organic coating; factory treated and sealed after cutting and finishing.
 - 1. Manufacturers:
 - a. Guardian Glass.
 - b. Lenoir Mirror Company, Lenoir, NC.
 - c. Substitutions: Refer to Section 01 25 00.
 - 2. Edges: Provide edges designed to eliminate cutting potential at edges and corners commonly referred to as arrised edges, as approved by Architect.
- D. Laminated Glass Frameless Mirrors: ASTM C1172, Kind LA, two sheets of clear float glass laminated with polyvinyl butyral film, safety glass; laminated layers shall be free of air pockets and foreign substances.
 - 1. Manufacturers:
 - a. Oldcastle BuildingEnvelope.
 - b. Guardian Industries Corp.
 - c. Global Security Glazing.
 - d. Pulp Studio, Inc.
 - e. Substitutions: Refer to Section 01 25 00.
 - 2. Glass: Mirror quality q1 or q2, clear float glass; factory treated and sealed after cutting and finishing.
 - 3. Edges: Provide edges designed to eliminate cutting potential at edges and corners commonly referred to as arrised edges, as approved by Architect.
 - 4. Glass Thickness: Nominal 1/4" total thickness unless otherwise indicated.
 - 5. Polyvinyl Butyral Core Thickness: Minimum 30 mil.
 - 6. Reflective Coating: Coating may be standard full silver reflective metallic coating on Number 2 surface or may be mirror reflective surface on polyvinyl butyral core.
- E. Mirror Attachment:
 - 1. Bottom Supports: Brite anodized aluminum angles such as Glass Distributors Inc. (301.779.2430)/Brite Anodized Aluminum 3/8" L-Bar Extrusion, provide felt pads for setting mirrors on angles; provide concealed fasteners.
 - 2. Adhesive: Nontoxic type as recommended by mirror manufacturer.

- F. Ballet Barres and Supports: Standard wood 1-1/2" diameter ballet barre with fixed ballet bar supports designed specifically for ballet barre installation over mirror without ballet barre supports touching mirror.

1. Manufacturers:

- a. BuyRailings (877.810.4116).
- b. WallBarre (864.288.8934).
- c. MatsMatsMats (877.777.6287).
- d. Substitutions: Refer to Section 01 25 00.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with GANA Glazing Manual and mirror manufacturer instructions.
- 1. Do not allow glass to touch metal surfaces.
- B. Provide ventilation to coating.
- C. Set or trim felt to face of mirror.
- D. Install ballet barre in accordance with ballet barre manufacturer recommendations and installation instructions without touching mirror.

3.2 CLEANING

- A. Remove nonpermanent labels immediately after installation.
- B. Remove and replace mirrors which are broken, chipped, cracked, abraded or damaged during construction period, including natural causes, accidents and vandalism.

END OF SECTION

SECTION 08 91 00

LOUVERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide extruded aluminum louvers and frames, with screens, attachment hardware, and accessories as required for complete finished installation.
- B. Related Sections:
 - 1. Section 08 41 00: Entrances and Storefronts

1.2 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature for each type of louver.
- B. Shop Drawings: Indicate profile of frame, details, relation to adjacent construction, flashing, blade configuration, duct work connection, screens, and percentage of free air opening.
- C. Samples: Furnish samples of metal finish.
- D. Certificates: Where performance requirements are included, provide AMCA Certified Rating Seal indicating louvers comply with requirements.

1.3 SITE CONDITIONS

- A. Take site dimensions affecting louvers prior to fabrication.
- B. Ensure openings are properly prepared and flashings are correctly located to divert moisture to exterior.
- C. Protect adjacent surfaces, finishes and materials from damage during installation of louvers.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The Airolite Corporation.
- B. Construction Specialties, Inc. (CSI).
- C. Nystrom Building Products.
- D. Airline Products Co.
- E. Ruskin.

F. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide extruded aluminum louvers and frames, with screens, attachment hardware, and accessories.
- B. Performance Criteria: Where indicated, comply with specific performance requirements; unit performance ratings determined in compliance with Air Movement and Control Association (AMCA) Standard 500 - L.
 - 1. Free Area: Minimum 45% based on 48" by 48" louver.
 - 2. Static Pressure Loss: Maximum 0.15" of water gage at airflow of 1000 fpm free air velocity.
 - 3. Water Penetration: Maximum 0.05 oz/sf of free area at intake airflow of 1000 fpm free area velocity.
 - 4. Wind-Driven Rain: Louvers shall achieve a wind-driven rating in conformance with applicable codes and regulations but not less than an A rating on a standard size louver as defined in AMCA 500 - L.
- C. Aluminum Extrusions: ASTM B221, alloy 6061 or 6063, temper T5 or T6; minimum 0.08" thick.
- D. Aluminum Sheet: ASTM B209, manufacturer's standard alloy; minimum 0.08" thick.

2.3 FABRICATION

- A. Louvers: Manufacturer's standard fabrication for types specified and configurations indicated on Drawings.
 - 1. Type: Extruded aluminum wall louvers, continuous blade (mullionless) type.
 - 2. Type: Extruded aluminum wall louvers, fixed blade mullion type.
- B. Bird Screen for Exterior Louvers: Minimum 0.063" diameter wire, 1/2" interwoven square mesh.
 - 1. Wire: Stainless-steel.
 - 2. Frame: Match louver.
- C. Fabricate louvers to maximum extent possible and disassemble as necessary for shipping and handling limitations; clearly mark units for reassembly and installation.
 - 1. Fabricate frames, including integral sills, to suit adjacent construction with tolerances for installation.
 - 2. Fabricate sill extension, flashings, wall anchors, structural supplementary sub-framing, and accessories as required for complete system; use same materials as provided for louvers.

- D. Join frame members and louver blades by welding; maintain equal blade spacing, including separation between blades and frame head and sill; maintain uniform appearance.
 - 1. Shop miter and weld blades into shop fabricated corner units to align with straight sections; include concealed bracing.
- E. Shop Finished Louvers: Factory finish with fluoropolymer coating based on Kynar 500 or Hylar 5000 and conforming with AAMA 2605; not less than two-coat system.
 - 1. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect including metallic finish based on mica.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install louvers in accordance with manufacturer recommendations and installation instruction, properly aligned and level.
- B. Secure louver rigid with concealed fasteners of non-corrosive metals to suit materials being encountered and to resist anticipated loads.
- C. Coordinate installation method with application of adjacent backing and structural elements, and mechanical work.
- D. Set and tie into flashings to ensure diversion of moisture to exterior.
- E. Hinge screens for access.

END OF SECTION

SECTION 09 21 00

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Gypsum board systems including gypsum board, light gage metal framing, suspension system for gypsum board systems, joint treatment, acoustical accessories, and general accessories for complete installation.
- B. Related Sections:
 - 1. Section 05 40 00: Cold formed metal framing
 - 2. Section 07 21 00: Building thermal insulation.
 - 3. Section 09 30 00: Cementitious backer unit tile substrates.

1.2 REFERENCES

- A. ASTM C754: Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board, or Water-Resistant Backing Board.
- B. ASTM C840: Application and Finishing of Gypsum Board.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination, Openings: Obtain dimensions and locations from other trades and provide openings and enclosures for accessories, specialties, equipment, and ductwork.

1.4 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature for framing, insulation, gypsum board, and acoustical accessories.
- B. Samples: Submit samples of special texture finish.
- C. Manufacturer's Certification: Furnish manufacturer's certification indicating products comply with Contract Documents and applicable codes.

1.5 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for adhesives, sealants, and caulks.
- B. Level 4 Finish Mock-Up: Provide Level 4 finish mock-up not less than 100 square feet in location acceptable to Architect. Approved mock-up may be incorporated into Project.

1.6 PROJECT CONDITIONS

- A. Do not begin installation of interior gypsum board until space is enclosed, space is not exposed to other sources of water, and space is free of standing water.
- B. Maintain areas to receive gypsum board at minimum 50-degree F for 48 hours prior to application and continuously after application until drying of joint compound is complete; comply with ASTM C840.
- C. Immediately remove from site gypsum board for interior use exposed to water, including gypsum board with water stains, with signs of mold, and gypsum board with mildew.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. National Gypsum Co.
- B. Georgia-Pacific Corp.
- C. United States Gypsum Co., USG Corp.
- D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide gypsum board assemblies including gypsum board, light gage metal framing, suspension system for gypsum board systems, joint treatment, acoustical accessories, and general accessories.
 - 1. Systems Responsibility: Provide products manufactured by or recommended by manufacturer of gypsum board to maintain single-source responsibility for system.
- B. Performance Requirements: Perform gypsum board systems work in accordance with recommendations of ASTM C754 and ASTM C840 unless otherwise specified.
 - 1. Loads: Comply with California Building Code requirements for design of metal framing for gypsum board systems.
 - a. Deflection: Maximum L/240 typical, L/360 where tile is indicated.
 - b. Deflection: Maximum L/240 typical, L/360 where tile or plaster are indicated.
 - 2. Large Format Tile: Comply with Tile Council of North America (TCNA) requirements for metal framing at maximum 16" on center and for maximum deflection of L/720 where large format tile as defined by TCNA is indicated.
- C. Regulatory Requirements:
 - 1. Fire-Rated Assemblies: Provide systems listed in applicable code or by Underwriter's Laboratory, Gypsum Association (GA) File No's in GA-600 Fire Resistance Design Manual or other listing approved by applicable authorities.

2. Seismic Requirements: Comply with code requirements for seismic bracing.
- D. Framing: Comply with ASTM C754, 20-gage and lighter unless otherwise indicated; provide gages as recommended by manufacturer for spans and loads indicated and as required by applicable codes.
 1. Studs: ASTM C645, screw-type Cee-shaped.
 2. Runners: Match studs.
 3. Furring Members: ASTM C645, screw-type, hat-shaped.
 - a. Sound Rated Assemblies: Provide resilient channels where indicated and where required to provide required sound transmission classifications.
 - 1) Acceptable Manufacturers:
 - a) USG/RC-1.
 - b) ClarkDietrich/RC-Deluxe.
 - c) Substitutions: Refer to Section 01 25 00.
 4. Channels: ASTM C754.
 5. Hangers: ASTM A641, Class 1 wire not less than sizes in Table No. 5 of ASTM C754 and as required by applicable codes; hanger rods, flat hangers, and angle-type hangers as required.
 6. Suspension System: ASTM C635, suspension system composed of main beams and cross furring members interlocking to form supporting network; recommended by gypsum board system manufacturer.
 7. Fasteners and Anchorages: As recommended by gypsum board system manufacturer.
- E. Gypsum Board: Comply with ASTM C840; maximum permissible lengths; ends square cut, tapered edges on boards to be finished.
 1. Typical: ASTM C1396, Type X, fire rated gypsum board, unless otherwise indicated.
 2. Mold Resistant Gypsum Board: Provide at high humidity areas not covered with tile including but not limited to kitchens, restrooms.
 - a. USG/Sheetrock Mold Tough Firecode Core.
 - b. Georgia Pacific/ToughRock Mold-Guard Fireguard X.
 - c. National Gypsum/Gold Bond XP Fire-Shield Gypsum Board.
 - d. Substitutions: Refer to Section 01 25 00.
 3. Tile Substrates: Cementitious backer units specified in Section 09 30 00 - Tiling.

4. Exterior Sheathing: Silicone treated glass mat gypsum sheathing, ASTM C1177, Type X, 5/8" thick unless otherwise indicated.
 - a. Manufacturers:
 - 1) Georgia Pacific/DensGlass Gold.
 - 2) Substitutions: Refer to Section 01 25 00.
5. Veneer Plaster Base: ASTM C1396, Type X, type recommended by gypsum board manufacturer for gypsum veneer plaster base.
 - a. Manufacturers:
 - 1) National Gypsum/Kal-Kore Veneer Plaster Base.
 - 2) Georgia Pacific/ToughRock Veneer Plaster Base.
 - 3) USG/Grand Prix Veneer Plaster Base.
6. Exterior Gypsum Soffit Board: ASTM C931, Type X; as recommended by manufacturer for exterior non-exposed applications.
7. Extended Exposure Gypsum Board: Fire rated Type X gypsum board designed specifically for extended exposure to moisture during construction; ASTM C1177; provide with score of 10 when tested using ASTM D3273 for mold resistance.
 - a. National Gypsum/eXP Extended Exposure Sheathing.
 - b. Georgia Pacific/DensArmor Plus or DensGlass.
 - c. USG/Sheetrock Fiberock Aqua Tough Sheathing.
 - d. Substitutions: Refer to Section 01 25 00.
8. Fiberglass Mat Faced Gypsum Roof Board:
 - a. USG Securock Glass-Mat Roof Board
 - b. Georgia-Pacific DensDeck Prime Roof Board
 - c. Substitutions: Refer to Section 01 25 00.
- F. Gypsum Board Accessories: Comply with ASTM C840.
 1. Provide protective coated steel corner beads and edge trim; type designed to be concealed in finished construction by tape and joint compound.
 2. Corner Beads: Manufacturer's standard metal beads.
 3. Edge Trim: "J", "L", "LK", or "LC" casing beads.
 4. Reinforcing Tape, Joint Compound, Adhesive, Water, Fasteners: Types recommended by system manufacturer and conforming to ASTM C475.
 - a. Typical Joint Compound: Chemical hardening type for bedding and filling, ready-mixed or powder vinyl type for topping.
 5. Control Joints: Back to back casing beads.
 - a. Back control joints with 4 mil thick polyethylene air seal.

6. Reveals: Extruded aluminum special trim pieces in manufacturer's standard or custom shapes to conform to configurations and dimensions indicated.
 - a. Manufactures:
 - 1) Fry Reglet Corp./Drywall Moldings.
 - 2) Gordon Inc./Final Forms I Drywall Trims.
 - 3) Substitutions: Refer to Section 01 25 00.
- G. Acoustical Accessories: Provide as indicated and as required to achieve acoustical ratings indicated.
 1. Acoustical Insulation: Preformed mineral fiber, ASTM C665, Type I; friction fit type without integral vapor barrier; as required to meet STC ratings indicated, or of thickness indicated.
 2. Acoustical Sealant: ASTM C919, type recommended for use in conjunction with gypsum board. Paintable, non-shrinking and non-cracking where exposed, nondrying, nonskinning, nonstaining, and nonbleeding where concealed.
 - a. Acoustical Sealant Manufacturers:
 - 1) USG/Sheetrock Acoustical Sealant.
 - 2) Tremco/Acoustical Sealant.
 - 3) Pecora/AC-20.
 - 4) Substitutions: Refer to Division 1.
 3. Electrical Box Pads: Provide at outlet, switch and telephone boxes in walls with acoustical insulation.
 - a. Electrical Box Pad Manufacturers for Non-Fire Rated Partitions:
 - 1) Harry A. Lowry & Associates (800.772.2521)/Lowry's Electrical Box Pads.
 - 2) Tremco Sheet Caulking (650.572.1656).
 - 3) Fire rated partition material manufacturers.
 - 4) Substitutions: Refer to Section 01 25 00.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Metal Framing Erection: Erect metal framing in accordance with ASTM C754 and manufacturer's recommendations.
 1. Install members true to lines and levels to provide surface flatness with maximum variation of 1/8" in 10'-0" in any direction.
 2. Door Opening Framing: Install double studs at door frame jambs; install runners on each side of opening at frame head height between jamb studs and adjacent studs.
 3. Install metal framing backing where required for support of fixtures, cabinets, accessories and hardware.

4. Coordinate installation of bucks, anchors, blocking, electrical and mechanical work which is to be placed in or behind partition framing; allow items to be installed after framing is complete.
- B. Ceiling Framing Installation: Erect in accordance with ASTM C754 and manufacturer's recommendations.
 1. Coordinate location of hangers with other work; provide trapeze supports and steel bracing as required to support ceiling.
 2. Install ceiling furring independent of walls, columns, and above-ceiling work.
 3. Space main carrying channels at maximum 48" on center, not more than 6" from perimeter walls.
 - a. Lap splices minimum 12" and secure together 2" from each end of splice.
 4. Place furring channels perpendicular to carrying channels at maximum 24" on center and not more than 2" from perimeter walls.
 5. Lap splices minimum 8" and secure together 2" from each end of splice.
 6. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing; extend bracing minimum 24" past each end of openings.
 7. Laterally brace entire suspension system.
- C. Gypsum Board Installation: Install in accordance with ASTM C840 and manufacturer's recommendations.
 1. Use screws when fastening gypsum board to furring and to framing.
 2. Erect gypsum board with ends and edges occurring over firm bearing.
 - a. Ensure joints of second layer do not occur over joints of first layer in double layer applications.
 3. Place control joints to be consistent with lines of building spaces and as directed by Architect.
 - a. Provide where system abuts structural elements.
 - b. Provide at dissimilar materials.
 - c. Lengths exceeding 30'-0" in partitions.
 - d. Ceiling areas exceeding 50'-0" or 2500 square feet.
 - e. Wings of "L", "U" and "T" shaped ceilings.
 4. Place corner beads at external corners; use longest practical lengths.
 5. Place edge trim where gypsum board abuts dissimilar materials.
 6. Tape, fill, and sand exposed joints, edges, corners and openings to produce surface ready to receive finishes; feather coats onto adjoining surfaces.

7. Finishing: Comply with Gypsum Association (GA) "Levels of Gypsum Board Finish".
 - a. GA Level 4 (Typical): Provide three-coat finishing and sanding is required for surfaces indicated to be painted; provide flush, smooth joints and surfaces ready for applied paint finishes.
8. Remove and replace defective work.

D. Acoustical Accessories Installation:

1. Place acoustical insulation tight within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
2. Place acoustical sealant within partitions in accordance with manufacturer's recommendations; install acoustical sealant at gypsum board perimeter at:
 - a. Metal Framing: One or two beads.
 - b. Base layer and face layer.
 - c. Penetrations of partitions.
3. Tolerance: Maximum 1/4" space between gypsum board at floor, ceiling, and penetrations and sealed with acoustical sealant.
4. Install electrical box pads with pads molded and pressed on back and all sides of box, closing openings, in accordance with manufacturer's instructions, for complete acoustical barrier.

END OF SECTION

SECTION 09 30 00

TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide tile installations with accessories, as required for complete installation.
 - 1. Provide cementitious backer unit tile substrate.
 - 2. Provide stone thresholds.
- B. Related Sections:
 - 1. Section 09 21 00: Gypsum board assemblies.

1.2 REFERENCES

- A. ANSI A108.1: Installation of Tile with Portland Cement Mortar.
- B. ANSI A108.5: Installation of Tile with Latex-Portland Cement Mortar.
- C. ANSI A108.10: Installation of Grout in Tilework.
- D. ANSI A108.11: Interior Installation of Cementitious Backer Units.
- E. Tile Council of North America (TCNA): Handbook for Ceramic Tile Installation.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination, Large Format Tile and Framing: Tile Council of North America (TCNA) requires framing at large format tile to be maximum 16" on center and for maximum deflection of $L/720$ where large format tile as defined by TCNA is indicated.
 - 1. Coordinate with framing installation to ensure proper stud spacing and deflection limits are provided at locations where large format tile is indicated.

1.4 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature for each type of material for Project.
- B. Samples: Furnish each type of tile clearly indicating pattern, coloration and joints.
 - 1. Color Charts: Submit actual tile sections showing full range of colors, textures and patterns available for each type of tile.

1.5 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for adhesives, sealants, and caulks.

- B. Ceramic Tile Flooring shall be stable firm and slip resistant. CBC Section 11B-302.1.

1.6 SITE CONDITIONS

- A. Provide heat and ventilation in areas where ceramic tile work is being performed, to allow tile to properly set.
- B. Take precautionary measures necessary to ensure excessive temperature changes do not occur.

1.7 WARRANTY

- A. Extended Correction Period: Provide for correcting failure of system to resist water penetration except where failure is result of structural failure of building. Repair system and pay for or replace damaged materials and surfaces.
 - 1. Hairline cracking due to temperature or shrinkage is not considered structural failure.
 - 2. Period: Two years.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. System Description: Provide tile installations with tile, grout, setting materials, and accessories as indicated.
- B. Regulatory Requirements, Slip-Resistance:
 - 1. Slip-Resistant Hard Surfaces: Hard surface finishes to comply with requirements of authorities having jurisdiction for slip-resistant hard surfaces, including general code requirements and requirements for access for persons with disabilities.
- C. Tile: Types as indicated which could include ceramic, ceramic mosaic, quarry, paver, porcelain, stone, and glass type tiles.
 - 1. Manufacturers:
 - a. Dal-Tile Corp.
 - b. Crossville Tile.
 - c. Arizona Tile
 - d. Summitville Tiles, Inc.
 - e. Manufacturers listed on Finish Schedule.
 - f. Substitutions: Refer to Section 01 25 00.
 - 2. Color, Style and Pattern: As indicated on Finish Schedule, as selected by Architect from manufacturer's full range of types of tiles indicated where not otherwise indicated
 - a. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

3. Base and Trim: Provide matching trim pieces, coordinated with sizes and coursing of adjoining flat tile as directed by Architect; types as indicated, as selected by Architect where not indicated.
- D. Portland Cement Setting Bed: Portland cement bed conforming to ANSI A108.1 and TCNA recommendations including separator sheet and reinforcing mesh.
 1. Separator sheet may be deleted where over waterproof membrane.
 2. Separator sheet may be deleted where over waterproof membrane or shower pan.
- E. Latex Thin Set: Thinset bond coat, consisting of latex-cementitious mortar conforming to ANSI A118.4.
 1. Manufacturers:
 - a. Laticrete International Inc.
 - b. Mapei Corp.
 - c. Parex USA/Mer-Krete.
 - d. Substitutions: Refer to Section 01 25 00.
- F. Latex-Cement Grout: ANSI A118.7, latex-cementitious type, uniform in color, resistant to shrinkage.
 1. Manufacturers:
 - a. Laticrete International Inc.
 - b. Mapei Corp.
 - c. Parex USA/Mer-Krete.
 - d. Substitutions: Refer to Section 01 25 00.
 2. Colors: provide standard color as directed by Architect.
- G. Cementitious Backer Units: ANSI A118.9 aggregated Portland cement with woven glass-fiber mesh on both faces; approximately 1/2" thick; UL fire rated as required to maintain integrity of fire rated assemblies.
 1. Manufacturers:
 - a. USG Industries, Durabond Division/Durock.
 - b. National Gypsum Co./PermaBase Cement Board.
 - c. Custom Building Products/Wonderboard.
 - d. Substitutions: Refer to Section 01 25 00.
 2. Contractor Option Coated Glass Mat Backer Units: Georgia Pacific/DenShield, UL fire rated as required to maintain integrity of fire rated assemblies.
- H. Cleaning and Sealing Materials: As recommended by tile and grout manufacturers, such as Bostik Construction Products/Hydroment CeramaSeal.

- A. Special Tile Trim Pieces: Provide as indicated on Drawings.
 - a. Manufacturers: Schluter Systems L.P.
 - b. Substitutions: Refer to Section 01 25 00.

2.2 MIXES

- A. Mix and proportion cementitious materials for site-made leveling coats, setting beds and grout as recommended by the TCNA Handbook for Ceramic Tile Installation.
- B. Mix and proportion pre-mixed setting beds and grout materials in accordance with manufacturer's recommendations.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prior to installing tile, ensure surfaces are level; comply with TCNA and tile manufacturer recommendations but not greater than following.
 - 1. Thin Set Tile Tolerance: Maximum surface variation of 1/8" in 10'-0".
- B. Ensure surfaces are clean and well cured.
 - 1. Drains: Where indicated, ensure surfaces are properly sloped to drains.
- C. Do not commence work until surface conditions are within tolerances required for proper installation; apply latex leveling material where necessary to meet required tolerances.
- D. Backer Units: Install units in accordance with ANSI A108.11, manufacturer's recommendations, and as required to provide fire ratings indicated on Drawings.

3.2 INSTALLATION

- A. Install tile in accordance with referenced ANSI Standards and TCNA recommendations for type of substrate and indicated setting method.
 - 1. Complexity of TCNA variations in types of tile installation systems and potential for changes to surrounding conditions during design and construction makes exact listing of potential conditions improbable.
 - 2. Contractor, installers, and manufacturer representatives shall inform Architect where actual conditions are not covered and where providing similar materials and systems do not comply with TCNA or manufacturer recommendations.
 - a. Where specified or similar materials and systems do not comply with TCNA or manufacturer recommendations submit proposed substitutions along with statement substitutions are of comparable quality to specified materials.

- B. Following systems shall form the basis of tile installation systems required for Project. Where Project conditions vary from TCNA and manufacturer recommendations, notify Architect immediately. Where different use similar materials and systems as appropriate.
 - 1. Latex-Cement Thin Set Wall Tile over Cementitious Backer Units: TCNA W244.
 - 2. Latex-Cement Thin Set Wall Tile over Coated Glass Mat Backer Units: TCNA W245.
- C. Place tile in accordance with patterns indicated on Drawings or as directed by Architect; carefully plan tile layouts, ensure pattern is uninterrupted from one surface to the next and through doorways.
 - 1. Apply latex thin set to back of tile where necessary to ensure 100% bond between bond coat and substrate; replace tiles which break due to voids between tile and substrate.
- D. Neatly cut tile around fixtures and drains; accurately form corners, base, intersections and returns.
 - 1. Base, Coves: Flush cove type with base grout joint on wall, cove tile on floor, unless otherwise indicated.
 - 2. Corners and Edges: Bullnose tile unless otherwise indicated.
- E. Locate expansion joints, control joints, contraction joints, and isolation joints where indicated; where not indicated, provide as recommended by TCNA Handbook and as approved by Architect.
 - 1. Install special trim pieces as indicated on Drawings and in accordance with manufacturer recommendations and installation instructions, true to lines and levels indicated and in correct relationship with tile and adjacent materials.
- F. Ensure tile joints are uniform in width, subject to normal variance in tolerance allowed in tile size; ensure joints are watertight, without voids, cracks, excess mortar or grout.
- G. Sound tile after setting, remove and replace hollow sounding units.
- H. Allow tile to set for a minimum 48 hours prior to grouting.
- I. Grout tile to comply with recommendations of TCNA and as specified.
- J. Leave completed installation free of broken, damaged and faulty tile.

3.2 CLEANING AND SEALING

- A. Clean tile surfaces free of foreign matter upon completion of grouting.
- B. Seal tile and grout surfaces where recommended by manufacturer for materials and applications involved; comply with manufacturer's recommendations.

END OF SECTION

SECTION 09 51 00

ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide suspended acoustical ceiling system with exposed suspended metal grid system, trim, and accessories as required for complete finished installation.
- B. Related Sections:
 - 1. Section 09 21 00: Gypsum board suspended ceiling systems.
 - 2. Divisions 21 through 28: Facilities services for ceiling penetrations.

1.2 REFERENCES

- A. ASTM C635: Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- B. ASTM C636: Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- C. ASTM E580: Application of Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels in Areas Requiring Seismic Restraint.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate installation of acoustical ceiling systems with items installed above ceilings to ensure work above ceilings is complete, ceiling space allows for concealed items while allowing required ceiling heights, and building is enclosed.

1.4 SUBMITTALS

- A. Product Data: Furnish manufacturers' literature.
- B. Shop Drawings: Clearly indicate grid layout and related dimensioning, junctions with other work and ceiling finishes, and inter-relation of mechanical and electrical items related to system.
- C. Samples: Furnish samples of exposed grid finish and each type of ceiling unit.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Firm with minimum five years successful experience in projects of similar type and scope; acceptable to manufacturer of integrated acoustical ceiling system.

1.6 SITE CONDITIONS

- A. Do not install ceilings until building is enclosed, sufficient heat is provided, dust generating activities have terminated and overhead mechanical work is completed, tested and approved.
 - 1. Do not allow acoustical ceiling units to be exposed to moisture; immediately remove acoustical ceiling units with stains, units with signs of mold, and units with mildew.
- B. Allow wet work to dry prior to commencement of installation.
- C. Maintain uniform temperatures of minimum 60 degrees F and humidity of 20% to 40% prior to, during and after installation.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Armstrong World Industries, Inc.
- B. CertainTeed.
- C. Rockfon North America, Chicago Metallic Corp.
- D. USG Corporation.
- E. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide acoustical ceiling systems with exposed suspended metal grid system, trim, and accessories as required for complete finished installation.
- B. Regulatory Requirements:
 - 1. Seismic Design Requirements: Comply with California Building Code requirements for seismic bracing of ceiling suspension system, and with ASTM E580.
 - a. Ceiling Struts: Provide struts as detailed on Drawings and as required by code, placed maximum 12'-0" on center in both directions and within 6'-0" of each wall.
 - b. Slack Wires: Provide safety slack wires, two per fluorescent fixture on diagonally opposite corners and a single wire for each recessed down light.
 - 2. Fire Performance Characteristics: Provide products listed by Underwriters Laboratories (UL) or other independent testing laboratory acceptable to applicable authorities.
 - a. Flame Spread/Smoke Density: Provide products meeting code requirements for maximum 25 flame spread and maximum 450 smoke developed.

- C. Suspension Systems: Comply with ASTM C635, as applicable to type of suspension system required for type of ceiling units indicated.
 - 1. Grid System:
 - a. Exposed Grid System: Standard 1" nominal face width, direct hung, aluminum or steel "T" exposed grid system.
 - b. Exposed Grid System: Narrow 9/16" nominal face width, direct hung, aluminum or steel "T" exposed grid system.
 - 2. Attachment Devices: Size for 5 times design load indicated in ASTM C635, Table 1, Direct Hung.
 - 3. Hanger Wires: Galvanized carbon steel, ASTM A641, soft temper, pre-stretched, yield-stress load of at least three times design load, but not less than 12-gage.
 - 4. Straps, Tubes and Angles: Provide galvanized steel as required to meet state and local requirements for seismic design loads.
 - 5. Structural Class: Minimum intermediate-duty system.
 - 6. Edge Molding: Manufacturer's standard angle molding for edges and penetrations of ceiling, with single flange of molding exposed.
 - 7. Finish of Exposed Items: Manufacturer's standard white baked enamel.
 - 8. Maximum Allowable Deflection: L/360.
- D. Acoustical Panels: ASTM E1264 type and form as indicated on Finish Schedule, as selected by Architect from manufacturer's full range of panels where not otherwise indicated.
 - 1. Panels: Mineral composition lay-in ceiling panels with reveal edge designed to be compatible with specified suspension system.
 - 2. Texture: Light fissured panels unless otherwise indicated on Drawings.
 - 3. Size: 2'-0" by 4'-0", except where otherwise indicated on Drawings.
 - 4. Size: 2'-0" by 2'-0", except where otherwise indicated on Drawings.
 - 5. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Furnish layouts for inserts, clips and other supports required to be installed by other trades for support of acoustical ceilings.

1. Install inserts, clips, and supports where not previously installed and where additional supports are required for complete installation.
- B. Measure ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling; do not use less than half width units at borders.
- C. Coordinate with other work supported by or penetrating through ceilings, including integral air handling systems, light fixtures, and other systems.

3.2 INSTALLATION

- A. Install acoustical ceiling systems in accordance with manufacturer's recommendations and ASTM C636.
 1. Coordinate installation of air handling systems and electrical systems integral with integrated acoustic ceiling systems.
 2. Finished Ceilings: True to lines and levels and free from warped, soiled or damaged grid or acoustical units.
- B. Install ceiling systems in a manner capable of supporting superimposed loads, with maximum permissible deflection of 1/8" in 10'-0".
- C. Install after major above-ceiling work is complete; coordinate location of hangers with other work.
 1. Ensure suspension system is located to accommodate fittings and units of equipment which is to be placed after installation of ceiling grid.
- D. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest adjacent hangers and related carrying channels as required to span required distance.
- E. Install ceiling suspension system to resist seismic loads as required by state and local codes, including extra hanger wires and compression supports for ceilings and light fixtures.
- F. Hang system independently of walls, columns, ducts, pipes and conduit. Where suspension system members are spliced, avoid visible displacement of the longitudinal axis or face plane of adjacent members.
- G. Do not support lighting fixtures from or on main runners or cross runners if weight of fixture causes total dead load to exceed deflection capability.
 1. Support fixture loads independently or provide supplementary hangers located within 6" of each corner.
- H. Do not install fixtures so main runners and cross runners are eccentrically loaded; where fixture installation would produce rotation of runners, provide stabilizer bars.
- I. Install edge moldings at intersection of ceiling and vertical surfaces, using maximum lengths, straight, true to line and level; miter corners.
 1. Provide edge moldings at junctions with other ceiling finishes.

- J. Where required form expansion joints to accommodate movement and maintain visual closure without distorting system.
- K. Fit acoustic units in place, free from damaged edges or defects detrimental to appearance and function.
 - 1. Lay directionally patterned units one way with pattern as directed.
 - 2. Fit border units neatly against abutting surfaces.
- L. Install system level, in uniform plane and free from twist, warp and dents.
- M. Install hold-down clips where required by applicable codes and where ceiling is within 20'-0" of an exterior door.

3.3 ADJUSTING

- A. Adjustment: Adjust sags or twists which develop in ceiling system and replace any part which is damaged or faulty.

END OF SECTION

SECTION 09 65 10

RESILIENT BASE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide resilient base and accessories as required for complete finished installation.
- B. Related Sections:
 - 1. Section 09 65 20: Resilient tile flooring.

1.2 SUBMITTALS

- A. Product Data: Furnish manufacturer's product literature.
- B. Samples: Furnish samples of each base color and type.

1.3 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for adhesives and resilient flooring.

1.4 SITE CONDITIONS

- A. Comply with manufacturer recommendations for site conditions but not less than following; maintain minimum 70-degree F air temperature at installation area for three days prior to, during, and for 24 hours after installation.
- B. Store materials in area of application; allow three days for material to reach same temperature as area.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Johnsonite, Inc.
- B. Burke Flooring, Division of Burke Industries.
- C. Roppe Rubber Corporation.
- D. Armstrong World Industries.
- E. Flexco Co.
- F. Allstate Rubber Corp.
- G. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide resilient base and accessories as required for complete finished installation.
- B. Performance Requirements: Provide materials tested under ASTM E648, Flooring Radiant Panel Test, with results of 0.45 watts/sq. cm or higher.
- C. Resilient Base: Conform to ASTM F1861, with premolded end stops and external corners; 1/8" gage; provide coved base at hard floor surfaces, straight base at carpet unless otherwise indicated.
 - 1. Type: Molded rubber, available in 4' lengths.
 - 2. Type: Extruded rubber, in rolls.
 - 3. Type: Vinyl base.
 - 4. Height: 4" unless otherwise indicated.
 - 5. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
- D. Primers and Adhesives: Water-resistant nontoxic types recommended by base manufacturer for specified material and application.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Apply to walls, columns, pilasters, casework, and other permanent fixtures in rooms and areas where base is required.
 - 1. Fit base joints tight and vertical.
 - 2. Maintain minimum measurement of 18" between joints.
- B. Miter internal corners; use molded sections for external corners and exposed ends.
- C. Install base on solid backing, adhere tightly to wall and floor surfaces; fill voids along top edge of base with manufacturer's recommended adhesive filler.
- D. Scribe and fit to door frames and other obstructions.
- E. Install straight and level to variation of plus or minus 1/8" over 10'-0".

3.2 CLEAN-UP

- A. Remove excess adhesive from floor, base and wall surfaces without causing damage.
- B. Clean surfaces in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 09 65 20

RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide resilient tile flooring and accessories as required for complete finished installation.
- B. Related Sections:
 - 1. Section 09 65 10: Resilient base.

1.2 SUBMITTALS

- A. Product Data: Furnish manufacturer's product literature.
- B. Samples: Furnish samples of each type of flooring color and pattern.

1.3 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for adhesives and resilient flooring.

1.4 SITE CONDITIONS

- A. Ensure floor surfaces are smooth and flat with maximum variation of 1/8" in 10'-0".
- B. Ensure concrete floors are dry and exhibit negative alkalinity, carbonizing, and dusting.
- C. Maintain minimum 70-degree F air temperature at flooring installation area for three days prior to, during, and for 24 hours after installation.
- D. Store flooring materials in area of application; allow three days for material to reach same temperature as area.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Armstrong World Industries, Inc.
- B. Congoleum Corp.
- C. Tarkett Inc./Azrock.
- D. Armstrong World Industries.
- E. Tarkett Inc./Azrock.

- F. Flexco Flooring.
- G. Burke Mercer.
- H. Johnsonite, Inc.
- I. Freudenberg Building Systems, Inc. (NORA).
- J. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide resilient tile flooring and accessories.
- B. Regulatory Requirements, Flammability: Provide materials tested under ASTM E648, Flooring Radiant Panel Test, with results of 0.45 watts/sq cm or higher.
- C. Regulatory Requirements, Slip-Resistance:
 - 1. Slip-Resistant Hard Surfaces: Hard surface finishes to comply with requirements of authorities having jurisdiction for slip-resistant hard surfaces, including general code requirements and requirements for access for persons with disabilities.
- D. Vinyl Composition Tile (VCT): 12" by 12" by 1/8" thick; vinyl composition tile conforming to ASTM F1066, Composition 1.
 - 1. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
- E. Resilient Luxury Solid Vinyl Tile: 12" by 12" by 1/8" thick; solid vinyl tile conforming to ASTM F1700.
 - 1. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
- F. Resilient Rubber Tile: 12" by 12" by 1/8" thick; solid vinyl tile conforming to ASTM F1344, Class 1B.
 - 1. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
- G. Edge Strips: Homogeneous vinyl or rubber, tapered or bullnose edge, color as selected by Architect.
- H. Sub-Floor Filler: White premixed latex-cement paste designed for providing thin solid surface for leveling and minor ramping of subsurface to adjacent floor finishes.
 - 1. Use material capable of being applied and feathered out to adjacent floor without spalling.
- I. Primers and Adhesives: Waterproof nontoxic types as recommended by flooring manufacturer for specified material and application.

- J. Sealer and Wax: Type recommended by flooring manufacturer for material type and location.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Conform to manufacturer's recommendations for preparation and to ASTM F710.
- B. Remove sub-floor ridges and bumps; fill low spots, cracks, joints, holes and defects with sub-floor filler.
- C. Clean floor and apply, trowel and float filler to leave smooth, flat hard surface; prohibit traffic until filler is cured.
- D. Test substrate for moisture content in accordance with flooring manufacturer recommendations; where moisture content exceeds recommendations take measures recommended by flooring manufacturer.

3.2 INSTALLATION

- A. Conform to manufacturer recommendations and installation instructions.
 - 1. Open floor tile cartons, enough to cover each area, and mix tile to ensure shade variations do not occur within any one area.
- B. Spread cement evenly in quantity recommended by manufacturer to ensure adhesion over entire area of installation; spread only enough adhesive to permit installation of flooring before initial set.
- C. Set flooring in place using methods to ensure full adhesion.
- D. Lay flooring with joints parallel to building lines to produce symmetrical pattern.
- E. Install minimum 1/2 tile at room and area perimeter.
- F. Terminate resilient flooring at centerline of door openings where adjacent floor finish is dissimilar.
- G. Install edge strips at unprotected and exposed edges.
- H. Scribe flooring to walls, columns, floor outlets and other appurtenances, to produce tight joints.
- I. Consult with Architect for floor pattern desired in each area.
- J. Edge Strips: Install where edge of tile would otherwise be exposed; butt to flooring without gaps; set in adhesive.

3.3 CLEAN-UP AND PROTECTION

- A. Remove excess adhesive from floor, base and wall surfaces without causing damage.

- B. Clean, seal and wax floor surfaces in accordance with manufacturer's recommendations.
- C. Prohibit traffic from floor for 48 hours after installation.

END OF SECTION

SECTION 09 77 30

FIBERGLASS WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide glass fiber reinforced polyester resin fabricated wall panels with trim pieces and accessories as required for complete installation.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Scheduling: Schedule installation of wall paneling as late in construction schedule as possible to prevent damage during construction.

1.3 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature.
- B. Shop Drawings: Indicate design parameters, adjacent construction, materials, dimensions, thickness, fabrication details, tolerances, colors, finishes, methods of support and anchorages.
- C. Maintenance Instructions: Include manufacturer's recommended cleaning materials and application methods, including precautions in use of cleaning materials that may be detrimental to surfaces.

1.4 QUALITY ASSURANCE

- A. CALGreen Sustainability Requirements: Comply with CALGreen requirements including those relative to pollution control for adhesives.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store panels in clean and dry area where temperatures are maintained at minimum 40-degrees F with normal humidity.
 - 1. Do not store in upright position.
- B. Take precautionary measures with adhesives and solvents to prevent fire hazards.

1.6 PROJECT CONDITIONS

- A. Maintain surfaces and materials at minimum 60-degrees F three days before and during application period.
- B. Provide continuous ventilation during work and after installation of wall covering.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Crane Composites/Glasbord.
- B. Nudo Products, Inc./Fiber-Lite Panels or Marlite FRP Panels.
- C. Stabilit America/Glasteel FRP Liner Panel.
- D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide glass fiber reinforced polyester resin fabricated wall panels, with trim pieces and accessories as wainscot surround at janitor sink.
- B. Regulatory Requirements:
 - 1. Fire-Rating: Class III (UL Class C), maximum 200 flame-spread, 450 smoke developed, ASTM E84.
 - 2. Wet Wall Applications: Provide system acceptable by applicable authorities for use on walls in toilet rooms including at locations adjacent to water closets and urinals.
- C. Trim Pieces: Manufacturer's standard matching moldings and trim pieces as required for complete, finished installation, and as required for joints, corners and panel edges; suitable for applications indicated.
 - 1. Color: Match panels.
- D. Adhesive: Nontoxic type recommended by wall covering manufacturer to suit application and complying with applicable limitations for volatile organic compound (VOC) emissions.
 - 1. Surface: As selected by Architect from manufacturer's full range of surface textures.
- E. Primer: Provide non-staining nontoxic release coat primer as recommended by wall panel manufacturer where panels are applied to gypsum board.
 - 1. Primer: Type designed to allow removal of wall paneling from gypsum board without damaging paper facing of board, and without premature separation of wall paneling from wall.
- F. Mechanical Fasteners: Concealed type only; types as recommended by system manufacturer.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Ensure surfaces to receive wall paneling are clean, true and free of irregularities, do not commence with work until surfaces are satisfactory.
- B. Ensure wall surface flatness tolerance does not vary more than 1/8" in 10'-0", nor vary at a rate greater than 1/16" per running foot.

3.2 INSTALLATION

- A. Handle and install wall panels in accordance with manufacturer's recommendations and installation instructions.
- B. Cope and miter trim pieces.
- C. Securely adhere panels to wall surfaces; use blind nailing methods as required to support panels until adhesive dries; exposed mechanical fasteners shall not be acceptable.
 - 1. Install panels in maximum size increments available.
- D. Remove excess adhesive from edges; wipe seam clean with dry cloth towel.
- E. Install wall paneling before installation of plumbing, bases, hardware, and similar accessories.

3.3 CLEANING

- A. Clean panel system in accordance with manufacturer's instructions.
- B. Remove debris and leave areas neat and clean.
- C. Replace accessories.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide painting and finishing of exposed items and surfaces requiring field painting and finishing including shop primed items.
 - 1. Specified surface preparation, priming and coats of paint are in addition to shop-priming and surface treatment specified under other sections of work.
 - 2. Painting and finishing include field finishing of exterior and interior items not listed as "Surfaces not to be Painted" unless clearly indicated otherwise.
 - 3. Painting and finishing include field finishing of select shop finished items such as mechanical grilles and registers and shop primed items such as access panels and louvers in doors, to match adjacent surfaces.
 - a. Match adjacent surfaces in color and sheen unless otherwise indicated.
 - 4. Field paint exposed bare and covered pipes, ducts, and hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under mechanical and electrical work in occupied spaces.
 - 5. Wood Doors: Contractor option to factory finish or field finish, coordinate with Section 08 14 00 - Wood Doors.
- B. Surfaces Not to be Painted:
 - 1. Finished items including finished metal surfaces.
 - 2. Walls and ceilings in concealed areas and generally inaccessible areas.
 - 3. Moving parts of operating mechanical and electrical units.
 - 4. Labels: Keep equipment identification and fire rating labels free of paint.
 - 5. Plastic smoke stops and weather-stripping at doors.
- C. Related Sections: Shop priming of ferrous metal items is included under various Specification sections.
 - 1. Section 06 40 00: Architectural Woodwork.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information, including paint label analysis and application instructions for each material.

- B. Samples: Submit samples for review of color and texture; provide list of material and application for each coat of each finish sample.
 - 1. Brush-Outs: Submit samples of each color and material with texture to simulate actual conditions, on hardboard.
 - a. Submit 8" by 10" samples of wood finishes on actual wood surfaces; label and identify each as to location and application.
 - b. Submit samples of concrete masonry (maximum 4" square) defining filler, prime and finish coats.
 - 2. Field Samples: Duplicate painted finishes of approved samples on actual wall surfaces and components for approval prior to commencing work.
 - a. Size: Minimum 100 sf located where approved.
 - b. Components: One full component as directed.
 - c. Simulate finished lighting conditions for review.
- C. Manufacturer Certificates: Furnish certificates from each manufacturer stating materials are top quality lines and suitable for intended use on this Project.
 - 1. CALGreen: Submit additional information as necessary to verify compliance with CALGreen requirements.
 - 2. CALGreen Requirements: Refer to Section 01 35 15 – CALGreen Environmental Requirements and comply with applicable CALGreen Checklist indicating requirements applicable to Project.
 - a. Comply with CALGreen requirements including those relative to finish material pollution control for paints and coatings.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, with:
 - 1. Name of material, color and sheen.
 - 2. Manufacturer's name, stock number and date of manufacture.
 - 3. Contents by volume, for major pigment and vehicle constituents.
 - 4. Thinning and application instructions.

1.4 SITE CONDITIONS

- A. Apply water-base paints when temperature of surfaces and surrounding air are between 50 and 90-degrees F.
- B. Do not apply paint in rain, fog or mist; or when relative humidity exceeds 85 percent; or to damp or wet surfaces.
- C. Painting may be continued during inclement weather if areas to be painted are enclosed and heated within temperature limits specified.

- D. Provide additional temporary ventilation during interior application of paints to eliminate volatile organic compound (VOC) emissions from interior spaces as quickly as possible.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Benjamin Moore & Co.
- B. Sherwin-Williams Co.
- C. Pittsburgh Paints, PPG Pittsburgh Paints, including Glidden Professional.
- D. Dunn-Edwards Corp.
- E. Vista Paint Co.
- F. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide painting and finishing of exposed items and surfaces requiring field painting and finishing including shop primed items.
 - 1. Definition: "Painting" and "coating" as used herein means systems including primers, emulsions, enamels, stains, sealers and fillers, whether used as prime, intermediate or finish coats.
- B. Regulatory Requirements:
 - 1. Volatile Organic Compound (VOC) Emissions: Furnish materials approved for use by applicable air quality management district for limitations of volatile organic compounds for architectural or special coatings as applicable.
 - 2. California Stair Stripes: Paint 2" stripes at stair nosing not otherwise marked, full tread and landing width, in accordance with California Code of Regulations, Title 24, Access Compliance requirements.
 - a. Exterior Stairs: Provide at landing and each tread in each stair run.
 - b. Interior Stairs: Provide at landing and last tread at each stair run.
- C. Material Quality: Provide top line quality commercial grade (professional painter) paints; materials not bearing manufacturer's identification as their top line product shall not be acceptable.
 - 1. Primers: Provide premium grade primers recommended by paint manufacturer for substrates indicated and for finish systems specified.
 - 2. Undercoats and Barrier Coats: Provide undercoat paints produced by same manufacturer as finish coats; use only thinners approved by paint manufacturer and use only within recommended limits.

3. Finish Coats: Provide finish coats capable of being washed with mild detergent without loss of color, sheen, or pigments.
 - a. Color pigments: Pure, non-fading, applicable types to suit substrates and service indicated; no lead content permitted.
4. Finish Coat Coordination: Provide finish coats which are compatible with prime paints, undercoats, and barrier coats used.
 - a. Review other Specification sections in which prime paints are provided; ensure compatibility of total coatings systems.
 - b. Upon request from other trades furnish information on characteristics of finish materials proposed for use.
 - c. Provide barrier coats over incompatible primers or remove and prime as required.
 - d. Notify Architect in writing of any anticipated problems in use of specified coating systems with substrates primed by others.
- D. Colors and Finishes: Prior to commencement of painting work, Architect will furnish color chips for surfaces to be painted.
 1. Use of proprietary names in color selection is not intended to imply exclusion of equivalent products of other manufacturers.
 2. Final acceptance of colors will be from samples applied on site.
 3. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Inspection: Examine areas and conditions under which painting work is to be applied.
 1. Start of painting work indicates acceptance of surfaces and conditions of surfaces and conditions within any area.
 2. Where exposed items or surfaces are not specifically mentioned in Schedules, paint same as adjacent similar materials or areas.
 3. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to a durable paint film.
- B. Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as specified for substrate condition.
 1. Existing Painted Finishes:

- a. Clean existing painted surfaces and remove oil, grease, dust, stains, scale, efflorescence, mildew, mold, algae, blisters, and non-adhering paint.
 - b. Measure adhesion of existing paints using ASTM D3359 tape test; remove existing coatings where poor adhesion is indicated.
 - c. Feather edges of severely deteriorated paint where several coats are removed as part of cleaning, to provide smooth transition for new paint.
 - d. Fill holes, cracks, and defects and fill and sand smooth, ready for new paint finish.
- C. Remove hardware, accessories, and items in place and not to be painted, or provide protection prior to surface preparation and painting; after painting reinstall removed items.
- D. Clean surfaces before applying paint; remove oil and grease prior to mechanical cleaning; program cleaning so contaminants from cleaning process do not fall onto wet, newly painted surfaces.
- E. Cementitious Materials: Prepare by removing efflorescence, chalk, dirt, grease, oils, and by roughening as required to remove glaze.
 - 1. Determine alkalinity and moisture content of surfaces to be painted.
 - 2. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, neutralize before application of paint.
 - 3. Do not paint over surfaces where moisture content exceeds manufacturer's printed directions.
- F. Wood: Clean wood surfaces of dirt, oil, and other foreign substances; sandpaper smooth surfaces exposed to view and dust off.
 - 1. Scrape and clean seasoned knots and apply thin coat of recommended knot sealer, before application of priming coat.
 - 2. Prime, stain, or seal wood required to be job-painted immediately upon delivery to job; prime edges, ends, faces, undersides, and backsides of wood.
 - 3. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler; sandpaper smooth when dry.
- G. Ferrous Metals: Touch up shop-applied prime coats wherever damaged using same type of primer as applied in shop or barrier coat compatible with finish paint.
 - 1. Bare Surfaces: Clean surfaces that are not galvanized or shop-coated, of oil, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
 - 2. Galvanized Surfaces: Clean free of oil and surface contaminants, using non-petroleum-based solvent; primer and touch-up primer to be zinc-rich primer.
- H. Mix painting materials in accordance with manufacturer's directions.

- I. Store materials in tightly covered containers; maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.
- J. Stir materials before application to produce mixture of uniform density and stir as required during application; do not stir surface film into material, if necessary, strain material before using.

3.2 APPLICATION

- A. Apply paint in accordance with manufacturer's directions; use applicators and techniques best suited for substrate and type of material being applied.
 - 1. Apply additional coats when stains or blemishes show through final coat, until paint is a uniform finish, color and appearance.
 - 2. Provide extra attention during application to assure dry film thickness at corners and crevices is equivalent to that of flat surfaces.
 - 3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces; paint surfaces behind permanently fixed equipment and furniture with prime coat only.
 - 4. Finish doors on tops, bottoms and side edges same as faces.
 - 5. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 - 6. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
 - 7. Sand lightly between coats when recommended by system manufacturer.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated or prepared for painting as soon as practicable after preparation.
 - 1. Allow time between successive coatings to permit proper drying.
 - 2. Do not recoat until paint feels firm and does not deform or feel sticky under moderate thumb pressure.
- C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as recommended by coating manufacturer.
- D. Prime Coats: Apply to items not previously primed; recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat.

- E. Finish Coats: Provide even texture; leave no laps, irregularity in texture, skid marks, or other surface imperfections.
 - 1. Opaque Finishes: Provide opaque, uniform finish, color and coverage; cloudiness, spotting, holidays, brush marks, runs, sags, ropiness, and other surface imperfections are not acceptable.
 - 2. Transparent and Stained Finishes: Produce glass smooth surface film of even luster; provide with no cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, and other surface imperfections.
- F. Completed Work: Match approved samples for color, texture and coverage; remove, refinish or repaint work not accepted.

3.3 PAINTING SCHEDULE

- A. Exterior Work: Provide following paint systems and sheens unless otherwise indicated.
 - 1. Metal: Semigloss sheen.
 - a. 1st Coat: Touch-up primer, prime if none.
 - b. 2nd and 3rd Coat: Exterior 100% acrylic enamel.
 - 2. Metal: High-performance coating specified in Section 09 96 70.
 - 3. Concrete: Flat sheen.
 - a. 1st and 2nd Coat: Exterior acrylic latex emulsion.
 - 4. Concrete, Elastomeric Coating:
 - a. Refer to Section 09 96 80 – Elastomeric Coating.
 - 5. Plaster: Flat sheen.
 - a. 1st and 2nd Coat: Heavy body vapor permeable waterproof elastomeric acrylic coating.
 - 6. Plaster: Flat sheen.
 - a. Refer to Section 09 96 80 – Elastomeric Coating.
 - 7. Concrete Masonry Units: Flat sheen.
 - a. 1st Coat: Surface filler.
 - b. 2nd and 3rd Coat: Heavy body waterproof acrylic emulsion.
 - c. Apply filler at rate to ensure coverage with pores filled.
 - 8. Concrete Masonry Units: Flat sheen.
 - a. Refer to Section 09 96 80 – Elastomeric Coating.
 - 9. Fiber Cement Siding: Flat sheen.

- a. 1st Coat: Alkali resistant primer.
 - b. 2nd and 3rd Coat: Exterior 100% acrylic enamel.
- 10. Opaque Finished Wood: Semigloss sheen.
 - a. 1st Coat: Primer undercoat.
 - b. 2nd and 3rd Coat: Exterior 100% acrylic enamel.
- 11. Stained Wood: Flat sheen.
 - a. 1st Coat: Exterior semi-transparent penetrating stain.
- 12. Natural Finish Wood: Flat sheen.
 - a. 1st Coat: Exterior clear penetrating wood sealer and preservative.
- 13. Traffic Line Paint: Manufacturer's standard sheen; colors as required by line or symbol; blue for handicapped parking spaces.
 - a. 1st and 2nd Coat: Water based acrylic/epoxy traffic line paint; other systems subject to prior approval by Architect.
- B. Interior Work: Provide following paint systems and sheens unless otherwise indicated.
 - 1. Gypsum Board Systems: Eggshell (satin) sheen at walls, flat sheen at ceilings, semigloss sheen at toilet rooms.
 - a. 1st Coat: Universal primer.
 - b. 2nd and 3rd Coat: Interior latex or acrylic latex emulsion.
 - 2. Metal: Semigloss sheen.
 - a. 1st Coat: Touch-up primer, prime if none.
 - b. 2nd and 3rd Coat: 100% acrylic enamel.
 - 3. Opaque Finished Wood: Semigloss sheen.
 - a. 1st Coat: Primer undercoat.
 - b. 2nd and 3rd Coat: 100% acrylic enamel.
 - 4. Stained Wood: Satin rubbed sheen.
 - a. 1st Coat: Wood stain.
 - b. 2nd Coat: Sanding sealer.
 - c. 3rd and 4th Coat: Acrylic modified urethane.
 - d. Fill open grained wood with filler and wipe before 2nd coat.
 - 5. Transparent Finished Wood: Satin rubbed sheen.
 - a. 1st Coat: Bleached shellac.
 - b. 2nd and 3rd Coat: Acrylic modified urethane rubbing varnish.
 - c. Fill open grained wood with filler and wipe before 1st coat.

6. Concrete: Flat sheen.
 - a. 1st Coat: Primer sealer.
 - b. 2nd and 3rd Coat: Interior latex emulsion.
7. Concrete Masonry Units:
 - a. Refer to Section 09 96 80 – Elastomeric Coating.
8. Concrete Masonry Units: Semi-gloss sheen..
 - a. 1st Coat: Surface filler.
 - b. 2nd and 3rd Coat: Interior latex emulsion.
 - c. Apply filler at rate to ensure coverage with pores filled.
9. Plaster: Eggshell (satin) sheen at walls, flat sheen at ceilings, semigloss sheen at toilet rooms.
 - a. 1st Coat: Latex primer-sealer.
 - b. 2nd and 3rd Coat: Interior acrylic latex emulsion.
10. Cotton and Canvas Covering Over Insulation: Flat sheen.
 - a. 1st (Size) Coat: Interior latex emulsion.
 - b. 2nd Coat: Interior latex emulsion.
 - c. Add fungicidal agent to render fabric mildew proof.
11. Concrete Floors: Gloss sheen; non-slip finish.
 - a. 1st Coat: Concrete conditioner.
 - b. 2nd and 3rd Coat: Polyurethane coating.
12. Wood Floors: Satin sheen; non-slip finish.
 - a. 1st Coat: Stain and filler as approved by Architect.
 - b. 2nd and 3rd Coat: Clear acrylic modified polyurethane.
- C. Special Whiteboard (Liquid Markers) Interior Wall Paint: Manufacturer's standard sheen and system.
 1. Manufacturers:
 - a. Sherwin-Williams/Dry Erase Coating.
 - b. IdeaPaint (800.393.5250)/White Dry Erase Paint.
 - c. Substitutions: Refer to Section 01 25 00.
- D. Sheens: Comply with ASTM D523, reflectance of paint.
 1. Flat: 1-10.
 2. Satin: 15-30.
 3. Eggshell: 30-45.
 4. Semigloss: 45-75.

5. Gloss: 75-100.

3.2 CLEAN-UP, PROTECTION, AND REPAIR

- A. Clean-Up: During progress of work, remove discarded paint materials, rubbish, cans and rags from site at end of each workday.
 1. Clean glass and paint-spattered surfaces immediately by proper methods of washing and scraping, using care not to scratch or damage finished surfaces.
- B. Protection: Protect work of other trades, whether to be painted or not; correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.
 1. Provide "Wet Paint" signs to protect newly painted finishes.
 2. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
- C. Repair: At completion of work of other trades, touch-up and restore damaged surfaces or defaced painted surfaces.

END OF SECTION

SECTION 09 96 70

HIGH-PERFORMANCE COATING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide high-performance coating system of urethane over epoxy primer as indicated, including surface preparation, priming and high-performance coating application.
 - 1. Location: Provide high-performance coating at exterior steel unless otherwise indicated. Coordinate priming with exterior steel specifications.
- B. Related Work:
 - 1. Section 09 90 00: Standard painting and coating systems.
 - 2. Section 09 96 80: Elastomeric coating for cementitious surfaces.

1.2 SUBMITTALS

- A. Product Data: Manufacturer's technical information, including coating label analysis and application instructions for each material.
- B. Samples: Submit samples for review of color and texture; provide list of material and application for each coat of each finish sample.
 - 1. Provide samples of each color and material with texture to simulate actual conditions.
- C. Certificates: Provide certificate from each manufacturer stating material is top quality line and suitable for intended use on this Project.

1.3 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for paints and coatings.
- B. Installer Qualifications: Minimum of five years successful experience in application of high-performance coating systems of type specified and acceptable to manufacturer of coating system.
- C. Mock-Up: Duplicate finish of approved samples in field at location as approved by Architect, one complete component or approximately 100 square feet, for approval prior to commencing work.
 - 1. Approved mock-up may be incorporated into Project.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, with:
 - 1. Name of material, color and sheen.
 - 2. Manufacturer's name, stock number and date of manufacture.
 - 3. Contents by volume, for major pigment and vehicle constituents.
 - 4. Thinning and application instructions.

1.5 SITE CONDITIONS

- A. Apply high performance coating when temperature of surfaces and surrounding air are between manufacturer recommended temperatures.
- B. Do not apply high performance coating in rain, fog or mist; or when relative humidity exceeds 85-percent; or to damp or wet surfaces.

1.6 WARRANTY

- A. Extended Correction Period: Provide for correcting failure of high-performance coating including peeling, chipping, rusting of substrate, cracking, delamination, chalking, and loss of color and sheen.
 - 1. Period: Two years.
- B. Manufacturer's Warranty: Submit manufacturer's warranty including special manufacturer services as required for manufacturer's warranty.
 - 1. Period: 10 years.
 - 2. Manufacturer's warranty shall not detract from requirements of extended correction period nor from City's rights under implied and expressed warranties regardless of wording of manufacturer's warranty.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. DuPont Co. Maintenance Finishes.
- B. Tnemec Company, Inc.
- C. PPG Protective & Marine Coatings.
- D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide high performance coating system of urethane over epoxy primer as indicated, including surface preparation, priming and high-performance coating application.

- B. Regulatory Requirements, Volatile Organic Compound (VOC) Emissions: Provide materials complying with applicable air quality management requirements for volatile organic compound (VOC) emissions limitations.
- C. Special Coating: High build acrylic polyurethane or aliphatic polyurethane over compatible epoxy primer as recommended by coating manufacturer and suitable for applications indicated and based on quality of following products.
 - 1. Systems:
 - a. DuPont/Imron with 25P primer.
 - b. Tnemec/Endura-Shield II (Series 1075) with Series V69 epoxy primer.
 - c. PPG/AmerShield VOC with Amerlock 400 primer.
 - d. Substitutions: Refer to Section 01 25 00.
 - 2. Special Coating System: Provide specific primer and coating as recommended by manufacturer for applications indicated, conforming to specified requirements.
 - a. 1st Coat: Epoxy primer.
 - b. 2nd and 3rd Coat: High-build acrylic polyurethane or high-build polyurethane.
 - 3. System Requirements:
 - a. Abrasion: ASTM D4060, CS-17 Wheel, 1,000 grams load, no more than 95 mg. loss after 1000 cycles.
 - b. Adhesion: ASTM D3359 Method B (Crosshatch Adhesion), coating applied to sandblasted steel and cured 30 days at 77° F, minimum rating of 5 on average of three tests.
 - c. Humidity: ASTM D4585, no blistering, cracking or delamination of film after 1000 hours exposure.
 - d. Salt Spray (Fog): ASTM B117, no blistering, rusting, cracking, or delamination of film; maximum 1/8" rust creepage at scribe after 1000 hours exposure.
 - e. UV: ASTM G154, no blistering, cracking or chalking, less than 35% gloss loss and less than 3.5 MacAdam unit color change after 1500 hours exposure.
 - 4. Coordination: Provide special coating system compatible with prime paints, undercoats, and barrier coats used.
 - a. Review other Specification sections in which prime paints and zinc-rich touch-coatings up are provided; ensure compatibility of total coatings systems.
 - b. Upon request from other trades furnish information on characteristics of finish materials proposed for use.
 - c. Provide barrier coats over incompatible primers or remove and reprime as required. Reprime with zinc-rich primer where galvanized.

- d. Notify Architect in writing of any anticipated problems in use of specified coating systems with substrates primed by others.
- D. Colors and Finishes:
 - 1. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
 - 2. Final acceptance of colors will be from samples applied on site.
 - 3. Color pigments: Pure, non-fading, applicable types to suit substrates and service indicated; no lead content permitted.
 - 4. Sheen: Gloss; comply with ASTM D523, reflectance of coating, 75-100.
- E. Material Quality: Provide primers produced by same manufacturer as finish coats; use only thinners approved by coating manufacturer and use only within recommended limits.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Inspection: Examine areas and conditions under which high performance coating work is to be applied.
 - 1. Start of high-performance coating work indicates acceptance of surfaces and conditions of surfaces and conditions within any particular area.
 - 2. Do not apply coating over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to a durable coating.
- B. Perform preparation and cleaning procedures in accordance with coating manufacturer's instructions and as specified for substrate condition.
- C. Remove items in place and not to be coated or provide protection prior to application of high-performance coating; after application of coating reinstall removed items.
- D. Clean surfaces before applying high-performance coating; remove oil and grease prior to mechanical cleaning; program cleaning so contaminants from cleaning process do not fall onto wet, newly coated surfaces.
- E. Metal Preparation: Comply with coating manufacturer recommendations, but not less than following requirements.
 - 1. Bare Surfaces: Clean surfaces which are not galvanized or shop-coated, of oil, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
 - 2. Galvanized Surfaces: Clean free of oil and surface contaminants, using non-petroleum-based solvent.

3. Painted Surfaces: Clean surfaces of loose paint, dirt, and foreign substances by mechanical cleaning; feather edges of existing paint to provide smooth, even substrate for high performance coating.
- F. Mix materials in accordance with manufacturer's directions.
- G. Store materials in tightly covered containers; maintain containers used in storage, mixing and application of coating in a clean condition, free of foreign materials and residue.
- H. Stir materials before application to produce mixture of uniform density and stir as required during application; do not stir surface film into material, if necessary, strain material before using.

3.2 APPLICATION

- A. Apply high performance coating in accordance with manufacturer's directions; use applicators and techniques best suited for substrate and coating material being applied.
 1. Apply additional coats when stains or blemishes show through final coat, until coating is a uniform finish, color and appearance.
 2. Provide extra attention to assure dry film thickness at corners and crevices is equivalent to that of flat surfaces.
- B. Scheduling: Apply first coat to surfaces that have been cleaned, pretreated or prepared for high performance coating as soon as practicable after preparation.
 1. Allow time between successive coatings to permit proper drying.
 2. Do not recoat until coating feels firm and does not deform or feel sticky under moderate thumb pressure.
- C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as recommended by coating manufacturer.
- D. Prime Coats: Apply to items not previously primed; recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat.
- E. Finish Coats: Provide even texture; leave no laps, irregularity in texture, skid marks, or other surface imperfections; edges clean and sharp where work joins other materials and colors.
 1. Provide opaque, uniform finish, color and coverage; cloudiness, spotting, holidays, brush marks, runs, sags, ropiness and other surface imperfections are not acceptable.
- F. Completed Work: Match approved samples and mock-up for color, texture and coverage. Remove, refinish or recoat work not accepted.

3.3 CLEAN-UP, PROTECTION AND REPAIR

- A. Clean-Up: During progress of work, remove discarded coating materials, rubbish, cans and rags from site at end of each workday.
 - 1. Clean glass and coating-spattered surfaces immediately by proper methods of washing and scraping, using care not to scratch or damage finished surfaces.
- B. Protection: Protect work of other trades, whether to be coated or not; correct damage by cleaning, repairing or replacing, and refinishing, as acceptable to Architect.
 - 1. Provide "Wet Coating" or "Wet Paint" signs to protect newly coated surfaces.
 - 2. Remove temporary protective wrappings provided by others for protection of their work, after completion of coating operations.
- C. Repair: At completion of work of other trades, touch-up and restore damaged surfaces and defaced coated surfaces.

END OF SECTION

SECTION 09 96 80

ELASTOMERIC COATING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide opaque exterior waterproof elastomeric coating system as required for complete weather-tight application.
 - 1. Provide elastomeric coating over concrete substrates where indicated.
 - 2. Provide elastomeric coating over concrete masonry substrates.
 - 3. Provide elastomeric coating over Portland cement plaster substrates.
- B. Related Work:
 - 1. Section 09 90 00: Standard paint and coating systems.
 - 2. Section 09 96 70: High performance coatings for exterior steel.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information, including label analysis and application instructions for each material.
 - 1. Provide certificate from manufacturer stating material is suitable for intended use on this Project.
 - 2. Documentation: Provide for procedures used in preparation of site tests of substrates.
- B. Samples: Submit samples for review of color and texture; provide list of material and application for each coat of each finish sample.
 - 1. Submit samples of each color and material with texture to simulate actual conditions, on hardboard.
 - 2. Duplicate finishes of approved samples on actual wall surfaces for approval prior to commencing work.
 - a. Size: Minimum 100 sf, located where approved.
- C. Certificate: Furnish certificate from manufacturer stating materials are top quality lines and suitable for intended use on this Project.

1.3 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for paints and coatings.
- B. Applicator: Company with minimum five years successful experience with comparable coating projects and acceptable to coating material manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, with following information.
 - 1. Name of material, color and sheen.
 - 2. Manufacturer's name, stock number and date of manufacture.
 - 3. Contents by volume, for major pigment and vehicle constituents.
 - 4. Thinning and application instructions.
- B. Store materials in tightly covered containers; maintain free of foreign materials and residue; do not use materials stored for more than one year.
- C. Protect from potential fire hazard.

1.5 PROJECT CONDITIONS

- A. Apply materials when temperature of surfaces and surrounding air are between 50 and 90-degrees F unless otherwise noted in manufacturer's literature.
- B. Do not apply coating in rain, fog or mist; or when relative humidity exceeds 85-percent; or to damp or wet surfaces.

1.6 WARRANTY

- A. Extended Correction Period: Provide for correcting failure of elastomeric coating due to water leakage, fading, chalking, and failure in adhesion to substrate.
 - 1. Period: Two years.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Frazee Paints/EMC Elasto-Wall.
- B. United Coatings/Aquathon.
- C. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide water-based 100% acrylic opaque exterior waterproof elastomeric coating system.
 - 1. Coating to be waterproof while still allowing water vapor to pass through coating to exterior.
- B. Regulatory Requirements: Furnish materials approved for use by applicable Air Quality Management District for limitations of volatile organic compounds for architectural or special coatings as applicable.

- C. Manufacturer: Established firm capable of producing premium quality commercial grade elastomeric coating system as required for complete installation, with minimum five years successful experience manufacturing materials provided for Project.
 - 1. Provide materials from single manufacturer, including surface preparation materials, primers, surface treatments, and coatings.
- D. Colors and Finishes: Prior to commencement of painting work, Architect will furnish color chips for surfaces to be painted.
 - 1. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
 - 2. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated; lead free.
 - 3. Final acceptance of colors will be from samples applied on site.
 - 4. Provide finish capable of being washed with mild detergent without loss of color, sheen, or pigments.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which painting work is to be applied.
- B. Start of application of coating system indicates acceptance of surfaces and conditions of surfaces and conditions within any particular area.
- C. Do not apply coating system over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to a durable paint film.

3.2 PREPARATION

- A. Perform preparation and cleaning procedures in accordance with coating manufacturer instructions and as specified for substrate condition.
- B. Remove hardware, accessories, and items in place and not to receive coating, or provide protection prior to surface preparation and application of coating; after application of coating system reinstall removed items.
- C. Clean surfaces before applying elastomeric coating; remove oil and grease prior to mechanical cleaning; program cleaning so contaminants from cleaning process do not fall onto wet, newly coated surfaces.
- D. Cementitious Materials: Prepare by removing efflorescence, chalk, dirt, grease, oils, and by roughening as required to remove glaze.
 - 1. Determine alkalinity and moisture content of surfaces to receive coating system.
 - 2. Neutralize before application of coating if surfaces are found to be sufficiently alkaline to cause blistering and burning of finish.

3. Do not apply coating over surfaces where moisture content exceeds manufacturer's printed directions.
- E. Mix materials in accordance with manufacturer's directions.
- F. Store materials in tightly covered containers; maintain containers used in storage, mixing and application of coating system in a clean condition, free of foreign materials and residue.
- G. Stir materials before application to produce mixture of uniform density, and stir as required during application; do not stir surface film into material, if necessary, strain material before using.
- H. Patch surface cracks and voids greater than 1/16" in accordance with coating manufacturer recommendations.

3.3 APPLICATION

- A. Apply elastomeric coating in accordance with manufacturer's directions; use applicators and techniques best suited for substrate and type of material being applied.
 1. Apply additional coats when stains or blemishes show through final coat, until coating has uniform finish, color and appearance.
 2. Provide extra attention to assure dry film thickness at corners and crevices is equivalent to that of flat surfaces.
 3. Where airless spray methods are used, back roll or brush surface where required to provide approved finish and texture.
- B. Scheduling Application of Coating: Apply first coat to surfaces that have been cleaned, pretreated or prepared for painting as soon as practicable after preparation.
 1. Allow time between successive coatings to permit proper drying.
 2. Do not recoat until coating feels firm and does not deform or feel sticky under moderate thumb pressure.
- C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as recommended by coating manufacturer.
- D. Finish Coats: Provide even texture; leave no laps, irregularity in texture, skid marks, or other surface imperfections.
 1. Finish: Provide opaque, uniform finish, color and coverage; cloudiness, spotting, holidays, brush marks, runs, sags, ropiness and other surface imperfections are not acceptable.
- E. Protect primer and finish materials from rain and surface water for minimum three hours after application.

- F. Completed Work: Match approved samples for color, texture and coverage; remove, refinish or repaint work not accepted.

3.4 FIELD QUALITY CONTROL

- A. Site Testing of Substrates: Test substrates to receive coating.
 - 1. Conduct tests on each building exposure and each type of substrate in unobtrusive locations as approved by Architect.
 - 2. Conduct tests on adjacent materials for possible reaction with coating materials.
 - 3. Develop evaluation of materials and techniques proposed for protection of surrounding surfaces prior to application for mock-up.
- B. Inspections: Manufacturer's representative shall inspect application of elastomeric coating on regular basis and advise applicators of proper procedures and methods.

3.5 CLEAN-UP, PROTECTION, AND REPAIR

- A. Clean-Up: During progress of work, remove discarded coating materials, rubbish, cans and rags from site at end of each workday.
 - 1. Clean glass and spattered surfaces immediately by proper methods of washing and scraping, using care not to scratch or damage finished surfaces.
- B. Protection: Protect work of other trades, whether to receive elastomeric coating or not; correct damage by cleaning, repairing or replacing, and refinishing.
 - 1. Provide "Wet Paint" signs to protect newly coated surfaces.
 - 2. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
- C. Repair: At completion of work of other trades, touch-up and restore damaged surfaces and surfaces defaced by application of elastomeric coating system.

END OF SECTION

SECTION 10 14 00

SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide general signage as indicated complete with attachment devices and accessories as required for complete installation.
- B. Related Sections:
 - 1. Section 09 90 00: Traffic line paint.
 - 2. Section 10 44 00: Fire extinguisher cabinet graphics.

1.2 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature and indicate each sign type, style, color, and method of attachment.
- B. Shop Drawings: Furnish listing of sign types, lettering and locations, along with dimensions of each sign.
 - 1. Computerized Output: Furnish computerized samples of signs and graphics at full scale duplicating final appearance.
 - 2. Dimensional Letter Signs: Furnish complete shop drawings regarding fabrication and method of attachment of dimension letter signs.
- C. Certification: Furnish manufacturer certification that photoluminescent egress path markings and signage conform to California Building Code requirements.

1.3 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for adhesives.
- B. Signage and Graphics
 - 1. Raised Characters shall comply with CBC Section 11B-703.2.
 - a. Depth: It shall be 1/32 inch minimum above their background and shall be sans serif uppercase and be duplicated in Braille.
 - b. Height: It shall be 5/8" minimum and 2 inches maximum based on the height of the uppercase letter "I". CBC Section 11B-704.2.5.
 - c. Finish and Contrast: Characters and their background shall have a non-glare finish. Character shall contrast with their background with either light characters on a dark background or dark characters on a light background. CBC Section 11B-703.2.5.1.

- d. Proportions: It shall be selected from fonts where the width of the uppercase letter "O" is a 60% minimum and 110% maximum of the height of the uppercase letter "I". Stroke thickness of the uppercase letter "I" shall be 15% maximum of the height of the character. CBC Sections 11B-703.2.4 and 11B-703.2.6.
- e. Character Spacing: Spacing between individual raised characters shall comply with CBC Section 11B-703.2.7 and 11B-703.2.8.
- f. Format: Text shall be in a horizontal format. CBC Section 11B-703.2.9.
- g. Braille: It shall be contracted (Grade 2) and shall comply with CBC Sections 11B-703.3. and 11B-703.4. Braille dots shall have a domed or rounded shape and shall comply with CBC Table and Figure 11B-703.4.1.
- h. Mounting Height: Tactile characters on signs shall be located 48" minimum to the baseline of the lowest Braille cells and 60" minimum to the baseline of the highest line of raised characters above the finish floor or ground surface. CBC Section and Figure 11B-703.4.1.
- i. Mounting Location: A tactile sign shall be located per CBC Section and Figure 11B-703.4.2 as follows:
 - 1) Alongside a single door at the latch side.
 - 2) On an inactive leaf at double doors with one active leaf
 - 3) To the right of the right had door at double doors with two active leafs.
 - 4) On the nearest adjacent wall where there is no wall space at the latch side of a single door or at the right side of double doors with two active leafs.
 - 5) So that a clear floor space of 18" x 18" minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position.
- j. Visual characters shall comply with CBC Section 11B-703.5 and shall be 40" minimum above finish floor or ground.
- k. Pictograms shall comply with CBC Section 11B-703.6.
- l. Symbols of accessibility shall comply with CBC Section 11B-703.7.
- m. Variable message signs shall comply with CBC Section 11B-703.8.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Package separately or in like groups of names, labeled as to names enclosed; include installation template, attachment system and installation instructions.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. ASI Modulex, ASI Sign Systems, Inc.
- B. Mohawk Sign Systems.
- C. Vomar Products, Inc.
- D. Gannon Design
- E. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide signage as indicated with attachment devices and accessories.
- B. Regulatory Requirements: Provide signs for assuring access for persons with disabilities in accordance with state and federal regulations.
 - 1. California Regulations: Comply with California Building Code.
 - 2. Federal Regulations: Comply with Americans with Disabilities Act (ADA) Standards.
- C. Dimensional Letter Signage: Provide individual letter signs as indicated.
 - 1. Aluminum: Manufacturer's standard for individual letter signs.
 - a. Finish: Clear anodized finish, AA-M12C22A41, Class I, AAMA 607.1.
 - 2. Stainless Steel: ASTM A666, Type 304 nonmagnetic corrosion resistant stainless steel with No. 4 satin directional polish finish.
 - 3. Fabrication: Fabricate dimensional letters as indicated, of minimum 0.25" plate or casting with edges and corners smooth and finished to match adjacent metal finishes.
 - 4. Attachment: Secure letters using connections concealed after installation; method subject to Architect approval.
 - a. Take care back welding does not damage exposed sign surfaces.
- D. Toilet Room Door Signs: Provide door signs conforming to California requirements for signs for toilet rooms; concealed mounting system.
 - 1. Material, Plastic: Manufacturer's standard colored plastic/photopolymer signs.
 - a. Texture: Smooth.
 - b. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

2. Material:
 - a. Aluminum: Manufacturer's standard for individual letter signs.
 - 1) Finish: Clear anodized finish, AA-M12C22A41, Class I, AAMA 607.1.
 - b. Stainless Steel: ASTM A666, Type 304 nonmagnetic corrosion resistant stainless steel with No. 4 satin directional polish finish.
3. Total Thickness: 0.25".
4. Provide signs required by California Code of Regulations Title 24.
 - a. Men's Room: 12" equilateral triangle, vertex pointing up.
 - b. Ladies' Room: 12" diameter circle.
 - c. Unisex Toilet: 12" diameter circle with equilateral triangle, vertex pointing up, superimposed on the circle; circle and triangle each 0.25" thick.
 - 1) Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
5. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
6. Symbols: As selected from manufacturer's standard symbols.
7. Adhesive: Type as recommended by sign manufacturer for type of substrate involved.
- E. Toilet Room Wall Signs: Provide signs conforming to California Building Code and ADA Standards for signs for permanent rooms, with inset symbols and with raised and Braille characters; concealed mounting system.
 1. Material, Plastic: Manufacturer's standard colored plastic/photopolymer signs.
 - a. Texture: Smooth.
 2. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
 3. Material:
 - a. Aluminum: Manufacturer's standard for individual letter signs.
 - 1) Finish: Clear anodized finish, AA-M12C22A41, Class I, AAMA 607.1.
 - b. Stainless Steel: ASTM A666, Type 304 nonmagnetic corrosion resistant stainless steel with No. 4 satin directional polish finish.
 4. Comply with California Building Code and ADA Standards for raised and Braille characters, pictorial symbols, finish, and contrasts requirements.

- F. Entry Decals: Provide minimum 6" square decals with international handicapped symbol white on blue background with white border, applied to glass at accessible entry doors of existing buildings where all entry doors are not accessible.
- G. Stairway Signs: Provide colored plastic/photopolymer signs in stairways, conforming to California Building Standards Code, Section 1013.4.
 - 1. Lettering: Type as required by CBC.
 - 2. Colors, Size, and Style: Conform to referenced code requirements and as approved by Architect.
 - a. Colors: Where color is not indicated on Drawings or Finish Schedule or specifically required by applicable code, provide custom color as directed by Architect.
 - 3. Information: Identify stairway, indicate whether there is roof access, floor level, and upper and lower terminus of stairway, and story of and direction to exit discharge.
 - 4. Provide raised five-pointed star located to left of identifying floor level at exit discharge level.
 - 5. Provide Floor Identification Signs required by CBC including both tactile and Braille sign.
 - 6. Provide photoluminescent egress path marking and signs as required by California Building Code for high rise buildings and as specified for photoluminescent egress markings and signage.
- H. Porcelain Signs at Parking: Provide porcelain enamel on steel sign with beaded text and symbols meeting requirements of California Building Standards Code and with ADA Standards.
 - 1. At entry to parking provide state required sign indicating unauthorized vehicles parking in accessible parking spaces may be towed at City's expense using exact wording required by CBC.
 - 2. Verify location and telephone number of location vehicle is to be towed with City; place this information as permanent part of sign wording.
 - 3. At parking spaces provide California required reflectorized sign, minimum 70 sq. inches, with symbol indicating accessibility.
 - 4. At van accessible parking spaces provide required "VAN PARKING" signs.
- I. Tactile Exit Door Signs: Provide colored plastic/photopolymer signs, conforming to California Building Code Section 1013.4 and ADA Standards for signs for permanent rooms, with tactile raised and Braille characters; concealed mounting system.
 - 1. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
 - 2. Size and Style: As indicated on Drawings.

- J. Room Identification and Direction Signs: Provide signs conforming to California and ADA Standards for permanent signs, total thickness 0.125"; provide raised and Braille characters conforming to California and ADA Standards; concealed mounting.
 - 1. Material, Plastic: Manufacturer's standard colored plastic/photopolymer signs.
 - a. Texture: Smooth.
 - 2. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
 - 3. Material:
 - a. Aluminum: Manufacturer's standard for individual letter signs.
 - 1) Finish: Clear anodized finish, AA-M12C22A41, Class I, AAMA 607.1.
 - b. Stainless Steel: ASTM A666, Type 304 nonmagnetic corrosion resistant stainless steel with No. 4 satin directional polish finish.
 - 4. Sizes and Styles: As indicated on Drawings, as directed by Architect where not otherwise indicated.
- K. Applied Copy Signs and Graphics: Letters and graphics as indicated on Drawings; Contractor option of silk-screen or vinyl applied.
 - 1. Silk-screen Signs and Graphics: Computer design screens for signs and graphics to designs and criteria established by Architect.
 - a. Silk-screen Lacquer: Match Advanced Screen Products/Industrial Gloss Lacquer Silk-screen Ink; colors as selected by Architect.
 - 2. Vinyl Signs and Graphics: Computer design vinyl signs and graphics to designs and criteria established by Architect.
 - a. Vinyl: Opaque non-reflective vinyl film, minimum 0.0035" thick, with pressure sensitive adhesive backing suitable for applications indicated; match 3M/Scotchcal Vinyl Film.
 - 3. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
- L. Tactile Emergency Evacuation Signs: Silk-screened polycarbonate with screening on back and with tactile and Braille information conforming to California requirements and ADA Standards.
 - 1. Information: Provide sign system with information as required by applicable authorities for emergency egress.
 - 2. Silk-Screen Colors:
 - a. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

- b. Silk-screen Lacquer: Match Advanced Screen Products/Industrial Gloss Lacquer Silk-screen Ink; colors as selected by Architect.
- 3. Size and Style: As indicated on Drawings and acceptable to applicable authorities.
- 4. Attachment: Method subject to Architect approval.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install signs in accordance with manufacturer recommendations and installation instructions, free from distortions and defects.
- B. Dimensional Letter Signage: Locate dimensional letters with spacing based on full-size computer-generated installation drawings secured to structure as required to resist anticipated loads.
 - 1. Final Location: As approved in field by Architect based on full size drawings.
- C. Toilet Room Door Signs: Install signs on doors after doors are painted and finished.
 - 1. Location: Mount signs with centerline of sign between 58" and 60" height as required by applicable code.
 - 2. Install centered and level, in line, in accordance with the manufacturer's recommendations.
 - 3. Clean and polish, remove excess adhesive.
- D. Toilet Room Wall Signs: Install signs on walls after surfaces on which they are to be mounted are painted and finished.
 - 1. Location: Mount signs at 48" to 60" height as required by applicable codes on strike side of door.
 - 2. Location: Mount signs with tactile characters 48" minimum (baseline of lowest Braille cells) and 60" maximum (baseline of highest line of raised characters) above finished floor and with on strike side of door for room identification signs as required by applicable codes, at heights indicated on details.
 - 3. Install level, in line, in accordance with California Building Code and ADA Standards to allow a person to approach within 3" of signs without being within a door swing and without encountering protruding objects.
 - 4. Clean and polish, remove excess adhesive.
- E. Entry Signs: Install in locations as approved by Architect.
- F. Stair Signs: Install signs inside stairwell after walls are finished, at locations immediately adjacent to door on strike side as required by referenced code, readily visible when door is open.

1. Location: Mount signs at 48" to 60" height as required by applicable codes.
- G. Parking Signs: Provide mounting hardware, including painted posts, as needed; mount signs at heights required by state code.
 1. Install parking entry sign at location as directed by Architect.
- H. Tactile Exit Door Signs: Install at doors with lighted "EXIT" signs; apply after walls are finished.
 1. Location: Mount signs at 48" to 60" height as required by applicable codes on strike side of door.
 2. Install level, in line, in accordance with the manufacturer's recommendations and ADA Standards to allow a person to approach within 3" of signs without being within a door swing and without encountering protruding objects.
 3. Clean and polish, remove excess adhesive.
- I. Room Identification and Direction Signs: Install signs after walls are finished.
 1. Location: Mount signs at 48" to 60" height as required by applicable codes on strike side of door for room identification signs, where indicated for direction signs.
 2. Room Identification Signs Location: Mount signs with tactile characters 48" minimum (baseline of lowest Braille cells) and 60" maximum (baseline of highest line of raised characters) above finished floor and with on strike side of door for room identification signs and where indicated for directional signs.
 3. Install signs level, in line, in accordance with the manufacturer's recommendations, California Building Code and ADA Standards.
 4. Install room identification signs at doors to allow a person to approach within 3" of signs without being within a door swing and without encountering protruding objects.
 5. Clean and polish, remove excess adhesive.
- J. Applied Copy Signs and Graphics: Examine surfaces and construction for conditions adversely affecting installation, performance and quality of work.
 1. Apply signage and graphics centered and level, in line, in accordance with manufacturer's recommendations.
- K. Emergency Evacuation Signs: Install signs after walls are finished.
 1. Location: Mount signs at locations indicated, as directed by Architect and applicable authorities if not otherwise indicated.
 2. Install signs level and in accordance with the manufacturer's recommendations and requirements of applicable authorities.
 3. Clean and polish.

- L. Photoluminescent Egress Path Markings and Signage: Install exit path marking and signage as required by applicable codes.

END OF SECTION

SECTION 10 28 00

TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide toilet accessories with attachment hardware and rough-in frames as required for complete, operational installation.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data illustrating each accessory at large scale.
- B. Samples: Provide one sample of each type of fixture specified.

1.3 QUALITY ASSURANCE

- A. Sustainability Requirements: Comply with *CALGreen* requirements including those relative to finish material pollution control for adhesives.
- B. Sanitary Facility Elements:
 - 1. Elements of Sanitary facilities shall be mounted at locations in compliance with CBC Sections 11B-602 through 11B-612.
 - 2. Grab bars in toilet facilities and bathing facilities shall comply with CBC Section 11B-609.
 - a. Grab bars and any wall or other surfaces adjacent to grab bars shall be free of sharp or abrasive elements and shall have rounded edges. The space around the grab bars shall be as follows:
 - 1) 1 ½" between the grab bar and the wall
 - 2) 1 ½" minimum between the grab bar and projecting objects below and at the ends.
 - 3) 12" minimum between the grab bar and projecting objects above.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver inserts and rough-in frames to jobsite at appropriate time for building in.
- B. Do not deliver accessories to site until rooms in which they are to be installed are ready to receive them.
- C. Pack accessories individually, protect each item and its finish.

1.5 SITE CONDITIONS

- A. Protect adjacent or adjoining finished surfaces from damage during installation of work of this section.
- B. Before starting work notify Architect in writing of conditions detrimental to installation or operation of units.
- C. Verify with Architect exact location of accessories.

1.6 WARRANTY

- A. Extended Correction Period:
 - 1. Replace mirrors which exhibit signs of desilvering or distortion.
 - 2. Period: Two years.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Bobrick Washroom Equipment, Inc.
- B. Bradley Corporation.
- C. American Specialties, Inc.
- D. Manufacturers listed on Toilet Accessories Schedules.
- E. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide toilet accessories with attachment hardware and rough-in frames.
 - 1. Provide standard materials and finishes for accessories listed; where more than one material or finish is available and not otherwise indicated provide as selected by Architect from manufacturer's standard materials and finishes.
- B. Regulatory Requirements - Access for Persons with Disabilities: Comply with California Building Standards Code and Americans with Disabilities Act (ADA) Standards.
- C. Stainless Steel Sheet: ASTM A666, commercial grade, Type 304, gages as standard with manufacturer of specified items.
- D. Stainless Steel Tubing: ASTM A269, commercial grade, seamless welded.
- E. Mirror Glass: ASTM C1036, q1 mirror select clear float glass with full silver coating, copper coating and organic coating; minimum 1/4" thick.

- F. Sheet Steel: ASTM A1008, cold rolled stretcher leveled; minimum G90 galvanized coating, ASTM A924 and A653.
- G. Adhesive: Epoxy type contact cement as recommended by accessory manufacturer; comply with applicable requirements for limitations on volatile organic compound (VOC) emissions.
- H. Fasteners, Screws, and Bolts: Hot dip galvanized; as recommended by accessory manufacturer for component and substrate.
- I. Keys: Provide universal keys for access to toilet accessory units requiring internal access for servicing and supply.
 - 1. Provide minimum six keys to City representative.
 - 2. Coin Operated Units: Provide locked coin box keyed separately from standard units, coin operated units keyed alike.

2.3 FABRICATION

- A. Weld and grind smooth joints of fabricated components.
- B. Form exposed surfaces from one sheet of stock, free of joints.
- C. Fabricate units with tight seams and joints, exposed edges rolled; hang doors and access panels with continuous piano hinges; provide concealed anchorage where possible.
- D. Provide steel anchor plates and anchor components for installation on building finishes.
- E. Form surfaces flat without distortion; maintain flat surfaces without scratches and without dents; finish exposed edges eased, free of sharp edges where potential exists for physical contact.
- F. Back paint components where contact is made with building finishes, to prevent electrolysis.
- G. Hot-dip galvanize ferrous metal anchors and fastening devices.
- H. Assemble components in shop; package complete with anchors and fittings.

2.4 FINISHES

- A. Exposed Finishes: Stainless steel, number 4, satin finish; satin chrome finish acceptable where stainless steel not available for accessory item listed or scheduled.
- B. Concealed Surfaces: Treat and clean, spray-apply one coat primer and baked enamel finish.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Provide templates and rough-in measurements.

3.2 INSTALLATION

- A. Install accessories in accordance with manufacturer's printed instructions using fasteners appropriate to substrate.
- B. Install true, plumb and level, securely and rigidly anchored to substrate.
- C. Use tamper-proof, security type fasteners.
- D. Adjust accessories for proper operation and verify mechanisms function smoothly.
- E. Replace damaged and defective items.
- F. Clean and polish exposed surfaces after removing temporary labels.

3.3 TOILET ACCESSORIES SCHEDULE

- A. Refer to Drawings.

END OF SECTION

SECTION 10 44 00

FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide fire extinguisher cabinets with accessories as required for complete installation.
 - 1. Semi-Recessed: Provide semi-recessed mounted fire extinguisher cabinets with exposed frame (trim); maximum 4" projection from finished wall surface.
 - 2. Surface Mounted: Provide surface mounted fire extinguisher cabinets with exposed frame (trim) for garage and areas not in a path of travel.
 - 3. Fire Extinguishers: City furnished and installed.
- B. Related Sections:
 - 1. Division 21: Fire protection systems.

1.2 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature.

1.3 REGULATORY REQUIREMENTS

- A. Fire Extinguisher Cabinets
 - 1. Fire Extinguisher Cabinets must comply with CBC Sections 11B-307, 11B-308, 11B-309, and 11B-403.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. J.L. Industries.
- B. Larsen's Manufacturing Co.
- C. **Potter Roemer. (Basis of Design)**
 - 1. Model: "Dana" 7250-7265 series, stainless steel, with duo-vertical panel with rolled radius return
 - 2. Mount: Recessed
 - 3. Finish: #304 stainless steel with #4 finish
 - 4. Lettering: Vertical ascending in red (-VAR)

D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. Systems Description: Provide fire extinguisher cabinets with accessories.

1. Public Areas: Flush recessed fire extinguisher cabinets.
2. Back-of-House Areas: Semi-recessed exposed frame fire extinguisher cabinets.
3. Masonry Walls: Surface mounted exposed frame fire extinguisher cabinets.

B. Flush Trimless Fire Extinguisher Cabinets:

1. Type:
 - a. J.L. Industries/Embassy Series.
 - b. Larsen's Mfg. Co./Occult Series.
 - c. Potter Roemer/Dana Series.
 - d. Substitutions: Refer to Section 01 25 00.
2. Cabinet Depth: Provide cabinets designed for space available in walls with fire extinguisher cabinets, and of sufficient depth to house 2A-10BC multi-purpose dry chemical type fire extinguisher.
3. Frame: Trimless with recessed door frame flush with finish wall.
4. Metal Gages: Manufacturer's standard for series specified.
5. Box: Provide manufacturer's standard box with white baked enamel interior finish and baked enamel exterior finish.
6. Doors: Steel, full flush metal panel, with break-glass or manufacturer's standard similar secure access type panel; provide thermosetting primer compatible with finish specified in Section 09 90 00 – Painting and Coating.
7. Door Hardware: Manufacturer's standard for secured access fire extinguisher cabinets panel with inside latch and lock.

C. Fire Extinguisher Cabinets with Exposed Frame (Trim): Provide semi-recessed mounting unless otherwise indicated, with maximum 4" extension from face of wall, provide trim suitable for installation indicated.

1. Type:
 - a. J.L. Industries/Ambassador Series.
 - b. Larsen's Mfg. Co./Architectural Series.
 - c. Potter Roemer/ Dana Series Basis of Design
 - d. Substitutions: Refer to Section 01 25 00.
2. Cabinet Depth: Provide cabinets designed for space available in walls with fire extinguisher cabinets, and of depth to house 2A-10BC multi-purpose dry chemical type fire extinguisher.
3. Trim: Manufacturer's standard edge trim for specified models.

4. Metal Gages: Provide manufacturer's standard gages for cabinets specified.
 5. Construction: Mitered and welded one-piece tubular door frames; weld joints and grind smooth; manufacturer's standard steel box with white baked enamel interior finish and primed exterior finish.
 - a. Steel Doors and Trim: Manufacturer's standard, prime coat finished.
 - b. Doors: Break-glass type secured access, with inside latch and lock.
 - c. Door Hardware: Continuous hinge permitting door to open 180 degrees.
- D. Surface Mounted Fire Extinguisher Cabinets:
1. Types:
 - a. J.L. Industries/Ambassador Series.
 - b. Larsen's Mfg. Co./Architectural Series.
 - c. Potter Roemer/Dana Series. Basis of Design
 - d. Substitutions: Refer to Section 01 60 00 Product Requirements.
 2. Cabinet Depth (Typical): Provide cabinets designed for space available in walls with fire extinguisher cabinets, and of depth to house 2A-10BC multi-purpose dry chemical type fire extinguisher.
 3. Type: Fully exposed, mounted directly to wall, with manufacturer's standard rolled edge trim based on specified cabinets.
 4. Metal Gages: Provide cabinets fabricated of minimum 18-gage throughout, 20-gage permitted for back.
 5. Construction: One-piece tubular door frames mitered and welded; weld joints and grind smooth; manufacturer's standard steel box with white baked enamel interior finish and primed exterior finish.
 - a. Steel Doors and Trim: Manufacturer's standard, prime coat finished.
 - b. Doors: Break-glass or similar secured access panel, with inside latch and lock.
 - c. Door Hardware: Continuous type hinge permitting door to open 180 degrees.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions under which fire extinguisher cabinets are to be installed.
- B. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install cabinets in locations and at mounting height to comply with requirements of governing authorities; prepare recesses in walls as required.

- B. Securely fasten to structure, square and plumb, in accordance with manufacturer's instructions.

- 1. Wherever exact location of units is not shown, locate as directed by Architect.

3.3 IDENTIFICATION

- A. After installation and finishing is completed, silkscreen or apply decal letters spelling "FIRE EXTINGUISHER" as applicable.
- B. Letter size, style and location as selected by Architect.

END OF SECTION

SECTION 10 51 00

METAL LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide heavy duty metal lockers with metal base, sloped tops, hardware, hooks, latches and attachment hardware, and infill panels as required for complete finished installation.
 - 1. Fixed Locker Room Benches: Provide stock hardwood benches with metal supports matching lockers and accessories as required for complete finished installation. Provide benches as required for access for persons with disabilities.

1.2 REFERENCES

- A. Americans with Disabilities Act (ADA) Standards.
- B. California Building Code: California Code of Regulations, Title 24, Part 2, requirements for providing accessibility for persons with disabilities.

1.3 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature.
- B. Shop Drawings: Indicate locker types, sizes, configurations, details, layout of groups of lockers, accessories, color and finish, and numbering.
- C. Samples: Furnish samples of metal finish.
 - 1. Furnish one full size locker, pay shipping costs for supply and return of sample locker; if approved, locker may be incorporated into work.

1.4 SITE CONDITIONS

- A. Protect locker finishes and adjacent surfaces and materials from damage or marring during installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. DeBourgh Mfg. Co.
- B. List Industries.
- C. Lyon Metal Products, Inc.
- D. Penco Products.

- E. Republic Storage Systems Company.
- F. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide heavy duty metal lockers with metal base, sloped tops, hardware, hooks, latches, attachment hardware, and infill panels.
 - 1. Provide fixed wood locker room benches.
- B. Regulatory Requirements, Access: Comply with California Building Code and Americans with Disabilities Act (ADA) Standards.
- C. Lockers: Double tier type unless otherwise indicated.
 - 1. Base: Recessed, "Z" type closed metal base.
 - 2. Tops: Continuously sloping type.
 - 3. Fillers: Provide filler panels to close off openings between lockers and between lockers and adjacent construction.
 - 4. Accessible Lockers: Size as required to comply with requirements for access for persons with disabilities.
- D. Sheet Steel: ASTM A526; commercial quality, zinc-coated, carbon steel sheet, hot-dip galvanized according to ASTM A924 and A653, with minimum A60 (ZF 180) or G 60 (Z 180) coating designation.
 - 1. Manufacturer's standard gages for heavy duty lockers materials but not less than following.
 - a. Body and Shelf: Minimum 24 gage.
 - b. Exposed Ends: Minimum 16 gage.
 - c. Doors: Minimum 14 gage.
 - d. Door frames: Minimum 16 gage.
 - e. Hinges: Minimum 14 gage.
 - f. Metal Base: Minimum 16 gage.
 - g. Metal Top: Minimum 20 gage.
 - h. Filler Panels: Minimum 18 gage.
- E. Fittings: Manufacturer's standard fittings for locker types indicated, including locking handle, coat hooks, shelves, door numbers, and rubber bumpers.
 - 1. Provide tamper proof handles with built-in padlock hasps.
 - 2. Fasteners: Zinc or nickel-plated steel; slotless type exposed bolt heads; self-locking nuts or lock washers for nuts on moving parts.
 - 3. Finishes: Manufacturer's standard plated steel hooks.

- F. Fixed Wood Benches: 1-1/4" thick hardwood, 9-1/2" wide typical, varnished; steel pipe pedestals at not over 6'-0" centers.
 - 1. Accessible Benches: Size as required to comply with requirements for access for persons with disabilities.

2.3 FABRICATION

- A. Sizes: Refer to Drawings.
- B. Bodies: Form backs, tops, bottoms, sides, and intermediate partitions of flanged sheet steel.
- C. Door: One-piece steel sheet, flanged at all edges, constructed to prevent springing when opening or closing; fabricate to swing 180-degrees.
 - 1. Provide recessed number plates; number doors consecutively in accordance with Architects instructions.
 - 2. Locking Handle: Recessed cup type with lifting trigger.
- D. Door Frame: Formed channel shapes.
- E. Provide ventilation openings at top and bottom of each locker.
- F. Finish edges smooth without burrs.
- G. Fabricate lockers square, rigid, and without warp, with metal faces flat and free of dents and distortions.
- H. Fabricate lockers for quiet operation with manufacturer's standard rattle-free latching mechanism and moving components isolated to prevent metal-to-metal contact.
 - 1. Reinforce inner face of door with a steel sheet panel filled with sound deadening insulation.

2.4 FINISHING

- A. Clean, degrease, neutralize, and finish with manufacturer's standard process.
- B. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
- C. Finish bench pedestals same as lockers.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Take site dimensions affecting this work, ensure preparatory work is properly sized and located.

3.2 INSTALLATION

- A. Install lockers in accordance with manufacturer recommendations and installation instructions, secure, plumb, level, square, and in line.
- B. Bolt adjoining locker units together to provide rigid installation.
- C. Install metal bases, end panels, sloping tops, and filler panels to close off openings and as required for complete installation.
- D. Secure bench pedestals to floors and benches to pedestals in accordance with manufacturer recommendations and installation instructions.
 - 1. Space pedestals maximum 72" on center.

3.3 ADJUSTING

- A. Adjust doors and latches to operate easily without binding; verify integral devices are operating properly.

3.4 CLEANING

- A. Clean interior and exposed exterior surfaces; touch-up marred finishes and replace lockers which cannot be restored to factory-finished appearance.

3.5 PROTECTION

- A. Protect lockers from damage, abuse, dirt, and paint; do not allow lockers to be used during construction.

END OF SECTION

SECTION 11 10 00

MISCELLANEOUS EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide miscellaneous equipment with hardware and accessories as required for complete secure and operational installation as applicable.
 - 1. Provide and install refrigerator. Fridge shall be side by side or freezer on bottom type.
 - 2. Provide and install microwave
 - 3. Provide and install Video Monitor Wall Brackets.
- B. Related Sections:
 - 1. Division 26: Electrical service.

1.2 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature.
- B. Shop Drawings: Show complete details of equipment including dimensions and field measurements.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Deliver inserts and rough-in frames to jobsite at appropriate time for building in.
- B. Do not deliver miscellaneous equipment to site until spaces in which they are to be installed are ready to receive them.
- C. Pack miscellaneous equipment individually, protect each item and its finish.

1.4 SITE CONDITIONS

- A. Protect adjacent or adjoining finished surfaces from damage during installation of work of this section.
- B. Before starting work notify Architect in writing of conditions detrimental to installation or operation of units.
- C. Verify with Architect exact location of miscellaneous equipment.

1.5 WARRANTY

- D. Extended Correction Period: Repair or replace miscellaneous equipment which does not function as intended.
 - 1. Period: Two years.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. System Description: Provide miscellaneous equipment with hardware and accessories as applicable.
- B. Regulatory Requirements - Access for Persons with Disabilities: Comply with California Building Standards Code and Americans with Disabilities Act (ADA) Standards.
- C. General: Provide standard materials and finishes for miscellaneous equipment listed; where more than one material or finish is available and not otherwise indicated provide as selected by Architect from manufacturer's standard materials and finishes.
- D. Attachments and Accessories: Provide for complete secure operational installation.
- E. Microwave: General Electric, allow \$300
- F. Refrigerator: Kitchen Aid, allow \$2,400

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install miscellaneous equipment in accordance with manufacturer's recommendations and installation instructions, level, true to line, and in correct relation to adjacent materials and finishes.
- B. Coordinate electrical connections with Division 26.
- C. Upon completion of installation, instruct City's personnel in operation and maintenance of electrical miscellaneous equipment.

END OF SECTION

SECTION 12 24 00

WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide manual chain operated window shades with brackets and accessories as required for complete finished operational installation.
 - 1. Solar Shades: Unframed.
 - 2. Blackout Shades: Side framed.
 - 3. Dual Solar and Blackout: Overlap mounted.

1.2 REFERENCES

- A. NFPA 701: Standard Methods of Fire Tests for Flame-Resistant Textiles and Films.
- B. FS CCC-T-191b: Flame Retardancy of Textiles.

1.3 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature.
- B. Shop Drawings: Show hardware, clearances and operation of shades with specified system.
 - 1. Layout of openings, partings and pulley positions subject to Architect approval where not clearly indicated.
- C. Samples: Submit samples of each fabric indicating finishing of top, bottom and sides, and section of frame indicating finish.
- D. Certificate of Flame Proofing or Flame Resistance: Submit certification, recommendations and instructions for laundering of specified fabrics and maintenance of entire installation.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide manual shades as complete units produced by one manufacturer, including hardware, accessory items, mounting brackets and fastenings.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver shades until building is ready for installation.
- B. Number and identify shades as to locations in Project.

1.6 SITE CONDITIONS

A. Before installation, physically measure and inspect space after limiting conditions are established.

1. Note floor and ceiling may not be level.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

- A. Mecho Shade Corporation/Mecho Shade System. Basis of Design
- B. Lutron Electronics Co./Manual Shading.
- C. SKYCO Shading Systems, Inc./Manual Shades.
- D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

- A. System Description: Provide manual chain operated window shades with brackets and accessories as required for complete finished operational installation.
- B. Regulatory Requirements:
 - 1. Flame Retardant Materials: Approved by California State Fire Marshal's Office.
 - 2. Fire Resistant Fabrics: Required to have passed one of following:
 - a. NFPA 701.
 - b. FS CCC-T-191, test 5903.
- C. Shade Operating System: Manual type chain operated roller shade system with adjustable slip clutch.
- D. Fabric:
 - 1. Solar Shades: Manufacturer's standard fire-resistant glass cloth fabric.
 - 2. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.
- E. Accessories: Provide accessories, brackets, fittings and fastenings as necessary for proper operation and installation of shades; conceal fasteners or finish flush, painted to match exposed metal finish.
- F. Colors: Where color is not indicated on Drawings or Finish Schedule, provide custom color as directed by Architect.

2.3 FABRICATION

- A. Center Seams: Use single widths of fabric with no center seams for each shade.

- B. Shade Mounting System: Allow for shade removal and replacement without disassembling hardware assembly.
- C. Operating System: Provide upper and lower stop limits to prevent over-winding and unrolling.
 - 1. Provide for left or right-hand operation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect site conditions prior to installation for conditions that could affect proper installation and operation of shades.
- B. Beginning installation signifies acceptance of substrates and conditions.

3.2 INSTALLATION

- A. Install shades in accordance with manufacturer's recommendations and installation instructions.
 - 1. Install shades level, plumb, secure, and at proper height; cooperate with other trades for securing shades to substrate and finished surfaces.
 - 2. Mount solar shades and blackout shades as indicated on Drawings to allow shade cloths to be adjacent.
- B. Hang shades to be straight and even, employing hand sewing of seams and hems as necessary for carefully matched installation with even, horizontal top and bottom hems, and quiet, smoothly operating system.
- C. Fabricate and install shades so when open, closed or while operating shades will not be abraded by window frame, ceiling or sill.

3.3 ADJUSTING

- A. Thirty days after hanging of shades, inspect installation for fabric shrinkage or expansion or other variations and rehang as necessary for conformance to specified tolerances.

END OF SECTION

SECTION 22 00 00

GENERAL PLUMBING

PART 1 - GENERAL

1.1 DESCRIPTION

Division 1 applies to this section. Provide plumbing as indicated, specified and required.

1.2 PRODUCT HANDLING

- A. Protection: Take all precautions necessary to protect the materials of this section before, during, and after installation.
- B. Replacements: In the event of damage, immediately repair all damaged and defective work to the approval of the Architect at no additional cost to the City.

1.3 LOCATION AND ACCESSIBILITY

- A. Valves, motors and other devices requiring service, maintenance and adjustment shall be placed in fully accessible positions and locations.
- B. Drawings: Coordinate all space requirements with other trades. All offsets and interferences may not be indicated due to the scale of the drawings.

1.4 QUALITY ASSURANCE

- A. Codes and Standards:
 - 1. All governing codes, ordinances and agencies, in accordance with the provisions of Division 1 of these specifications.
- B. Warranty: The contractor shall furnish a written warranty for labor, materials and equipment provided under this contract in accordance with the provisions of Division 1 of these specifications.

1.5 SUBMITTALS

- A. Manufacturer's Literature: Submit brochures on all materials and equipment to the Architect in accordance with the provisions of Division 1 of these specifications.
- B. Other Submittals:
 - 1. Shop Drawings.
 - 2. Sterilization Test Report.
 - 3. Test Data.

4. Operations and Maintenance Manuals.
5. Record Drawings.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Pipe Escutcheons: Provide polished chromium plate and brass set screw escutcheons where plumbing pipes pass through walls, floors, ceilings, and partitions in finished portions of building, including pipes at fixtures.
- B. Pipe Identification:
 1. Piping identification per California Plumbing Code Requirements and pipes not covered by the Plumbing Code shall be per ANSI standards: Each individual pipeline shall be marked for quick and easy identification as to content, direction of flow, and character of material carried in the pipes by Seton SNA or STR markers.
 2. Markers shall be installed and spaced at not more than 20 ft. intervals, but not less than once per room and so located that markers shall be visible from floor level.
 - a. One marker shall be installed at each side of valves, special fittings and at branch take-off. In furred spaces install one band 2 ft. above floor and 19 in. below ceiling line.
 3. Color scheme shall be approved. Base color for markers shall be as follows:

Domestic hot water - Yellow w/Black Letters
Domestic cold water - Green w/White Letters
Industrial water - Yellow w/Black Letters
Sanitary sewer - Green w/White Letters
Sanitary vent - Green w/White Letters
Storm drains - Green w/White
Pumped Condensate – Yellow w/Black Letters
Condensate – Yellow w/Black Letters
- C. Valve Identification:
 1. Valve tags: Provide a tag consisting of a 2 in. dia. 20 ga. stainless steel or brass disk for each main and branch line shut-off valve or cock. Fasten tags in place with continuous steel ring or chain around stem of valves and round pipe for cocks. Two inch letters and figures stenciled in contrasting colors on pipe or pipe covering may be substituted for tags on OS&Y valves. Disks shall be stamped with service designation, with 1/4 in. high letters.
- D. Materials: Materials when not otherwise definitely specified shall conform to the applicable standards.

- E. Equal Materials and Substitutions: In addition to manufacturers specified, the following shall also be considered equal, provided corresponding models meet specified requirements. Equivalent substituted equipment named herein shall be submitted to Architect for approval. Submit alternate selections at time of bid, listing major equipment.

<u>ITEM</u>	<u>MANUFACTURER</u>
1. Access Panels:	Milcor, Mifab
2. Angle Stops & Supplies:	Brasscraft, Speedway
3. Backflow Preventers:	Watts
4. Cleanouts:	Wade
5. Drains & Floor Sinks:	Wade, Mifab
6. Electric Water Coolers:	Halsey Taylor, Elkay
7. Faucets:	Chicago, Delta, Sloan
8. Flush Valve:	Toto, Zurn, Sloan, Kohler
9. Hose Bibb:	Mifab, Acorn
10. Insulation:	3M, Manville, Fiberglas
11. No-Hub Couplings:	Clamp-All, Mission, Husky
12. Pipe Hangers & Supports:	Tolco, B-Line, Hilti
13. Plumbing Fixtures:	Toto, Zurn, Sloan
14. Pressure Gauges:	Marsh, Marshalltown, Trerice
15. Sinks:	No known equals
16. Soil Pipe:	No known equals
17. Solders:	Handy-Harman, Lucas, Milhaupt
18. Strainers:	Walworth, Bailey, Mueller
29. Toilet Seats:	Church, Beneke, Bemis
20. Trap Primer:	Mifab, Sioux Chief, Smith
22. Valves:	Crane, Red-White
23. Water Hammer Arrestor:	Sioux Chief, Smith, Mifab
24. Water Heaters:	Rheem, A.O. Smith, Bradford White
25. Water Pressure Reducing Valves:	Watts, ClaVal

2.2 PIPE AND FITTING SCHEDULE

- A. Soil and storm drain lines 5 ft. from building: As indicated on Civil drawings. Install in accordance with authorities having jurisdiction.
- B. Soil, waste, vent and storm drain piping to 5 ft. outside building: Cast-iron soil pipe and fittings shall conform and be installed to the requirements of CISPI Standard 301, ASTM A888 or ASTM A74 for all pipe and fittings. Pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute and be listed by NSF International or receive prior approval of the engineer. Wrap all underground piping per paragraph 3.10 herein. Tyler, A. B. & I., Charlotte.

Soil, waste, vent and storm drain piping below grade to 5 ft. outside building: Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 DWV. Charlotte, Mueller Industries, IPEX, or equal.

- C. Domestic hot and cold water piping above ground: Type L hard-drawn copper tube, ASTM B88, and wrought copper fittings, ANSI B16.22.
- D. Domestic cold water piping below ground and outside the building:
 - 1. 3 in. and smaller: Type K hard-drawn copper tube, ASTM B88, and wrought copper fittings ANSI B16.22, solder joint type (refer to paragraph 3.09 herein).
 - 2. 4 in. and larger: Bell and Spigot Class 50 ductile iron pipe centrifugally cast, cement-lined inside (refer to paragraph 3.10 herein).
- E. Indirect and Condensate Drains: Type M copper tube, ASTM B88 and wrought copper fittings, ANSI B16.22, solder joint type. Coordinate condensate trap installation with air conditioning unit manufacturer. All interior condensate drain piping shall be insulated.
- F. Sub-Soil Drainage: Equivalent to Schedule 40 PVC perforated pipe with solid wall fittings and solvent cemented joints. Perforations shall be 3/8 in. diameter on 3 in. centers 90 degrees apart in two rows parallel to pipe axis. Install per manufacturer's directions.

Note: Installation shall be in accordance with the Soils Engineer's recommendations.

2.3 MATERIALS FOR JOINTS, FITTINGS AND VALVES

- A. Soil, Waste, Vent and Storm Drain Cast-Iron Pipe:
 - 1. Above Ground: Type 304 Series stainless steel, "No-Hub" standard duty, shielded couplings shall conform to Cast Iron Soil Pipe Institute, CISPI-310-85 and shall be listed by NSF International with stainless steel corrugated shield, stainless steel bands and tightening devices and ASTM C564 rubber sleeve. Equivalent to Tyler, Husky HD 2000, A.B. & I.
 - 2. Below Ground: Type 304 stainless steel, "No-Hub" by the Cast Iron Soil Pipe Institute, CISPI-310-85 with stainless steel shield, stainless steel band and tightening devices and ASTM C564 neoprene rubber gasket. Equivalent to Husky SD-4000.
- A. Soil, Waste, Vent and Storm Drain ABS Pipe:
 - 1. Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 DWV fittings with solvent cemented joints. Install per manufacturer's directions.
- B. Solder and Flux:
 - 1. Water Piping: Equivalent to Harris "Bridgit" stay-safe lead-free solder alloy (ASTM B 813) with stay-clean paste flux. 95-5 solders are not approved. Below ground piping shall have brazed joints with silver solder.

2. Copper Indirect and Condensate Drainage Piping: Lead-free solder with non-corrosive paste flux.
- C. Welded Joints: Welding shall be performed only by qualified welders, and shall comply with ASME Boiler Construction Code, ANSI Code for pressure piping, and state requirements.
- D. Unions and Gaskets:
1. 2 in. and under for steel pipe: Screwed malleable-iron ground joint, Class 150 WOG, with brass-to-iron seat, galvanized or black to suit service.
 2. 2-1/2 in. and larger for steel pipe: Cast-iron flanged gasket type, conforming to ANSI B16.1, galvanized or black to suit service, or 150 lb. forged steel slip-on flanges.
 3. Unions for copper tubing: Cast bronze, ground joint pattern, soldered joint connection, ASTM B62 and ANSI B16.18.
 4. Dielectric Unions: Complete with isolators and gaskets of same size as pipe, galvanized or black to suit service. Watts series 3004/LF3004 galvanized or Watts series 3006 black steel.
 5. Dielectric Flanges: F.H. Maloney Co., Type E flanges for cathodic insulation.
 6. Gaskets: 1/16 in. Garlock #17022.
- E. Strainers: Lead-free Y-type with stainless steel mesh screen with perforations suitable for service requirements.
1. 3 in. and smaller: Wilkins Model YBS-XL, Watts LF777 SI, or equal. 125 psi at 400°F. steam, cast bronze, threaded ends with screwed brass closure plug.
 2. 4 in. and larger: Ames series 8000F, Watts 77FSS, or equal. Class 125 cast iron and class 150 cast steel flanges, stainless steel with closure plug.
- F. Valves: Valves shall be lead-free and of same manufacturer, or following numbers or equivalent by comparator chart of approved manufacturer. Provide adapters for valves in copper tubing where necessary. All domestic water valves, 2-1/2 in. and smaller, shall be full port ball valves.
1. Eccentric valves, 2 in. and smaller, gas: "SMG" PPG series valve with 316 stainless steel, plug carbon steel, body, screwed or flanged, PTFE seats, U.L. listed.

2. Gate valves, 3 in. and larger, domestic water: Lead-free 200 psi WOG, solid wedge disc, union bonnet, rising stem, flanged. MSS-SP-70. Nibco F619-RW, Watts LFGV-3- or 4-inch.
 3. Ball valves, domestic water 2-1/2 in. and smaller: Lead-free Bronze, body and brass materials fullport, solid ball class 150, MPTFE seats and stem packing. MSSSP-110, ANSI/NSF 61-8. Apollo 77CLF-100 Series, Nibco S/T685-80-LF, Watts B6080 Series (Threaded) and B6801 Series (Soldered) or Red and White 5044 AB.
 4. Balancing Valve: Bell & Gossett Circuit Setter Plus, bronze, screwed. Watts CSM-61 Series.
- G. Check Valves:
1. Drainage Systems:
 - a. Horizontal swing check, ductile iron body, one-piece alloy steel disc, 250 psi, flanged, fusion bonded epoxy coated interior and exterior, domed access cover. ValMatic Swing-Flex VM-502A, or equal.
 2. Domestic Water Systems:
 - a. In-Line check valve, 2 in. and smaller, lead-free bronze body, threaded, stainless steel spring. Apollo model CVB-61LF series, Nibco T-480-Y-LF.
 - b. Dual Check Valve, 1 in. and smaller, lead-free composite body with corrosion resistant internal parts, two independently operated in-line spring loaded modular checks. Wilkins Model 705-XL, Apollo model DUC-4NLF.
 - c. Swing check valve, 2 in. and smaller, lead-free, Y-pattern, dezincification resistant bronze silicon alloy, threaded, MSS SP-80. Nibco T-413-Y-LF, or equal.

2.04 BACKFLOW PREVENTERS

- A. Reduced Pressure Principle Type: Pipe relief to floor sink, or as indicated on drawings.
1. 2 in. and smaller: Wilkins Model 975-XL2, lead-free, bronze body, 175 psi, replaceable seats.
 2. 2-1/2" and larger: Wilkins Model 375-XL, ductile iron body, epoxy coated interior and exterior, flanged, replaceable seats.

2.5 HOSE BIBBS

- A. HB-1: Woodford MB-24 recessed wall hydrant.
- B. HB-2: Woodford 21, wall hydrant with vacuum breaker.

2.6 PIPE HANGERS

- A. Hangers shall be supplied with factory installed isolation and di-chromate finish.
 - 1. 2 in. and smaller: Grinnell F69.
 - 2. 2-1/2 in. and larger: Grinnell F65.
 - 3. Concrete inserts: Grinnell 281 and 282.
 - 4. Riser clamps for copper piping: Grinnell 261P, plastic coated.
 - 5. Riser clamps for other piping: Grinnell 261.

2.7 ROOF FLASHING

- A. Sanitary Vent Flashings: Semco 1100-3 or 1100-5, with one-piece lead flashing and counterflashing sleeve.
- B. Other Pipe Through Roof Flashing: Semco 1100-2 or 1100-4, one-piece 4 lb. lead flashing and counterflashing sleeve.

2.8 PIPE SLEEVES

- A. Provide at concrete or masonry exterior bearing walls, Adjust-to-Crete, Paramount, or Sperzel Cretesleeve. Wall sleeves shall be flush with finished surface. Sleeves shall be sized to allow 1/2 in. clearance around pipe or insulation. Insulation and covering shall be continuous through sleeves.
- B. At exterior walls below grade provide a modular mechanical seal consisting of inter-locking EPDM rubber links shaped to continuously fill the annular space between the pipe and the wall opening with a molded high density polyethylene sleeve water-stop ring, end caps and reinforcing ribs. ASTM B117, ISO 9002. Mechanical seals shall be "Thunderline" Link Seal, or approved equal.

2.9 ACCESS PANELS

- A. Access Panels in Plaster Walls and Ceilings: Karp #DSC214PL, Elmdor PW, 24x24 in. with metal access door and frame, prime coated steel and painted to match adjacent surfaces. For fire rated areas use Karp #KRP-150 FR 1-1/2 hour "B" Label access panels, U.L. listed.
- B. Access Panels in Acoustic Tile Ceilings: Karp #DSC-210, Elmdor AT, 24x24 in. with metal access door and frame, 24x24 in. minimum size, prime coated steel, recessed to accept standard tile in full opening door.

- C. Access Panels in Ceramic Tile Walls: Karp #DSC214M, Smith 4730, chrome-plated cover and frame of suitable size for purpose intended, but not less than 8x8 in. size. For fire rated areas use Karp #FRP-150 FR 1-1/2 hour "B" Label access panels, U.L. listed.

2.10 CLEANOUTS

For cast-iron soil pipe, iron body with extra heavy bronze plugs screwed into caulking ferrules; for steel pipe, extra heavy bronze plugs; and for vitrified clay pipe, vitrified clay plugs. Where cleanouts occur in finished interior walls, provide access panels, plates, and frames for flush mounting. Exposed parts of floor cleanouts shall have adjustable top. All cleanouts and cleanout plugs shall be accessible. Cleanouts for drain pipes that pass through a backwater valve shall be identified with a permanent label stating "BACKWATER VALVE DOWNSTREAM." Cleanouts for drain pipes that pass through a grease interceptor shall be identified with a permanent label stating "GREASE INTERCEPTOR DOWNSTREAM." Cleanout shall be the following:

- A. In finished floors: Cast-iron with polished nickel bronze round top, non-skid diamond tread set flush with the floor. Provide with carpet marker when located in future carpeted areas and flashing flange when used with waterproofing membrane.

Smith - 4023
Zurn - ZN-1402-2
Mifab - C-1100-R

- B. In mechanical equipment areas: Cast-iron with heavy cast-iron round top, non-skid diamond tread set flush with the floor. Provide flashing flange when used with waterproofing membrane.

Smith - 4223
Zurn - Z-1400
Mifab - C-1100-XR

- C. In walls: Cleanout tee with squared polished nickel bronze access plate with vandalproof screws and frames. Opening 8x8 in. minimum.

Smith - 4558-U
Zurn - ZN-1447
Mifab - C-1460-S

- D. In exterior grades: Cast-iron body, vandalproof cover, non-skid diamond tread, set flush with grade or finished surface. In non-surfaced area, they shall be cast in a concrete block 14x14x6 in. deep.

Smith - 4248
Mifab C-1100-XR

2.11 WATER HAMMER ARRESTORS

Precision Plumbing Products (PPP) maintenance free water hammer arrestors, installed as indicated or as recommended by PDI pamphlet WWH-201. In no case shall a flush valve fixture or a quick closing faucet or valve be installed without shock protection.

2.12 PRESSURE TEMPERATURE RELIEF VALVE

Provide domestic water heater with ASME rated pressure/temperature relief valve set to relieve at 125 psi pressure and at 188 degrees to 208 degrees F temperature range.

2.13 THERMOMETERS

H.O. Trerice BX91403-1/21/2 (scale 30 degrees to 240 degrees F) adjustable angle red mercury type with 9 in. chrome-plated bronze case, 3-1/2 in. stem and swivel nut 3/4 in. NPT brass separable socket, and etched scale with graduations as shown or required.

2.14 TRAP PRIMER ASSEMBLIES

A. Provide for drains and floor sinks where trap primer is not provided from a water closet and as indicated and specified, each including trap primer valve, standpipe, and distribution unit(s) required for the specified distribution. Provide each concealed assembly with access panel, 8 in. by 8 in. size when distribution units are not required and 12 in. by 12 in. size when one or two distribution units are required. Recess box flush in wall for electronic models. Exposed trap primers and piping is not acceptable. Provide trap primer piping same as specified for domestic water, including pipe wrapping.

1. TP-1: Precision Plumbing Products model P-1 or P-2, or equal.
2. TP-2: Precision Plumbing Products Mini-Prime MPB-500-12V
3. TP-3: Precision Plumbing Products Mini-Prime MPB-500-115V

2.15 PRESSURE GAUGES

Potter-Roemer 6240-U.L. - F.M. 0-300 psi range, complete with 3-1/2 in. diameter dial and gauge cock. Install pressure gauges where indicated and as required.

2.16 INSULATION

A. All pipe insulation shall comply with the State of California Energy Conservation Standards. Insulation thicknesses indicated are based on insulation having thermal resistances in the range of R-4.0 to R-4.6 per inch of thickness on a flat surface at a mean temperature of 75 degrees F. Thicknesses indicated are minimum and shall be increased proportionately for materials having R values less than 4.0 per inch of thickness or may be reduced for materials having R values greater than 4.6 per inch thickness. Install pipe insulation after piping is installed, tested and approved and is in clean, dry condition. Firmly butt insulation joints.

B. Insulate all hot water and interior condensate drain piping with glass fiber pipe insulation with factory applied white jacket, J-M Micro-Lok 650 AP, 1 in. thick for pipe sizes of 1/2 in. to 1 in., and 1-1/2 in. thick for pipe sizes to 1-1/4 in. and

larger. Insulate fittings and valves with preformed insulation with PVC premolded one piece fitting cover, J.M. Zeston cover. Adhere longitudinal laps and butts of strips of jacket with factory applied pressure sensitive tape system, J-M AP-T. Flanges and unions shall not be covered.

- C. Insulate all piping under lavatories and sinks accessible to the physically disabled with Truebro LavGuard2 or Plumberex Pro-Extreme, hot and cold water supply and 'P' trap form fitted insulation.
- D. Insulate all interior condensate drain piping with AP Armaflex closed-cell elastomeric foam insulation. Flame-spread index of 25 or less and smoke-developed index of 50 or less. 1/2-inch thick for 4-in. diameter pipe and less.

2.17 PLUMBING FIXTURES

- A. General: Plumbing fixtures trim and exposed supplies and wastes shall be brass with polished chrome-plated finish. Provide individual loose key stops or, if so specified, screw driver stops for supplies and, unless integral with valves or faucets, mount under fixture. Separately trap all wastes. Provide exposed supplies and wastes to wall with polished chrome-plated cast brass wall escutcheons. All lavatories shall have 1-1/2 in. 17 gauge chrome-plated cast brass P-traps. All plumbing fixtures shall be white, unless otherwise noted.
- B. Wall-Hung Fixtures: Fixtures specified with hangers or supporting arms shall have hangers or arms securely mounted on a 1/4 in. thick by 6 in. wide steel wall plate which extends at least one stud beyond first and last fixture mounting points, or a total of three studs minimum. Attach wall plate to each structural stud it crosses by tack welding each side of stud flange at top and bottom of plate. Fixture or supporting arms shall be securely and firmly attached to steel wall plate in accordance with manufacturer's instructions. If structural studs are not being installed behind wall-hung fixtures, plumbing contractor shall notify Architect and Mechanical Engineer immediately.
- C. Wall-Hung Water Closets: Provide with chair carrier supports as required with foot supports anchored to concrete slab with minimum 1/2 in. dia. x 3 in. long cinch anchors per foot including rear anchor for non back-to-back carriers. Install at heights indicated on the Architectural drawings. Conceal fixture bolts with vitreous china caps. Provide with auxiliary foot supports where the distance from wall to carrier exceeds 10 inches.
- D. Floor-Mounted Water Closets: Install on slotted cast-iron floor flanges. Make joints permanently gas and watertight with a preformed wax gasket and held in place with 5/16-in. solid brass bolts concealed with vitreous china bolt caps. Color to match fixture.
- E. Urinals: Install with brass nipples. Install at heights indicated on Architectural drawings. Conceal fixture bolts with vitreous china caps. Color to match fixture.
- F. Drains: Where installed in construction with waterproof membrane, provide drains with flashing clamp device with corrosion-resistant clamping bolts.

- G. Fixture Sealer: Install wall-hung fixtures with white silicone sealer between fixture and wall, applied smooth and even.
- H. Fixtures, trim and accessories shall be equal, unless otherwise noted to the following:
1. Water Closet (WC-1): Wall-hung, ADA, battery sensor, flush valve.
 - a. Vitreous china, siphon jet action, elongated bowl, top spud, 1.28 gallon flush.

American Standard 3351.101 "Millenium Flowise" bowl only.
 - b. Solid plastic white open-front seat less cover: Bemis1955SSCT.
 - c. Flush Valve:

Sloan Royal Optima 111-1.28 SFSM, 1.28 GPF
 - d. Carriers: Smith 210 Series Horizontal
Smith 230 Series Vertical
 2. Urinal (U-1): Wall-hung, battery sensor, flush valve.
 - a. Vitreous china, siphon jet, 0.125 gallon flush.

American Standard 6002.001.020 "Pintbrook."

Flush valve:

Sloan Royal 186-0.125, 0.125 GPF SFSM battery power.
 3. Lavatory (L-1): Wall-hung, A.D.A., manual, faucet.
 - a. Vitreous china, 20 x 18 in., concealed arms, 3 holes, 4 in. center.

American Standard 0355.012 "Lucerne"
 - b. Faucet: American Standard Model 7385.V05 with 1/2 GPM flow restrictor, manual, and grid drain with chrome-plated tailpiece.
 - c. Angle Stops and Supplies: Equivalent to McGuire LH Series with solid flexible tube rises.
 - d. Trap: Chrome-plated 17 gauge tubular brass "P" trap.
 4. Service Sink (SS-2): Floor-mounted.
 - a. Cast-iron acid-resisting enameled 28x28 in. with rim guard.

American Standard 7741.000 "Flowell"

- b. Faucet: Chrome-plated, wall-mounted fitting with hose end, vacuum breaker, wall brace, bucket hook, integral stops.

Chicago 897-RCF

5. Sink (S-1): Single-compartment, A.D.A.

- a. Stainless steel, 18 x 15 x 6-1/2 in. deep, three hole punched, 8 in. centers, 18 gauge, self-rimming, undercoated for sound deadening, center rear drain.

Just SL-ADA-1815-A-GR

- b. Faucet: 8 in. centers, with swing spout, single lever handle, chrome-plated. Kohler K-7507 "Purist"
- c. Angle Stops and Supplies: Equivalent to McGuire LH Series with solid flexible tube rises.
- d. Trap: 17 gauge chrome-plated tubular brass "P" trap.
- e. Garbage Disposer. In-Sink-Erator Pro- 750, 3/4 HP, 120 volt, single-phase, 60 Hz.

6. Drinking Fountain (DF-1): Dual height, A.D.A.

- a. Lead-free, wall mounted, barrier free, "Hi-Lo", 18 gauge 304 stainless steel satin finish, vandal resistant bubbler, front access plate. Stainless steel louvered panel. Install at heights for the physically disabled. Angle stop and supply equivalent to McGuire LFH2165LK, lead-free.

Elkay #LLMABFTLDDWS

7. Emergency Shower and Eyewash (EEWS-1):

- a. 1-1/4 in. galvanized pipe with 9 in. diameter floor flange, shower head ABS plastic with instant action ball valve and rigid pull-rod, ABS plastic bowl, eye/face wash fountain complete with emergency sign.

Acorn #S1340-BF with ET71-2-BVS-OTG

8. Floor Drain (FD-1): Foot traffic.

- a. Cast-iron double drainage drain with clamping flange, bottom outlet and 5 in. square polished nickel bronze adjustable strainer. 3 in. size drains shall have 6 in SQ. stainless steel square strainer.

Mifab F1000

9. Floor Drain (FD-2): Medium duty.

- a. Cast-iron, flashing collar, 8 in. round cast-iron bar grate.

Smith 2110

10. Roof Drain (RD-1):

- a. Cast-iron drain, adjustable extension sleeve, flashing collar, gravel stop cast-iron dome strainer, sump receiver and underdeck clamp.

Smith 1010Y-CL-U-CID

11. Overflow Drain (OD-1):

- a. Cast-iron drain, extension sleeve, flashing collar, 2 in. high water dam, cast-iron dome strainer, sump receiver and underdeck clamp.

Smith 1080Y-CL-U-CID

12. Floor Sink (FS-1):

- a. 12 in. square, 6 in. deep acid-resistant coated interior cast-iron drain and grate, cast-iron bottom dome strainer and underdeck clamp. Provide partial grate for discharge pipes.

Smith 3140-Y

2.18 SPECIALTY ITEMS

- A. Domestic Electric Water Heaters: Electric water heaters, of storage capacity and recovery as scheduled on drawings, complete with insulated steel jacket, glass-lined tank, drain valve with hose connection, temperature controls. Manufacturer's certification of compliance for Title 24 shall be included with equipment submittals. Provide galvanized sheet metal drain pan and Spacemaker pre-assembled galvanized steel stand with seismic clips under water heater as indicated. Provide expansion tanks equivalent to Amtrol and sized in accordance with manufacturer's directions.
- B. Hot Water Circulating Pumps (CP-1): B & G, Grundfos or equal all bronze construction, close-coupled, centrifugal type, complete with mechanical seals, wearing rings, and characteristics as indicated on drawings. Provide high static spring isolation hanger per B & G requirements. Provide automatic water temperature control or seven-day time clock and interlock with pump.
- F. Fire Safing: Safe all pipe penetrations through fire rated walls and floors with U.L. listed Proset, Hilti or Nelson Fire Safing. Install per manufacturer's directions.

2.19 VIBRATION ISOLATION

- A. Domestic Hot and Cold Water Piping:
 - 1. Riser Support: 0.06 inch deflection Type A neoprene pads with load distribution pads under riser clamps.
 - 2. Horizontal Piping: Minimum 3/8 inch felt between pipe and clevis hanger.
 - 3. Miscellaneous Attachments: Trisolators.
 - 4. Seismic Restraints: Suspended piping-cables as required by code.
- B. Water Heater(s):
 - 1. 0.06 inch deflection Type A neoprene pads.

2.20 VIBRATION ISOLATORS

- A. Type A: Neoprene pad. Waffle, ribbed or other forms. Typically 1/4 to 5/16 inch thick. Durometers of 40 to 65. Static deflections from 0.01 to 0.07 inches. Nominal design 40 durometer for 0.05 inches static deflections. Provide steel load distribution plates. Size of pad to be specified by isolator supplier based on load per pot. Mason W and WM, Vibrex R, or equal.
- B. Type B: Trisolators. Sheet metal sleeve with felt insert to be installed at attachments of points of hangers or piping. Semco, Elcen, or equivalent shop fabricated device.

PART 3 – EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection: All plumbing shall be installed in accordance with the requirements of all governing authorities, the original design, and the referenced standards.
- B. Discrepancies:
 - 1. In the event of discrepancy, immediately notify the Architect.
 - 2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
 - 3. Interferences between installed work of various trades due to lack of coordination shall be resolved by Architect whose decision is final. Relocate or offset any work as required to accommodate work of other trades at no extra cost to the City when so directed by the Architect.

3.2 LOCATIONS AND SPACE REQUIREMENTS

- A. Contractor shall fully inform himself regarding peculiarities and limitations of spaces available for installation of work under this division. Drawings indicate

desired location and arrangement of piping, equipment and other items, and are to be followed as closely as possible. Work specified and not clearly defined by drawings shall be installed and arranged in a manner satisfactory to Architect. In event changes in indicated locations and arrangements are deemed necessary by Architect, they shall be made by Contractor without additional charge provided the change is ordered before work is installed and no extra materials are required.

- B. Verify all spaces, dimensions for all fixtures, equipment, tenant or City-furnished equipment and equipment furnished under other sections.
- C. Obtain all necessary rough in data and dimensions for all fixtures, equipment, tenant or City-furnished equipment and equipment furnished under other sections.
- D. Maintain ample headroom clearances and accessibility. Maintain ceiling heights.
- E. Constantly check work of other trades to prevent interference with this installation.

3.3 PIPE INSTALLATION

- A. Make pipe runs straight and true. Springing or forcing piping into place is not permitted. Install in manner to prevent any undue strain on equipment. Make joints smooth and unobstructed inside and out, and ream pipe ends thoroughly to remove burrs. Conceal piping in finished portions of the buildings except as otherwise directed or indicated. Cap or plug ends and openings in pipe and fittings immediately to exclude dirt until equipment is installed or final connections are made. Make pipe size reductions with reducing fittings. Use no bushings unless specifically authorized. Use no close nipples. Proceed to rough in as rapidly as general construction of building will permit and complete and test before any lathing, plastering, or drywall, or other finish work is started. Fit work to available space and accurately rough in. Grade and valve water piping so as to provide for complete drainage and control of the system. Provide clamps and/or concrete thrust blocks at dead ends, angles, or other points where separation of joints may occur. Grade vent piping to allow piping to free itself of condensation or water. Pipe and supports shall not be in contact with structure, other piping, conduit, ductwork or other equipment.
- B. Install piping to clear beams unless sleeving is indicated. Constantly check work of other trades to prevent interference with this installation. Obtain approval from Architect if coring or cutting of concrete work is necessary due to failure to install required sleeves prior to the time of concrete pour. Cost of coring and cutting work shall be borne by the subcontractor.
- C. Exposed Plated or Enameled Pipe: Make connections to equipment with special care. Show no tool marks or threads.
- D. Dielectric Unions: Make connections between two dissimilar metal pipes with dielectric unions.

- E. Unions: Provide a union at both sides of automatic valves, at equipment connections and elsewhere indicated or required, unless flanges are indicated.
- F. Floor, Wall and Ceiling Plates: Provide where pipes pierce finished surfaces.
- G. Noise: Install soil, waste, and water piping in manner that prevents any unusual noise from flow of water under normal conditions.
- H. Shutoff Valves: Provide where indicated and required for adequate control of systems and for isolation of fixture groups and equipment.
- I. Buried Piping: Install with minimum 36 in. coverage unless otherwise indicated. Lay piping accurately to grade where invert elevations are indicated. When required, provide thrust blocks per manufacturer's recommendations.
- J. Equipment and Materials: Install per manufacturer's recommendations.
- K. Accessibility: Install work readily accessible for normal operation, reading of instruments, adjustment, service, inspection and repair. Provide access panels where indicated and required.
- L. Pipe Joints: Make screwed joints with a minimum amount of compound applied to the male thread only. All joints shall be made per code requirements. Use of "Bull Head" tees in domestic water system is prohibited.
- M. Pipe Supports: Support or secure to building construction or firmly anchor waste, vent, and water pipes in such a manner that they cannot be displaced. Use of makeshift devices such as wire, rope, wood, and tape, etc., is prohibited.
- N. Pumped Condensate Piping: Install flat with minimal offsets at one elevation within the ceiling space.

3.4 HANGERS AND SUPPORTS

- A. Hold horizontal pipe runs firmly in place using approved steel and iron hangers, supports, and/or pipe rests unless otherwise indicated. Suspend hanger rods from concrete inserts or from approved brackets, clamps or clips. Hang pipes individually or in groups if supporting structure is adequate to support weight of piping and fluid. Except for buried piping, hang or support pipe runs so that they may expand or contract freely without strain to pipe or equipment.
 - 1. Horizontal steel piping: Provide hangers or supports every 10 ft. except every 8 ft. for piping 1-1/4 in. and smaller.
 - 2. Horizontal copper tubing: For 2 in. diameter and over, provide hangers every 10 ft.; for 1-1/2 in. diameter and smaller, every 6 ft.
 - 3. Horizontal cast-iron hub and spigot piping: Provide hangers or supports at each hub.

- 4. Horizontal cast-iron no-hub piping: Provide hangers or supports at each side of a no-hub fitting. Provide anti-separation bracing at each 90 degree change of direction.
- 5. Vertical piping: Support at floor with iron pipe clamps.
- 6. Sway brace in accordance with NFPA 13.
- B. Branches: Provide separate hangers or supports for branch lines 6 ft. or more in length.
- C. Sound and Electrolysis Isolators: Provide at all hangers and supports for hot and cold domestic water lines. Securely attach pipe to walls, studs, etc. All such piping isolated from structure by 1/2 inch felt or "Trisolators".

3.5 EXPANSION AND CONTRACTION

Install piping subject to expansion and contraction with expansion loops made up of bends, fittings, or Victaulic couplings, expansion joints, swing joints, or other approved methods or devices. Branch lines from mains subject to expansion and contraction shall have a swing joint at a point of connection with the main. Risers which pass through one or more floors shall have swing joints at their base. Anchor lines subject to expansion and contraction by approved methods to restrict movement.

3.6 CORROSION PREVENTION

Make joint between cuprous and ferrous materials with approved nylon insulating couplings. Separate contact surfaces of dissimilar metals with non-conducting coating.

3.7 CLEANOUTS

- A. Provide cleanouts where indicated and required. Unless otherwise indicated, cleanouts shall be accessible with extensions to grade, to outside of buildings, or to floors above as indicated or required. Do not locate cleanouts in public lobbies and public corridors unless approved by Architect.
- B. Membranes: Where waterproofing membrane occurs under floor, bring membrane to cleanout without puncturing, and permanently anchor to integral anchoring flange with a heavy cast-iron clamping collar and rustproofed bolts.
- C. Covers: Set cleanout covers with all finished wall, floor or grade. In all cases securely anchor by means of integral lugs and bolts. Where surfacing material such as resilient covering is specified, ascertain thickness being used and set cleanout top so finished floor is smooth.
- D. Use Acorn 3500 thread compound.

3.8 ACCESS BOXES AND PANELS

- A. Provide valve boxes for valves located below grade. Provide metal access panels of size and type hereinbefore specified for valves or shock absorbers located in concealed areas.

- B. Access Boxes and Panels: Set flush with finished wall, floor or ceiling. Those in finished walls shall have door or plate removed during construction or be otherwise suitably covered to protect finish.
- C. Outside General Service Access Boxes: Provide with metal or clay pipe sleeve extensions where added depth is necessary. Do not locate boxes in public walks, driveways or covered passages unless indicated.

3.9 WRAPPING FOR BURIED STEEL AND COPPER PIPING

- A. All buried steel pipe shall be factory coated with Plexco 20 mil high density polyethylene coating (yellow color). Finished coating shall have continuous imprinting of coating type and applicator and pipe type and manufacturer. All fittings and field joints of buried steel piping shall be cleaned, primed then fully protected by wrapping with two separate wrappings (each half lapped) of 0.010x2 in. wide pressure sensitive polyvinyl tape. All fitting and joint wrapping shall overlap pipe wrapping a minimum of 2 in.
- B. Affidavit: Deliver coated pipe to jobsite accompanied by applicator's affidavit certifying that wrapped pipe has been given high voltage holiday detector test and that pipe was free of holidays when pipe was shipped from applicator's yard. Submit one copy of every affidavit to Architect prior to installation.
- C. Field Joints: Test field applications for holidays by a high voltage holiday test method in Architect's presence.
- D. Damage: Handle wrapped piping with extreme care to avoid damage. Repair and retest marred or damaged pipe wrapping.
- E. Install cathodic protection for steel or ferrous piping per Corrosion Engineer's recommendations and/or applicator contractor familiar with cathodic protection having a minimum of 5 years experience in the fabrication and installation of cathodic protection.
- F. Copper tubing, pipe wrap same as for field wrap steel fittings, no holiday test required. Backfill with clean sand.
- G. Backfill steel and copper piping with clean sand a minimum of 4 inches all around pipe and fittings.

3.10 PROTECTION FOR UNDERGROUND DUCTILE AND CAST-IRON PIPE AND FITTINGS

Wrap all pipe and fittings with 8 mil polyethylene encasement in accordance with ANSI/AWWA Standard C105/A21.5-93. Bed and backfill with clean sand at least 6 inches thick surrounding the pipe. Underground iron pipe should also be electrically insulated from dissimilar metals and above ground iron pipe.

3.11 EXCAVATION AND BACKFILLING

Perform excavation and backfilling required work under this section unless otherwise specified. Conform to requirements of Division 2 and of public authorities having jurisdiction.

3.12 SPECIALTY ITEMS

Install as indicated on the drawings, as herein specified, and as recommended by manufacturer.

3.13 STERILIZATION

A. Domestic Water System: Sterilize each unit of water supply and distribution system with liquid chlorine or hypochloride before acceptance for operation in accordance with AWWA C651-92, "Standard for Disinfecting Water Mains." Work shall be done by Contractor and, unless otherwise required by public authorities having jurisdiction, shall conform to the following:

1. Materials:
 - a. Liquid chlorine: U.S. Army Specification 4-1.
 - b. Hypochloride: Liquid shall conform to Fed. Spec. O-C-11RA (Int. 4).
2. Method: Amount of chlorine shall provide a dosage of 50 ppm minimum. Introduce chlorinating materials into lines and distribution system in approved manner. After a contact period of 24 hours minimum during which period chlorine residual shall be maintained at 5 ppm minimum, flush out systems with clean water until residual content is not greater than 0.2 ppm. Flush entire system open and close valves in lines being sterilized several times during contact period.
3. Test Reports: Furnish one copy of test report of complete and adequate sterilization to Architect before final acceptance of work. Certificates shall bear signature of an official of laboratory responsible for test. Cost of testing laboratory services shall be included in this subcontract.

3.14 TESTS

- A. Perform tests to Architect's satisfaction. Make tests in presence of Architect and at a time suitable to him if requested. Furnish necessary labor and equipment and bear costs for testing. Cost of replacing and/or repairing damage resulting therefrom shall be borne by this Contractor. Should the Contractor refuse or neglect to make tests necessary to satisfy the Architect that requirement of specifications and drawings are met, such tests may be made by an independent testing company and the Contractor charged for all expenses.
- B. Hydrostatic Tests: Make by completely filling piping system with water and eliminating accumulations of air so that leakage, no matter how small, will be apparent on testing gauge immediately. Maintain pressure until pipe under test has been examined, but in no case less than 24 hours. Test systems at following pressure:

<u>SYSTEM</u>	<u>TEST PRESSURE</u>
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Domestic cold water	150 psig
Domestic hot water	150 psig

C. Sanitary Soil, Waste, Vent System Tests: Before installation of fixtures, cap ends of system and fill lines with water to 10 ft. above the section being tested (including vents) and allow to stand until a thorough inspection is made. Make tests in sections if necessary or convenient. However, include interconnections between new sections and previously tested sections in the new test.

D. Roof Drainage System: Test as specified for sanitary system.

3.15 ADJUSTING

Upon completion of work and after cleaning of system, fixtures and equipment, and automatic parts of plumbing system shall be carefully adjusted for normal operation. All flush valves and fixture stops shall be checked for proper operation and final adjustments made where required. System shall operate quietly without vibration or noise.

END OF SECTION

SECTION 23 00 00

GENERAL MECHANICAL SPECIFICATIONS

PART 1-GENERAL

1.01 GENERAL CONDITIONS

A. General Description:

1. Air conditioning for indicated area complete with supply ducts, return air ducts, air distribution equipment and controls.
2. Air conditioning units complete with required supply fans, cooling coils, filters, ductwork, diffusers, grilles, dampers, controls and other items herein specified.
3. Ventilation of miscellaneous rooms with exhaust fans, ducting and controls.
4. Removal of existing ductwork and piping as indicated on the drawings.

1.02 RELATED WORK INCLUDED IN THIS SECTION

- A. Furnish electrical devices necessary for mechanical work, except disconnects unless indicated otherwise.
- B. Line and low voltage wiring for mechanical controls including final connections.
- C. Conduit for line and low voltage wiring for mechanical controls.
- D. Responsibility for obtaining clarification of discrepancies between mechanical and electrical work prior to proceeding with the work.
- E. Responsibility for proper operation of automatic pneumatic/electric controls and equipment and of electric power driven equipment furnished under this section.
- F. Miscellaneous steel for ducts and pipes hangers and supports including structural calculations prepared by a California licensed Structural Engineer.

1.03 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. Concrete work including miscellaneous metal in connection with pits, trenches and catch basins with foundations or concrete pads under rooftop package units, boiler units, pump and other mechanical equipment. Templates for spacing and sizes of concrete pads and anchor bolts under this section.
- B. Electrical work as follows will be provided Electrical contract scope:
 1. Conduit for line wiring for equipment and devices as indicated or specified except conduit for line and low voltage wiring for mechanical controls as specified under Division 26.
 2. Line wiring for equipment and devices as indicated or specified herein except line and low voltage wiring for mechanical controls as specified under Division 26.
 3. Providing disconnect switches.
 4. Installing electrical devices such as starters and disconnects, and when indicated, furnishing all such devices.

1.04 QUALITY ASSURANCE

- A. Codes and Standards: In addition to the requirements of all governing codes, ordinances and agencies, conform to the requirements of the following codes and standards:
 1. Applicable City regulations and ordinances
 2. California Building Code, 2022 Edition
 3. California Mechanical Code, 2022 Edition
 4. The California Code of Regulations (CCR) Title 24, 2022.

5. Health and Safety Code, State of California
6. National Board of Fire Underwriters Publications:
 - a. Pamphlet # 70 National Electrical Code
 - b. Pamphlet # 90A Air Conditioning Systems

1.05 SUBMITTALS

- A. Shop Drawings: Before any of the materials of this Section are delivered at the jobsite, submit complete shop drawings. Show all details of all ductwork, piping and equipment pads. The shop drawings shall represent a coordinated set of drawings with other disciplines.
- B. Product Data:
 1. Submit copies of all manufacturers' product data simultaneously with all shop drawing submittals.
 2. Product data to include all air conditioning equipment, hangers, fans, ductwork construction, piping, and other standard items as required to complement shop drawings for a submittal indicating all products to be used on this work.
 3. Manufacturers and suppliers of equipment shall provide all data necessary for compliance with the State of California Energy Efficiency Code: Compliance certification for all equipment shall be included in equipment submittals.
- C. Record Drawings: Maintain throughout the progress of the work project record drawings and submit to the Architect at completion of work.
- D. Operating Manuals and Maintenance Manuals:
 1. Submit copies of all operating instructions and maintenance manuals.
 2. Fully instruct City operating personnel and demonstrate performance, operation and maintenance of equipment. Amount of time allocated for said instruction and demonstrations of equipment and systems shall be part of these obligations. Submit a letter to Architect signed by City representative who will operate system stating that he is fully instructed by contractor about operation and maintenance of equipment and system.
 3. Submit one additional set of approved instructions and one additional set of approved 11 inch x 17 inch control diagrams suitably framed behind glass for mounting as directed.

1.06 PRODUCT HANDLING

- A. Protection: Take all precautions necessary to protect the materials of this section before, during, and after installation.
- B. Replacements: In the event of damage, immediately repair all damaged and defective work to the approval of the Architect at no additional cost to City.

1.07 JOB CONDITIONS

- A. Examination of the Site: Examine the site and include all conditions in bid proposal under which work is to be performed.

1.08 MISCELLANEOUS

- A. Locations and Accessibility: Contractor shall fully inform himself regarding peculiarities and limitations of spaces available for installation of work under this section. Valves, motors, controls and other devices requiring service, maintenance and adjustment shall be placed in fully accessible positions and locations. Provide access doors where required in ductwork or construction whether specially detailed or not, and render all such devices accessible.
- B. Drawings indicate desired location and arrangement of ductwork, piping, equipment and other items, and are to be followed as closely as possible. All offsets and interferences may

not be indicated due to the scale of the Drawings. Contractor shall assume responsibility for coordinating work with all other trades. Work specified and not clearly defined by the drawings shall be installed and arranged in a manner satisfactory to Architect. In the event changes in indicated locations and arrangements are deemed necessary by Architect, they shall be made by Contractor without additional charges provided the change is ordered before work is installed and no extra materials are required.

PART 2-PRODUCTS

2.00 VIBRATION ISOLATION

- A. Provide vibration isolation equipment for all mechanical equipment and piping as specified herein and indicated on the drawings. The vibration isolation system shall be installed in a manner to prevent the transmission of vibration to the structure. No rigid connections between rotating or oscillating equipment or piping and the building will be permitted.
- B. General Requirements:
 - 1. Vibration isolation manufacturer shall furnish written instructions covering the installation and adjustment of all isolators. The manufacturer shall replace any isolation that has been improperly sized.
 - 2. Mechanical subcontractor shall coordinate his work with the other trades. Contractor following him, such as plastering or electrical, shall be notified and instructed to avoid any contact with his installation that would reduce the effectiveness of the system.
 - 3. Inspections: Vibration isolation manufacturer shall make an inspection of the vibration installation, and inform the Contractor in writing of any necessary corrections and/or adjustments.
 - 4. Bases: Where called for in the specifications and on the drawings, all structural steel bases, including concrete pouring form bases, shall be designed and fabricated by the vibration isolation manufacturer. The concrete for the pouring form bases shall be by others.
 - 5. Vibration isolation shall be manufactured by a single manufacturer. All isolation shall be in strict accordance with the following specifications and manufactured by M.W. Sausse and Co., Inc. The isolation manufacturer shall include in the submittal the following information:
 - a. Type of isolator.
 - b. Deflection.
 - c. Free or unloaded height.
 - d. All physical characteristics of springs used.
 - e. Size of structural members.
 - f. Efficiency calculations.
 - g. Any other pertinent information to make the submittal complete.
- C. Technical Requirements:
 - 1. Isolators shall be designed or treated for resistance to corrosion. Structural steel bases shall be cleaned of welding slag and painted with primer and finish coat. All nuts, bolts and washers shall be zinc-electroplated.
 - 2. All equipment shall be equipped with seismic restraints in accordance with the requirements of all governing agencies. These restraints shall be designed and supplied by the vibration isolation manufacturer. Suspended equipment and piping shall be restrained by steel cable. This cable and the method of installation shall be the responsibility of the mechanical contractor. The cable restraints shall be installed in such a manner as to not short circuit the vibration isolation. The Contractor shall submit details for approval.

2.01 INSULATION

- A. All insulation shall comply with California Code of Regulations, Title 24.
- B. Install pipe insulation after piping is installed, tested and approved, and is in clean dry condition. Firmly butt insulation joints.

- C. Unions: Insulate in same manner as fittings, flanges and valve bodies. Conspicuously mark locations on pipe coverings.
- D. Shields: For pipes 4 inches and larger, at each hanger protect insulation with 12 inches long 18 gauge galvanized metal shield over heavy density calcium silicate insulation insert. For pipes 3 inches and smaller, at each hanger protect insulation with 4 inch long 18 gauge galvanized metal shield.
- E. Thermal Duct Insulation: Insulate all concealed cold supply air, return air and plenums unless otherwise specified, with Johns Manville Microlite fiberglass duct insulation, wrapped entirely around duct with joints lapped at least 2 inches and secured with 16 gauge galvanized wire on 12 inch centers. Insulation value shall comply with Title 24 requirements. Insulation shall cover all surfaces including standing seams.

2.02 REFRIGERANT PIPING

- A. Refrigerant piping shall be copper type ACR refrigerant piping with wrought copper fittings.
- B. Hot gas and suction refrigerant piping insulation:
 - 1. Insulate piping with glass fiber pipe insulation with factory applied white jacket, Johns Manville, Micro-Lok. Insulate fittings, flanges and valves with pre-formed insulation with PVC pre-molded one piece fitting covers, Johns Manville Zeston 2000. Adhere longitudinal laps and butt strips of jacket with factory applied pressure sensitive tape system Johns Manville AP-T Plus. Provide aluminum jacketing and aluminum preformed fitting covers, 0.016 in. thick on outdoor piping.

2.03 SPLIT SYSTEM HEAT PUMP UNITS

Furnish and install Carrier outdoor heating unit and Carrier indoor fan coil units of sizes and capacities indicated. Units shall be field connected and provided with additional refrigerant charge as recommended by the manufacturer. Units shall be UL listed and carry UL labels.

- A. Outdoor Units:
 - 1. The unit shall contain sufficient charge for complete system. Brass service valves with refrigerant line fittings and service ports shall be located on exterior on unit. Flex connectors shall be used to connect dx piping to outdoor unit.
 - 2. Outdoor coil shall be aluminum fins mechanically bonded to non-ferrous tubing. Factory installed coil refrigerant metering device internal components shall be removable for cleaning or replacement. Outdoor unit fan shall be of propeller type, direct driven. Fan motor shall be resiliently mounted.
 - 3. Compressor shall be welded-hermetic type with internal vibration isolation. Compressor motor shall have both thermal and current-sensitive overload device. Compressor shall be equipped with a crankcase heater and have internal high-pressure switch or relief valve and low pressure switch.
 - 4. Controls shall be factory wired. Controls and protective devices shall include a suction line low-pressure switch, suction line accumulator and pressure relief device.
 - 5. Accessories shall include indoor electronic, programmable thermostat, circuit to prevent compressor short cycling, start capacitor and relay. Liquid line filter drier, suction line connection adapter. Bi-flow solenoid in lieu of pistons for refrigerant metering.
- B. Indoor Units:
 - 1. Furnish and install direct-expansion fan coils equipped with cooling control kit in the location and manner shown on the plan. Unit shall operate properly in indicated position and is to be installed with ductwork.
 - 2. Unit enclosure shall be insulated and constructed of cold-rolled steel, bonderized and finished with baked enamel. Large front service access panels shall provide easy

access to all components. Reversible filter rack shall have duct connection flanges and be equipped with permanent type filter that slides out for maintenance.

C. Special Features:

1. Condensate Pump (Factory Provided, Field Installed): Pump shall be designed for quiet operation and shall consist of an internal reservoir/sensor assembly, and a remote pump assembly. The capability of the condensate pump shall be 3 to 25 ft., and shall be activated by a level sensor on the condensate pan.

2.04 DUCTLESS SPLIT SYSTEM AIR CONDITIONING UNITS

Furnish and install indoor, wall-mounted, direct expansion fan coil and commercial condensing or heat pump units. Unit shall be rated per ARI Standards 210/240 and listed in the ARI directory as a matched system

A. Outdoor Units:

1. The unit shall contain sufficient charge for complete system. Brass service valves with refrigerant line fittings and service ports shall be located on exterior on unit. Flex connectors shall be used to connect dx piping to outdoor unit.
2. Outdoor coil shall be aluminum fins mechanically bonded to non-ferrous tubing. Factory installed coil refrigerant metering device internal components shall be removable for cleaning or replacement. Outdoor unit fan shall be of propeller type, direct driven. Fan motor shall be resiliently mounted.
3. Compressor shall be welded-hermetic type with internal vibration isolation. Compressor motor shall have both thermal and current-sensitive overload device. Compressor shall be equipped with a crankcase heater and have internal high-pressure switch or relief valve and low pressure switch.
4. Controls shall be factory wired. Controls and protective devices shall include a suction line low-pressure switch, suction line accumulator and pressure relief device.
5. Accessories shall include indoor electronic, programmable thermostat, circuit to prevent compressor short cycling, start capacitor and relay. Liquid line filter drier, suction line connection adapter. Bi-flow solenoid in lieu of pistons for refrigerant metering.

B. Indoor Unit:

1. Indoor, direct-expansion, wall-mounted fan coil unit shall be complete with cooling/heating coil, fan, fan motor, piping connectors, electrical controls, microprocessor control system, and integral temperature sensing. Furnish with integral wall-mounting bracket and mounting hardware, and interconnection cable.
2. Unit Cabinet: Cabinet discharge and inlet grilles shall be attractively styled, high-impact polystyrene. Cabinet shall be fully insulated for improved thermal and acoustic performance.
3. Fan shall be direct-drive with air intake at the upper front face of the unit and discharge at the bottom front. Automatic, motor-driven vertical air sweep shall be provided standard. Air sweep operation shall be user selectable.
4. Coil shall be copper tube with aluminum fins and galvanized steel tube sheets. Fins shall be bonded to the tubes by mechanical expansion. A drip pan under the coil shall have a drain connection for hose attachment to remove condensate. Condensate pan shall have internal trap and auxiliary drip pan under coil header.
5. Motors shall be open drip-proof, permanently lubricated ball bearing with inherent overload protection. Fan motors shall be 3-speed.
6. Controls: Controls shall consist of a microprocessor-based control system which shall control space temperature, determine optimum fan speed, and run self-diagnostics. The temperature control range shall be from 64° F to 84° F. Control features shall

include: automatic restart, 24 timer function, coil freeze protection, integral setback control, dehumidification mode, fan only operation, fan speed control, and short cycle compressor timer.

7. Unit shall have filter track with factory-supplied cleanable filters.
8. Units shall have flare connections, and a 90-degree suction elbow shall be provided for rear connection.

C. Special Features:

1. Condensate Pump (Factory Provided, Field Installed): Pump shall be designed for quiet operation and shall consist of an internal reservoir/sensor assembly, and a remote pump assembly. The capability of the condensate pump shall be 3 to 25 ft., and shall be activated by a level sensor on the condensate pan.

2.05 DUCTS AND SHEET METAL WORK

Provide ducts, plenums, access doors, fresh air intakes and exhausts as indicated and required. All ductwork shall be constructed, erected and tested in accordance with the most restrictive of local regulations, procedures detailed in the ASHRAE Handbook of Fundamentals or the applicable standards adopted by the Sheet Metal and Air Conditioning Contractors National Association. Provide prefabricated spiral lockseam ducts and fittings and rectangular ducts of galvanized steel. Distribution ductwork shall be low pressure, 2 inch S.P. Outside air and exhaust air ductwork shall be low pressure, 2 inch S.P.

- A. Final connections to ceiling diffuser boxes and linear diffusers shall be made with flexible glass fiber duct. Casco Silent Flex-II. Connections of flexible duct to round ducts shall be made with ½ inch wide positive locking straps.
- B. All connections to main cold supply ducts shall be made with low loss fittings.
- C. Flat duct surfaces shall be crimped diagonally regardless of size. Longitudinal joints in all duct sizes may be flat-lock joints. Transverse joints and intermediate bracing shall be constructed of galvanized sheet metal or galvanized structural angles in accordance with requirements of the ASHRAE guide and public authorities having jurisdiction.
- D. Lock joints shall be hammered to make them airtight. Inside of duct shall present a smooth surface to flow of air.
- E. Changes in size of ducts shall increase gradually with a slope of not more than 12 inches in 5 feet where possible, but not more than 12 inches in 3 feet in any event.
- F. Turns shall be made with a throat radius of not less than the duct width.
- G. Horizontal ductwork shall be strongly supported with galvanized hangers in accordance with the requirements of the ASHRAE guide and public authorities having jurisdiction.
- H. Provide double thickness turning vanes at all sharp right angle turns.
- I. Plenums shall be made of 18 gauge galvanized sheet steel reinforced horizontally on a maximum of 48 inch centers by 1-1/2 x 1-1/4 x 1/8 inch galvanized angles and reinforced vertically by 1-1/2 inch standing seams.
- J. Plenum access doors 24 x 54 inch minimum size shall be galvanized sheet steel doors and frames properly reinforced to prevent breathing. Door shall be of same gauge as the duct or casing and shall have 1 inch insulation with galvanized sheet steel on both sides. Each door shall be hung on 5% tee hinges with one or more catches which are operable from both sides and similar to Ventfabrics, Inc. 260 Ventlock Hatch. Doors shall be hung to open against pressure and shall be fitted with felt to ensure airtightness.
- K. Flexible connections for air ducts shall be 16 oz. airtight Ventglass noncombustible fabric with fire retardant neoprene coating on outside. Attach to ductwork by lock seam. Install not more than 6 inches long. Provide where required or indicated.
- L. Seal joints on main cold supply air ducts at each floor with UL classified sealant. Sealant shall be specifically designed to seal high pressure ductwork.

2.06 TURNING VANES

- A. Both dimensions less than 48 inches: Single vane or approved double thickness airfoil vanes.
- B. Either dimension greater than 48 inches: Double thickness airfoil vanes of approved pattern.
- C. Rectangular smooth radius elbows: Provide multiple splitter vanes.

2.07 DAMPERS

- A. Provide balancing volume dampers in each branch duct and in each main duct of constant volume systems to provide for complete air balancing. Fit each manual volume damper with bearings and an adjusting device having a locking mechanism. Provide access panels if concealed or inaccessible through ceiling or wall.
- B. Balancing dampers where neither dimension of duct exceeds 17 inches may be a job fabricated butterfly type consisting of a blade constructed of 18 gauge galvanized steel securely riveted or welded at its center axis to a square operating rod.
- C. Balancing dampers where either dimension exceeds 18 inches shall be Air Balance AC-116, opposed blade type.

2.08 INLINE CEILING FAN

- A. Sizes and capacities indicated on the plans.
- B. Fan shall be ceiling, wall, or inline mounted, direct driven, centrifugal exhaust fan.
- C. Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories (UL 705). Fan shall bear the AMCA certified ratings seal for sound and air performance.
- D. Construction: The fan housing shall be minimum 20 gauge galvanized steel and acoustically insulated. Blower and motor assembly shall be mounted to a minimum 14 gauge reinforcing channel and shall be easily removable from the housing. Motor shall be mounted on vibration isolators. Unit shall be supplied with integral wiring box and disconnect receptacle shall be standard. Discharge position shall be convertible from right angle to straight through by moving interchangeable panels. The outlet duct collar shall include a reinforced aluminum damper with continuous aluminum hinge rod and nylon bushings. To accommodate different ceiling thickness, an adjustable prepunched mounting bracket shall be provided. A powder painted white steel grille shall be provided as standard.
- E. Wheel: Wheel shall be centrifugal forward curved type, constructed of galvanized steel. Wheel shall be balanced in accordance with AMCA Standard 204-96, Balance Quality and Vibration Levels for Fans.
- F. Motor: Motor shall be open drip proof type with permanently lubricated bearings, built-in thermal overload protection and disconnect plug. Motor shall be furnished at the specified voltage.

2.09 INLINE CENTRIFUGAL FANS

- A. Greenheck Model SQ. Fan shall be duct mounted, direct driven centrifugal square inline.
- B. Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories (UL 705). Fan shall bear the AMCA certified ratings seal for sound and air performance.
- C. The fan shall be of bolted construction utilizing corrosion resistant fasteners. Housing shall be minimum 18 gauge galvanized steel with integral duct collars. Bolted access doors shall be provided on three sides, sealed with closed cell neoprene gasketing.
- D. Wheel shall be centrifugal backward inclined, constructed of 100% aluminum, including a precision machined cast aluminum hub. Wheel shall be balanced in accordance with AMCA Standard 204-96, Balance Quality and Vibration Levels for Fans.
- E. Motor shall be heavy duty type with permanently lubricated sealed ball bearings and furnished at the specified voltage, phase, and enclosure.
- F. Bearings shall be permanently lubricated, sealed ball bearings and selected for a minimum L50 life in excess of 200,000 hours at maximum catalogued operating speed.

2.10 DIFFUSERS, REGISTERS AND GRILLES

- A. Air distribution equipment shall be of sizes and capacities indicated, furnished in factory finished enamel of color selected. Submit paint samples for approval.
- B. Square Ceiling Diffusers: Titus model PCS, steel construction with perforated face. Mounting shall be adapted to ceiling suspension system. Use modular face size 24 x 24 inches. 16 x 16 inch ceiling module shall be used for hard ceiling installation and in all restrooms.
- C. Return and Relief Air Grilles: Titus model PAR, steel construction to match ceiling diffusers.
- D. Return and Exhaust Duct Mounted Registers: Titus model 50F, steel construction with opposed blade volume damper.
- E. Toilet and Miscellaneous Exhaust Air Registers: Titus model 50F, steel construction with opposed blade volume dampers.
- F. Provide branch balancing damper with remote damper operator by Pottorff or Young Regulator in inaccessible locations where no access panels are indicated on the drawings.

2.11 HVAC INSTRUMENTATION AND CONTROLS

- A. Contractor shall familiarize himself with the existing controls system at the job site prior to proposal of work to assure that scope is adequately understood.
- B. Electric Controls:
 - 1. New fans and unitary equipment – New and remodeled equipment shall be tied into time clocks and electric controls systems or come with a programmable thermostat.

2.12 EQUALS AND SUBSTITUTIONS

- A. In addition to manufacturers specified, the following shall also be considered equal, providing corresponding models meet specified requirements. Equivalent substituted equipment named herein shall be submitted to Architect for approval. Submit alternate selections at time of bid listing major equipment.
 - Item: Manufacturer:
 - 1. Vibration Isolation: Mason Industries
 - 2. Insulation: Owens-Corning, Certainteed, Knauf
 - 3. Split System AC Unit: Trane
 - 4. Dampers: Pottorff, Greenheck
 - 5. Fans: Cook, Twin City
 - 7. Diffusers, Registers, Grilles: Price, Krueger

PART 3-EXECUTION

3.01 STATEMENT

- A. All Heating, ventilation and air conditioning shall be installed in accordance with the requirements of all governing authorities.

3.02 LOCATIONS AND ACCESSIBILITY

- A. Drawings indicate desired location and arrangement of piping, ductwork, equipment and other items, and are to be followed as closely as possible. All offsets and interferences may not be indicated due to the scale of the Drawings. Coordinate work with all other trades.
- B. Valves, motors, controls and other devices requiring service, maintenance and adjustment shall be placed in fully accessible positions and locations. Provide access doors where required in ductwork and construction and render all such devices accessible.

3.03 EQUIPMENT IDENTIFICATION

- A. All major equipment shall bear firmly attached metal nameplates which state name of manufacturer, model number and electrical data. An additional permanent label shall be affixed to each equipment which will clearly indicate by number which operating and maintenance manual explains maintenance requirements in detail.
- B. Pipe Identification: Mark each individual pipe for quick and easy identification with Identobands, aluminum with enamel finish, 1-1/2 inches wide, installed as recommended by manufacturer after completion of piping and finish painting. Unless otherwise specified, coding shall conform to Scheme for the Identification of Piping Systems (ANSI A13.1-1956). Color scheme shall be approved. Base color for markers shall be as follows:

Refrigerant piping: Yellow

3.04 INITIAL LUBRICATION, ADJUSTING AND FILLING SYSTEMS

- A. Before operating any mechanical systems, equipment bearings shall be lubricated and bolts, pulleys, and other moving parts checked for alignment and tolerances in accordance with manufacturer's operating instructions. Piping and liquid systems shall be flushed out and filled with operating fluids. After tests, valves and other parts of work shall be adjusted for quiet operation. Strainers shall be cleaned out by removing and washing basket or screen. Compressors shall have lubricating oil changed. Vibrations and noise shall be suppressed.

3.05 CLEANING OF EQUIPMENT, MATERIALS AND PREMISES

- A. Clean equipment and materials thoroughly. Leave surfaces to be painted smooth, clean, and ready for painters. Clean entire premise of unused materials, rubbish, debris, grease spots and dirt left by subcontractors. Remove, clean and replace pipeline strainers after systems have been in operation for a period of 30 calendar days.

3.06 HANGERS AND SUPPORTS

- A. Hold horizontal pipe runs firmly in place using approved steel and iron hangers, supports, and/or pipe rests, unless otherwise indicated. Suspend hanger rods from concrete inserts or from approved brackets, clamps or clips. Hang pipes individually or in groups if supporting structure is adequate to support weight of piping and fluid. Except for buried piping, hang or support pipe runs so they may expand or contract freely without strain to pipe or equipment.
- B. Horizontal Steel Piping: Provide hangers or supports every 10 feet except every 8 feet for piping under 1 inch in diameter, unless otherwise specified.
- C. Horizontal Copper Tubing: For 2 inch diameter and over, provide hangers, every 10 feet, for 1-1/2 inch diameter and smaller, every 6 feet.
- D. Vertical Piping: Support at every floor with wrought iron pipe clamps.
- E. Branches: Provide separate hangers or supports for branch lines 6 feet or more in length.

3.07 EQUIPMENT AND MATERIALS

- A. Install per manufacturer's recommendations.

3.08 ACCESSIBILITY

- A. Install work readily accessible for normal operation, reading of instruments, adjustment, service, inspection and repair. Provide access panels where indicated and required.

3.09 SYSTEM BALANCING

- A. Section Includes: Testing, adjusting and balancing of mechanical equipment and systems.

- B. Provide and be responsible for protection and repair of adjacent surfaces and areas which may become damaged as a result of Work of this Section. Protect Work hereunder until completion and final acceptance. Repair or replace damaged or defective Work to original specified conditions, at no extra cost to the City.
- C. All performance testing and balancing of the mechanical systems including:
 - 1. Supply air systems.
 - 2. Return air, fresh air and exhaust air systems.
 - 3. Report and report forms.
- D. Submittals: Submit a complete testing and balancing procedure indicating all test equipment that will be used, testing procedures, test data sheets, systems schematics and points of testing.
 - 1. Test and Balance Data: Submit test and balance data on completion of work under this Section.
 - 2. Certification: Certify in writing that system has been adjusted and balanced and design conditions have been attained.
- E. Contractor shall provide to the Architect, HVAC Contractor and Electrical Contractor requirements for drive changes, installation of additional dampers, vanes, grille baffles or other items as may be required to balance the system to the City's satisfaction.
- F. Verification of Conditions: Prior to testing and balancing, balancing contractor shall inspect equipment and materials to assure that all balancing operations can be performed. Balance subcontractor shall arrange with HVAC Contractor and Electrical Contractor for satisfactory correction of all defects in workmanship and/or material that could affect the work specified herein.
- G. System Operation: Contractor shall coordinate with HVAC specifications and controls specifications and contractors to have all parts of systems in full operation and shall continue the operation of same during each working day of testing and balancing.
- H. System testing and balancing shall be performed by an independent agency certified by the Associated Air Balance Council (AABC) or NEBB.
- I. All test instruments shall be accurately calibrated and maintained in good working order. Test instruments shall have certification by the manufacturer or by an approved test laboratory within one year of the testing date.
- J. Air Distribution Testing and Balancing:
 - 1. Test and adjust blower RPM to design requirements.
 - 2. Test and record motor full load amperes.
 - 3. Make pitot tube transverse of main supply, return, exhaust and outside air ducts and obtain design CFM.
 - 4. Test and record system static pressures, suction and discharge.
 - 5. Test and adjust system for design exhaust air CFM.
 - 6. Test and adjust system for design outside air CFM.
 - 7. If more than one outside air design condition exists (demand control ventilation), balance report shall include separate tests for minimum condition and maximum condition.
 - 8. Test and record entering air temperature (D.B. heating and cooling).
 - 9. Test and record entering air temperature (W.B. cooling).
 - 10. Test and record leaving air temperatures (D.B. heating and cooling).
 - 11. Test and record leaving air temperature (W.B. cooling).
 - 12. Adjust all main supply and return air ducts to proper design CFM.
 - 13. Test and adjust each diffuser, grille and register to within plus-minus 10% of the amount shown on the drawings.
 - 14. Each grille, diffuser and register shall be identified as to location and area.

15. Size, type and manufacturer of diffusers, grilles, registers and all tested equipment shall be identified and listed. Manufacturer's ratings on all equipment shall be used to make required calculations.
 16. Readings and tests of diffusers, grilles and registers shall include the required FPM velocity and test velocity, required CFM and test result CFM after adjustments.
 17. In cooperation with the control manufacturer's representative, the setting adjustment of automatically operated controls to operate as specified, indicated and/or noted.
 18. All diffusers, registers and grilles and all equipment shall be adjusted to maintain the design conditions.
- K. Coordinate Tests with the manufacturer of each equipment.
- L. Witness: Notify Architect in writing two weeks prior to testing and balancing of all major equipment in order to arrange that Architect's representative will witness the tests.
- M. Reporting
1. Reports shall include all outlets, balanced to tolerances indicated above. Indications of "not accessible" or "not operating" are not acceptable. Balance contractor shall resolve any access issues with mechanical subcontractor before submitting report.
 2. For any new pump or fan (e.g. exhaust fan, supply fan), include pump curve or fan curve in the report.
 3. Drive changes, if required to achieve design air quantities, are the responsibility of contractor.
- N. Mechanical and balancing contractors shall be responsible for all Title 24 Acceptance testing requirements as indicated on the compliance documentation. Copies of all Acceptance tests shall be included in the air balance report and submitted to the engineer and the City for record.

3.10 CONNECTION

- A. Connections between two dissimilar metal pipes shall be made with dielectric unions.

3.11 AIR DISTRIBUTION EQUIPMENT LOCATIONS

- A. Air distribution equipment locations shall be coordinated with architectural drawings.

3.12 TURNING VANES

- A. Turning vanes shall be installed in all right angle sharp turns in ducts.

3.13 DUCT LINING

- A. Where indicated, specified duct dimensions are net clear dimensions, i.e., clear dimensions, after insulation has been installed.

3.14 REPAIR OF EXISTING SURFACES

- A. Contractor shall provide and be responsible for protection and repair of adjacent existing surfaces and areas that may have been damaged as a result of demolition and new work.

3.15 CEILING DIFFUSER COORDINATION

- A. Contractor shall strictly coordinate all ceiling diffusers and grilles with architectural reflected ceiling plan. If any discrepancies are encountered, the engineer shall be notified for clarification.

3.16 THERMOSTAT LOCATION

- A. Contractor shall coordinate final location of all thermostats with architect and tenant construction coordinator prior to any rough-in installation work. Coordinated shop drawings showing thermostats, sensors, switches, and all other wall devices should be provided to the design team for review.
- B. Provide insulated backing on all thermostats located on exterior walls so fluctuations in wall temperature do not provide false readings. Verify that thermostats will not be installed in direct sunlight.
- C. Provide white thermostat covers for all locations within scope of work.

3.17 AS-BUILT DRAWINGS

- A. Contractor shall provide record as-built drawings to tenant construction coordinator and architect at the completion of tenant construction.

3.18 THERMOSTAT REQUIREMENTS

- A. Room thermostats shall be capable of being set to maintain space temperature set points for 55 degrees to 85 degrees and shall be capable of operating the heating and cooling in sequence. Thermostats shall be adjustable to provide a temperature range of 5 degrees between full heating and full cooling being supplied. Temperature control system shall operate in accordance with the base building sequence of operation.

3.19 DUCT ELBOWS

- A. Provide minimum duct radius on elbows at one and one half times duct sizes.

3.20 DIFFUSER THROW PATTERN

- A. All ceiling diffusers shown on the plans shall be provided as four way throw unless otherwise noted. Pattern blades shall be set in a horizontal position unless otherwise noted.

3.21 DUCTWORK REQUIREMENTS OF CMC

- A. All ductwork shall conform to chapter 6 of the Uniform Mechanical Code.

3.22 DUCT AND EQUIPMENT REQUIREMENTS OF TITLE 24

- A. All supply air ducts and fire dampers shall be installed per Title 24 regulations.
- B. All mechanical equipment shall be certified by the manufacturer for compliance with Title 24 energy requirements.

3.23 RETURN AIR PLENUM REQUIREMENTS

- A. Return air plenum shall not contain any combustible material.

3.24 ACCESS REQUIREMENTS

- A. Provide access and clearance requirements per 2022 Mechanical code and manufacturer installation whichever is more restrictive.

3.25 DUCTWORK PROTECTION DURING CONSTRUCTION

- A. At the time of rough installation or during storage on the construction site and until final startup of the heating and cooling equipment, all ducts and other related air distribution

component openings shall be covered with tape and plastic to reduce the amount of dust and debris which may collect in the system.

3.26 TEMPORARY VENTILATION DURING CONSTRUCTION

- A. The permanent HVAC system shall only be used during construction if necessary to condition the building within the required temperature range for material and equipment installation. If the HVAC system is used during construction, use return air filters with MERV-8 Filtration. Replace all filters immediately prior to occupancy.

END OF SECTION

SECTION 26 00 00 - GENERAL ELECTRICAL SPECIFICATIONS (rev 09-18)

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. This specification shall apply to all phases of Work hereinafter specified, shown on Drawings, or as required to provide a complete installation of electrical systems for this Project. Work required under this specification is not limited to just the Electrical Drawings - refer to Architectural, Structural, Landscape, and Mechanical/Plumbing Drawings, as well as all other drawings applicable to this project, which designate the scope of work to be accomplished. The intent of the Drawings and Specifications is to provide a complete and operable electrical system that includes all documents that are a part of the Contract.
 - 1. Work Included: Furnish labor, material, services and skilled supervision necessary for the construction, erection, installation, connections, testing, and adjustment of all circuits and electrical equipment specified herein, or shown or noted on Drawings, and its delivery to the City complete in all respects ready for use.
 - 2. The electrical Work includes installation or connection of certain materials and equipment furnished by others. Verify installation details, installation and rough-in locations from the actual equipment or from the equipment shop drawings.
- B. Electrical Drawings: Electrical Drawings are diagrammatic, and are intended to convey the scope of work, indicating intended general arrangement of equipment, conduit and outlets. Follow Drawings in laying out Work and verify spaces for installation of materials and equipment based on actual dimensions of equipment furnished.

1.2 QUALITY ASSURANCE

- A. Design, manufacture, testing and method of installation of all apparatus and materials furnished under requirements of these specifications shall conform to latest publications or standard rules of the following:
 - 1. Institute of Electrical and Electronic Engineers - IEEE
 - 2. National Electrical Manufacturers' Association - NEMA
 - 3. Underwriters' Laboratories, Inc. - UL
 - 4. National Fire Protection Association - NFPA
 - 5. Federal Specifications - Fed. Spec.
 - 6. American Society for Testing and Materials - ASTM
 - 7. American National Standards Institute - ANSI
 - 8. National Electrical Code - NEC
 - 9. National Electrical Safety Code - NESC

10. Insulated Cable Engineers Association - ICEA
 11. American Institute of Steel Construction - AISC
 12. State and Municipal Codes In Force In The Specific Project Area
 13. Occupational Safety and Health Administration (OSHA)
 14. Electronics Industries Association/Telecommunications Industry Association (EIA/TIA)
 15. California Electrical Code (where adopted)
 16. Local Authority Having Jurisdiction (AHJ) Published Electrical Standards and Codes
- B. Perform Work in accordance with the National Electrical Code, applicable building ordinances, and other applicable codes, hereinafter referred to as the "Code." The Contractor shall comply with the Code including local amendments and interpretations without added cost to the City. Where Contract Documents exceed minimum requirements, the Contract Documents take precedence. Where code conflicts occur, the most stringent shall apply unless variance is approved.
1. Comply with all requirements for permits, licenses, fees and codes. The Contractor, at Contractor's expense, shall obtain all permits, licenses, fees, special service costs, inspections and arrangements required for Work under this contract, unless otherwise specified.
 2. Comply with requirements of the applicable utility companies serving this Project. Make all arrangements with utility companies for proper coordination of Work.

1.3 GENERAL REQUIREMENTS

- A. Guarantee: Furnish a written guarantee for a period of (1) one-year from date of acceptance.
- B. Wherever a discrepancy in quantity or size of conduit, wire, equipment, devices, circuit breakers, etc., (all materials), arises on the Drawing and/or Specifications, the Contractor shall be responsible for providing and installing all material and services required by the strictest condition noted on Drawings and/or in Specifications to ensure complete and operable systems as required by the City and Engineer.
- C. All Core Cutting, Drilling, and Patching:
1. For the installation of work under this Section, the aforementioned shall be performed under this Section of the Specifications and the Concrete section of the Specifications.
 2. No holes will be allowed in any structural members without the written approval of the Project's Structural Engineer.
 3. For penetrations of concrete slabs or concrete footings, the work shall be as directed in the Concrete Section of Specifications.

4. The Contractor shall be responsible for patching and repairing surfaces where he is required to penetrate for work under this contract.
 5. Penetrations shall be sealed to meet the rated integrity of the surface required to be patched and repaired. The patched surface shall be painted or finished to match the existing surface.
- D. Verifying Drawings and Job Conditions:
1. The Contractor shall examine all Drawings and Specifications in a manner to be fully cognizant of all work required under this Section.
 2. The Contractor shall visit the site and verify existing conditions. Where existing conditions differ from Drawings, adjustment(s) shall be made and allowances included for all necessary equipment to complete all parts of the Drawings and Specifications.

1.4 WORK IN COOPERATION WITH OTHER TRADES

- A. Examine the Drawings and Specifications and determine the work to be performed by the electrical, mechanical and other trades. Provide the type and amount of electrical materials and equipment necessary to place this work in proper operation, completely wired, tested and ready for use. This shall include all conduit, wire, disconnects, relays, and other devices for the required operation sequence of all electrical, mechanical and other systems or equipment.
- B. Provide a conduit-only system for low voltage wiring required for control of mechanical and plumbing equipment described in this or other parts of the Contract Documents. Install all control housings, conduits, and backboxes required for installing conductors to the controls.
- C. Install separate conduits between each heating, ventilating and air conditioning sensing device and its control panel and/or control motor. Before installing any conduit for heating, ventilating and air conditioning control wiring, verify the exact requirements from the control diagrams provided with the equipment manufacturer's shop drawings.

1.5 TESTING AND ADJUSTMENT

- A. Upon completion of all electrical work, the Contractor shall test all circuits, switches, light fixtures, lighting control and dimming systems including distributed systems, UPSs, generators, SPDs, lighting inverters, transfer switches, motors, circuit breakers, motor starters and their auxiliary circuits and any other electrical items to ensure perfect operation of all electrical equipment.
- B. Equipment and parts in need of correction and discovered during such testing, shall be immediately repaired or replaced with all new equipment and that part of the system shall then be retested. All such replacement or repair shall be done at no additional cost to the City.
- C. All circuit(s) shall be tested for continuity and circuit integrity. Adjustments shall be made for circuits not complying with testing criteria.

- D. All test reports, including copies of any required Energy Code Acceptance Forms (e.g. CA Title 24 Acceptance for Code Compliance Forms) should be submitted to the Engineer at completion of project.

1.6 IDENTIFICATION

- A. Nameplates shall be provided for unit substations, switchgear, switchboards, distribution boards, distribution panels, panel boards, motor control centers, transformers, transfer switches, contactors, starters, disconnect switches, enclosed circuit breakers/switches, inverters, UPSs, PDUs, RDCs, SPDs, lighting control panels, dimming panels, door releasing system panels, fire alarm/central monitoring terminal cabinets/power supplies/control panels, and all low voltage system terminal and control cabinets.

- 1. Nameplate inscriptions shall be identical to the equipment designations indicated in plans and specifications. Nameplates shall be engraved with the device designation/identification on the top line, source identification for the device on the 2nd line per NEC, or CEC where adopted, Art 408.4 and load designation for the device on the bottom line. Where load designation consists of a branch circuit, omit bottom line. Where device designation is not indicated on plans/specifications, Contractor shall submit a written clarification request to the Engineer.

Example: Transformer 1TA

Source Disconnecting Location: Switchboard MSA located in Rm 110

Load: Panels 1LA and 1 LB

- 2. All circuit breakers/fuses in switchgear, switchboards, distribution boards, distribution panels, UPS output circuit breakers, PDU sub-feed circuit breakers and motor control centers shall have individual nameplates located immediately adjacent to the respective device. Nameplate inscription shall identify the downstream equipment or device served by the circuit breaker or fuse.
- B. Identification nameplates, UON, shall be laminated/extruded modified acrylic that is 3/32" thick, UV-stabilized, matte finish, suitable for use in 180 deg. F ambient, with beveled edges and engraved white letters 3/8" high, minimum, on 1-1/2" high black background (utility/normal and optional standby power systems) for single line of text. Where two lines of text are required, provide minimum 2" high nameplate. Where three lines of text are required, provide minimum 2.5" high nameplate. Provide white letters on red background for all NEC, or CEC where adopted, Article 517 essential power systems, Article 700 Emergency Systems, Article 701 Legally required standby systems and Article 708 COPS.
- C. Identification nameplates for new switchgear, switchboards, distribution boards, distribution panels, panel boards and motor control centers shall be attached with switchgear manufacturer-provided screws via switchgear manufacturer factory pre-drilled holes. A factory option to rivet identification nameplates to the equipment is only acceptable if screw-fastened nameplates are not an available option from the switchgear manufacturer. Field drilling or other mechanical attachment methods that change/void the NEMA or NTRL rating of the enclosure are strictly forbidden.
- D. Identification nameplates for transformers, transfer switches, disconnect switches, enclosed circuit breakers/switches, inverters, UPSs, PDUs, RDCs, SPDs, lighting control panels, dimming panels, door releasing system panels, terminal cabinets and all circuit breakers/fuses in switchgear, switchboards, distribution boards, distribution panels, UPS output circuit breakers, PDUs, PDU sub-feed circuit breakers, and motor control centers

shall be attached to the equipment by self-adhesive backing integral to the nameplates. When equipment is located outdoors, provide nameplates without self-adhesive backing and attach to equipment using weather-rated, UV-resistant epoxy. In all cases, clean surfaces before applying identification nameplates parallel to equipment lines.

- E. Warning Placards, as required by General Single Line Diagram Notes for multiple power sources, or instruction placards, as required for all kirk-key interlock schemes, all UPS bypass procedures or as required elsewhere in the plans/specifications shall be engraved 1/2" high white lettering on a red background using the same material specified for identification nameplates with a self-adhesive backing. Warning/instruction placards shall be attached to the face of the equipment directly related to the placards. Provide a formal placard submittal for review by the Engineer prior to ordering any warning/instruction placards. In all cases, clean surfaces before applying warning/instruction placards parallel to equipment lines.
- F. Receptacles that are part of a UL-listed under floor computer room whip assembly, ceiling and/or cable/ladder tray-mounted receptacles used in lab, manufacturing, commercial kitchen environments or that are serving telecom/data/AV racks and cabinets shall have identification nameplates located on the wiring device plate cover. Nameplates shall be self-adhesive, 3/32" thick Micarta with beveled edges, engraved 1/4" high white lettering on black background with serving power source, circuit identification and NEMA/IEC receptacle type. Use of two (2) separate nameplates per device plate cover is acceptable. Affix nameplates to be visible when plugs are occupying receptacles.
- G. See wiring device section of this specification for wiring device plate cover labeling requirements.
- H. See drawings for panel board schedule directory installation requirements.
- I. See conduit installation section of this specification for conduit labeling requirements.

1.7 FINAL INSPECTION AND ACCEPTANCE

- A. After all requirements of the Specifications and/or the Drawings have been fully completed; representatives of the City will inspect the work. Contractor shall provide competent personnel to demonstrate the operation of any item or system to the full satisfaction of each representative.
- B. Final acceptance of the work will be made by the City after receipt of approval and recommendation of acceptance from each representative.

1.8 RECORD DRAWINGS

- A. Drawings of Record: The Contractor shall provide and keep up-to-date, a complete record set of drawings. These shall be corrected daily and show every change from the original Drawings. This set of prints shall be kept on the job site and shall be used only as a record set. This shall not be construed as authorization for the Contractor to make changes in the layout without definite instruction in each case. Upon completion of the work, a set of reproducible Contract Drawings shall be obtained from the General Contractor and all changes as noted on the record set of prints shall be incorporated thereon with black ink in a neat, legible, understandable and professional manner. Refer to the Supplementary General Conditions for complete requirements.

1.9 APPROVALS, EQUALS, SUBSTITUTIONS, ALTERNATIVES, NO KNOW EQUAL

- A. Approvals: Where the words (or similar terms) “approved”, “approval”, “acceptable”, and “acceptance” are used, it shall be understood that acceptance by the City, Architect and Engineer are required.
- B. Equal: Where the words (or similar terms) “equal”, “approved equal”, “equal to”, “or equal by”, “or equal” and “equivalent” are used, it shall be understood that these words are followed by the expression “in the opinion of the City, Architect, and Engineer.” For the purposes of specifying products, the above words shall indicate the same size, made of the same construction materials, manufactured with equivalent life expectancy, having the same aesthetic appearance/style (includes craftsmanship, physical attributes, color and finish), and the same performance.
- C. Substitution: For the purposes of specifying products, “substitution” shall refer to the submittal of a product not explicitly approved by the construction documents/specifications.
 - 1. Substitutions of specified equipment shall be submitted and received by the Engineer ten (10) days prior to the bid date for review and written approval. Regulatory Agency approval for all substitutions will be the sole responsibility of the Contractor. To receive consideration, requests for substitutions must be accompanied by documentary proof of its equality with the specified material. Documentary proof shall be in letterform and identify the specified values/materials alongside proposed equal values/materials. In addition, catalog brochures and samples, if requested, must be included in the submittal. ONLY PRE-BID APPROVED PRODUCTS, ISSUED VIA A FORMAL BID ADDENDUM TO ALL BIDDERS, WILL BE ALLOWED ON THE PROJECT. REGARDLESS OF THE APPROVAL ON ANY SUBSTITUTION, ALL BIDS SHALL BE BASED ON THE PRODUCTS EXACTLY AS SPECIFIED. PRICING FOR EACH APPROVED SUBSTITUTION SHALL BE INCLUDED IN THE BID SUBMITTAL AS A SEPARATE LINE ITEM.
 - 2. In the event that written authorization is given for a substitution, after award of contract, the Contractor shall submit to the Engineer quotations from suppliers/distributors of both the specified and proposed equal material for price comparison, as well as a verification of delivery dates that conform to the project schedule.
 - 3. In the event of cost reduction, the City will be credited with 100 percent of the reduction, arranged by Change Order.
 - 4. The Contractor warrants that substitutions proposed for specified items will fully perform the functions required.
- D. Alternates/Alternatives: For the purposes of specifying products, “alternatives/alternates” may be established to enable the City/Architect/Engineer to compare costs where alternative materials or methods might be used. An alternate price shall be submitted in addition to the base bid for consideration. If the alternate is deemed acceptable, written authorization will be issued.
- E. No Known Equal: For the purposes of specifying products, “No Known Equal” shall mean that the City/Architect/Engineer is not aware of an equivalent product. The Contractor will need to submit a “Substitution” item, per the requirements listed above, if a different product is proposed to be utilized.

1.10 SHOP DRAWINGS/SUBMITTALS

- A. Shop Drawings/Submittals, unless required otherwise by general project specifications or instructions to bidders, shall be submitted in electronic format (PDF) to include a Letter of Transmittal (PDF), which shall give a list of the drawings submitted with dates and/or system(s) components contained within the submittal. Drawings and material cut sheets shall be complete in every respect and edited/marked to indicate specific items being provided. Printed/Hard copies are not acceptable.
- B. The Shop Drawings/Submittals shall be marked with the name of the project, numbered consecutively, and bear the approval of the Contractor as evidence that the Contractor has checked the Drawings. Any Drawings submitted without this approval will be returned to the Contractor for resubmission.
- C. If the shop drawings show variations from the requirements of the Contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in the Contractor's letter of transmittal. If the substitution is accepted, the Contractor shall be responsible for proper adjustment that may be caused by the substitution. Samples shall be submitted when requested.
- D. Only products listed as "Equal" within the contract documents, along with formally approved "Substitutions" will be reviewed. Products not conforming to these items will not be reviewed and will be returned to the Contractor for re-submittal.
- E. Review comments used in response to shop drawings/submittals are:
 - 1. "No Exception Taken" - Product approved as submitted.
 - 2. "Furnish as Corrected" - Re-submittal not required, although the Contractor shall provide the submitted product with corrections as noted.
 - 3. "Revise and Resubmit" - Re-submittal required with corrections as noted.
 - 4. "Rejected" - Re-submittal required based upon the originally specified product.
- F. Shop drawings shall be submitted on the following but not limited to:
 - 1. Lighting Fixtures, Lamps, and Ballasts.
 - 2. Switchgear, Switchboards, Distribution Boards, Motor Control Centers, Panel boards, and Bus Ducts; complete with overcurrent device information.
 - 3. Transformers.
 - 4. Fire Alarm System/Central Monitoring System.
 - 5. Wiring Devices.
 - 6. Lighting Control System/Dimming System Products.
 - 7. Pullboxes and Underground Vaults.
 - 8. Terminal Cabinets

9. Lighting Inverters, UPSs, RDCs, PDUs, Generators, Transfer Switches, SPD Systems.
10. Cable Tray, Flexible Cable Tray and Cable Runway.
11. Power Poles and Floor Boxes.
12. Arc Flash, Short-Circuit and Coordination studies.
13. All other products called out on drawings that call for shop drawing submittal.

1.11 MAINTENANCE, SERVICING, INSTRUCTION MANUALS AND WIRING DIAGRAMS

- A. Prior to final acceptance of the job, the Electrical Contractor shall furnish to the City at least four (4) copies of operating, maintenance, and servicing instructions, as well as four (4) complete wiring diagrams for the following, but not limited to, items or equipment:
 1. Lighting Control System/Dimming Systems.
 2. Fire Alarm System.
 3. Transformers.
 4. Switchgear, Switchboards, Distribution Boards, Motor Control Centers, Panel boards, and Bus Ducts; complete with overcurrent device information
 5. Lighting Inverters, UPS's, PDUs, Generators, Transfer Switches, SPD Systems
- B. All wiring diagrams shall specifically cover the system supplied. Typical drawings will not be accepted. Four (4) copies shall be presented to the City.

1.12 INTERRUPTION OF SERVICE/SERVICE SHUTDOWN

- A. Any interruption of electrical services, electrical circuits, electrical feeders, signal systems, communication systems, fire alarm systems, etc. required to perform work, shall meet the specific prior-approval requirements of the City. Such work shall be scheduled with the City to be performed at the City's convenience.
- B. Interruptions/outages of any of the City's systems and services mentioned above shall be scheduled to occur during other than the City's normal business hours. Any overtime costs shall be borne by the Contractor.
- C. See drawings for any additional requirements regarding outages, interruption and any temporary services required.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials and Equipment: All electrical materials and equipment, including custom-made equipment, shall be new and shall be listed by Underwriter's Laboratories (UL) and bear their

label or be listed and certified by a Nationally Recognized Testing Lab (NRTL) that is also recognized by the local Authority-Having-Jurisdiction (AHJ)

- B. Switchgear/Switchboards/Distribution Boards/Motor Control Centers:
 - 1. See general single line notes on single line drawing for more information.
- C. Panel boards – Branch Circuit:
 - 1. See drawings for panel board schedules and specifications.
- D. Transformers:
 - 1. See drawings for transformer schedules and specifications.
- E. Lighting Fixtures:
 - 1. See drawings for lighting fixture and lamp schedules and additional specifications. Furnish, install and connect a lighting fixture at each outlet where a lighting fixture type symbol (designated on plans) is shown as being installed. Each fixture shall be complete with all required accessories including sockets, glassware, boxes, spacers, mounting devices, fire rating enclosure and lamps.
 - 2. Ballasts: See lighting fixture schedule notes. All noisy ballasts shall be replaced at no cost to the City.
 - 3. Lamps: See lamp/fixture schedule and lamp/lighting fixture schedule notes.
- F. Wiring Devices:
 - 1. Provide wiring devices indicated per plan. Devices shall be specification grade. Acceptable manufacturers are Leviton, Pass and Seymour and Hubbell. Provide all similar devices of same manufacturer, unless indicated otherwise. All device colors shall be from the full range of manufacturer standard color options as selected by the Architect. This selection will be made during the shop drawing review process
 - a. Wiring Devices (Decora)
 - 1) Convenience Receptacle #16252- ???
 - 2) Dedicated Receptacle #16352-???
 - 3) Convenience I.G. Receptacle #16262-IG-???
 - 4) Dedicated I.G. Receptacle #16362-IG-???
 - 5) Convenience G.F.C.I. Receptacle #GFT1-???
 - 6) Dedicated G.F.C.I. Receptacle #GFNT2-???
 - 7) Convenience Hospital Grade Receptacle #16252-HG?-???
 - 8) Dedicated Hospital Grade Receptacle #16352-HG?-???
 - 9) Convenience G.F.C.I. Hospital Grade #GFNT1-HG?
 - 10) Dedicated G.F.C.I. Hospital Grade #GFNT2-HG?
 - 11) Tamper Resistant Convenience Receptacle #TDR15-???
 - 12) Tamper Resistant Dedicated Receptacle #TDR20-???
 - 13) Tamper Resistant GFCI Receptacle #GFTR2-???
 - 14) Tamper Resistant. Convenience. G.F.C.I. Hospital Grade Receptacle #GFTR1-HG?
 - 15) Tamper Resistant. Dedicated. G.F.C.I. Hospital Grade Receptacle #GFTR2-HG?

16)	Weather/Tamper Resistant GFCI Receptacle	#GFWT2-???
17)	Convenience Simplex Receptacle	#16251-???
18)	Dedicated Simplex Receptacle	#16351-???
19)	Recessed Clock Receptacle	#5361-CH-???(Non-Decora)
20)	Single Pole Switch	#5621-2-???
21)	Double Pole Switch	#5622-2-???
22)	Three Way Switch	#5623-2-???
23)	Four Way Switch	#5624-2-???
24)	Pilot Light Switch "On"	#5628-2-???
25)	Pilot Light Switch "Off"	#5631-2-???
26)	Projection Screen Switch	#5657-2-???
27)	Low Voltage Momentary Switch	#5657-2-???
28)	Keyed Switch	#1221-2L-???(Non-Decora)
29)	Door Jam Switch	#1865-???

- b. Use of dedicated receptacles is required where plans depict a branch circuit supplying only a single simplex or duplex receptacle. Use of controlled receptacles is required where depicted on plans - see controlled receptacle specifications for additional information.
2. I.G. (isolated ground) receptacle bodies shall be of a basic color specified above with an orange triangle to symbolize isolated ground.
3. H.G. (hospital grade) receptacle bodies shall be of a basic color specified above with a green circle to symbolize hospital grade.
4. When shown circuited with an I.G. conductor, receptacles shall be of an I.G. type. As an example, a NEMA L6-30R denoted on the plans and shown circuited with an I.G. conductor shall be an I.G. version of that receptacle.
5. Wiring devices located in wood finished areas shall generally be black unless otherwise indicated by the Architect.
6. Wiring devices located in mirrors shall generally be white with stainless steel cover plates unless otherwise indicated by the Architect.
7. In addition to other device requirements listed elsewhere in this specification and NEC, or CEC where adopted, Articles 406.12 & 517.18, all 125V & 250V, 15A and 20A, non-locking receptacles shall be Tamper-Resistant when located in the following locations:
 - a. In dwelling units per NEC, or CEC where adopted, Article 210.52.
 - b. In guest rooms and guest suites of hotels and motels.
 - c. In child care or daycare facilities.
 - d. In preschool and elementary education facilities.
 - e. In business offices, corridors, waiting rooms, and the like in clinics, medical and dental offices and outpatient facilities.
 - f. In a subset of Assembly Areas outlined in NEC, or CEC where adopted, Article 518.2 including transportation waiting areas, gymnasiums, skating rinks, and auditoriums.

- g. In dormitories.
 - h. In pediatric care areas per NEC, or CEC where adopted, Article 517.18(C).
- 8. Wiring devices shall be listed "hospital grade", and so identified, in the following locations:
 - a. Patient bed locations within general care areas per NEC, or CEC where adopted, Article 517.18(B).
 - b. Patient bed locations within critical care areas per NEC, or CEC where adopted, Article 517.19(B).
 - c. In "other-than-hazardous" anesthetizing locations per NEC, or CEC where adopted, Article 517.61(C)(2).
- 9. Wiring device cover plates located on recessed boxes shall be commercial grade nylon. Plate color shall match wiring device color UON on plans. Cover plates utilized on surface mounted boxes shall be metal. Plastic cover plates are unacceptable.
- 10. Except as otherwise noted, all wiring device plates on the project shall be labeled with panel and circuit number(s) utilizing a Brother P-Touch labeling system with 1/2" tape (yellow on black) or equal by Herman-Tellerman or Panduit. Locate label on the concealed side of the wiring device plate. Handwritten labels are unacceptable.
- 11. The Contractor shall provide duplex receptacle outlets in the appropriate configurations necessary to comply with applicable energy code requirements for controlled receptacles and as shown on plans. All wiring devices indicated to be controlled receptacles shall be NEMA-approved, electrical code-compliant with factory markings on the face of the receptacle(s) with the word "Controlled" or utilize further markings and symbols to indicate which receptacles on each outlet is/are controlled. Stickers, field-applied markings or other non-permanent markings are not acceptable. Where a GFCI receptacle outlet is required to be controlled, provide an adjacent controlled duplex receptacle outlet connected on the load side of the GFCI outlet. Generally, one receptacle in a duplex receptacle outlet is required to be controlled. It may be the lower receptacle or upper receptacle based on manufacturer offering. However, the controlled receptacle location within a controlled receptacle outlet shall remain consistent throughout the project. Where an existing duplex receptacle outlet is required to be controlled, provide a new wiring device with the appropriate control configuration necessary to comply with plans. All controlled receptacles shall be connected to a branch circuit controlled by an occupancy sensor-based or relay panel lighting control system. Acceptable manufacturers are Leviton, Pass and Seymour and Hubbell.
- 12. The following wiring device plates shall have custom engraving:
 - a. Key operated switches, switches with pilot lights, and switches for the control of motors, heaters and ventilators. Engraving shall be black and occur on the exposed side of the plate indicating the motor, heater, or ventilator controlled.
 - b. Receptacles on optional standby generator and/or UPS power shall have custom engraved plates with the words "Generator" or "UPS" in black

letters. In addition, where located in telecommunications closets, IDFs, server rooms, data centers, labs (wet, dry or electronic) indicate panel board and circuit number.

- c. For Health Care Facilities, provide custom engraved device cover plates, for all devices, indicating panel board and circuit number. Devices served by normal/utility power circuits shall have black lettering. Devices served by essential electrical system power circuits shall have red lettering.
 - d. All stainless steel and nylon device plates shall be engraved using a rotary engraving process except for black lettering on stainless steel device plates which may be accomplished via laser etching process. All lettering shall be 3/16" high. Provide a dimensioned submittal drawing detailing a typical device faceplate with engraving.
- G. Weatherproof Outlet Covers/Assemblies: All Receptacles identified as weatherproof on the drawings shall be weather-resistant, tamper-resistant, GFCI type and equipped as follows:
- 1. Type WP-A: Recessed wall box with a hinged, lockable, cast aluminum, self-closing, gasket-equipped door that is wet location-listed rain tight while "in use". Unit shall comply with NEC, or CEC where adopted, Article 406.9(A) and (B). UON on drawings, provide a minimum of 2 separate compartments suitable for installation of power receptacles, AV or communications outlets. Additionally, unless otherwise noted on drawings, provide the following:
 - a. A 20A weather-resistant, tamper-resistant, GFCI duplex receptacle in the first compartment. Provide branch circuiting per plans.
 - b. A blank metal plate suitable for field installation of power, AV or communications devices in the second compartment.
 - c. Where indicated on plans as requiring data, AV, or other low voltage service outlet, provide minimum 3/4" C.O. with pull string routed from the second compartment to nearest low voltage pull box. Where shown mounted in a building wall, any blank/unused compartment shall be equipped min. 3/4" C.O. with pull string routed to the nearest accessible ceiling space.
 - d. See wiring device section of this specification for additional wiring device plate cover labeling requirements.
 - e. 1 key minimum per device (minimum of 2 per project) to the City's project manager upon completion of project.
 - f. Custom color powder coat finish as selected by Architect - Include all costs in base bid for same.
 - g. In locations with sufficient wall depth, provide 6" wide x 6" tall x 5-1/2" deep recessed wall box (C.W. Cole #TL310-WCS-K1-CUSTOM COLOR).
 - h. In locations utilizing shallow stud walls construction or other walls of insufficient depth, provide 10-3/4" wide x 7-3/8" tall x 3-7/8" deep recessed wall box (C.W. Cole #TL310-WCS-SH-K1 -CUSTOM COLOR).

- i. See drawings for additional details.
 - 2. Type/Subscript WP-B: Wet location-listed raintight while "in use" cast copper-free aluminum, extra-duty, lockable cover with baked aluminum lacquer finish and one gang, weather-resistant, tamper-resistant GFCI receptacle. Hubbell WP26E series. Polycarbonate covers are unacceptable. Unit shall comply with NEC, or CEC where adopted, Article 406.9(A) and (B). Contractor shall powder coat cover assembly to a custom color where receptacle locations are deemed by the Architect to be in aesthetically sensitive or public spaces. Custom color as selected by Architect.
 - 3. Type WP-C: (C.W. Cole #TL310-WCS-PED-ADA-K1-CUSTOM COLOR or #TL310-WCS-PED-K1-CUSTOM COLOR) pedestal device box with a hinged, lockable, cast aluminum, self-closing, gasket-equipped door that is wet location-listed raintight while "in use". Unit shall comply with NEC, or CEC where adopted, Article 406.9(A) and (B). UON on drawings, provide a minimum of 2 separate compartments suitable for installation power receptacles, AV or communications outlets. Additionally, unless otherwise noted on drawings, provide the following:
 - a. A 20A weather-resistant, tamper-resistant, GFCI duplex receptacle in the first compartment. Provide branch circuiting per plans.
 - b. A blank metal plate suitable for field installation of power, AV or communications devices in the second compartment.
 - c. Where indicated on plans as requiring data, AV, or other low voltage service outlet, provide minimum 3/4" C.O. with pull string routed from the second compartment to nearest low voltage pull box.
 - d. See wiring device section of this specification for additional wiring device plate cover labeling requirements.
 - e. 1 key minimum per device (minimum of 2 per project) to the City's project manager upon completion of project.
 - f. Include all costs in base bid for ADA version (22.5" tall) of pedestal box. Prior to ordering material, contractor shall coordinate with Architect and/or AHJ to determine which pedestal box locations do not require ADA compliance and may be changed to the standard (11.5" tall) version of the pedestal box.
 - g. Custom color powder coat finish as selected by Architect. Include all costs in base bid for same.
 - h. See drawings for additional details.
 - 4. Type/Subscript WP-D: Damp location-listed (not-Raintite-in-use) cast copper-free, pad lockable, die-cast aluminum cover with baked aluminum lacquer finish and one gang GFCI receptacle. Hubbell/Rayco 502?/503? Series. Polycarbonate covers are unacceptable. Unit shall comply with NEC, or CEC where adopted, article 406.9(A) and (B). Custom color powder coat finish as selected by Architect. Include all costs in base bid for same.
- H. Motor Controllers/Starters: See drawings for motorized equipment schedules and specifications.

I. Circuit Breakers:

1. Service entrance circuit breakers smaller than 400A (Amp) frame shall be thermal-magnetic trip with inverse time current characteristics unless otherwise indicated below. Service entrance main circuit breakers and main circuit breakers, 400A frame and larger, shall be 100% rated, solid-state type as outlined in this specification. All other service entrance circuit breakers, 400A frame and larger, shall be 100% rated, solid-state type as outlined in this specification.
2. All non-service entrance circuit breakers 225A and larger shall be thermal magnetic type and have continuously adjustable instantaneous pick-ups of approximately 5 to 10 times trip rating. Breakers shall have either tamper-resistant rating dials or easily changed trip rating plugs with trip ratings as indicated on the Drawings. Rating plugs shall be interlocked so they are not interchangeable between frames. Additionally, all non-service entrance circuit breakers, 600A frame and larger, located in 480V, 3-phase, 3-wire or 277/480V, 3-phase, 4-wire switchgear, distribution boards, panel boards or busway plugs shall be solid state, 100% rated. Breaker shall have built-in test points for testing long delay, short delay and instantaneous, and ground fault (where shown) functions of the breaker by means of a 120V operated test kit. Contractor shall utilize a test kit capable of testing all breakers 400A and above - at the Engineer's request.
3. All non-service entrance circuit breakers less than 225A shall be molded plastic case, air circuit breakers conforming to UL 489. Provide breakers with thermal magnetic trip units, and a common trip bar for two- or three-pole breakers, connected internally to each pole so tripping of one pole will automatically trip all poles of each breaker. Provide breakers of trip-free and trip-indicating bolt-on type, with quick-make, quick-break contacts. Provide single two- or three-pole breaker interchangeability. Provide padlocking device for circuit breakers as shown on the Drawings.
4. Where a Current Limiting Circuit Breaker (CLCB) is indicated on drawings or as required elsewhere in this specification, provide a UL listed current limiting thermal magnetic circuit breaker(s) UON. An independently operating limiter section within a molded case is not allowed. Coordinate CLCB ratings as required to protect electrical system components on the load side of the CLCB to include, but not limited to, protecting automatic transfer switches, panel boards and lighting control panels.
5. Where a solid-state circuit breaker is indicated on drawings or as required elsewhere in this specification, provide a solid-state circuit breaker with minimum five function complete with built-in current transformers. The five functions shall be independently adjustable and consist of Overload/Long Time Amp Rating, Long Time Delay, Short Time Delay, Short Circuit/Instantaneous Pickup, but may also include Shunt Trip and/or Ground Fault if so indicated on the Drawings. Rating plugs shall be interlocked so they are not interchangeable between frames. Breaker shall have built-in test points for testing long delay and instantaneous, and ground fault (where shown) functions of the breaker by means of a 120V operated test kit. Contractor shall utilize a test kit capable of testing all breakers 400A and above, at the Engineer's request.
6. Circuit breakers, 1200A Frame or larger, or circuit breakers with sensors or adjustable trip settings, 1200A or larger, shall be equipped with an Energy Reducing Maintenance Switch that complies with NEC, or CEC where adopted, 240.87 (B) (3) unless specified elsewhere with an alternate arc energy reduction method allowed by this same code section.

7. Ground Fault Interrupting Breakers: Provide with molded plastic case, air circuit breakers, similar to above with ground fault circuit interrupt capability, conforming to UL Class A, Group 1.
 8. Arc Fault Interrupting Breakers: Provide with molded plastic case, air circuit breakers, similar to above with arc fault circuit interrupt capability, conforming to UL 1699. Provide on all dwelling-unit circuits supplying bedrooms, sleeping quarters etc. as required to comply with NEC, or CEC where adopted, Article 210.12.
 9. Tandem or half-sized circuit breakers are not permitted.
 10. Series-Rated Breakers: UL listed series-rated combinations of breakers can be used to obtain panelboard-interrupting ratings shown on Drawings. If series-rated breakers are used, switchboards, distribution boards, and panel boards shall be appropriately labeled to indicate the use of series-rated breakers. Shop drawing submittal shall include chart of UL listed devices, which coordinate to provide series rating.
 11. Circuit breakers shall be standard interrupting construction. Panelboard shall accept standard circuit breakers up to 100A.
 12. Circuit breaker handle accessories shall provide provisions for locking handle in the on or off position.
 13. Shunt-trip equipped circuit breakers shall be provided on all elevator feeders.
 14. Temperature compensating circuit breaker(s) shall be provided when located in outdoor enclosure(s) or when located in an enclosure subject to high ambient heat due to due nearby industrial processes, etc.
 15. Provide 75 degree Celsius-rated conductor lugs/lug kits as required on all circuit breakers to accept conductor quantities and sizes shown on drawings.
 16. All circuit breaker terminations shall be suitable for use with 75-degree Celsius ampacity conductors. Listed, dual-rated pin terminals, straight or offset, are acceptable for use to in accommodating oversized or parallel conductor installations.
 17. Circuit breakers serving Fire Alarm or Central Monitoring panels and power supplies shall be red in color and lockable in the "ON" position.
- J. Disconnect Switches:
1. Non-fusible or fusible, heavy-duty, externally-operated horsepower-rated, 600V A.C: Provide NEMA 3R, lockable enclosures for all switches located on rooftops, in wet or damp areas and in any area exposed to the elements.
 2. Fusible switches shall be Class "R" when 600A or less or Class "L" when greater than 600A.
 3. Amperage, Horsepower, Voltage and number of poles per drawings: All shall be clearly marked on the switch nameplate.

4. Provide the City's project manager with one (1) spare set of fuses and two (2) sets of fuse clips/fuses for every set of fuses on the project.
- K. Fuses:
1. Provide fuses at all locations shown on the Drawings and as required for supplemental protection:
 - a. Fuses shall be manufactured by Bussman, Shawmut, or equal.
 - b. All fuses shall be the product of a single manufacturer.
 2. Main and Feeder Protection:
 - a. Protective devices rated greater than 600A: Provide Bussman Hi-Cap fuses, Class L, current limiting, having an interrupting rating of 200,000A RMS.
 - b. Protective devices rated 600A or less: Provide Bussman Class R fuses, Class RK series current limiting fuses, having an interrupting rating of 200,000A RMS.
 3. Motor Protection:
 - a. Where rating of protective device is greater than 600A, provide Bussman Hi-Cap fuses, Class L, current limiting, having an interrupting rating of 200,000A RMS.
 - b. Where rating of protective device is 600A or less, provide Bussman Class RK series current limiting fuses, having an interrupting rating of 200,000A RMS.
 - c. Where fuses feeding motors are indicated, but not sized, it shall be the responsibility of the Contractor to coordinate the fuse size with the motor to provide proper motor running protection.
 - d. When rejection type fuses are specified (Class RK series) the fuse holder of all switches (specified in other Sections) shall be suitable for the fuses provided.
- L. Cable Tray, Flexible Cable Tray and/or Cable Runway:
1. See drawings for Cable Tray, Flexible Cable Tray and/or Cable Runway specifications.
- M. Uninterruptible Power Systems (UPS):
1. See drawings for UPS schedules and specifications.
- N. Power Distribution Units (PDU):
1. See drawings for PDU schedules and specifications.
- O. Generator Systems:

1. See drawings for Generator schedules and specifications.
- P. Transfer Switches:
1. See drawings for Transfer Switch schedules and specifications.
- Q. Lighting Control/Dimming Systems:
1. See drawings for Lighting Control and/or Dimming Systems schedules and specifications.
 2. Wall box dimmers shall be rocker-type as manufactured by Lutron (no known equal except as noted below). Dimmers and dimmer faceplates shall match the color of adjacent switches and faceplates. Dimmers and dimmer faceplates in wood finished areas shall generally be black unless otherwise indicated by the Architect. The Contractor shall obtain written approval of the Architect regarding final dimmer and dimmer faceplate color selection prior to ordering material. Multiple dimmers/switches shall be ganged together with a common cover plate. Provide dimmers as follows:
 - a. Incandescent: Lutron DIVA DV-10P or DV-103P (3-way) (1000-Watt max.).
 - b. Electronic Low Voltage: Lutron DIVA DVELV-300P or DVELV-303P- (3-way) (300 Watt).
 - c. Magnetic Low Voltage: Lutron DIVA DVLV-10P or DVLV103p (3-way) (800-Watt max.).
 - d. Fluorescent (3-Wire): Lutron DIVA DVF-103P (single/3way, 8A @ 120V) or DVF-103P-277 (single/3way, 6A @ 277V).
 - e. Fluorescent (0-10V): Lutron DIVA DVTV with PP-???H Power Pack.
 - f. Fluorescent (Lutron Tu-Wire): Lutron DIVA DVFTU-5A3P with Lutron H.P. module where required.
 - g. LED (0 - 10V): Lutron DIVA DVTV with PP-???H Power Pack.
 - h. Screw Base CFL/LED: Lutron DIVA DVCL-153P.
 - i. Fan Control: Lutron DIVA DVFSQ-F (1.5A @ 120V max, 3 speed, single pole, 3-way).
 3. Contractor shall verify if dimmer(s) requires derating when ganged. Contractor shall provide, and provide connections to, additional Lutron Power Modules, Lutron Power Packs, and / or Lutron Interface Modules where required to accommodate loads higher than dimmers standard or derated load-carrying capacity. Note - contractor may to provide a Lutron recommended dimmer type (typically a #DVF-103P unit) to control the necessary power modules or interface devices.
- R. Fire Alarm System/Central Monitoring System:
1. See drawings for Fire Alarm System or Central Monitoring System specifications.

- S. Surge Protective Device (SPD):
 - 1. See drawings for SPD specifications.
- T. Conduit:
 - 1. Galvanized Rigid Conduit (GRC) shall be full weight threaded type steel. Steel conduit shall be protected by overall zinc coating to inside and outside surfaces, applied by the hot dip, metalizing, or sherardizing process.
 - 2. Intermediate Metal Conduit (IMC), shall be hot-dipped galvanized in accordance with UL 1242, and meet Federal Specification WWC-581 (latest revision).
 - 3. Electrical Metallic Tubing (EMT) shall be zinc-coated steel with baked enamel or plastic finish on inside surfaces. EMT shall be dipped in a chromic acid bath to chemically form a corrosion-resistant protective coating of zinc chromate over galvanized surface.
 - 4. Flexible metal conduit shall be constructed of aluminum or hot-dipped galvanized steel strips wound spirally with interlocking edges to provide greatest flexibility with maximum strength. Interior surfaces shall be smooth and offer minimum drag to pulling in conductors. Use only as directed in writing by the Engineer with the exception of 400 Hz feeders and 400 Hz branch circuits which shall be run in flexible aluminum conduit.
 - 5. Liquid-tight conduit (Seal-Tite) shall be galvanized steel flexible conduit as above except with moisture and oil-proof jacket, pre-cut lengths and factory-installed fittings. For outdoor installations and motor connections only unless otherwise noted on drawings.
 - 6. Factory assembled, or off-site assembled wiring systems (such as Metal Clad (MC) Cable, Type AC Cable, Type NM Cable, Type BX Cable, etc.) shall not be used unless otherwise indicated in the Allowed Specification Deviations Section or Deductive/Additive Alternate Pricing Section generally located on the symbols list drawing.
 - 7. When approved for use in the Allowed Specification Deviations Section, generally located on the symbols list drawing, MC cables shall be allowed for lighting branch circuits (homeruns shall be EMT), receptacle branch circuits (homeruns shall be EMT) and poke-thru fed systems furniture homeruns. MC shall not be used where exposed, except for a maximum 6' length for final connections to light fixtures, or terminate in electrical panelboards or distribution boards. Equipment ground conductor shall be green. Isolated ground conductor shall be green with yellow stripe. Provide 600V rated aluminum or lightweight steel interlocking armor Metal Clad (MC) cable with copper conductors, THHN (90-degree C) insulation, and integral equipment grounding conductor and isolated grounding conductor as required. Type AC cable listed for use in patient care areas for non-essential electrical system branch circuits per NEC or CEC where adopted, Article 517.13 shall be required in such areas in lieu of MC cable. Type AC and MC cable shall not be used for essential electrical system branch circuits. MC cable shall be manufactured to Underwriter Laboratory Standard 1569. See PART 3 - EXECUTION section of this specification for additional installation requirements.
 - 8. Nonmetallic Flexible Tubing (ENT) shall not be used unless otherwise indicated in the Allowed Specification Deviations Section or Deductive/Additive Alternate

Pricing Section generally located on the symbols list drawing. Use of ENT, if allowed, is strictly limited to use in CMU walls and parking structures decks or as directed in writing by the Engineer. See PART 3 - EXECUTION section in this specification for additional installation requirements.

9. Non-Metallic Conduit:

- a. Polyvinyl chloride (PVC) rigid conduit, Schedule 40, Type II for underground installation only with solvent welded joints, conforming to Underwriters Laboratories, Inc. (UL) requirements, listed for exposed and direct burial application.
- b. Conduit and fittings shall be produced by the same manufacturer.

10. Fire-rated MC Cable:

- a. 2-hour fire-rated, polymer insulated 600V MC cable listed and conforming to Underwriters Laboratories, Inc. (UL) 2196 and UL 1569 requirements for installation as an Electrical Circuit Protective System for use in complying with NEC, or CEC where adopted, Articles 695 and 700. Where adopted, cable sheath shall be suitable for use as a NEC or CEC equipment grounding conductor, and shall be listed for use in wet locations to 90 degrees C (Raychem or equal).
- b. Cable connectors shall be brass MC connectors.

U. Fittings:

1. Condulet type fittings shall be smooth inside and out, taper threaded with integral insulating bushing and of the shapes, sizes and types required to facilitate installation or removal of wires and cables from the conduit and tubing system. These fittings shall be of metal, smooth inside and out, thoroughly galvanized, and sherardized cadmium plated.
2. Metallic condulet covers shall have the same finish as the fitting and shall be provided for the opening of each fitting where conductors do not pass through the cover.
3. Connector, coupling, locknut, bushings and caps used with rigid conduit shall be steel, threaded and thoroughly galvanized. Bushings shall be insulated.
4. UON all EMT fittings, connectors and couplings installed in concealed locations, areas not considered to be wet or damp locations by the AHJ, or areas not subject to physical damage, shall be steel, zinc or cadmium plated, threadless, compression, steel locking ring type with insulated throat. Where suitable for use, steel set screw fittings are allowed for trades sizes of 2" and smaller. Insulated throat is not required for fittings, connectors and couplings 1" and smaller.
5. All interior and exterior EMT fittings, connectors and couplings, 2" and smaller, installed in exposed or concealed locations that are considered by the AHJ to be wet or damp locations, shall be Raintite-listed, steel, zinc or cadmium plated, threadless, compression, steel locking ring type with insulated throat. If Raintite-listed, EMT fittings, connectors and couplings are unavailable for a given trade size or if conduit is installed in an area subject to damage – provide rigid metallic or intermediate metallic conduits, fittings, connectors and couplings as required.

6. Flexible steel conduit connectors shall be a malleable iron clamp or squeeze type or steel twist-in type with insulated throat. The finish shall be zinc or cadmium plating.
 7. Conduit unions shall be "Erickson" couplings, or approved equal. The use of running threads will not be permitted.
- V. 600 Volt Conductors - Wire and Cable:
1. All conductors shall be copper. Provide stranded conductor for #10 AWG and larger or when making flexible connections to vibrating machinery. Use compression "fork" type connectors or transition to solid conductors when connecting to switches, receptacles, etc.
 2. Type THHN/THWN-2 thermoplastic, 600 volt, UL approved, dry and wet locations rated at 90 degrees Celsius, for conductors of all sizes from #12 AWG up to and including 1000 kcmil. RHH/RHW insulation is allowed only to provide an Electrical Circuit Protective System to comply with NEC, or CEC where adopted, Articles 695 and 700.
 3. Wire and cable shall be new, manufactured not more than six (6) months prior to installation, shall have size, type of insulation, voltage rating and manufacturer's name permanently marked on outer covering at regular intervals.
 4. Wire and cable shall be factory color-coded by integral pigmentation with a separate color for each phase and neutral. Each system shall be color-coded and it shall be maintained throughout.
 5. Systems Conductor Color Coding:
 - a. Power 208/120V, 3PH, 4W:
 - 1) Phase A = Black
 - 2) Phase B = Red
 - 3) Phase C = Blue
 - 4) Neutral = White or White with Phase Color Tracer
 - 5) Switch legs = Purple (Switch legs shall also be identified separately by numerical tags).
 - 6) Travelers = Purple with Black stripe or Pink.
 - b. Power 480/277V, 3PH, 4W:
 - 1) Phase A = Brown
 - 2) Phase B = Orange
 - 3) Phase C = Yellow
 - 4) Neutral = Grey or Grey with Phase Color Tracer
 - 5) Switch legs = Purple (Switch legs shall also be identified separately by numerical tags).
 - 6) Travelers = Purple with black stripe or Pink..
 - c. Ground Conductors: Green
 - d. Isolated Ground Conductors: Green with continuous yellow stripe.
 - e. Fire Alarm System: As recommended by the manufacturer.

6. All color-coding for #12 through #6 AWG conductor shall be as identified above. Conductors #4 AWG and larger shall be identified with utilizing phase tape at each termination.
 7. No conductors carrying 120V or more shall be smaller than #12 AWG.
 8. Aluminum conductors shall not be used.
 9. Wire-pulling compounds used as lubricants in installing conductors in raceways shall only be "Polywater J". No oil, grease, graphite, or similar substances may be used. Pulling of #1/0 or larger conductors shall be done with an approved cable pull machine. Other methods; e.g. using vehicles and block and tackle to install conductors are not acceptable.
- W. Medium Voltage Conductors (greater than 600V):
1. See drawings for Medium Voltage Cable Schedule and Specifications.
- X. Junction and Pullboxes:
1. For interior dry locations, boxes shall be NEMA 1 galvanized one-piece drawn steel, knockout type, with removable, machine screw secured covers.
 2. For outside, damp or surface locations, boxes shall be NEMA 3R heavy cast aluminum or cast iron with removable, gasketed, non-ferrous machine screw secured covers.
 3. For in-grade applications, junction and pull boxes shall be pre-cast concrete or molded fiberglass manufactured by Christy, Brooks-Jensen, or Utility Vault Co. Fiberglass boxes shall:
 - a. Be used only in landscape planter areas that are not subject to damage from lawnmowers, tractors and other machinery.
 - b. Not be used in lawn or turf areas.
 - c. Not exceed 11" W x 17" L in size unless required to be larger to meet code requirements.
 4. All boxes shall be sized for the number and sizes of conductors and conduits entering the box and equipped with plaster rings where required.
 5. All boxes located in traffic areas shall be traffic rated.
- Y. Outlet Boxes:
1. For fixtures, boxes shall be galvanized, one-piece drawn steel, knockout type equipped with 3/8" fixture studs and plaster rings where required.
 2. For convenience outlets, wall switches, or other devices, outlet boxes shall be galvanized one-piece drawn steel, knockout type 4" x 4"x 2-1/8" minimum size with plaster rings as required.

3. For locations where standard boxes are not suitable due to number and size of conduit to be terminated, special boxes shall be designed to fit space or meet other requirements, and submitted for approval.
 4. For exposure to weather, damp locations, or surface mounting, outlet boxes shall be heavy cast aluminum or cast iron with threaded hubs; covers shall be watertight with gaskets and non-ferrous screws.
 5. Outlet boxes used for support of ceiling fans shall be galvanized, one-piece drawn steel, knockout type equipped with bracing bars and plaster rings where required and listed for ceiling fan support use. Such boxes shall be labeled and capable of supporting ceiling fan weights up to 70 pounds.
 6. See drawings for floor box installation notes and specifications.
- Z. Plywood Backboards: Where indicated for telephone or communications system terminals or other equipment assemblies, provide backboards of size indicated. Use 3/4" thick x 8' all (length per plans), Douglas Fir, void-free, kiln-dried, fire-rated plywood finished on one side and prime coat painted on all surfaces with finish coat of enamel paint, color by Architect. Leave one (1) fire-rating stamp/sheet exposed for inspection.
- AA. Terminal Cabinets:
1. Terminal cabinets shall be fabricated of hot dipped galvanized code gauge sheet metal for flush or surface mounting, complete with barriered sections, a door for each vertically barriered section and sizes as indicated on plan. Doors shall be hinged and lockable. Locks shall be keyed to match the branch circuit panelboards. Terminal cabinet trims shall match the branch circuit panels.
 2. Provide each terminal cabinet with a full size mounting backplate.
 3. Terminal cabinets shall be installed complete with full-length skirts of the same construction and finish as the terminal cabinet.
 4. Where mounted outdoors, terminal cabinets shall be NEMA 3R, weatherproof complete with gaskets and required sealant to prevent moisture from entering the terminal cabinet.
 5. All terminal cabinets and terminal cabinet barriered sections shall be labeled by the cabinet or cabinet section use (i.e. CATV, Security, etc.). Labels shall be Micarta type as specified elsewhere in these specifications. Unless otherwise noted, all termination blocks and cables shall be labeled per ANSI/EIA 606 standard.
- BB. Painting: Terminal cabinets, panels, junction boxes, pull boxes, etc., and conduit installed in public view shall be painted with colors selected by the Architect to match the subject surfaces. Refer to painting section of the specifications for additional requirements.
- CC. Seismic Design, Certification and Anchoring of Electrical Equipment:
1. Contractor shall include all costs in the base bid for labor, materials, all special inspections and structural engineering design necessary to meet the Seismic Design Requirements for Non-structural Components (Chapter 13, ACE SEI 7-05 Minimum Design loads for Buildings and Other Structures) as required by IBC, or CBC where adopted, Section 1708 and as related to the installation all electrical

equipment furnished under this contract. See Specific Project Site Seismic Criteria on architectural and/or structural plans which include Building Occupancy Category, Seismic Design Category, Design Spectral Response Acceleration (S_{DS}), Height factor ratio (z/h) and Site Class. Non-structural Component Importance Factor (I_p) for a particular component shall be determined based on the following criteria:

- a. $I_p = 1.0$: Non-life safety, Non-structural Components in an Occupancy Category IV Facility not required for continued operations of the facility or in any other Occupancy Category Facility where component failure will not impair continued operation of the facility.
 - b. $I_p=1.5$: Designated Seismic Systems are those non-structural components in any Occupancy Category IV facility (except as noted above) or that are a part of any code-defined Critical, Life Safety, Emergency and Legally Required Standby Electrical System. Additionally, those non-structural components containing hazardous materials shall be classified as Designated Seismic Systems. While Designated Seismic Systems are generally identified on the plans, they may include items such as generators, automatic transfer switches, UPS units and all associated electrical distribution equipment and components necessary for the designated seismic system to form a complete and operable system. The Contractor shall ultimately be responsible for identifying Designated Seismic Systems. For any electrical component either identified on the plans or determined by the contractor to be a Designated Seismic System, all line and load side electrical distribution systems supporting that Designated Seismic System (including, but not limited to, feeders, panel boards switchboards, transformers, all related component supports and attachments etc.) shall be considered a part of the designated seismic system for the purposes of code-compliance and seismic certification.
 - c. z/h - Height factor ratio: See plans for respective equipment locations.
2. Provide a delegated-design submittal for each of the following seismic-restraint systems to be used as required:
- a. Restraint Channel Bracings consisting of 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, with other matching components, and with corrosion-resistant coating; rated in tension, compression, and torsion forces.
 - b. Restraint Cables consisting of ASTM A 603 galvanized-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.
 - c. Seismic-Restraint Accessories consisting of hanger rod/hanger rod stiffener assemblies, multifunctional steel connectors for attaching hangers to rigid channel bracings and/or restraint cables, bushings for floor and wall-mounted equipment anchor bolts and resilient isolation washers and bushings.
 - d. Mechanical Anchor Bolts consisting of 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.

- e. Adhesive Anchor Bolts consisting of drilled-in and capsule anchor system containing resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide specific LEED-compatible environmentally-friendly resins and adhesives on all LEED projects. Provide anchor bolts and hardware with 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.
3. Submittal shall include design calculations and details for selecting seismic restraints complying with performance requirements, design criteria, and analysis data signed and sealed by the contractor's structural engineer responsible for their preparation. Calculations shall include, but not be limited to, static and dynamic loading caused by equipment weight, operation, and seismic and, if applicable, wind forces required to select seismic and, if applicable, wind restraints and for designing vibration isolation bases. Provide seismic and wind-restraint detailing to support system selection, arrangement of restraints, attachment locations, methods, and spacings with all components identified to include their strengths, directions and values of forces transmitted to the structure during seismic events and association with vibration isolation devices. Sizes of components shall be selected so strength will be adequate to carry present static and seismic loads to accommodate 25% spare future capacity within specified loading limits.
4. Any pre-approval and evaluation documentation shall have a California Office of Statewide Health Planning and Development (OSHPD) Special Seismic Certification Preapproval (OSP) demonstrating horizontal and vertical load testing and analysis showing maximum seismic-restraint ratings, by ICC-ES or another agency acceptable to authorities having jurisdiction. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) that support seismic-restraint designs must be signed and sealed by a qualified professional engineer.
5. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified elsewhere in the project specifications.
6. Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where connection is terminated to equipment that is anchored to a different structural element from the one supporting them as they approach equipment. Flexible connection limitations of the NEC, or CEC where adopted, shall apply.
7. Install seismic-restraint devices using methods approved by OSHPD or an agency acceptable to authorities having jurisdiction providing required submittals for component.
8. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by OSHPD or an agency acceptable to authorities having jurisdiction.

9. The contractor shall engage a qualified testing agency to perform tests and inspections as listed in other Project Specifications, but as a minimum shall include at least four of each type and size of installed anchors and fasteners selected by Architect. Schedule tests with City, through Architect, before connecting anchorage device to restrained component (unless post connection testing has been approved), and with at least seven days' advance notice. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members as required. Test to 90 percent of rated proof load of device. Prepare and submit test and inspections reports.
- DD. Trenching and Backfilling: Contractor shall be responsible for trenching and backfilling. Refer to Trenching and Backfilling section of the specifications for complete requirements.

PART 3 - EXECUTION

3.1 PREPARATION AND INSTALLATION

- A. Installation of Conduit and Outlet Boxes:
1. All conduit installed in the dry walls or ceilings of a building shall be steel tube (EMT), aluminum tube (EMT), or Intermediate Metal Conduit (IMC). Flexible conduit shall not be used in lieu of EMT, IMC or rigid conduit except as noted herein.
 2. Galvanized rigid conduit (GRC) or intermediate metal conduit (IMC) shall be used as follows:
 - a. When noted on the drawings.
 - b. When considered exposed to damage by the local AHJ.
 - c. When installed in wet or damp locations and of a trade size where listed-Raintite fittings, connectors, couplings etc. are unavailable.
 - d. When required by NEC or CEC Article 517.13.
 - e. When installed in concrete and masonry. The use of ENT in CMU walls and parking structures may be allowed only as directed in writing by the Engineer. Request for ENT substitution must be made prior to bid and in accordance with pre-bid substitution requests requirements of these specifications.
 3. Intermediate metal conduit (IMC), is approved for use in all locations as approved for GRC or steel-tube EMT and in accordance with NEC, or CEC where adopted, Article 342.
 4. Flexible steel conduit shall only be permitted to be used at light fixture outlets and connections to vibrating electrical equipment. Except when concealed in walls or other structural elements, all flexible steel conduit runs shall be less than 6'-0". All outdoor installation shall be made using liquid-tight flex with approved fittings. Include a separate insulated green ground conductor sized per NEC in each conduit. Other uses of flexible conduit shall be allowed only as approved in writing by the Engineer.

5. Flexible liquidtight conduit shall be installed in lieu of the flexible steel; where required by the NEC, or CEC where adopted, in damp and wet location, where exposed to weather, in refrigerated area (65°F or less), and/or between seismic joints. All rotating electrical equipment shall be supplied with flexible, liquid-tight conduit with appropriate slack and shall not exceed thirty-six (36) inches. Include a separate insulated green ground conductor sized per NEC in each conduit. Other uses of liquidtight flexible conduit shall be allowed as approved in writing by the Engineer on a case by case basis.
6. Rigid metallic conduit installed underground or embedded in concrete shall be 1" trade size minimum and shall be wrapped with 20 mil. Polyvinylchloride plastic tape, PVC conduit installed underground or embedded in concrete shall be 3/4" minimum trade size.
7. Where required for providing an electrical circuit protective system to comply with NEC, or CEC where adopted, Articles 695 and 700 utilize UL Listed 2-hour fire-rated, MC cable or UL Listed 2-hour fire-rated RHH/RHW conductors in conduit.
8. Conduit shall be run so as not to interfere with other piping fixtures or equipment.
9. The ends of all conduit shall be cut square, carefully reamed out to full size and shall be shouldered in fitting.
10. No running threads will be permitted in locations exposed to the weather, in concrete or underground. Special union fittings shall be used in these locations.
11. Where conduit is underground, under slabs or grade, exposed to the weather, or in wet locations, make joints liquid tight and gas tight.
12. All metal conduit in masonry and concrete and where concealed under floor slabs shall have joints painted with thread compound prior to makeup.
13. PVC conduit shall not be run in walls except where approved by the Engineer prior to bid in limited instances that may include concrete or CMU walls used in site retaining, parking structures, or exterior equipment yard or enclosure walls, etc.
14. Where conductors enter a raceway or a raceway in a cabinet, pull box, junction box, or auxiliary gutter, the conductors shall be protected by a plastic bushing type fitting providing a smoothly rounded insulating surface.
15. Where conduit extends through roof to equipment on roof area, the Contractor shall provide flashing material compatible with the roofing system as required by the roofing specifications or as required by the City's roof warranty. This flashing shall be delivered to the roofing Contractor for installation. The actual location of all such roof penetrations and outlets shall be verified by the Architect/City. Contractor to verify type of flashing prior to bid and include all costs.
16. All conduit shall be supported at intervals not less than 6'-0" and within 12" from any outlet and at each side of bends and elbows. Conduit supports shall be galvanized, heavy stamped, two-hole conduit clamp properly secured.
17. Where conduit racks are used the rack shall consist of two-piece conduit clamps attached to galvanized steel slotted channels, properly secured via threaded rods attached directly to the building structure.

18. Nail-in conduit supports, one-piece set screw type conduit clamps or perforated iron for supporting conduit shall not be used.

19. Seismic Conduit Support:

- a. All conduit shall be supported in such a manner that it is securely attached to the structure of the building. Attachment is to be capable of supporting the tributary weight of conduit and contents in any direction. Maximum spacing of support and braces are to be as follows:

<u>CONDUIT SIZE</u>	<u>MAXIMUM SPACING</u>
1/2" to 3"	6'-0"
3-1/2" to 4"	8'-0"

20. All conduit runs shall be installed parallel or perpendicular to walls, structural members, or intersection of vertical planes and ceilings. Field made bends and offset shall be avoided where possible. Crushed or deformed raceway shall not be installed.
21. Open knockouts in outlet boxes only where required for inserting conduit.
22. Locate wall outlet of the same type at same level in all rooms, except where otherwise noted.
23. Outlet boxes on metal studs shall be attached to metal hangers, tack welded or screwed to studs; on wood studs attachment shall be with wood screws, nails are not acceptable.
24. Recessed boxes shall not be mounted back-to-back in any wall; minimum offset shall be 24 inches.
25. Junction Boxes that do not contain any device(s) shall be located in storage rooms, electrical closets, or above accessible ceilings, not in hard lid ceilings or other forms of inaccessible ceilings. Place boxes which must be exposed to public view in a location approved by the City's Project Manager. Provide covers or plates to match adjacent surfaces as approved by the City's Project manager.
26. Surface mounted pull boxes, terminal cabinets, junction boxes, panel boards etc., shall be attached to walls using appropriate screws, fasteners, backing plates, stud blocking etc., as detailed on architectural and/or structural drawings. If architectural and/or structural drawings are not provided on the project, Contractor shall provide all necessary mounting hardware and backing support to comply with local building code requirements and any additional requirements imposed by the local Authority-Having-Jurisdiction.
27. Sleeves shall be installed where conduit passes through masonry or concrete walls and shall be 24-gauge galvanized steel no more than 1/2" greater in diameter than the outside diameter of the conduit. When located in non-rated structures, caulk conduit sleeve with stone wool and waterproof below grade. When located in fire rated structures, provide UL listed fire stopping system. See fire stopping section of this specification for additional requirements.
28. All boxes shall be covered with outlet box protector, Appleton SB-CK, or similar device/method to keep dirt/debris from entering box, conduit or panels. If dirt/debris does get in, it shall be removed prior to pulling wires.

29. All boxes installed outdoors shall be suitable for outdoor installations, gasketed, screw cover, and painted as directed by the Architect with weatherproof paint to match building.
30. All conduit entries to outdoor mounted panels, cabinets, boxes, etc., shall be made using Myers "SCRU-TITE" hubs Series ST.
31. Provide nylon or a 1/8-inch O.D. polyethylene rope, rated at 250 pounds tensile strength, in all conduits more than 5 feet in length left empty for future use. Not less than 5 feet of rope shall be left at each end of the conduit. Tag all lines with a plastic tag at each end indicating the termination/stub location of the opposite end of the conduit.
32. All multiple conduit runs within suspended ceilings shall be suspended from building structure by means of unistrut hangers/racks, Conduit shall not be allowed to lay on ceiling or be supported from ceiling suspension wires or other suspension system. Support conduit to structure above suspended ceilings 8" minimum above ceiling to allow removal of ceiling tile. Maintain two-inch clearance above recessed light fixtures
33. All exposed conduits and support hardware shall be painted to match the finish of the wall or ceiling to which it is supported.
34. Where conduits or wireways cross seismic joints, provide approved flexible conduit connection or approved expansion/deflection fitting to allow for displacement of conduit in all three axes. Connection shall allow for movement in accordance with design of seismic joint. Non-flexible raceways crossing expansion joints or other areas of possible structural movement shall make provision for 3-way movement at such points by means of expansion/deflection fittings. Fittings shall be installed in the center of their axes of movement and shall not be deflected to make part of a conduit bend, or compressed or extended to compensate for incorrect conduit expansion/deflection fittings(s) complete with ground jumpers. Where necessary, provide approved expansion joints to allow for thermal expansion and contraction of conduit(s). Install expansion joints complete with ground jumpers.
35. Seal all conduits where termination is subject to moisture or where conduit penetrates exterior wall, floor or roof, in refrigerated areas, classified (hazardous areas) and as indicated on the drawings.
36. Except as otherwise indicated on the Drawings or elsewhere in these specifications, bends in feeder and branch circuit conduit 2 inches or larger shall have a radius or curvature of the inner edge, equal to not less than ten (10) times the internal diameter of the conduit. Except where sweeping vertically into a building, and where sweep radius equals ten (10) times conduit diameter, underground communications and building interconnect conduits 3 inches or larger shall have a minimum 12'-6" radius or curvature of the inner edge. For the serving utilities, radius bends shall be made per their respective specifications.
37. Tag all empty conduits at each accessible end with a permanent tag identifying the purpose of the conduit, footage end-to-end, and the location of the other end. In wet, corrosive outdoor or underground locations, use brass, bronze, or copper 16-gauge tags secured to conduit ends with #16 or larger galvanized wire. Inscribe on the tags, with steel punch dies, clear and complete identifying information.
38. The following additional requirements shall apply to underground conduits:

- a. Underground conduit shall be Schedule 40 PVC (polyvinyl chloride) unless otherwise indicated elsewhere in these specifications or as required per NEC, or CEC where adopted Article 517.13.
- b. For all communications conduits 2" and larger and feeders 100A or greater, provide with a minimum 3" inch, (2,000 LB) concrete envelope, 2-inch minimum separation between conduits, installed at depth of not less than 24" below grade. (Provide concrete encasement and/or greater minimum conduit depth as required by the Utility Companies.) Conduit separation within a duct bank shall be maintained using plastic spacers located at 5'-0" intervals. Where power and communication conduits are run in a common trench, a 12-inch minimum separation shall be maintained between power and communication conduits or as required by Utility Companies. Where concrete encasement is not required by serving utilities for a utility-only duct bank, provide free draining sand bedding suitable to achieve 95% relative compaction based on ASTM D1557 using 6" lifts or directed by Utility Company Standards.
- c. In all cases, where any conduit(s) pass under a building slab or footing, the electrical Contractor will provide a Bentonite clay or concrete barrier that conforms to the height and width of the trench excavation extending a minimum of 24" on either side of the foundation. In all cases, where conduit(s) pass through a sleeve in a footing or other foundation element, the electrical Contractor will provide a Bentonite clay or concrete barrier between the sleeve and the conduit(s) surrounding the conduit(s) for the entire depth of the sleeve. The barrier is required to prevent passage of moisture under or through the slab or footing via the trench or sleeve.
- d. Where underground conduit passes under a building slab, concrete encasement may not be required, except as required above, contact the Engineer for written direction prior to omitting any encasement.
- e. Underground conduits, which terminate inside building(s) below grade, such as in a basement level, or which slope so that water might flow into interior building spaces, shall be sealed at the point of penetration with a modular conduit seal (Link-Seal or equal by Rox Systems). Conduit/conduit sealing system penetrations of waterproofing membranes/systems on existing structures shall be completely restored as required to maintain membrane/system manufacturer and installer warranty for the installation. All conduits shall be provided with a 4% slope away from buildings. All conduits shall be installed such that the water cannot accumulate in the conduit and such that water drains into the nearest manhole, pull box or vault – not into the facility. In instances where grade changes or elevation differences prevent sloping of conduit away from a building into the nearest manhole, pull box or vault or where accumulation of water in a manhole, pull box or vault may result in water traveling into the facility, conduits shall be sealed internally at each end of each conduit using conduit sealing bushing, sized as required for the conductors contained within the conduit (O-Z Gedney #CSBG 100psig withstand or equal). In all cases, install plugs or caps in spare (empty) conduits at both ends of each conduit (Jackmoon or equal) preventing both water and gas from entering the facility via the conduits.
- f. Include a separate insulated green ground conductor sized per NEC, or CEC where adopted, in each underground electrical feeder/branch circuit.

- g. All underground conduits with circuits rated at 40As or greater and all underground communications conduits shall be provided with a metallic marker tape located 12 inches below the finished grade.
 - h. Where underground conduits sweep into/through slabs, utilize PVC 90 degree sweeps that transition, via female PVC adapter to GRC coupling mounted flush in slab. GRC couplings shall be 1/2 lap taped with 20-mil tape. If the distance of the conduit run between a sweep and the next connecting sweep, pullbox, vault or manhole exceeds 150 ft then the sweep shall be concrete encased. Exceptions:
 - 1) Communications conduits shown terminating at a finished floor shall have an additional 4" high GRC nipple equipped with a bushing, removable conduit plug, labeling tag and pull rope. Tie off pull rope to conduit plug.
 - 2) Utility conduit sweeps shall be installed per the requirements of the respective utility company.
 - i. All PVC conduit shall be glued for a water and gas tight installation. The Contractor shall use appropriate solvent on all joints prior to gluing conduit and fittings together.
 - j. All underground conduit work shall conform to the Federal, State and Local Safety Orders or Rules regarding excavations, trenches and related earthwork. For projects in California, refer to the California Code of Regulations, Title 8, Construction Code Sections 1540 and 1541 for additional requirements.
39. Installation of Metal Clad (MC) Cable (when use is permitted in the Allowed Specification Deviations Section or Deductive/Additive Alternate Pricing Section, generally located on the symbols list drawing).
- a. Provide J-box above accessible ceiling prior to running MC cable within partitions or walls. J-box shall be permanently labeled with panel identification and circuit numbers contained within.
 - b. Overhead MC cable runs shall generally follow building lines to provide a neat and workmanlike installation.
 - c. Provide code-sized J-boxes to accommodate MC cable splicing in general. For systems furniture poke-through feeds utilizing MC cable, transition from MC cables to conduit and wire near the panelboard in the TI accessible ceiling space on the floor below the panel board via code-sized gutter(s). Utilize UL listed, insulated barrier strips with recessed screw heads (Ideal #89-6?? Series or equal) fastened within the gutter(s), terminate MC conductors on one side of the strips(s) and individual conductors in conduit from the panelboard(s) on the other side of the strip(s). Label each terminal strip(s) with panel designation. Label each phase conductor with circuit number using wire markers (Ideal or equal). Wire nuts are not an acceptable alternative to the terminal strips in these underfloor transition locations. Provide (1) spare 3/4" conduit from each gutter to its respective panelboard.
 - d. MC cable shall not run directly into panelboards, distribution boards or electrical rooms.

- e. MC cabling shall be provided with its own code-approved ceiling support wires, cable hangers, individual spring steel support clips, steel trapeze hangers, threaded rods or dedicated #10 AWG drop wire. Cable supports shall be fastened to concrete slabs, beams, joists or other structural members of the building. In no case shall MC cable rest on ceilings, suspended ceilings or structures. Do not support MC cable using ceiling support wires. The use of nylon cable ties to support MC cable is not allowed.
 - f. Use lock or spring nut MC cable fittings.
 - g. Cable runs shall be continuous from wiring device to wiring device – no intermediate splicing J-boxes allowed.
 - h. When terminating or splicing at a junction, outlet, or switch box, cut the cable with an armored cable rotary cutter such that 6-inches of free conductors remain for connections or splices. Use screw-in or spring lock connector and ensure a proper bonding by firmly tightening the connector to both the box and cable. Insert an anti-short bushing at cable ends to protect conductors from abrasion and use insulated connectors.
 - i. MC cable bend radius shall not be less than seven (7) times the external diameter of the cable.
 - j. MC cables passing through fire-rated walls or floors shall be firestopped as required with a UL listed system. See firestopping requirements outlined elsewhere in this specification for additional requirements.
 - k. Installation shall not exceed code requirements for total current carrying conductors in multiple MC Cable runs bundled together into a single MC cable hanger or strap, unless support device is specifically listed for such purpose. Neutrals shall be counted as current carrying conductors.
 - l. Maintain MC Cable clearance of at least 6 inches from hot water and any other high temperature pipes. Maintain at least 12-inches clearance between MC cable(s) and telecommunication conduits and cables. MC cable shall cross telecommunication cables and conduits at right angles.
 - m. MC cabling shall not be run through exposed ceilings, where open grid conditions exist, exposed on walls, or exposed to view. See Power Plan and Lighting Plan General Notes for additional requirements.
40. Installation of Electrical Nonmetallic Tubing (ENT) Cable (when use is permitted in the Allowed Specification Deviations Section or Deductive/Additive Alternate Pricing Section generally located on the symbols list drawing).
- a. When approved for use in the Allowed Specification Deviations Section or Deductive/Additive Alternate Pricing Section, generally located on the symbols list drawing, 1/2" and 3/4" trade size ENT shall be allowed for concealed lighting branch circuits, receptacle branch circuits and miscellaneous signal system circuits within concrete floors, walls and columns within parking structures.
 - b. ENT conduit shall meet the requirements of Underwriters Laboratories Standards 1479 and 1655, NEMA TC-13, and be UL-listed.

- c. All ENT conduit, ENT fittings, ENT boxes and ENT accessories shall be UL listed and manufactured by the same manufacturer so as to form a complete ENT system. ENT systems shall only be used if they are listed for use in fire resistance rated concrete floors and ceilings with resistance ratings as indicated elsewhere in the project plans. ENT system shall comply with NEC, or CEC where adopted, Article 362.
- d. All ENT fittings and ENT boxes shall be concrete-tight listed without the use of tape. Additionally, ENT fittings shall be constructed of high impact PVC and able to resist ENT conduit pull out forces of a minimum of 175 lbs. ENT fittings with fewer than 6 locking tabs for ENT connection shall utilize manufacturer approved glue as additional protection from fitting/conduit separation. ENT conduit to rigid conduit transition fittings shall be equipped with set screw fittings on the rigid conduit side of the fitting. ENT to metal box fittings shall be equipped with a threaded end and lock washer.
- e. Where tubing enters a box, fitting, or other enclosure provide a bushing or adapter to protect conductors from abrasion unless the box, fitting, or enclosure design provides equivalent protection.
- f. ENT junction boxes shall have brass screw inserts and shall be rated to support lighting fixtures weighing less than 50 lbs.
- g. Concrete tight metal boxes shall be used to support pendant hung fixtures or fixtures over 50 lbs.
- h. ENT shall be provided in continuous lengths between junction boxes without use of in-line splices or connectors and shall be clearly marked/labeled at least every 10 feet.
- i. All ENT conduit containing electrical branch circuits shall contain a code-sized equipment ground conductor.
- j. ENT shall transition to EMT, IMC, RMC, or rigid PVC, as appropriate or as called out elsewhere in this specification, for all exposed conduits within/on/under a parking structure.
- k. ENT shall transition to appropriately sized PVC expansion joint(s) at all structure expansion or seismic joints.
- l. ENT shall be securely fastened and supported every 2 – 3 ft. and within 1 ft. of every junction box and fitting to prevent movement and sag.
- m. ENT shall be routed straight without sags, or excessive bending. Where bends are required, comply with Table 362.24 of the NEC for minimum radius of bends. Number of bends shall not exceed quantity allowed by code where used for power and lighting branch circuit and/or feeder conductors. Where utilized for communications system conductors (phones, data cabling, etc.) number of bends shall not exceed the equivalent of (2) 90-degree bends with conduit length no more than 100 feet without installation of a TIA 569-compliant pull box.
- n. Separation of ENT from fittings, excessive sags, or deflections in ENT runs that prevent pulling of wire and other ENT system product or system

installation failures/errors shall be corrected by saw cutting and patching as necessary at no additional cost to the City. Use of surface mounted conduits and junction boxes as a repair method is unacceptable.

- o. Empty ENT runs shall be provided with a nylon pull string.
- p. Coordinate installation of raceway with structural steel and other structural members. Do not cut, notch or otherwise alter structural members without obtaining approval in writing from the Structural Engineer of record.
- q. No more than (2) 3/4" ENT conduits may cross each other within a horizontal concrete slab without obtaining approval in writing from the Structural Engineer of record.

B. Installation of 600-Volt Conductors:

- 1. All electrical wire, including signal circuits, shall be installed in conduit.
- 2. All circuits and feeder wires for all systems shall be continuous from over current protective device or switch to terminal or farthest outlet. No joints shall be made except in pull, junction or outlet boxes, or in panel or switchboard gutters.
 - a. Utilize preinsulated "winged" spring type connectors, 3M Company "Performance Plus" #O/B or #R/Y or equal as required for splices and taps in conductors #6 AWG and smaller. When a spring connector is used in an underground environment or when subject to moisture, utilize a 3M Company Scotchcast 3507G epoxy resin connector sealing pack to seal the spring connector. THE USE OF PUSH-WIRE CONNECTORS (e.g. "WAGO" OR EQUIVALENT) IS STRICTLY PROHIBITED.
 - b. Wires #4 AWG and larger AWG shall be joined together as follows:
 - 1) When located in an underground environment or when subject to moisture, the splice shall be made with compression connector and sealed by a 3M, or equal, PST cold shrink connector insulator.
 - 2) When located in an interior environment, the splice shall be made with an IlSCO or equal dual rated, insulated splice-reducer connector or multi-tap connector-listed for use with 75/90-degree Celsius rated conductors.
 - c. Connections to busbar shall be made with dual-rated copper/aluminum one-piece compression lugs. Paralleled conductor connections shall be by mechanical lugs.
- 3. Thoroughly clean all conduit and wire-ways and see that all parts are perfectly dry before pulling any wires.
- 4. Install UL approved fixture wire from all lighting fixture lamp sockets into fixture outlet or junction box.
- 5. For 20A branch circuit wiring, increase #12 conductors to #10 for 120-volt circuits longer than 100 feet and for 277V circuits longer than 150 feet.

6. Conductor Support: Provide conductor supports as required by codes and recommended by cable manufacturer. Where required, provide cable supports in vertical conduits and provide lower end of conduit with a ventilator.
- C. Grounding/Bonding:
1. Provide grounding and bonding for entire electric installation as shown on plans, as listed herein, and as required by applicable codes. Included, but not limited to, are items that require grounding/bonding:
 - a. Conduit, Raceways and Cable Trays.
 - b. Neutral or identified conductors of interior wiring system.
 - c. Panel boards, Distribution Boards, Switchgear and Switchboards.
 - d. Non-current carrying metal parts of fixed equipment.
 - e. Telephone distribution equipment.
 - f. Transformers, Inverters, UPS, PDU, RDC, Transfer Switch and Generator Systems.
 - g. Raised Flooring.
 - h. Exposed metal in maintenance holes, hand holes.
 - i. Lightning Protection Systems and Antennas.
 - j. Metal piping installed in or attached to a building/structure.
 - k. Metallically isolated structural steel.
 - l. Metallically isolated underground metal water piping.
 - m. Elevator hydraulic piston/lift case.
 2. In multi-occupancy buildings, Contractor shall bond metal water piping systems instated in, under or attached to a building and/or structure serving individual occupancies where the piping system(s) are metallically isolated from each other. Per NEC, or CEC where adopted ART. 250.104(A)(2) and (4), the bonding conductor shall be sized per Table 250.122 and connected to the switchboard/panel board serving that suite/occupancy.
 3. Use of Ground Rods: Furnish and install required number of 3/4" x 10' copper clad ground rods to meet specified resistance, all required grounding wires, conduit and clamps. The size of the grounding conductors shall be not less than that set forth in the latest edition of the California Code of Regulations, Title 24, State of California and NEC (CEC, where adopted), unless otherwise indicated. Rods shall be installed such that at least 10 feet of length is in contact with the soil. Where rock bottom is encountered, the electrode shall be driven at an oblique angle not to exceed 45 degrees from vertical or shall be buried in a trench that is at least 30 inches deep. The upper end of the electrode shall be flush with or below ground level unless the above ground end and the grounding electrode conductor attachments are protected against physical damage. Unless otherwise noted,

connection to the grounding electrode conductor may be by compression type or exothermic process connector. Mechanical connectors shall not be used.

4. Grounding System Connection:

- a. Compression connectors shall be unplated copper, manufactured by Burndy, or approved equal, designed specifically for the intended connection.
- b. Exothermic weld-type connectors shall be 'Cadweld' manufactured by Erico Products, or approved equal, designed specifically for the intended connection.
- c. Mechanical connectors shall not be used.

5. Isolated Ground Receptacles shall have an insulated ground wire connected between the receptacle and the panelboard isolated ground bus. Unless otherwise noted, this ground wire shall not be grounded at any other point, and shall be distinguished from other ground wires by a continuous yellow stripe.

6. Provide separate green equipment ground conductor in all electrical raceways to effectively ground all fixtures, panels, controls, motors, disconnect switches, exterior lighting standards, and noncurrent carrying metallic enclosures. Use bonding jumpers, grounding bushings, lugs, busses, etc., for this purpose. Connect the equipment ground to the building system ground. Use the same size equipment ground conductors as phase conductors, up through #10 AWG. Use NEC (or CEC where adopted) Table 250.122 for conductor size with phase conductors #8 and larger, if not shown on the Drawings.

7. Clean the contact surfaces of all ground connections prior to making connections.

8. Ductwork: Provide a flexible ground strap, No. 6 AWG equivalent, at each flexible duct connection at each air handler, exhaust fan, and supply fan, and install to preclude vibration.

9. Motors: Connect the ground conductor to the conduit with an approved grounding bushing, and to the metal frame with a bolted solderless lug. Bolts, screws and washers shall be bronze or cadmium plated steel.

10. Building grounding system resistance to ground shall not exceed 25 ohms unless otherwise noted and should be confirmed by testing.

D. Line Voltage and Low Voltage Power Supplies to all Mechanical Equipment Including Plumbing, Heating and Air Conditioning Units:

- 1. An electric power supply, including conduit, any necessary junction and/or outlet boxes and conductors and connection shall be furnished and installed by the Contractor for each item or mechanical equipment.
- 2. Power supplies to individual items of equipment shall be terminated in a suitable outlet or junction box adjacent to the respective item of equipment, or a junction box provided by the manufacturer or the equipment and directed by the Mechanical Contractor. Allow sufficient lengths of conductor at each location to permit connection to the individual equipment without breaking the wire run.

3. The location of all conduit terminations to the equipment is approximate. The exact location of these conduit terminations shall be located and installed as directed by the Mechanical and Plumbing Contractor.
 4. Provide power supplies to all plumbing and mechanical equipment, including but not limited to, equipment furnished and installed by City or Contractor such as heating and air conditioning equipment, pumps, boilers, auto valves, water coolers, trap primers etc. The installation shall produce a complete and operable system.
 5. Unless otherwise noted, the Contractor shall furnish and install all conduit, boxes, wires, etc., for line voltage wiring and low voltage wiring.
 6. It is the Contractor's responsibility to verify with the drawings of other trades regarding the extent of his responsibility for mechanical equipment. The bid must include a sum sufficient to cover the cost of the installation.
 7. The location of all power supply connection and/or terminations to the mechanical equipment is approximate. The exact locations of these terminations shall be verified with other trades during construction.
- E. Prefabricated Equipment: Installation of all prefabricated items and equipment shall conform to the requirements of the manufacturer's specifications and installation instruction pamphlets. Where code requirements affect installation of materials and equipment, the more stringent requirements, code or manufacturer's instructions and/or specifications, shall govern the work.
- F. Firestopping:
1. The Contractor shall be responsible for furnishing all material, labor, equipment, and services in conjunction with the selection and installation of a complete, fully functioning, code compliant, UL-listed, fire stop assembly/system(s) as required by project conditions.
 2. Each fire stop assembly/system shall have an "F" and/or "T" rating as required by each condition requiring fire stopping. Each fire stop assembly/system shall have a current UL listing, as indicated in the latest edition of the UL Fire Resistance Directory. Contractor shall verify acceptability of all fire stopping methods and system selections with the authority having jurisdiction prior to installation. The Contractor shall install each fire stop assembly/system in accordance with the manufacturer's printed instructions.
 3. Each fire stop assembly/system shall be labeled with fire stop manufacturer-furnished label on each side of the fire stopping systems depicting UL # etc.
- G. Housekeeping Pads
1. Provide a minimum 3" high housekeeping pad above finished floor/finished grade for all floor-mounted switchgear, switchboards, distribution boards, transformers, motor control centers, etc., flush with the face of the equipment. Located in mechanical central plant(s), other mechanical spaces, and located outdoors, pads shall be flush with the face of the equipment. Confirm pad dimensions with local inspector prior to forming pad to ensure any local code interpretations/conditions are met regarding housekeeping pads.

2. Unless otherwise noted above, provide a minimum 1-1/2" high housekeeping pad above finished floor/finished grade for all interior floor-mounted switchgear, switchboards, distribution boards, transformers, motor control centers, transfer switches etc., flush with the face of the equipment. All housekeeping pad heights are as measured from finished floor or grade. Confirm pad dimensions with local inspector prior to forming pad to ensure any local code interpretations/conditions are met regarding housekeeping pads.
3. Provide a 1-1/2" high housekeeping pad above finished floor/finished for service equipment. Prior to pad rough-in, Contractor shall verify serving utility company's maximum meter height requirements and, if necessary, adjust height of housekeeping pad to comply with those requirements. In indoor applications, the pad shall be flush with the face of the switchgear. In outdoor applications, the housekeeping pad shall extend a minimum of 4 feet from the front of switchgear/switchboard's weatherproof enclosure. Confirm pad dimensions with local inspector prior to forming pad to ensure any local code interpretations/conditions are met regarding housekeeping pads.
4. All housekeeping pads located in, on or attached to a building shall be seismically braced/connected to the building structure.

END OF SECTION

SECTION 26 31 00 - PHOTOVOLTAIC SYSTEM

PART 1 GENERAL

1.01 INTRODUCTION

- A. It is the intent of these specifications to ensure that the PV systems are designed, engineered, and installed consistent with all National, State, and local codes and standards.
- B. At a minimum the system shall consist of the supply and installation of an array of photovoltaic modules, mounting structure, terminal box(es), quick-connect electrical connectors, DC wiring, DC disconnect, grid connected inverter, AC disconnect, AC wiring, all metering equipment, a data acquisition and monitoring system (DAS) and a connection to the facility's electrical system.
- C. All work associated with preparing the site and building for the installation shall be included.
- D. The contractor shall review all drawings that are associated with the construction of the facility. Contractors bid submittal shall account for all existing and proposed conditions in the base bid/price.

1.03 STANDARDS

- A. It is the intent of these specifications to ensure that the PV systems are designed, engineered, and installed consistent with and adhere to any and all currently adopted versions of the International Building Code as amended by the State of California, applicable utility rules and tariffs, and any and all technical and installation specifications and guidelines, to include the following:
 - 1. ASCE /SEI 7-16 - Minimum Design Loads for Buildings and Other Structures.
 - 2. IBC - International Building Code, as amended by the State of Illinois
 - 3. NEC National Electrical Code (NFPA 70), as amended by the State of Illinois
 - 4. IFC- International Fire Code, as amended by the State of Illinois
 - 5. IEEE 519 - Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems.
 - 6. IEEE 929 - Recommended Practice for Utility Interface of Photovoltaic (PV) Systems.
 - 7. IEEE 1262 - Recommended Practice for Qualification of Photovoltaic (PV) Modules - Description.
 - 8. IEEE 1374 - Guide for Terrestrial Photovoltaic Power System Safety.
 - 9. NABCEP - North American Board of Certified Energy Practitioners.
 - 10. NEMA 3R - Industrial Enclosures.
 - 11. NEMA 4 - Enclosures Constructed for either Indoor or Outdoor Use.
 - 12. NRTL - Nationally Recognized Testing Laboratories.
 - 13. OSHA - Occupational Health and Safety Administration, United States Department of Labor.
 - 14. UL 1703/61730 - Flat-Plate Photovoltaic Modules and Panels.
 - 15. UL 1741 SA - Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources.

PART 2 PRODUCTS

2.01 PROPOSAL

- A. The base bid shall include the contractors final and all-inclusive cost for a turn-key PV installation.

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- B. All installations shall meet or exceed OSHA requirements for equipment access.
- C. Submittals/information due with bid:
 - 1. PV module data sheets – including the manufacturer's warranty data.
 - 2. Inverter data sheets – including the manufacturer's warranty data.
 - 3. Mounting system type
 - 4. Proposed schedule to meet the proposed installation date and allowed hours of work per other portions of this RFP.
 - 5. Company experience, relevant previous installations, and references.
 - 6. Summary of Key Personnel.
 - 7. Summary of any insurance coverage limits as requested.
 - 8. Acknowledgement of any site access restrictions noted in the RFP.
 - 9. Any documentation indicating compliance with any financial requirements per other portions of the RFP.

2.02 SUBMITTALS

- A. Shop Drawings: Include photovoltaic module structural supports, solar module controls sequences, and instrument mounting and interconnections and all other components, part and pieces required to complete the function assembly. Where applicable, include pre-fabricated assemblies such as inverter skids or racking assemblies, and shop drawings for foundations or other support structures.
- B. Product Data: Include detailed information for components of the solar energy system.
 - 1. Wiring.
 - 2. DC-AC Inverter.
 - 3. Solar Storage Battery Option, where applicable.
 - 4. Solar Modules.
 - 5. Instrumentation.
 - 6. Switch gear.
 - 7. DC and AC disconnects
 - 8. Combiner boxes, where applicable.
 - 9. Rack mounting system.
 - 10. Monitoring systems, including appropriate interfacing with existing facility data collection systems.
- C. Operation and Maintenance Solar Energy Systems Data Package:
 - 1. Safety precautions.
 - 2. Operators restart.
 - 3. Startup, shutdown, and post-shutdown procedures.
 - 4. Normal operations.
 - 5. Emergency operations.
 - 6. Environmental conditions.
 - 7. Preventative maintenance plan and schedule.
 - 8. Troubleshooting guides and diagnostics techniques.
 - 9. Wiring and control diagrams.
 - 10. Maintenance and repair procedures.
 - 11. Removal and replacement instructions.
 - 12. Spare parts and supply lists.
 - 13. O&M submittals data.
 - 14. Parts indemnifications.
 - 15. Testing equipment and special tool information.
 - 16. Warranty information.
 - 17. Testing and performance data.

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18. Contractor information.
- D. Closeout Submittals:
 1. Posted operating instructions for solar photovoltaic energy system; provide for wiring identification codes and diagrams of solar photovoltaic systems, operating instructions, control matrix, and troubleshooting instructions.
 2. Two (2) copies of the City's manual – including the O & M information with recommended maintenance including cleaning instructions for the PV panels.
 3. One on-site training session for the entire facility staff focusing on safety and for facility maintenance staff focusing on maintenance and safety.
 4. Record drawings showing the final placement of all panels, power optimizers, connections, and conduit placement and single-line/riser diagrams.
 - 6.. Start-up procedure checklists and measurements.
 7. All warranties.
 8. Coordination with Commissioning Agent on system functionality.

PART 3 EXECUTION

3.01 GENERAL

- A. All equipment and materials shall be suitable for the environment in which they are to be installed. All materials that are used outdoors shall be sunlight and UV resistant. All Balance of Systems (wiring, components, conduits, and connections) must be suited for conditions for which they are to be installed.
- B. Materials shall be designed to withstand the temperatures to which they are exposed.
- C. Dissimilar materials shall be isolated from one another using non-conductive shims, washers, or other methods.
- D. Metals shall be hot dipped galvanized steel or anodized aluminum.
- E. Aluminum shall not be placed in direct contact with concrete materials.
- F. Only 18/10 or better stainless steel fasteners shall be used.
- G. Structural members shall be corrosion resistant aluminum, 6061 or 6063.
- H. All electrical conduits shall be galvanized and painted if exposed.
- I. All electrical equipment shall be rated for the current and voltage ratings necessary for the application.
- J. All required over-current protection devices will be included in the system and accessible for maintenance. Each shall have trip ratings no greater than the de-rated amperage of the conductor it protects.

3.02 PV MODULES

- A. All modules shall meet or exceed the requirements of IEEE Standard 1262 and UL Standard 1703/61730.
- B. Thin-film PV modules will not be considered.
- C. PV modules using Cadmium are not approved.
- D. Crystalline silicon flat-plate PV modules are acceptable.

- E. See drawings/cut sheets for the basis of design module. Any deviations from this module wattage/performance must have documentation substantiating the desired kW requirement is met.

3.03 MOUNTING SYSTEM

- A. It is the Contractor's responsibility to ensure that the special requirements of each area are completely understood prior to providing a Bid.
- B. The mounting system shall be a fixed-tilt solution with mechanically attached flat roof attachments.
- C. The mounting system shall be a fixed extruded rail type of mounting systems as manufactured by IronRidge or equal and adhere to AHJ standards.
- D. Manufacturers deferred submittals shall be the responsibility of the contractor.
- E. Racking system shall be listed per UL1703 as a grounded system.

3.04 INVERTER(S)

- A. The inverter(s) shall be sized so it can operate the PV arrays at maximum power for the coldest, hottest, and optimal array operating temperatures based upon the PTC wattage.
- B. Inverters must comply with IEEE 929-2000 – "Recommended Practice for Utility Interface of Photovoltaic Systems" and UL 1741 SA – "Standard for Static Inverters and Charge Controllers for use in Photovoltaic Systems". Inverters shall be factory tested for performance, and results shall be included in the O & M manual.
- C. The output of the system shall not exceed the harmonic distortion levels as specified in IEEE 519.
- D. The inverter must be rated for outdoor use with safety enclosure and cover protection.
- E. Installation shall meet all applicable UL 1741, IEEE Standard 929-2000 and Standard 519, NEC codes, and the latest applicable ANSI and FCC standards and addenda dated prior to the award of the purchase order for this procurement.
- F. See drawings and data sheets for the basis of design inverter selection. Any deviations from this inverter and its performance must have documentation substantiating the desired kW requirement is met.

3.04 METERING, MONITORING, DATA ACQUISITION SYSTEM, AND WEATHER STATION

- A. The PV system is used in utility-interactive grid-tied applications, and the inverter is comprised of three key elements:
 - 1) Microinverter
 - 2) Energy Communication Unit (ECU)
 - 3) Energy Monitor and Analysis (EMA) web-based monitoring and analysis system
- B. The following environmental sensors are optional additions available to the client:
 - 1) PV module temperature
 - 2) Dry-bulb temperature
 - 3) Plane of array solar irradiation
- C. Any additional DAS shall include the following:
 - 1) a data-logger, network interface device for data retrieval, NEMA 4 enclosure
 - 2) 5-years of monitoring and hosting service on a secure website.

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- 3) Meters shall be provided and installed with revenue grade Interval Data Recording (IDR) meters complete with industry standard telemetry for communication with Ethernet services. The contractor will also provide a connection to the building's Energy Management System (EMS) for the purposes of metering, monitoring and data collection of solar production as required by the client. Meters must connect to a monitoring/data collection recording solar production through Time of Use (TOU) increments applicable to the local utility standards, with a minimum 15 minute intervals.

3.05 BATTERY ENERGY STORAGE SYSTEM (NOT APPLICABLE)

- A. BESS shall be designed and manufactured with safety and environment as a priority. BESS shall be designed to be fit for the intended purpose and represent good electrical engineering and industry practice. BESS shall be designed and constructed to operate normally within the environmental conditions of the Site - including temperature, humidity, wind speed and altitude.
- B. Battery shall be of Lithium-Ion type suitable for utility scale BESS. Different chemistry of Lithium-Ion batteries shall be Lithium Manganese (LMO) or Lithium Nickel Manganese Cobalt Oxide (NMC) or Lithium Nickel Cobalt Aluminum Oxide (NCA) or Lithium Ion Phosphate (LFP).
- C. BESS shall be a completed system with cooling system, fire suppression system, water injection system, temperature sensors, humidity controls, localized battery management system (BMS) as appropriate. BESS Controllers shall provide functionalities to interface with Unit controller. A roof-mounted BESS solution with thermal management technology, similar to the Yotta Energy product, may also be considered.
- D. BESS must comply with UL 9540A – testing the fire safety hazards associated with propagating thermal runaway within battery systems.

3.06 AC DISCONNECT

- E. AC Disconnects shall be 600V rated (for a 480V 3-phase service).
- F. Enclosures shall be steel or fiberglass with a NEMA 1/NEMA 3R (or better) as required. Enclosures shall be painted to match surroundings when visible.
- G. When required by Distribution Provider's operating practices, furnish and install a ganged, manually-operated isolating switch (or a comparable device mutually agreed upon by Distribution Provider and Engineer) near the Point of Interconnection to isolate the Generating Facility from Distribution Provider's Distribution or Transmission System. The device must allow visible verification that separation has been accomplished (must meet the local Utility Company requirements) and shall include markings or signage that clearly indicates open and closed positions.
- H. Disconnects shall be by Cooper/Crouse Hinds, Eaton or equal.

3.07 WIRE/FUSES

- A. Wiring shall be appropriately rated Photovoltaic Wire type as manufactured by General Cable or equal.
- B. All other wiring shall be THHN/THWN type as manufactured by General Cable or equal.
- C. DC fuses shall be KLKD type fast acting fuses.

3.08 GENERAL MATERIAL AND INSTALLATION REQUIREMENTS

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- A. All work shall be coordinated with the facility staff to ensure minimal impact on the Facility's operation.
- B. All existing facilities that are affected by the installation of PV equipment shall be moved, modified, and replaced to the City's standards.
- C. The installation shall be completed in a "workman like manner." The area shall be kept clean and free of obstructions at all times.
- D. The installation shall be completed per the manufacturer's installation manual.
- E. The installation shall be completed without affecting existing construction.
- F. All electrical connections and terminations shall be fully tightened, secured, and strain relieved as appropriate.
- G. All mounting equipment shall be installed to the manufacturer's specifications.
- H. All cables, conduit, exposed conductors, and electrical boxes shall be secured and supported according to code requirements.
- I. All national and local electric and building code requirements shall be met.
- J. All applicable environmental regulations shall be met.
- L. Contractor shall meet with the City prior to start of work and daily during installation to coordinate activities and minimize interruption to Operations.
- M. The bidder must provide a minimum of 120 hours' notice to the City prior to any shutdown.
- N. All series connected strings of modules must include a series fuse as required by UL and NEC to prevent wiring to other system components. Parallel connections of modules in individual source circuits are not permitted. Parallel connected cells within individual modules are allowable as long as the module listing allows for the series fuse required for this configuration.
- O. System switching and metering equipment shall have convenient access for resetting or repair during electrical outages, and regular monitoring for data retrieval.
- P. Systems shall be designed and installed using UL or ETL listed components, including mounting systems.

3.09 SYSTEM ELECTRICAL

- A. Electrical construction shall meet all National, State, and local electric codes. All systems must be installed in accordance with all applicable requirements of local electrical codes and the National Electrical Code (NEC), including but not limited to Article 690, "Solar Photovoltaic Systems" and Article 705 – "Interconnected Electrical Power Production Sources".
- B. The modules shall be interconnected using cable assemblies. The pigtails shall be quick-connect electrical wiring connections rated for the application.
- C. All wiring shall be copper in type and shall be listed for a minimum operation of 1000 volts and temperature rating of 90 degrees Celsius in wet locations. All current carrying conductors shall be enclosed in conduit, excluding module interconnections and connections from individual module strings to the inverters.
- E. The system shall have at least one inverter. Full specifications of each inverter shall be supplied as part of the system design documentation submittal. An isolation transformer shall be part of each system for interfacing to the City's existing electrical system.
- F. Interconnection must comply with the serving utility's interconnection standards for non-Utility Generation. Contractor shall be responsible for installing the complete system to the satisfaction of the serving utility, and all costs to provide an approved interconnection shall be included in the base bid.

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3.10 INSTALLATION STANDARDS

- B. The installation shall be completed with a minimum of impact on the environment.
- C. System Installation shall conform to Manufacturers' Installation Manuals and approved project drawings and specifications.
- D. Array mounting hardware shall be compatible with the site considerations and environment. Special attention shall be paid to minimizing the risk from exposed fasteners, sharp edges, and potential damage to the modules or support structures. Corrosion resistance and durability of the mechanical hardware shall be emphasized – the use of stainless steel fasteners and aluminum support structures are required. The use of ferrous metals, wood, or plastic components is not acceptable.

3.12 SYSTEM OUTPUT MEASUREMENT:

- A. The Contractor will establish the initial system output to demonstrate that the system is performing as designed, and to establish a baseline to be used for warranty. The system output will be verified on a clear and sunny day after construction of the system has been completed.
- B. Prior to inverter startup, voltages will be recorded for each string, each sub-array, and the entire array. Measurements will be recorded and provided to the City in a clear, tabular format, electronically in a Microsoft Excel spreadsheet. Each voltage measurement will include the following ancillary data: the date; the time of day that the measurement was taken. Contingent of environmental sensors required for the project site, a sample panel temperature at the time, the dry-bulb temperature at the time, and the solar irradiation at the time shall be documented. The strings that make up each sub-array will be clearly identified on a drawing by number.
- C. After inverter startup, current shall be recorded for each string, each sub-array, and the entire array. Measurements will be recorded and provided to the City in a clear, tabular format, electronically in Microsoft Excel. Each current measurement will include the following ancillary data: the date; the time of day that the measurement was taken. Contingent of environmental sensors required for the project site, a sample panel temperature at the time, the dry-bulb temperature at the time, and the solar irradiation at the time shall be documented. The strings that make up each sub-array will be clearly identified on a drawing by number.
- D. Start-up shall be per all manufacturers' instruction.
- E. System start-up procedure will be as outlined by the Manufacturer's Installation Manual and the Inverter Manual.

3.12 PROJECT CLOSEOUT

- A. Clean all equipment and PV modules. PV modules shall be brush cleaned with soap and water and rinsed thoroughly.
- B. Clean all work areas, removing any debris.
- C. The Successful Respondent will also be required to provide a minimum of one (1) training session. Topics to be covered in this training include theory of operation, operating requirements, component descriptions and specifications, maintenance requirements and schedule, safety precautions, an overview of the System Manual and record keeping.
- D. Prepare two (2) copies of operating and maintenance manuals in hard cover binders and deliver to the City. At a minimum the binders shall include:
 - 1. A complete set of all approved submittals including shop drawings and product literature.
 - 2. Copy of the City's manual – including the O & M information with recommended maintenance including cleaning instructions for the PV panels.
 - 3. Start-up procedure checklists and measurements.
 - 4. All warranties.

DIVISION 26 - GENERAL ELECTRICAL SPECIFICATIONS

END OF SECTION

SECTION 27 10 00

STRUCTURED CABLING SYSTEM

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The work under this section includes all final design, material, equipment, supplies, labor, testing, and accessories required to furnish and install a complete Structured Cabling System (SCS) as indicated on the drawings and as specified herein. These systems shall be defined as all cables, equipment, products, etc, as indicated on the drawings, and mentioned in these specifications.
- B. It is the intent of the Drawings and Specifications, which are presented in a "design-build" format, for the Contractor to design, provide and install a complete, fully operational, and tested system.
- C. All miscellaneous system components including, but not limited to, cables, termination equipment, punch blocks, patch panels, ladder racks, backboards, equipment racks, speakers, clocks, cameras, enclosures, terminal cabinets, and any other related items shall be furnished and installed complete under this section, such that the system shall perform all functions listed herein in compliance with all of the specified requirements.
- D. Schedule is paramount to the project's success. With this, the structured cabling Contractor will have to be a team player, continually working with the team to facilitate expeditious design, procurement, and construction processes.
- E. This project will be performed in a phased construction format. Each phase of construction will be completely installed, labeled and tested, to the greatest extent physically possible, before moving to the next phase.
- F. It is a mandatory requirement that a single Contractor perform the work described in the following specification sections:
 - 1. Section 26 00 00 – General Electrical.

1.2 RELATED WORK, STANDARDS, DOCUMENTS AND PUBLICATIONS

- A. Each agency's relative codes, standards, and recommended practices apply to the voice/data cabling systems and their components as specified herein:
 - 1. American National Standards Institute (ANSI)
 - a. ANSI T1.336 Engineering requirements for a universal telecommunications frame
 - b. ANSI T1.404 Network and customer installation interfaces – DS3 and metallic interface specification

2. Building Industry Consulting Service International (BICSI)
 - a. Telecommunications Distribution Methods Manual (TDMM) – latest edition.
 - b. Customer Owned Outside Plant Design Manual (CO-OSP) – latest edition.
3. Comite Consultatif Internationale de Telegraphique et Telephonique (CCITT)
4. Federal Communications Commission (FCC)
 - a. FCC Part 68 Rule
5. American Society for Testing and Materials (ASTM)
 - a. E814-02 Standard Test Method for Fire Tests of Through-Penetration Fire Stops
6. Insulated Cable Engineers Association (ICEA)
 - a. Communications Wire and Cable for Premises Wiring.
7. International Electrotechnical Commission (IEC)
 - a. IEC 61935-01 Generic Cabling Systems - Specification for the testing of balanced communication cabling in accordance with ISO/IEC 11801 Part 1: Installed Cabling
 - b. IEC 61935-02 Generic Cabling Systems - Specification for the testing of balanced communication cabling in accordance with ISO/IEC 11801 Part 2: Patch Cords and Work Area Cords
8. Institute of Electrical and Electronics Engineers (IEEE)
 - a. IEEE 802 Specification for Local Area Networks, latest edition.
 - b. IEEE 802.3an Specification for 10GBASE-T Ethernet, latest edition.
 - c. ANSI/IEEE C62.41 – Guide on the Surge Environment in Low-Voltage (1000V or less) AC Power Circuits, latest edition.
9. International Organization for Standardization (ISO)
 - a. ISO/IEC 11801 Information Technology – Generic Cabling for Customer Premises, latest edition.
 - b. ISO TR 24750 Technical Report
10. National Fire Protection Association (NFPA)
 - a. ANSI/NFPA-70 National Electric Code – Current version as adopted by AHJ(NEC)

- b. ANSI/NFPA-75 Standard for the protection of information technology equipment
- 11. National Electrical Manufacturers Association (NEMA)
 - 12. Occupational Safety and Health Administration (OSHA)
 - 13. Telecommunications Industry Association (TIA)
 - a. TIA/EIA-492AAAC Detail Specification for 850nm Laser-Optimized 50 micron Core Diameter/125 micron Cladding Diameter Class IA Graded-Index Multimode Optical Fibers.
 - b. TIA/EIA-492AAD Detail Specification for 850nm Laser-Optimized 50 micron Core Diameter/125 micron Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers Suitable for Manufacturing OM4 Cabled Optical Fiber.
 - c. TIA-526-7 Optical Power Loss of Installed Single-Mode Fiber Cable Plant.
 - d. TIA-526-14-B Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant; IEC 61280-4-1 Edition 2, Fiber-Optic Communications Subsystem Test Procedure- Part 4-1: Installed Cable Plant- Multimode Attenuation Measurement.
 - e. ANSI/TIA-568-C.0 Telecommunications Cabling for Customer Premises, latest edition.
 - f. ANSI/TIA-568-C.1 Commercial Building Telecommunications Cabling Standard, latest edition.
 - g. ANSI/TIA-568-C.2 Twisted-Pair Telecommunications Cabling and Components Standard, latest edition.
 - h. ANSI/TIA-568-C.3 Optical Fiber Cabling Components Standard, latest edition.
 - i. ANSI/TIA-568-C.4 Broadband Coaxial Cabling and Components Standard, latest edition.
 - j. ANSI/TIA-569-B Telecommunications Pathways and Spaces, latest edition.
 - k. ANSI/TIA/EIA-598-C Optical Fiber Cable Color Coding.
 - l. ANSI/TIA-606-B Administration Standard for Commercial Telecommunications Infrastructure, latest edition.
 - m. ANSI/TIA-607-B Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications, latest edition.
 - n. ANSI/TIA-758-B Customer Owned Outside Plant Telecommunications Infrastructure Standard, latest edition.
 - o. ANSI/TIA-862-A Building Automation Systems Cabling Standard, latest edition.
 - p. ANSI/TIA-942-A Telecommunications Infrastructure Standard for Data Centers, latest edition.
 - q. ANSI/TIA-1152 Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling, latest edition.
 - 14. Underwriters Laboratories Standards (UL)
 - a. UL 5 Surface Metal Raceways and Fittings, latest edition.
 - b. UL 5A Nonmetallic Surface Raceways and Fittings, latest edition.

- c. UL 5B Strut-Type Channel Raceways and Fittings, latest edition.
- d. UL 5C Surface Raceways and Fittings for Use with Data, Signal, and Control Circuits, latest edition.
- e. UL 514A Metallic Outlet Boxes, latest edition.
- f. UL 514B Conduit, Tubing, and Cable Fittings, latest edition.
- g. UL 514C Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers, latest edition.
- h. UL 514D Cover Plates for Flush-Mounted Wiring Devices, latest edition.
- i. UL 943 Ground-Fault Circuit-Interrupters (GFCI), latest edition.
- j. UL 1363 Relocatable Power Taps, latest edition.
- k. UL 1449 Transient Voltage Surge Suppressors, latest edition.
- l. UL 1685 Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables, latest edition.
- m. UL 1863 Communications-Circuit Accessories, latest edition.

15. Intetek Testing Services ETL SEMKO (ETL)

- B. The Contractor shall be responsible for obtaining and utilizing the latest Structured Cabling, Architectural, Security and Electrical plans.

1.3 GENERAL REQUIREMENTS

- A. Manufacturer: The term “manufacturer” shall be defined as the company, or group of companies, that actually produces the products meeting the requirements of Section 2 of this document. The manufacturer shall have a minimum of seven- (7) year’s experience in manufacturing products of this type and shall be ISO 9001 Certified. The products, summarized in this specification, shall be supplied by a single manufacturer, with the exception of:
 - 1. Data racks and other hardware that is not defined as part of the channel test configuration by ANSI/TIA/EIA 568-C.
 - 2. Fiber Optic Cable and Outside plant (OSP) fiber cable.
 - 3. Channel solutions consisting of cabling and connectivity hardware independently tested as by UL or ETL and that are listed Section 2 of this document.
 - 4. Cables manufactured by another manufacturer specifically called out on the drawings.
- B. Contractor: The term “Contractor” shall be defined as the company, or group of companies, that actually installs the products per Section 3 of this document. The

Contractor selected to provide the installation of this system shall be certified by the manufacturer in all aspects of design, installation and testing of the products described herein.

1. The Contractor shall hold a valid State of California C-7 Low-Voltage license, shall have completed at least ten (10) projects of equal scope, shall have been in business of furnishing and installing systems of this scope and magnitude for at least the past five (5) consecutive years, and capable of being bonded to assure the City's Project Manager of performance and satisfactory service during the guarantee period.
2. The Contractor shall have a minimum of one (1) Registered Communications Distribution Designer (BICSI RCDD) and a minimum of two (2) BICSI TECHNICIAN level technicians on staff as full time employees.
3. All work shall be performed under the supervision of a company accredited and trained by the manufacturer and such accreditation must be presented. Contractor must be accredited a minimum of 180 days prior to bid submittal date.
4. The Contractor shall be a manufacturer's Authorized Installer and Warranty Station for the equipment offered and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment.
5. All personnel performing work on this project must have successfully completed the manufacturer's training course prior to performance of any work on this project. Accreditation will consist of individual employee certifications issued by the manufacturer. All personnel engaged in the testing of fiber optic and category-6 metallic premise horizontal and distribution systems must have successfully completed the test equipment manufacturer's training. Certification of such training must be presented prior to any work performed on this project.
6. The Contractor selected for this Project shall adhere to the engineering, installation and testing procedures and utilize the authorized manufacturer components and distribution channels in provisioning this Project.
7. The Contractor shall own and maintain tools and equipment necessary for successful installation and testing of fiber optic cable, and Category 6 metallic premise horizontal and distribution systems, and have personnel who are manufacturer trained in the used of such testing tools and equipment.
8. The Contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work.
9. For additional Contractor requirements, see Section 1.06.A.1 (b) of this document in its entirety.

1.4 QUALITY ASSURANCE

- A. It is the intent of these specifications to establish an installation standard of quality for labor and materials. For any proposed product substitution or when the Contractor intends to include an "or equal" product in the bid pricing, the Contractor shall provide a substitution/or-equal request submittal to the City's Project Manager for review no

later than fifteen (15) calendar days prior to Bid submittal. This report shall include all of the following items:

1. Description of how the proposed product(s) will impact meeting the project completion date, indicate all item(s) with lead times and expected delivery date(s).
 2. Itemized cost comparisons between the proposed product(s) and the listed product(s).
 3. Detailed technical analysis of the electrical and mechanical specification differences between the proposed product(s) and the listed product(s).
 4. ETL "Verified" or UL "Verified" test lab documentation for the proposed product(s) and assemblies proposed.
 5. Proposed product identification, manufacturer literature (specifications and cut sheets).
 6. Name, address and contact information of several similar projects where the substituted product(s) have been used.
 7. Name, address and contact information of the proposed product(s) manufacturer's local representative.
 8. Sample proposed product(s) manufacturer's lifetime component and application warranty. Detailed warranty requirements are described in Section 1.10 SPECIFIC SYSTEM PRODUCT, INSTALLATION AND OVERALL SYSTEM WARRANTY of this document.
- B. The City's Design Team/Project Manager must approve any proposed product(s) substitution item in writing. The City's Design Team/Project Manager reserves the right to require a complete sample of any proposed product(s) and may request a sample tested by an independent testing consultant to prove equality. The decision of the City's Design Team/Project Manager regarding equality of proposed product(s) items will be final.
- C. If a proposed product(s) is given final acceptance by the City's Project Manager, the Contractor shall reimburse the City's Design Team/Project Manager for the costs to review the proposed product(s) substitution(s), and for any additional engineering charges, and shall pay all charges of other trades resulting from this products use, at no cost to the City.

1.5 GENERAL SUBMITTAL REQUIREMENT

- A. Submittals shall be presented and formatted per the guidelines in the Division 1 section of this bid package.
- B. All cut sheets shall represent the latest version, part number, and revision of the product. Where multiple products or part numbers appear on a page, a bold arrow or circle shall indicate which product or part numbers are to be used as part of the

installation. The submittal shall include all descriptive pages associated with the product, not just the page showing the part number.

1.6 PRE INSTALLATION SUBMITTAL REQUIREMENTS

- A. Within fifteen (15) calendar days after the date of award of the Contract, the Contractor shall submit the following:
1. Submittal Binder: Submit six (6) copies of the complete Submittal Binder to the City for review. The binder shall consist of five (5) major sections with each section separated by index tabs. Each page in the binder shall be numbered sequentially and shall be summarized in the index.
 - a. The FIRST section shall be the "title sheet" which shall include the submittal date, project title and address, name and contact information of the Contractor, and name of the City.
 - b. The SECOND section shall include the following items:
 - 1) CONTRACTOR'S LICENSE: A copy of the low voltage Contractor's valid State of California C-7 Low-Voltage license.
 - 2) PROOF OF EXPERIENCE: Proof (written documentation) that the low voltage Contractor has been regularly engaged in the business of low voltage contracting consisting of, but not limited to, engineering, fabrication, installation, and servicing of communication systems of the type specified herein for at least the past five (5) consecutive years.
 - 3) PENDING LITIGATION: Provide a statement summarizing any pending litigation involving any officer or principal of/or the company, the nature of the litigation and what effect the litigation may carry as it relates to this work in the worst-case scenario. Non-disclosure of this item, if later discovered, may result, at the City's discretion, in the Contractor bearing all costs and any cost related to associate delays in the progress of the work.
 - 4) INSURANCE CERTIFICATES: Copy of low voltage Contractor's current liability insurance and state industrial insurance certificates in conformance with the contract documents.
 - 5) PROJECT LIST: A List containing at least ten (10) California installations completed within the last five (5) years by the low voltage Contractor that are comparable in scope and nature to that specified in the contract document. Provide up to date contact information for each project listed including contact name, title, email address and phone number.
 - 6) SERVICE CAPABILITY: Documentation indicating in detail that the low voltage Contractor has competent engineering, installation, service personnel and facilities with reasonable stock of service parts within 75 air miles of the job site. Do not submit a sales brochure as documentation.
 - 7) AUTHORIZATION LETTERS: Letters from the low voltage equipment manufacturer stating that the low voltage bidding Contractor is a Factory Authorized Distributor/Installer, and is trained and certified for the equipment he proposes to use on this project, and is licensed to purchase and install software required to provide the specified functions.

- 8) **CERTIFICATION:** Copy of the following current BICSI certifications. Provide proof that the certificate holders are full time employees of the low voltage Contractor's local facility servicing this project and will be actively involved on site for the duration of this project.
- a) BICSI RCDD, minimum of (1). Mandatory requirement: Shall be on site a minimum of one (1) day per workweek.
 - b) BICSI TECHNICIAN, minimum of (2). Mandatory requirement: Shall be on site a minimum of five (5) full 8-hour days per workweek.
- 9) **PROOF OF TRAINED PERSONNEL:** Documentation that the Contractor has full time on-staff personnel, manufacturer trained and BICSI certified, for the equipment proposed for this project, and on-staff manufacturer trained and certified by the Test Equipment manufacturer in the proper use of the test equipment required on this project. Provide copies of all manufacturers' training/certification documentation, and Test Equipment manufacturer's training/certification documentation. Provide a statement that personnel meeting these qualifications are in the local facility, and will be maintained at that facility throughout the project and the warranty period.
- c. The THIRD section shall contain a detailed bill of materials including the quantity, product Manufacturer, product part number, product description, and corresponding specification section number or drawing sheet number where that product is referenced. Also listed in the bill of materials shall be each item of test equipment to be used to test the optical fiber copper and coax components. Include all patch cords and other specialized components. See example format below:
- | Description | Part # | Quantity | UoM | Spec | Test Equip. |
|--------------------|----------------|-----------|------------|------|----------------|
| CAT6 Station cable | Hubbell #12345 | 100 boxes | 1000ft/box | 2.03 | Fluke DTX-1800 |
- d. This information may be used by the City to evaluate the Contractor's general understanding of the project scope during the bid evaluation. Errors/Omissions from this bill of material do not relieve the Contractor from providing all material, components, labor, etc., as outlined in this specification and on the drawings to provide a complete and useable structured cabling system.
- e. The FOURTH section shall contain original manufacturer cut sheets for all of the materials that meet the requirements listed in Section 2 of this specification and all materials described on the construction drawings. Also include manufacturer's cut sheets for all testing equipment to be used for completion of the project. All pages shall be numbered sequentially corresponding to the bill of materials. On each cut-sheet, provide an indicating arrow next to each part number of proposed material.
- f. The FIFTH section shall contain a designation schedule for each system component location and complete full size 30" x 48", unless otherwise specified, bond drawings, showing system wiring plans. The professionally

drafted drawings shall be generated on AutoDesk AutoCAD 2010 (or later) computer design software. These drawings shall also include:

- 1) MDF, BDF and IDF Diagrams - Including:
 - a) Cable routing.
 - b) Position of all components and apparatus.
 - c) Detailed layout of the wallfield(s).
 - d) Labeling plan.
- 2) Site Plan – Including:
 - a) Conduit routing of all site conduits
 - b) Building designations
 - c) MDF and IDF locations
 - d) Cabling between MDF and IDF racks
- 3) Work Area Floor Plans - Including:
 - a) Detailed cable routes.
 - b) Device locations and quantities.
 - c) Approved labeling plan for all work areas.
- 4) Cross Connect Documentation - Including:
 - a) Cross-connect records for all voice, and data devices.
- 5) Riser Distribution Plan.
- 6) Rack elevations of all MDF and IDF equipment.
- 7) 1/4" scale plans of all data rooms.
- 8) Cable Tray, Conduit, and Raceway Plans (if applicable).
- 9) Campus Distribution Plan (if applicable).
- 10) Building Control Plans (if applicable).

B. Failure to comply with any of the requirements listed above may result in the rejection of the entire submittal package.

1.7 PROJECT DIRECTION

- A. Single Point of Contact: Contractor will provide an English-proficient, single point of contact, i.e., Project Manager, to speak for the Contractor and to provide the following functions:
1. Initiate and coordinate tasks with City's Project Manager, and others as specified by City's Project Manager.
 2. Provide day-to-day direction and on-site supervision of Contractor personnel.
 3. Shall be readily available to the City/City's Project Manager 24 hours a day / 7 days a week throughout the duration of the Project.
 4. Shall have full time cellular phone capability, and the ability to send/receive email correspondence, accessible by the City's Project Manager.
 5. Ensure conformance with all Contract provisions.
 6. Participate in weekly site project meetings and construction meetings.
 7. Provide detailed and written weekly status reports to City's Project Manager. The content shall be substantive enough to bring about a full understanding of all situations current and situations future. Weekly reports shall include but are not limited to detailed progress report, RFI status log (Request For Information), OSI status log (City's Supplemental Instructions), Change Order Log (pending and approved), Project Addendum log. Each of the above must show assigned responsibilities and event history. Weekly reports shall include milestone information, resource updates (staff and materials), and any conditions or incidents that may impact the Project Schedule.
 8. This individual will remain as Project Manager for the duration of the project. The Contractor may change Project Managers only with the City's Project Manager's written approval.

1.8 PLANNING

- A. Planning meetings and schedule: Within fifteen (15) calendar days after the date of award of the Contract, an initial planning meeting will be held with the successful bidder to clarify all requirements (systems, services, distribution methods, etc.), identify responsibilities, and schedule the events that will transpire during the implementation of the project. Within seven (7) calendar days of this initial meeting, the Contractor shall provide a written report and project schedule to clearly document the events and responsibilities associated with the project. Contractor's project schedule shall conform to the overall Project Construction Schedule issued by the Construction Management Company or the City. Contractor is required to attend all planning and other construction meetings as requested by the City, Architect, or Engineer.

1.9 POST INSTALLATION SUBMITTAL REQUIREMENTS

- A. Within fifteen (15) calendar days after the completion of work, the Contractor shall submit the following:

1. Record Documentation:
 - a. Final Test Results – Test results for each cable indicating tests performed, results obtained and values measured. Test results shall be provided in electronic format with the associated application (if required) for viewing. Testing shall be conducted in accordance with Section 3.06 of this document.
 - b. As-Built Drawings – Contractor shall provide a complete set of professionally drafted full size 30" x 48", unless otherwise noted, reproducible bond as-built drawings, generated on AutoDesk AutoCAD 2010 or later. Contractor shall provide/create backgrounds and floor plans. Borders to be provided or approved by Architect. MDF and IDF Diagrams – Including:
 - 1) Cable routing for each system.
 - 2) Position of all components and apparatus.
 - 3) Detailed elevation layout of the wall field(s).
 - 4) Labeling plan. (utilize labeling plan as specified in this document)
 - 5) Cross-connect records for all voice and data devices in Word or Excel.
 - 6) Riser Distribution Plan.
 - 7) Cable Tray, Conduit, and Raceway Plans.
 - 8) Campus Distribution Plan (include utility company pathways and cabling).
 - 9) Voice, data, IP clock, IP speaker, and CCTV camera device locations.
 - 10) Terminal cabinet(s), equipment racks, UPS power supply(s), control panel(s), switch(s), server(s), patch panel(s), wireless access point locations.
- B. After as-built submittal is approved by City, the Contractor shall provide to City two (2) sets of CDs containing all post-installation submittals and close out documentation.
- C. As-Built Documentation Display In Each MDF and IDF: Within fifteen (15) days after the completion of work, the Contractor shall install a complete Contractor-provided, professionally drafted as-built floor plan in color in each MDF and IDF mounting frame. Each floor plan, generated on AutoDesk AutoCAD 2010 computer design software and printed in color, shall depict all jack locations in each modular furniture cubicle and all other areas. Also depicted shall be speaker, clock, wireless access point, terminal cabinets, MDF, IDF, pull boxes, vaults, CCTV cameras, television jack locations, or any other communications outlet cables by the SCS Contractor. All jack locations shall be color coordinated with the City's labeling scheme as described elsewhere in this specification. Contractor's device symbols shall match the device symbols utilized on the bid documents. The Contractor will provide to City two (2)

sets of CDs containing all as-builts in AutoCAD 2010 .dwg format, 11"x17" PDF format, and 30"x48" PDF format.

D. Warranty Documentation:

1. Contractor shall apply for all Manufacturers' Extended Warranties on behalf of the City. Contractor shall present to City all General and Specific Warranty Documents per Warranty Specifications Sections. Warranty shall commence after final acceptance of System and Project Close Out by the City.

1.10 GENERAL SYSTEM PRODUCT, INSTALLATION AND OVERALL SYSTEM WARRANTY

A. A twenty-five (25) year Extended Product Warranty and Application Assurance for the data / cctv wiring systems shall be provided as follows:

1. 25 Year Extended Product Warranty

- a. The 25 Year Extended Product Warranty shall ensure against product defects, that all approved cabling components exceed the specifications of ANSI/TIA/EIA 568-B and ISO/IEC 11801, exceed the attenuation and NEXT requirements of ANSI/TIA/EIA 568-B and ISO/IEC 11801 for cabling channels, that the installation will exceed the loss and bandwidth requirements of ANSI/TIA/EIA 568-B and ISO/IEC 11801 for fiber channels, for a twenty-five (25) year period. The warranty shall apply to all passive SCS components.
- b. The 25 Year Extended Product Warranty shall cover the replacement or repair of defective product(s) and labor for the replacement or repair of such defective product(s) for a twenty-five (25) year period.

2. 25 Year Application Assurance

- a. The 25 Year Application Assurance shall cover the failure of the wiring system to support the application which it was designed to support, as well as additional application(s) introduced in the future, up to 350Mbps parallel transmission schemes, by recognized standards or user forums that use the ANSI/TIA/EIA 568-B or ISO/IEC 11801 component and channel specifications for cabling, for a twenty-five (25) year period.

3. System Certification

- a. Upon successful completion of the installation and subsequent inspection, the City's Project Manager shall be provided with a numbered certificate, from the manufacturing company, registering the installation.

B. Cable Manufacturer site certifications are not allowed.

1.11 GENERAL ENGINEERING AND DESIGN GUIDELINES

A. Cabling System Installation Practices

1. Plastic cable tie (tie wrap) devices shall not be utilized at any time. Only Velcro-type strap devices are permitted. Velcro-type straps are to be utilized in the MDFs and IDF's at a maximum interval of three (3) feet.
2. All pull rope devices are to be replaced in all pathways for future use.
3. All intra-building cabling shall be routed either parallel or at right angles to the building structure and/or walls.
4. All innerduct shall be supported at a maximum of twelve (12) inch intervals if running vertical and maximum of forty-eight (48) inch intervals if running horizontal.
5. No cabling is to be pulled through electrical Condulet (L-bend) devices. If conduit devices are pre-existing and it is determined, at the review of the City's representative, that sufficient space in the conduit is available and the City provides written approval to utilize the conduit, the Contractor shall remove the conduit cap, pull the cable to and beyond the cap then carefully reinstall the cap.
6. Communications cabling shall never be tied or attached to electrical conduits, power cables or devices, lighting systems, or co-exist inside any pathway with power cabling.
7. Any visible damage to a cable such as kinks or bends in violation of the minimum bend radius shall render the cable segment defective and shall be removed and replaced by the Contractor at no additional cost to the City.
8. Cabling installed above accessible ceiling spaces shall either be installed in conduit, or supported above the accessible ceiling tiles by Contractor-provided Contractor-installed j-hooks. J-hooks shall be installed on their own independent support wires or rods, and spaced at intervals not to exceed 5 feet.
9. All materials shall be new, unused, and delivered to job site in original manufacturer or distributor cartons or packages. No previously installed material shall be used at any time.
10. Reference Part 3 of this document for additional installation guidelines and requirements.

1.12 SPECIFIC SYSTEM REQUIREMENTS

A. Backbone Infrastructure Cabling – Data

1. Backbone Fiber Optic Cabling
 - a. Contractor shall provide 12 strand laser optimized OM4 multimode fiber optic cable as indicated on the plan drawings.
 - b. Single mode fiber optic cable is not required on this project unless specifically noted on the plan drawings.

- c. Provide a 20-foot slack loop neatly coiled and secured at each end of the fiber optic cable.
 - d. Splicing of fiber optic cable shall not be permitted.
 - e. All exposed fiber optic cable shall be enclosed in innerduct. Innerduct is not required within inter-building conduits.
 - f. Provide 1-meter and 2-meter fiber optic patch cords for each pair of strands terminated at the Server room and IDF rooms.
 - g. See Part 2 of this document for fiber optic cable specifications.
2. MDF/IDF UTP Termination Equipment
- a. The horizontal cross-connect for data circuits shall consist of patch cords from the horizontal Category 6 termination panels to the network equipment within the same or adjacent racks.
 - b. The Server room and IDF horizontal data cross-connects shall be contained in free standing City-provided lockable cabinet(s) as described in Part 2 of this document, and as detailed on the bid documents/plan drawings.
 - c. Patch panels shall be 24 or 48 open frames, with (1) cat-6 jack installed per cat-6 cable, wired to T568B wiring scheme.
 - d. Category 6 patch cords and cables shall be provided by the Contractor. At the Server room and each IDF, provide one (1) 3-foot cord or 7-foot cord for each cat-6 cable terminated in the patch panels, and provide one (1) 10-foot cord for each cat-6 cable terminated at a data outlet. In instances where longer cords are required, the Contractor shall clarify the requirement with the City before installing any longer cords. Where the specifications and the plan drawings conflict, the more stringent requirement will apply.
 - e. See Part 2 of this document for cable specifications.

PART 2 - PRODUCTS

2.1 STRUCTURED CABLING SYSTEM

- A. Acceptable Manufacturers - all equipment listed herein will be by:
 - 1. SCS components: Hubbell, Belden, or AMP.
- B. It is the responsibility of the bidder to insure that the proposed product meets or exceeds every standard set forth in these specifications and the equipment's technical data sheets.
- C. The functions and features specified are vital to the operation of this facility; therefore, inclusion of a component's manufacturer in the list of acceptable manufacturers does

not release the Contractor from strict compliance with the requirements of this specification.

- D. See Quality Assurance section of this specification for additional product substitution requirements.

2.2 OUTLETS

A. Faceplates

1. All Faceplates shall be available in single, duplex, triplex, quad, or six-plex arrangement in a single gang configuration.
2. Faceplates shall be available in eight-plex arrangement in a dual gang box configuration.
3. Surface mount boxes shall be available in single, dual, quad, and six-plex configuration.
4. Modular furniture faceplates shall be available in single, dual, triple and quad configuration for the City's modular existing and/or new modular furniture. Faceplates shall be flush-mounted in the modular furniture. Surface mounted boxes/faceplates are unacceptable. The Contractor is responsible for coordinating with the City's modular furniture Contractor to determine faceplate requirements. The Contractor shall provide and install all parts/fittings necessary to meet the requirements of this section.
5. Wall mounted phone jack faceplates shall be single gang configuration, constructed of stainless steel and have two standard phone mounting posts located above and below the jack opening. Wall mounted phone faceplates will consist of 8p8c modular (RJ-45) jacks.
6. Faceplates shall have designation windows with clear plastic covers.

- B. Communications outlets shall consist of one, two or three gang utility outlet boxes plates equipped with 8-pin modular (RJ-45) jacks utilizing T568B wiring scheme. All outlet cabling shall terminate on termination blocks at their associated Server room, Intermediate Distribution Frame (IDF) Rooms, or as otherwise indicated on the drawings.

- C. Unless otherwise noted on the floor plans, or within this document, all data wall outlets for 23- AWG copper cable shall be:

1. 8-position/8-conductor (8p8c) modular outlets for data and for voice.
2. Insulation displacement.
3. Support universal applications in a multi-vendor environment, accepting modular RJ-45 plugs for data outlets and for voice outlets.

4. Provide with blank module inserts for all unused module locations. Jack module arrangement is shown on the drawings. Provide color-coded inserts at each outlet, termination block and at patch panels.

D. Category 6 Gigabit outlets

1. All Category 6 outlets shall meet or exceed Category 6 transmission requirements for connecting hardware, as specified in ANSI/TIA/EIA 568-C Commercial Building Telecommunications Cabling Standard and be part of the UL LAN Certification and Follow-up Program.
2. The Category 6 outlets shall be capable of being in a modular patching situation or as a modular telecommunication outlet (TO) supporting current 10Base-T, Token Ring, 100 Mbps TP-PMD, 155 Mbps ATM, 622 Mbps ATM using parallel transmission schemes and evolving high-speed, high-bandwidth applications, including Ethernet, 1000BASE-T and 1.2 Gbps ATM.
3. The Category 6 outlets shall be capable of being installed at either a 45-degree or a 90-degree angle in any modular faceplate, frame, or surface-mounted box avoiding the need for special faceplates.

2.3 STATION CABLE

- A.** Category 6 UTP cables shall extend between the station location and its associated IDF and consist of 4-pair, 23-AWG, unshielded, twisted pairs, and shall terminate on 8-position modular jacks provided at each outlet.

B. Category 6 UTP, 4 Pair

1. The high performance Category 6 UTP cable shall be of the traditional round design with molar separator tape between pairs 2/3 and 1/4.
2. The cable jacket shall comply with Article 800 NEC for use as a plenum cable. The 4-pair UTP cable shall be UL Listed type CMP (plenum) when installed in a plenum rated space, or CMR (riser) when installed in a riser space.

- C.** All Category 6 high performance cables shall meet or exceed the following:

D. Electrical Characteristics:

DC Resistance Max	9.38 (Ohms/100m)
Positive ACR	8.7dB Guaranteed Out to 250 MHz-km

E. Physical specifications:

	Non – Plenum	Plenum
Conductor size	23AWG	23AWG
Diameter	.22" nominal	.20" nominal
Weight/k*	24 lbs.	25 lbs.

- F. Guaranteed Electrical Performance Requirements (dB/100M):**

Freq MHz	Insertion Loss Max.	Min. NEXT	Min. ACR	Min. PSNEXT
10.0	6.0	61.6	58.7	60.2
16.0	7.6	58.2	53.6	56.8
25.0	9.7	55.0	48.4	53.6
62.5	15.8	48.4	35.7	47.0
100.0	20.3	45.0	27.7	43.6
200.0	29.8	40.0	13.2	38.6
250.0	33.8	38.4	7.6	37.0

- G. Product Specification: Hubbell, Belden, or AMP.

2.4 MODULAR PATCH PANEL SYSTEM

- A. The termination block shall support the appropriate emerging high-bandwidth applications, including 1 Gbps Ethernet, potentially 1.2 Gbps ATM and 2.4 Gbps ATM, Multi-Tasked Split Screen Computing, Virtual Holographic Video Conferencing, Instant Access Telemedicine, 3D CAD/CAM Engineering, and Internet-Intranet Communications/ Commerce, as well as all 77 channels (550 MHz) of analog broad band video, including 1000 Mbps Ethernet and potentially 1.2 Gbps ATM, and facilitate cross connection and inter connection using modular patch cords.
- B. All Modular jack panels shall be wired to ANSI/TIA/EIA 568-C using T568B wiring scheme.
- C. The wiring block shall be able to accommodate 23 AWG cable conductors.
- D. The Category 6 modular jack panels shall meet or exceed the Category 6 standards requirements in ISO/IEC 11801 and ANSI/TIA/EIA and shall be UL Listed.
- E. A 110-IDC termination block shall provide for the termination of horizontal, equipment, or tie cables.
- F. All patch panels shall have two (2) cable strain relief/management bars (Leviton #49005-CMB or equal) installed at the rear of the panel to support the terminated horizontal cabling.
- G. Each patch panel shall have one horizontal wire manager installed above and below.
- H. Unloaded patch panels such as Hubbell #UDX24E is acceptable, when the appropriate cat-6 jacks are provided and installed to match the quantity of cat-6 cables to be terminated.
- I. Product Specification: Hubbell, Belden, or AMP.

2.5 CATEGORY 6 – PATCH/STATION CORDS

- A. Provide Category 6 Modular Patch/Station cords for each assigned port on the patch panel and for each outlet in the station locations. All cords shall conform to the requirements of ANSI/TIA/EIA 568-C Standard, Horizontal Cabling Section. Cords shall be equipped with an 8-pin 8-conductor modular connector on each end and

shall conform to the length(s) specified. All cords shall be wired to T568B wiring scheme. All cords shall be factory-built by the station cabling manufacturer. Fabrication of cords in the field is prohibited.

- B. All patch cords shall exceed ANSI/TIA/EIA and ISO/IEC Category 6/Class E specifications. Patch cords shall be available in stranded and solid conductor in lengths to twenty (20) feet.
- C. The patch cord shall have built-in exclusion features to prevent accidental polarity reversals and split pairs.
- D. UL Verified for ANSI/TIA/EIA 568-C Electrical Performance
- E. Miscellaneous:
 - 1. UL Listed for Fire Safety
 - 2. ISO 9001 Certified Manufacturer
- F. Product Specification: Hubbell, Belden, or AMP.
- G. Quantity: (1) 3' patch cable and (1) 7' workstation patch cable for each terminated cable.

2.6 UNSPECIFIED EQUIPMENT AND MATERIAL

- A. Any item of equipment or material not specifically addressed on the drawings or in this document and required to provide a complete and functional SCS installation shall be provided in a level of quality consistent with other specified items.

2.7 FIRE RATED PATHWAY

- A. The firewall through-penetration shall be a manufactured, UL Classified, firestop device/ system designed to allow cables to penetrate fire-rated walls with a built-in fire sealing system that automatically adjusts to the amount of cables installed.
- B. The firestopping device shall be capable of installation in new construction or retrofit in existing structures.
- C. The device shall be UL Tested and Classified in accordance with ASTM E814 (UL 1479) and with ratings up to and including 2 hours.
- D. Manufacturer: Specified Technologies Inc., EZ-Path (#EZDP33FW) or equal by Wiremold.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

- A. The wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's wiring diagrams. Should any variations in these

requirements occur, the Contractor shall notify the City's Project Manager before making any changes. It shall be the responsibility of the manufacturer-authorized distributor of the approved equipment to install the equipment and guarantee the system to operate as per plans and specifications.

- B. Furnish all conductors, equipment plugs, terminal strips, etc., and labor to install a complete and operable system.
- C. The cables within the rack or cabinets shall be numbered for identification using machine generated labels.
- D. Splices of cables are not acceptable.
- E. The labor employed by the Contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the City's Project Manager to engage in the installation and service of this system.
- F. The Contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc. The Contractor shall remove all debris and rubbish created in the course of this project. The Contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., caused by the performance of this work.
- G. The system must meet all local and other prevailing codes.
- H. All cabling installations shall be performed by qualified technicians.
- I. Cable lubricants i.e. Polywater) shall be used to reduce the cable pull tension stated by the cable manufacturer during cable installation in conduits and innerduct. Contractor shall verify the acceptability of the lubricant to be used with the cable manufacturer, prior to using such a lubricant. Lubricants that harden after installation are not allowed. Submit all proposed lubricants for approval PRIOR to use on low voltage, A/V, coax, fiber, and data cables. Cable lubricants shall be allowed to dry a minimum of 15 days before performing certification tests.
- J. Cables may be run exposed above ceilings, provided the cabling is supported independent of other utilities such as conduits, pipes, and the ceiling support systems. The Contractor shall include all costs in base bid for any additional supports/seismic bracing required by the Local Authority having Jurisdiction. The cables shall not be laid directly on the ceiling panels. The use of hook and loop ties shall be done in accordance with the cable manufacturer's requirements. The cable jacket composition must meet local and all other prevailing fire and safety codes.
- K. All firewalls penetrated by structured cabling shall be sealed by use of a non-permanent fire blanket or other method in compliance with the current edition of NFPA and the NEC or other prevailing code and must be a system listed by UL. The Contractor must not use concrete or other non-removable substance for fire stopping on cable trays, wireways or conduits. Contractors who use this method will be required to replace all cables affected and provide the original specified access to each effected area. This requirement also applies to maintaining fire ratings of all

floors penetrated by conduits or devices designated for use by voice and data cabling.

- L. All equipment racks shall be bolted to the structural floor by the SCS Contractor in the location shown on drawings. Wall mounted relay rack and wall mounted cabinet kits shall be screwed to studs, not drywall.
- M. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the Contractor before final acceptance at no cost to the City.
- N. The cable manufacturer's minimum bend radius and maximum pulling tension shall not be exceeded.
- O. Cable raceways, when required, shall not be filled greater than the NEC maximum fill for the particular raceway type.

3.2 SPECIFIC SYSTEM INSTALLATION REQUIREMENTS

- A. All communications cabling used throughout this project shall comply with the requirements as outlined in the NEC Articles 725, 760, 770, and 800 and the appropriate local codes. All copper cabling shall bear UL listed type CMP (Plenum Rated) and/or CM/G (General Purpose) and/or CMR (Riser Rated). All fiber optic cabling shall bear OFNP (Plenum Rated) and/or OFNR (Riser Rated) and/or OFN/G (General Purpose). SCS Contractor is responsible for installing appropriately rated cable for the environment in which it is installed.
- B. Cable Pathways:
 - 1. In suspended ceiling, accessible ceiling, and raised floor areas where duct, cable trays or conduit are not available, the Contractor shall bundle, in bundles of 48 or less, station or other cabling with half inch hook and loop strips, but not deforming the cable geometry. Cable bundles shall be supported via "J" hooks attached to the existing building structure and framework at a maximum of five (5) foot intervals. Plenum rated hook and loop ties will be used in all appropriate areas. In areas where two or more bundles are traveling in close proximity, utilize a Chatsworth Rapid-Trak Cable support system. The Contractor shall adhere to the manufacturers' requirements for bending radius and pulling tension of all cables.
 - 2. Cables or J-hooks shall not be attached to lift out ceiling grid supports or laid directly on the ceiling grid.
 - 3. Cables or J-hooks shall not be attached to or supported by fire sprinkler heads, HVAC ducts, or delivery systems or any environmental sensor located in the ceiling air space.
 - 4. Where additional conduit(s)/sleeve(s) are required, but not provided by the electrical Contractor, the SCS cabling Contractor shall be responsible to provide such conduit(s)/sleeve(s). Conduit(s) and sleeve(s) shall be of suitable material, sized, installed, fire-stopped, and grounded as required by the NEC, ANSI/TIA/EIA standards and all other applicable codes and standards. Any

conduit(s) and sleeve(s) added by the SCS Contractor shall be approved by the City's Project Manager prior to rough-in.

5. All J-hooks shall be rated and designed for CAT6 cabling.
- C. Sealing of openings between floors, into or through rated fire and smoke walls, existing or created by the Contractor for placement of new or removal of old cable into or through shall be the responsibility of the Contractor. Sealing material (Approved UL listed system) and application of this material shall be accomplished in such a manner that is acceptable to the local fire and building authorities having jurisdiction over this work. Creation of such openings as are necessary for cable passage between locations as shown on the drawings shall be the responsibility of the Contractor's work. Any openings created by or for the Contractor and left unused shall also be sealed as part of this work.
1. Fire stopping work shall be performed by a single Contractor to maintain consistency and accountability on the project.
 2. The Contractor shall install penetration firestop seal materials in accordance with design requirements, and manufacturer's instructions.
 3. The Contractor's installer shall be certified, licensed or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements.
 4. All installed through penetration firestops shall be identified via label, or stencil. Label shall state that the fill material around the penetrating item is a firestop, and that it shall not be disturbed unless by an authorized Contractor. The label shall include the firestop brand name, and the classified system number for which it was installed.

a. Sample Label:

MANUFACTURER'S NAME:

ATTENTION

Fire Rated Assembly

For Any Changes To This System, Please Refer To UL System Listed Below

PRODUCT:

HOOR RATING:

UL SYSTEM:

INSTALLATION DATE:

INSTALLED BY:

LICENSE NUMBER:

PHONE:

FAX:

- D. The Contractor shall be responsible for damage to any surfaces or work disrupted as a result of his work. Repair of surfaces, including painting, shall be included as necessary.

- E. Cable bundles within the Server/IDF rooms shall be dressed into bundles of no more than twenty-four (24) cables. Maintain each bundle with half inch-wide hook and loop strips spaced every twelve (12) inches maximum.
- F. The Contractor shall install all patch cords per direction of the City's project manager in a neat and systematic fashion. Prior to installing all patch cords, the Contractor shall install patch cords in a single rack to demonstrate work practices to the City's project manager. Only after any corrections/modification to the installation as directed by the City's project manager, may the Contractor continue installing the patch cords in the remaining racks.
- G. Each equipment cabinet and rack requires its own dedicated grounding connection to the grounding infrastructure. Grounding infrastructure shall consist of a dedicated #6 AWG (min.) green conductor from every rack/cabinet back to the TMGB/TGB. All ground conductor attachments to the TMGB/TGB shall utilize 2-hole compression lugs. See Section 2.13 Grounding System and Conductors of this document for more information.
- H. In raised-floor environments, the ground conductor shall attach to the lowest holes on the front rail of each rack/cabinet.
- I. Rack/cabinet mounted equipment shall be grounded via the chassis, in accordance with manufacturer's instructions. The equipment chassis shall be bonded to the rack/cabinet using one of the following methods:
 - 1. If the equipment has a separate grounding hole or stud, use a #10-AWG ground wire from the chassis ground hole/stud to the rack grounding bus.
 - 2. If the manufacturer suggests grounding via the chassis mounting flanges, use tri-lobular thread-forming screws (not self-tapping or sheet metal screws) to attach the equipment to the rack/cabinet rails. If the equipment mounting flanges are painted, remove the paint and apply an anti-oxidant, or use tri-lobular thread-forming screws and two (2) "Type B" internal-external tooth lock washers to safely ground equipment to the rack.
- J. Bonding of ladder tray sections- Attach bonding straps to each ladder tray section by utilizing either two (2) tri-lobular thread-forming screws (not self-tapping or sheet metal screws) or by using two (2) standard bolts with two (2) "Type B" internal-external tooth lock washers per bolt. If thread-forming screws are not used, remove paint at each connection point and use an approved anti-oxidant prior to attaching the bonding strap.
- K. All installation shall be done in conformance with TIA/EIA 568-C standards, BICSI TDMM guidelines and manufacturer's installation guidelines. The Contractor shall ensure that the maximum pulling tensions of the specified distribution cables are not exceeded and cable bends maintain the proper radius during the placement of the facilities. Failure to follow the appropriate guidelines will require the Contractor to provide, in a timely fashion, any additional material and labor necessary to properly rectify the situation to the satisfaction and written approval of the City's Project Manager. This shall also apply to any and all damages sustained to the cables by the Contractor during the implementation.

1. **Bonding and Grounding:** The Contractor shall be responsible for providing an approved ground at all distribution frames. The Contractor shall also be responsible for ensuring ground continuity by properly bonding all appropriate cabling, closures, cabinets, service boxes, and framework. All grounds shall consist of #6-AWG copper wire and shall be supplied from an approved building ground and bonded to the main electrical ground. All cable sheaths and splice cases shall be grounded to a Telecommunications Ground Bus. All grounding must be in accordance with the NEC, NFPA, ANSI-J-STD-607-A and all local codes and practices. The Electrical Contractor shall be responsible for providing a properly sized grounding conductor from the main electrical ground to the telecommunications ground bus in each Server/IDF room. The SCS Contractor shall be responsible to provide the telecommunications busbar, attach the Electrical Contractor-provided ground conductor, and bond all required equipment and components within each Server/IDF room to the busbar.
2. **Power Separation:** The Contractor shall not place any distribution cabling alongside power lines, or share the same conduit, channel or sleeve with electrical apparatus.
3. **Miscellaneous Equipment:** The Contractor shall provide any necessary screws, anchors, clamps, hook & loop ties, distribution rings, wire molding (Server room & IDF locations), miscellaneous grounding and support hardware, etc., necessary to facilitate the installation of the System.
4. **Special Equipment and Tools:** It shall be the responsibility of the Contractor to furnish any special installation equipment or tools necessary to properly complete the System. This may include, but is not limited to, tools for terminating cables, testing and splicing equipment for copper/fiber cables, communication devices, jack stands for cable reels, or cable winches.
5. **Labeling:** The Contractor shall be responsible for printed labels for all pull boxes, conduits, cables, protectors, racks, cabinets, patch panels, connector panels, cords, distribution frames, and outlet locations, according to the specifications. No labels are to be written by hand. Contractor shall submit sample of all labeling schemes for City's consideration and approval. Final label scheme shall be by direction and approval of the City.
6. **Cable Storage:** The Contractor shall not roll or store cable reels without an appropriate underlay and the prior written approval of City's Project Manager.
7. **Cable Records:** The Contractor shall maintain conductor polarity (tip and ring) identification at the main equipment room (switch room), risers, and station connecting blocks in accordance with industry practices, but only in locations authorized by the City's Project Manager. Contractor to provide spread sheet for all outdoor backbone and indoor riser backbone cables tested.

3.3 STRUCTURED CABLING GENERAL INSTALLATION DESCRIPTION

A. The structured cabling system shall consist of any or all of the following subsystems:

1. Work Area Subsystem

2. Horizontal Subsystem
 3. Administration Subsystem
 4. Backbone Subsystem
 5. Equipment Subsystem
- B. Work Area Subsystem: The Work Area Subsystem provides the connection between the information outlet and the station equipment in the work area. It consists of cords, adapters, and other transmission electronics.
1. Contractor shall supply the wiring or cords that connect terminal devices to information outlets. This includes mounting cords and connectors, as well as extension cords.
- C. Horizontal Subsystem: The Horizontal Subsystem provides connections from the horizontal cross connect to the information outlets in the work areas. It consists of the horizontal transmission media, the associated connecting hardware terminating this media and outlets in the work area. Each floor of a building is served by its own Horizontal Subsystem(s).
1. Horizontal Cabling
 - a. Contractor shall supply horizontal cables to connect each information outlet to the backbone subsystem as shown on the drawings.
 - b. Unless otherwise noted on the floor plans or within this document, the type of horizontal cables used for each work location shall be 4-pair unshielded twisted pair (UTP).
 - c. The 4-pair UTP cables shall be run using a star topology format from the administration subsystem to every individual information outlet. All cable routes, other than those dictated on the drawings, are to be approved by City's Project Manager prior to installation.
 - d. The length of each individual run of horizontal cable from the administration subsystem to the information outlet shall not exceed 295-ft (90 m).
 - e. Contractor shall observe the bending radius and pulling strength requirements of the 4-pair UTP cable during handling and installation.
 - f. Each run of cable between the termination block and the information outlet shall be continuous without any joints or splices.
 - g. All station cable shall be placed in the interior of walls unless otherwise noted or obstructed.
 - h. In the event Contractor is required to remove ceiling tiles, such Work shall not break or disturb grid. Removal of the ceiling grid must be coordinated with the City's Project Manager. All insulation shall be replaced in its original location.

- i. Avoid electromagnetic interference (EMI) by maintaining adequate physical separation between telecommunications cabling and possible sources such as, but not limited to, electric motors, electric erasers, electric pencil sharpeners, transformers, fluorescent lighting that share distribution space with telecommunications cabling, copiers that share work area space with line cords and terminals, large fax machines and power cords that supports such equipment. Minimum separation shall be 6 inches.
 - j. Contractor shall provide City's Project Manager with detailed cable run diagrams for cable runs within raised floors (if shown on plans) detailing exact locations of cable for review and written approval by City's Project Manager.
 - k. Conduit runs installed by the Contractor should not exceed 100 feet or contain more than two 90 degree bends without utilizing appropriately sized pull box. Pull boxes are not to be used in lieu of a bend.
 - l. Station cables and tie cables installed within ceiling spaces shall be routed through these spaces at right angles to electrical power circuits.
 - m. Each station cable shall have 1 meter of service slack configured in an "S" shape via J-hooks at rack or wall field end and 1 foot of service loop at station outlet end. Service slack shall be located within 15' of the Server/IDF room as required to maintain a neat and "workmanship like" installation.
- D. Administration Subsystem: The Administration Subsystem links all of the subsystems together. It consists of labeling hardware for providing circuit identification and patch cords or jumper wire used for creating circuit connections at the cross connects. All wallfield layouts must be approved by City's Project Manager prior to rough-in and installation.
 - 1. Separate termination fields shall be created for voice, data and building service applications.
 - 2. Termination blocks that require rotation after connection of horizontal/vertical wiring will not be allowed.
 - 3. Contractor shall supply cross-connect wire, patch cords and fiber patch cords for cross-connection and inter-connection of termination blocks and lightguide interconnection units.
- E. Backbone Subsystem:
 - 1. The main cable route within a building is called the Backbone Subsystem. It links the main distribution frame (MDF) in the Server equipment room to each intermediate distribution frame (IDF). It consists of the backbone transmission media between these locations and the associated connecting hardware terminating this media. It is normally installed in a star topology, with first-level backbone cables beginning at the main cross connect. If needed, second-level backbone cables begin at intermediate cross connects.

2. The backbone subsystem shall include vertical runs (riser) of in-building cable between floors of a multi-story building, if applicable.
 3. All fibers will be run in innerduct and terminated in the Server/IDF Rooms, or as otherwise indicated on drawings, with connectors, type as specified elsewhere, in rack mounted or wall mounted fiber patch panels equipped with sufficient panels, couplers and jumper storage shelves to terminate and secure all fibers. All innerduct (Carlton or equal) shall be corrugated and a minimum of $\frac{3}{4}$ " in diameter unless otherwise indicated on plans. Innerduct shall be plenum, riser or general rated as required by the environment in which it is to be installed.
 4. Contractor shall supply unshielded 23-AWG multi-pair copper cables and optical cables as the riser cables. Reference this document and plan drawings for quantities. The cable shall support voice and data applications. Contractor shall observe the bending radius and pulling strength requirements of all backbone cables during handling and installation.
- F. Equipment Room Subsystem: The Equipment Subsystem consists of shared (common) electronic communications equipment in the equipment room or telecommunications closet and the transmission media required to terminate this equipment on distribution hardware.

3.4 DAMAGES

- A. The Contractor will be held responsible for any and all damages to portions of the building caused by it, its employees or sub-Contractors; including but not limited to:
1. Damage to any portion of the building caused by the movement of tools, materials or equipment.
 2. Damage to any component of the construction of spaces.
 3. Damage to the electrical distribution system.
 4. Damage to the electrical, mechanical and/or life safety or other systems caused by inappropriate operation or connections made by the Contractor or other actions of Contractor.
 5. Damage to the materials, tools and / or equipment of the City, its consultants, agents and tenants.

3.5 PENETRATIONS OF WALLS FLOORS AND CEILINGS

- A. Unless specifically shown on the drawings, the Contractor shall make no penetration of floors, walls or ceiling without the prior written approval of the City's Project Manager.
- B. Any penetrations through acoustical walls or other walls for cable pathways / cables shall be sealed by the Contractor in compliance with applicable code requirements and as directed by City's Project Manager.

- C. Any penetrations through fire-rated walls for cable pathways / cables shall be sealed by the Contractor as required by code and as directed by City's Project Manager. The Contractor shall be required to work together with the General Contractor and the Electrical Contractor to coordinate and develop all fire stopping methods prior to any cable installation. The Contractor shall also, prior to the commencement of on-site activities, submit to City's Project Manager, details of any special systems to be used.
- D. Roof penetrations are prohibited. No conduit shall be installed on roofs or route horizontally on exterior walls.

3.6 TESTING/WARRANTY

A. Structured Cabling System

- 1. The Contractor shall provide competent, test equipment manufacturer-trained engineers and/or technicians, authorized by the manufacturer of the cabling system, to technically supervise and participate during all tests for the systems.
- 2. The Contractor shall test and certify the cabling system to minimum standards as set forth in the TIA/EIA-568-C specifications for 100BaseTX Ethernet and for Category 6 cable, token ring, and 1000baseT signals.
- 3. All cables and termination hardware shall be 100% tested for defects in installation and to verify cable performance under installed conditions. All conductors of each installed cable shall be verified usable by the Contractor before system acceptance. Any defect in the cable system installation including but not limited to cable, connectors, feed-through couplers, patch panels, splices, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
- 4. Each cable shall be tested for continuity on all pairs and/or conductors. Twisted-pair voice cables shall be tested for length, continuity, pair reversals, opens, shorts, transpositions, presence of AC and DC voltages and opens using a "green light" type test set. Twisted-pair horizontal cables shall be tested for the all of the above requirements, plus tests that indicate installed cable performance. These cables shall be tested using a TIA/EIA-568-C.2-1 Category 6 Level III / IEC 61935 Level III or better ETL certified cable tester/analyzer.
- 5. Shielded/screened cables shall be tested with a device that verifies shield continuity in addition to the above stated tests.
- 6. The test shall be recorded as pass/fail as indicated by the test set in accordance with the manufacturers recommended procedures and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested before final acceptance.
- 7. Each installed cable shall be tested for installed length using a Time Domain Reflectometer (TDR) type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the TIA/EIA-568-C Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number.

8. Multi-pair cables, record the following tests on every cable pair in each multipair cable using a TDR type device: record the shortest pair length, continuity, pair reversals, shorts, opens, transpositions, presence of AC and DC voltage.
9. Enhanced Category 6 data cable shall be performance verified using an automated test set. This test set shall be capable of testing for the continuity and length parameters defined above, and provide results for the following tests:
 - a. Attenuation (Insertion Loss).
 - b. Return Loss (RL).
 - c. Near End Crosstalk (NEXT) – measured at both ends of each cable pair.
 - d. Attenuation to Crosstalk Ratio (ACR).
 - e. Power Sum Near End Crosstalk (PSNEXT).
 - f. Power Sum Attenuation to Crosstalk Ratio (PSACR).
 - g. Far End Crosstalk (FEXT).
 - h. Equal Level Far End Crosstalk (ELFEXT).
 - i. Power Sum Equal Level Far End Crosstalk (PSELFEXT).
10. Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the ANSI/TIA/EIA Standard, and the result shown as pass/fail. Test results shall be printed directly from the test unit or from a download file using an application from the test equipment manufacturer. The printed test results shall include all tests performed, the expected test result, and the actual test result achieved.
11. Optical Fiber Cable Testing: All fiber testing shall be performed on all fibers in the completed end to end system by test equipment manufacturer-trained engineers and/or technicians. There shall be no splices unless clearly defined in Section 3 of this specification or on the plan drawings. Testing shall consist of a bi-directional end to end OTDR trace performed per ANSI/TIA/EIA 455-61 & ANSI/TIA/EIA 526 and a bi-directional end to end power meter test performed per ANSI/TIA/EIA 455-53A. The system loss measurements shall be provided at 850 and 1300 nanometers for multimode fibers and 1310 and 1550 for single mode fibers.
 - a. Pre-installation cable testing: The Contractor shall test all lightguide cable prior to the installation of the cable. The Contractor shall assume all liability for the replacement of the cable should it be found defective during the warranty period.
 - b. Loss Budget: Fiber links shall have a maximum loss of: (allowable cable loss per km) (km of fiber in link) + (.4dB) (number of connectors) = maximum allowable loss.

- c. Any link not meeting the requirements of the standard shall be brought into compliance by the Contractor, at no additional charge to City.
12. The Contractor shall provide test documentation to the City's Project manager in a three ring binder(s) and in CD format within three weeks after the completion of a specific project. The binder(s) shall be clearly marked on the outside front cover and spine with the words "Test Results", the project name, and the date of completion (month and year). The binder shall be divided by test type. A paper copy of the test results shall be provided that lists all the links that have been tested, and include link name, overall pass/fail evaluation, date and time of test, cable type and NVP value. Detailed test results shall be provided for each link tested and shall include length, propagation delay, delay skew, insertion loss, return loss, NEXT, ELFEXT, ACR, PSNEXT, PSELFEXT, and PSACR.. Detailed test results for each link will also include customer site name, name of standard selected to execute the tests, date and time test results were saved in memory of test unit, brand name model and serial number of tester and revision of the tester software and test standards database in the tester. Individual test data within each section shall be presented in the sequence listed in the test summary records. Unless a more frequent calibration cycle is specified by the manufacturer, an annual calibration cycle is anticipated on all test equipment used for this installation.
13. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be collocated in the binder.
14. The entire Intercom/PA/Clock system shall be warranted free of mechanical or electrical defects for a period of five years after final acceptance of the installation.
15. Any Intercom/PA/Clock Any equipment that is not installed per the manufacturer's recommendation shall be replaced promptly and at no cost to the City.
16. Any material showing mechanical or electrical defects shall be replaced promptly at no expense to the City.
17. Contractor shall test all intercom/public address speaker volume levels in the presence of the City's representative. Contractor shall adjust all individual speaker sound levels to the satisfaction of the City's representative.
18. The Intercom/public address system shall provide clear, natural sound uniformly distributed throughout the designated areas.
19. Provide all labor and material warranties for each system, as described elsewhere in this document.
20. At the City's direction, the Contractor shall perform additional random testing which shall consist of a random sample of up to 10% of each installation distribution system. The Contractor shall assume responsibility for providing the proper test equipment and staff to conduct tests. The City's representative shall witness the tests.

21. Should the initial 10% test not be 100% successful (all drops testing over CAT6 up to 250MHz), the Contractor shall assume responsibility to repair/replace non-passing links, at the direction of the City, and the links to re-verify and resubmitted. A 20% random sample shall then be conducted to ensure proper performance of the system.
22. Should there be failure in this re-test, the Contractor shall be responsible to repeat the re-test procedure until such time as all cabling is verified.

3.7 COMPLETION OF WORK:

- A. At the completion of the Systems, the Contractor shall restore to its former condition, all aspects of the project site and on a daily basis, shall remove all waste and excess materials, rubbish debris, tools and equipment resulting from or used in the services provided under this Contract. All clean up, restoration, and removal noted above will be by the Contractor and at no cost to City. If the Contractor fails in its duties under this paragraph, City may upon notice to the Contractor perform the necessary clean up and deduct the costs thereof from any amounts due or to become due to the Contractor. It shall be the Contractor's responsibility to remove trash from the areas it is working in and bring trash and debris to the Contractor provided dumpster.

3.8 INSPECTION

- A. On-going inspections shall be performed during construction by the City's representative. All work shall be performed in a high quality manner and the overall appearance shall be clean, neat and orderly. Any work that does not meet the City's representative's approval shall be removed and reinstalled by the Contractor at no additional cost to the City.

3.9 LABELING REQUIREMENTS

- A. Numbers must be assigned to each outlet location using a logical designation convention. Blueprints with the outlet placement and configuration information have been furnished to the Contractor. Contractor will provide the equipment as necessary to generate Panduit PAN-CODE (or Equal) laser printer generated self-laminating labels using the numbering convention shown below and as specified herein. Before any permanent labels are installed on blocks, face plates or cables, Contractor shall submit a sample label of each various type listed below to City's Project Manager for written approval to ensure compliance with the labeling scheme, legibility, etc. Final label scheme shall be determined by the City's decision. Contractor is responsible to provide a labeling scheme that meets with the City's satisfaction.
- B. Station Faceplate Labeling. The following is illustrative of the number convention to be used:
 1. Example: 2-001
 2. IDF location where cable originates (i.e., IDF room "#2").
 3. 01: Station Number

- C. Station Outlet Labeling. The following is illustrative of the number convention to be used:
 - 1. Example: A
 - 2. Data A 1st Data Jack
 - 3. Example: B
 - 4. Data B 2nd Data Jack
- D. Station Cable Jacket Labeling. All station cables (Voice and Data) will be labeled within six inches of each termination end (e.g., at both ends, outlet end and MDF/IDF end) using "P-Touch" type, self-laminating cable markers.
 - 1. Example: 2-001A
 - 2. IDF location where cable originates (i.e., IDF room "#2").
 - 3. 01.: Station Number
 - 4. A: Cable Identification ("A" for data cable #1, "B" for data cable #2, etc.)
- E. Backbone and Riser Cable Labeling. All backbone and riser cables (copper, fiber, coax, etc) will be labeled to reflect the origin and destination abbreviation for the cable and pair counts on large font (16 pitch) self-laminating labels, which shall be located within 18 inches of each end of the cable. Labels shall be placed on the cable to be visible without relocating surrounding cables.
 - 1. Example #1: IDF2/IDF3/CP100/01
 - 2. IDF2: Cable Origination
 - 3. IDF3: Cable Destination
 - 4. CP100: Cable Type & Pair or Strand Count (ex. 100 – pair Copper Cable. Other possibilities include HB for hybrid fiber cable, MM for multimode cable, and SM for singlemode cable.)
 - 5. 01: Cable identification number (ex. cable 01). There may be more than one backbone or riser cable with the same origin, destination and pair count.
- F. Voice Station Cable Termination Block Labels. All voice station cables will be labeled using appropriate terminal-block label strip with label holders. Termination blocks shall be labeled in such a manner to indicate Termination Block number (ex: W1, W2, etc) and type of cables (ex. Voice Cables, Alarm circuits, etc.).
 - 1. Termination Block Label:
 - 2. Example: W1 – Voice Cables 1st Floor
 - 3. W1: Wall Field 100-pair 110-block #1

4. Individual voice cable numbers on label strip:
 5. Example: 001
 6. Station #1
- G. Voice Riser Cable Termination Block Labels. All voice riser blocks shall be labeled using appropriate terminal-block label strip with label holders and shall follow Station Outlet Faceplate Labeling scheme outlined above. Building interconnect voice cable termination block labels shall be per ANSI/TIA/EIA-606-B. Final label scheme shall be determined by the City's decision.
- H. Patch Panel Labels, Horizontal. All patch panels will be labeled using large font (24 pitch minimum) self-laminating laser patch panel label markers. Patch panels shall be labeled sequentially from top to bottom of rack/cabinet (ex: A, B, C, etc). Patch panels will have labels attached to the front left and front right.
1. Example: A
 2. A: First patch panel in rack/cabinet.
 3. Data cable #1 shall be terminated adjacent to data cable #2 moving left to right and top to bottom.
- I. Fiber Patch Panel Labels. All fiber patch panels will be labeled using self-laminating laser patch panel label markers. Fiber panel labels shall include all information as specified by the City. Contractor is responsible to provide a labeling scheme that meets with the City's satisfaction. At a minimum, the fiber panel label card shall indicate: destination of connected cables on the patch panel followed by a slash (/), origination of connected cables on the patch panel followed by a slash (/), and the port number adjacent to the port
1. Example: MDF/IDF2/01
 2. MDF: Destination Patch Panel Location Designation
 3. IDF2: Origination Patch Panel Location Designation
 4. Indicates port number on both origin and destination patch panels.
- J. Equipment Rack/Cabinet Labeling: All equipment racks/cabinets shall be labeled according to their room identifier and a two-digit number. The labels will be engraved plastic plates, with 1"-high white letters on black background. The labels will be attached to the cross member at the top front of each frame or rack with appropriately sized sheet metal screws. Self-adhesive strips, glues, etc. are unacceptable.
1. Example: MDF-01
 2. MDF: Room Designation
 3. Rack Identifier

- K. Innerduct and Fiber Cable Warning Labeling. The Contractor shall provide and install tags of stamped plastic for tube cable and innerduct. The labeling convention described above within Paragraph E shall apply. Additionally, the Contractor will also install fiber optic warning tags (Panduit #PST-FO) every 12 feet on all exposed fiber optic cable and on innerduct containing fiber optic cable installed within the building, also on innerduct and cable visible in each pull box, manhole, and vault.
- L. MDF/BDF/IDF Floor Plan Mounting Frame: Provide wall mountable floor plan mounting frame with removable Plexiglas front cover in each MDF/BDF/IDF. Frame and cover shall be sized to house 30"x42" floor plan drawing. Coordinate location of frame with City's Project Manager prior to installation.
- M. Telecommunications Main Grounding Busbars (TMGB, TGB): All telecom grounding busbars shall be labeled using large font (16 pitch) self-laminating labels. Labels shall indicate "TMGB" or "TGB". If more than 1 busbar is in the room, include a numerical indication (ex: TMGB-1).

3.10 MISCELLANEOUS PROJECT REQUIREMENTS

- A. Site Cleaning: Throughout the progress of the plant construction, the Contractor shall keep the working area free from debris of all types and remove from the premises all rubbish resulting from any work done by Contractor. On a daily basis and at the completion of its work, the Contractor shall, to the extent possible, leave the premises in a clean and finished condition.
- B. Conduits: All backbone cabling will run through dedicated conduits. All new conduits will be supplied with a pull string. Contractor shall supply pull string and pull rope for the installation of all cables in existing conduits. For all conduits left with available capacity, Contractor shall replace pull strings with 1/4-inch pull rope during the course of his work. Contractor must seal all conduits with an approved sealing compound.
- C. Cabling and Termination Identifications: All new cabling shall be of the type specified herein. Any conflicts between cabling types specified and code or design requirements shall be submitted to City's Project Manager for review and final disposition. All cabling shall be neatly laced, dressed and adequately supported. Cabling must be concealed to the fullest extent possible. In addition, a numbering and marking scheme must be used to identify all cable and cabling terminations. All cables, regardless of length, shall be marked and/or numbered at both ends. Marking codes and methodologies shall correspond to the instructions in this specification.
- D. Seismic Requirements: Contractor will install all equipment racks, equipment cabinet enclosures, cable runways, etc. according to local, state and/or federal code. Contractor will notify City's Project Manager of such requirements and shall provide such bracing as required. Contractor to coordinate all installation with the structural Engineer of Record.
- E. Safety Requirements: Contractor will utilize appropriate personnel and display warning signs, signals, flags and/or barricades at the work site to ensure adherence to safety regulations and as prudence requires.

- F. Specification/Drawing Status: All specifications and drawings related to this project will be “frozen” after shop drawing approval. The City reserves the right to negotiate any future changes with the Contractor at any time.

3.11 MISCELLANEOUS SUPPORT REQUIREMENTS

- A. Upon approval of shop drawings, Contractor shall immediately place orders for all required materials, components, and supplies. In addition, Contractor shall secure and forward written confirmations (including orders and shipping dates) direct from each manufacturer/vendor to the City’s Project Manager.
- B. Contractor shall expedite shipment of all materials, components and supplies, as necessary to ensure the successful completion of the Project by the date required. All costs for expediting shall be included within Contractor’s pricing as provided below.
- C. The system cost herein shall include administration/maintenance training for at least ten City’s representatives with a minimum allotment of three (3) eight hour sessions. All training shall include written and/or video materials that shall remain the property of City. If materials are written, they shall be provided in quantities sufficient for each person trained; if materials are video, one copy of each will be required. The administration/maintenance training shall include, but not be limited to, the following:
1. Review of as-built documentation, including a site demonstration.
 2. All warranty information.
- D. Minimum standards for maintenance purposes shall include optional access to service on a 24 hour-a-day, 365 day-a-year basis. In addition, Contractor shall, upon notification, respond as follows:
1. Emergency Response: Contractor must respond by utilizing remote diagnostics capabilities (as applicable) within thirty minutes of notification. If necessary, Contractor must dispatch at least one certified technician for arrival on-site within two hours of notification.
 2. Non-Emergency Response: Contractor shall respond by utilizing remote diagnostics capabilities and or cause dispatch of at least one certified technician for arrival on-site within one business day of notification.
 3. Definition of “Emergency”: For maintenance purposes, “emergency” shall be defined as one or more of the following conditions:
 - a. Defects of any riser pairs and/or components involving at least ten percent (10%) of any riser cable’s capacity.
 - b. Defects of station cable pairs and/or components involving at least ten percent (10%) of any department or group of voice and/or data stations.
 - c. Defects significantly impairing any single attendant console.

- d. Defects of any fiber optic cable and/or components involving at least ten percent (10%) of any departments or group's fiber-based systems and/or stations.
- e. Any pre-defined failure as submitted by City and agreed to be Contractor.

3.12 FINAL ACCEPTANCE

- A. The City or City's representative may visit the site during the installation of the system to ensure that correct installation practices are being followed.
- B. The City or City's representative will conduct a final job review once the Contractor has finished the job. This review will take place within one week after the Contractor notifies the City.
- C. Two copies of all certification data and drawings for all identifications shall be provided to the City before the City's review.
- D. The City or City's representative will review the installation and certification data prior to the system acceptance.
- E. The City or City's representative may test some of the systems features to ensure that the certification data is correct. If a substantial discrepancy is found, the City reserves the right to have an independent consultant perform a certification of the entire system. If such a procedure is undertaken, the cost of the testing will be billed back to the Contractor.
- F. In the event that repairs or adjustments are necessary, the Contractor shall make these repairs at his own expense. All repairs shall be completed within 10 days from the time they are discovered.
- G. The Contractor shall provide two (2) copies of an "operating and servicing manual" for the system within fourteen (14) calendar days of City's final acceptance of the system. The manuals shall be bound in flexible binders. All data shall be printed material or typewritten. Each manual shall include the following: instructions necessary for the proper operation and servicing of the system; complete as-built installation drawings of the system (11"x17"); equipment specification cut sheets, complete performance test data, complete warrantee information and replacement parts list with current prices listed, contact information for repair and warranty work requests.
 - 1. The Contractor shall mount a full size 30" x 48" bond copy of each scaled Site Plan within MDF room and each IDF room with removable Plexiglas front cover. Frame and cover shall be sized to house the site plan and floor plan drawings. Coordinate location of frame with City's Project Manager prior to installation.
 - 2. The Contractor shall hand to the City a copy of any applicable installation specific software configurations including all log-in passwords in CD format.
 - 3. Warranty- The entire system shall be warranted free of mechanical or electrical defects for a period of three years after the final acceptance of the installation.

Any material showing mechanical or electrical defects shall be replaced promptly at no additional expense to the City.

END OF SECTION

SECTION 27 41 00

AUDIOVISUAL SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

- A. This specification shall apply to all phases of Work hereinafter specified, shown on Drawings, or as required to provide a complete installation of Audiovisual Systems for this Project. Work required under this specification, is not limited to just the Audiovisual Systems (AVS) - refer to Architectural, Electrical, Structural, Landscape, Structural Cabling and Mechanical/Plumbing Drawings, as well as all other drawings applicable to this project, which designate the scope of work to be accomplished. It is the intent of the Drawings and Specifications for the Contractor to finalize design, provide and install a complete, fully operational, and tested system.
1. Work Included. Furnish labor, material, services and skilled supervision necessary for the construction, erection, installation, connections, testing, and adjustment of all AVS equipment specified herein, or shown or noted on Drawings, and its delivery to the City complete in all respects functional system ready for use.
- a. Equipment and materials as indicated on the audio-visual drawings.
 - b. Extension rings where required to provide a flush mount surface for cover plate mounting on finished walls.
 - c. Engraved nameplates on the equipment rack and any custom wall plates.
 - d. Coordination of all millwork mounting of any AVS device with the Architect and millwork providers.
 - e. Include work not usually shown or specified, but necessary for proper installation and operation of the system or piece of equipment.
 - f. All conduits, device junction boxes, wall plates and floor boxes, not shown on the electrical drawings, but required to complete the audio-visual system installation.
 - g. Installation of any specialty back boxes, including display backboxes, and speaker rough-in kits with j-boxes and flexible conduit connections.
 - h. Installation of all backing or structural support for flat panel displays, projectors, projection screens, speakers, and other AVS equipment not shown elsewhere in these drawings and specification but required to complete the audio-visual system installation.
 - i. Seismic and safety wires where required.
 - j. Connection of AVS equipment to Fire Alarm shunt wiring as required to mute AV systems during fire alarm event.

- k. If not provided by others, Design, engineer and provide complete means of support, suspension, attachment and seismic restraint for all AVS equipment, including but not limited to, speakers, displays and projectors. (Hereinafter "support) of the Work of this Specification in accordance with local building codes and regulations. Contractor shall obtain the services of an engineer licensed to perform this work within the State of Jurisdiction it is to be performed.
- 2. The AVS Contractor Work shall include installation or connection of certain materials and equipment furnished by others. Verify installation details, installation and rough-in locations from the actual equipment or from the equipment shop drawings.
- 3. Audiovisual Systems are diagrammatic, and are intended to convey the scope of work, indicating intended general arrangement of equipment. Follow Drawings in laying out Work and verify spaces for installation of materials and equipment based on actual dimensions of equipment furnished.
- B. All miscellaneous system components including, but not limited to, cables, speakers, signal converters, interface panels and components, termination equipment, patch panels, backboards, converters, digital matrix switchers, digital video extenders, controllers, digital signal processors, amplifiers, pre-amps, custom faceplates, mounting hardware, fasteners, racks, cabinets, and any other related items shall be furnished and installed complete under this section, such that the system shall perform all functions listed herein in compliance with all of the specified requirements. Verify functionality of all signal chains for proper operation.

1.2 QUALITY ASSURANCE

- A. Design, manufacture, testing and method of installation of all apparatus and materials furnished under requirements of these specifications shall conform to latest publications or standard rules of the following:
 - 1. AES - Audio Engineering Society
 - 2. ANSI - American National Standards Institute
 - 3. BICSI - Building Industry Consulting Service International, Inc.
 - 4. CEDIA - Custom Electronic Design and Installation Association
 - 5. Digital Display Working Group
 - 6. EIA - Electronic Industries Alliance
 - 7. FCC - Federal Communications Commission
 - 8. HDMI Licensing, LLC
 - 9. INFOCOMM - International Communications Industries Association
 - 10. IEEE - Institute of Electrical and Electronic Engineers

11. ISO - International Organization for Standardization
 12. ITU -Telecommunication Standardization Sect
 13. MPEG - Moving Picture Experts Group
 14. NAB - National Association of Broadcasters
 15. NEC - National Electrical Code
 16. NEMA - National Electrical Manufacturers Association
 17. NFPA - National Fire Protection Association
 18. NSCA - National Systems Contractors Association
 19. CALOSHA - Occupational Safety and Health Administration
 20. SMPTE - Society of Motion Picture and Television Engineers
 21. TIA - Telecommunications Industry Association
 22. IBC - International Building Code
 23. UL - Underwriters Laboratories Inc.
 24. VESA - Video Electronics Standards Association
 25. Local Authority Having Jurisdiction (AHJ) Published Standards and Codes
- B. The contractor is required to obtain the latest revisions of these standards and provide the infrastructure which meets the most stringent implementation of these standards.
- C. Perform Work in accordance with the National Electrical Code, applicable building ordinances, and other applicable codes, hereinafter referred to as the "Code." The Contractor shall comply with the Code including local amendments and interpretations without added cost to the City. Where Contract Documents exceed minimum requirements, the Contract Documents take precedence. Where code conflicts occur, the most stringent shall apply unless variance is approved.
1. Comply with all requirements for permits, licenses, fees and codes. The Contractor, at Contractor's expense, shall obtain all permits, licenses, fees, special service costs, inspections and arrangements required for Work under this contract, unless otherwise specified.
 2. Comply with requirements of the applicable utility companies serving this Project. Make all arrangements with utility companies for proper coordination of Work.

1.3 GENERAL REQUIREMENTS

- A. Warranty: Furnish a written guarantee for a period of (1) one-year from date of acceptance. Provide Phone Contact information for service personnel within twenty-four hours of call and for exchange of faulty equipment. This obligation is limited to

exclude conditions of misuse.

- B. The one-year warranty also includes any software installed on the system. After AVS certification and acceptance, source code changes and/or additional programming, whether requested by the City or performed by the Installing Contractor, shall be warranted by the Installing Contractor for a period of one (1) year, with the Installing Contractor responsible for the diagnosis and repair.
- C. The Contractor shall provide an annual "Software Maintenance" contract for consideration. This shall cover all software provided as part of this system and/or written for this system and shall include both routine upgrades to applications and operating systems, as well as any modifications to software that may be required by any of the AVS equipment provided on the project. The Software Maintenance contract shall commence immediately after expiration of the warranty period and continue for three (3) years.
- D. Wherever a discrepancy in quantity of equipment, cable, devices, etc., (all materials), arises on the Drawing and/or Specifications, the Contractor shall be fully responsible for providing and installing all material and services required by the strictest condition noted on Drawings and/or in Specifications to ensure complete and operable systems as required by the City and Engineer.
- E. The Contractor shall hold a valid State of California C-7 Low-Voltage license, shall have completed at least 10 projects of equal scope, shall have been in business of furnishing and installing systems of this scope and magnitude for at least five years, and capable of being bonded to assure the City of performance and satisfactory service during the guarantee period.
- F. The contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work.
- G. All work shall be performed under the supervision of a company accredited by the AVS equipment manufacturer and such accreditation must be presented at the time of the bid.
- H. The installing contractor shall be a factory authorized dealer / installer and warrantee station for the brand of equipment offered at the time of the bid and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment at time of bid. The installing contractor shall provide availability for spare set of all major parts for the system at all times or have immediate access to replacement equipment.
- I. All of the equipment in this specification shall be furnished and installed by Authorized Factory Installation technicians. The Contractor shall furnish a letter from the manufacturer of all major equipment, which certifies that the installing contractor is the Authorized Installer and that the equipment has been installed according to factory intended practices. The Contractor shall also furnish a written guarantee from the manufacturer that they shall have a service representative assigned to this area for the life of the equipment.
- J. All AV systems equipment supplied shall be listed by Underwriters Laboratories or Nationally Recognized Testing Laboratory. A copy of the listing card for the proposed

system shall be included with the contractor's submittal. Any equipment submitted that is not NRTL-listed shall be subjected to on-site testing by AHJ-approved agency at the Contractor's sole cost. All expenses related to such testing, including any repairs or replacements caused by damage to the equipment shall be borne by the Contractor.

- K. Personnel: Use adequate numbers of directly employed skilled technicians and installers who are thoroughly trained and experienced with the specified requirements and the methods needed for proper performance of the AV systems installation work specified herein. Use of temporary labor or sub-contracted labor shall not be allowed unless explicitly allowed elsewhere in this specification.
1. Designated Project Engineer: Provide a designated Project Engineer in responsible charge of the Design, CAD, In-House testing and on the on-site commissioning of the Project during all phases of the work of this specification. The Project Engineer shall hold a current InfoComm CTS-D along with all applicable AV equipment manufacturer certifications necessary to complete the work specified herein. The Project Engineer shall be the same individual through the execution of the work unless illness, loss of personnel, or other circumstances reasonably beyond the control of the Contractor intervene. All Certifications shall be held by the Project Engineer at the time of the bid and shall have at least five (5) years direct experience in similar work.
 2. The Lead Technician shall have at least three (3) years direct experience in similar work. The AV technician assigned to this project shall be fully trained, qualified and carry valid and current industry certifications regarding the, installation, operation and testing of audiovisual systems. At least one lead technician shall hold a current InfoComm CTS-I, with all applicable AV equipment manufacturer certifications necessary to complete the work specified herein shall be assigned as Lead Technician to the project. All Certifications shall be held by the Lead Technician at the time of bid.
 3. Custom Control System Programmer: Provide Manufacturers Certifications as required for the equipment used on this project. Provide at least one (1) full time programmer on staff, capable of on-site custom programming of the custom remote-control system specified herein. Control System Programmer to hold the following certifications: InfoComm CTS-D, CTS-I or CTS along with Extron Control Professional (ECP) Certification, and Extron AV Associate certifications, or Crestron Master Programmer, at least Silver Level., or equivalent Certification from AMX, QSC Level 2. A programming Sub-Contractor may be used as long as the Programmer has the certifications as listed above. The AV Contractor shall take full responsibility to provide a properly programmed AV System.
 4. Designated Project Manager: Provide Manufacturers Technician's Certifications as required for the equipment used on this project. Provide a designated Project Manager in responsible charge of the fabrication shop and on the Project Site during all phases of installation and testing of the work of this specification. The Project Manager shall hold current InfoComm CTS-D, CTS-I or CTS, and Extron AV Associate certifications or applicable and equivalent Certifications for Crestron or AMX, QSC Level 2 and shall be the same individual through the execution of the work unless illness, loss of personnel, or other circumstances reasonably beyond the control of the Contractor intervene.

5. Commissioning Personnel shall have a current AQAV Certified Quality Technician (CQT) certification in good standing and shall be capable of performing AV commissioning tests during staging and final commissioning of the system according to the AV 9000: Quality Management System for the Audio-Visual Technology Industry.
- L. All the equipment in this specification shall be furnished and installed by the Authorized Factory Installer of the equipment with the most current software & firmware package available at the time of installation.
- M. Software – Control System, DSP, and All Other Applicable Equipment
 1. At the time of City Acceptance of the installation, all equipment shall include any and all updated software or hardware revisions including source code to allow the City to make alternations and modifications to AVS programming to include, but not limited to all custom programs for remote control system touch panels, control systems, Digital Signal Processors. The software developer shall retain intellectual property rights to the operation software. The City shall be granted a license in perpetuity for use. The following requirements shall apply:
 - a. A written release shall be given by the Installing Contractor for all control programming done by the Installing Contractor's personnel or sub-contractors. The release shall acknowledge the City's Cityship and right to modify programming directly, or to have the or to have the programming modified by others on the City's behalf. The programming code provided must be the latest version. Provide a date in the code file name.
 - b. No program resident in a control system shall be overwritten until a back-up of the resident program is made or programming modified by others or the City's' behalf.
 - c. All source code changes must be fully documented.
 - d. At the completion of the project, (3) USB drives shall be supplied to the City with the written release that includes the program and source code for the system in an unencrypted format. All documentation, not residing in the code in Adobe PDF and Microsoft Office format. The programming code provided must be the latest version. Provide a date in the code file name.
- N. Verifying Drawings and Job Conditions:
 1. This Contractor shall examine all Drawings and Specifications in a manner to be fully cognizant of all work required under this Section.
 2. This Contractor shall visit the site and verify existing conditions. Where existing conditions differ from Drawings, adjustment(s) shall be made, and allowances included for all necessary equipment to complete all parts of the Drawings and Specifications.
- O. Operation, Control Programming and Touch Panels
 1. It is imperative for the AV Contractor to interview the City's staff to gather and

document the various operational modes including signal routing of the DSP-Control System, IP Video Systems, Device Control Requirements to ensure any controlled device is properly integrated into the Control system. Control via the QSC Touch Panels, Control Room Computer and other Existing System must be integrated as required.

1.4 WORK IN COOPERATION WITH OTHER TRADES

- A. Examine the Drawings and Specifications and determine the work to be performed by the Architectural structural cabling, electrical, mechanical, structural, and other trades. Provide the type and amount of AVS materials and equipment necessary to place this work in proper operation, completely wired, tested and ready for use. This shall include all additional conduits, boxes and other devices for the required operation sequence of all AVS equipment.
- B. Low voltage conduit, boxes and power provided by division 16 or 26000 contractor.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver equipment until site conditions are adequate to receive work; protect items from weather while in transit.
- B. On-Site Storage
 - 1. The Contractor shall be responsible coordinate and maintain a secure storage space.
 - 2. If this storage space is required to be on-site it shall be the Contractor's responsibility to coordinate the size and spatial requirements with the City.
 - 3. The Contractor shall assume full responsibility for the storage space and all contents, unless otherwise indicated by the City.
 - 4. The Contractor shall examine the site and the Programmatic Documents and review with the City the designated areas of access, delivery, and storage for the Contractor's use. The Contractor agrees that such areas are satisfactory and sufficient for their needs in the completion of their work and in conformance with the terms of this Contract.
- C. Store materials indoors in ventilated areas with constant, but minimum, temperature of 60 degrees F and a maximum temperature of 90 degrees F and maximum relative humidity of 25% to 55%.
- D. Protection from Damage
 - 1. The Contractor shall provide all protection necessary to safeguard their work from damage by their operations and the operations of others. Unless the Contractor proves to the City's satisfaction that the Work has been damaged by others, the Contractor shall promptly repair, adjust, and clean all defective installations and bear all associated costs.

1.6 RECORD DRAWINGS

A. Drawings of Record:

1. The Contractor shall provide and keep up to date, a complete record set of drawings. These shall be corrected daily and show every change from the original Drawings. This set of prints shall be kept on the job site and shall be used only as a record set. This shall not be construed as authorization for the Contractor to make changes in the layout without written direction in each case. Upon completion of the work, a set of reproducible Contract Drawings shall be used to denote all changes as noted on the record set of prints shall be incorporated thereon with black ink in a neat, legible, understandable and professional manner. Refer to the Supplementary General Conditions for complete requirements.

1.7 APPROVALS, EQUALS, SUBSTITUTIONS, ALTERNATIVES, NO KNOW EQUAL

- A. Approvals: Where the words (or similar terms) “approved”, “approval”, “acceptable”, and “acceptance” are used, it shall be understood that acceptance by the City, Architect and Engineer are required.
- B. Equal: Where the words (or similar terms) “equal”, “approved equal”, “equal to”, “or equal by”, “or equal” and “equivalent” are used, it shall be understood that these words are followed by the expression “in the opinion of the City, Architect, and Engineer.” For the purposes of specifying products, the above words shall indicate the same size, made of the same construction materials, manufactured with equivalent life expectancy, having the same aesthetic appearance/style (includes craftsmanship, physical attributes, color and finish), and the same performance.
- C. Substitution: For the purposes of specifying products “substitution” shall refer to the submittal of a product not explicitly approved by the construction documents/specifications.
 1. Substitutions of specified equipment shall be submitted and received by the Engineer ten (10) days prior to the bid date for review and written approval. Regulatory Agency approval for all substitutions shall be the sole responsibility of the Contractor. To receive consideration, requests for substitutions must be accompanied by documentary proof of its equality with the specified material. Documentary proof shall be in letterform and identify the specified values/materials alongside proposed equal values/materials. In addition, catalog brochures and samples, if requested, must be included in the submittal. ONLY PRE-BID APPROVED PRODUCTS, ISSUED VIA A FORMAL BID ADDENDUM TO ALL BIDDERS, WILL BE ALLOWED ON THE PROJECT. REGARDLESS OF THE APPROVAL ON ANY SUBSTITUTION, ALL BIDS SHALL BE BASED ON THE PRODUCTS EXACTLY AS SPECIFIED. PRICING FOR EACH APPROVED SUBSTITUTION SHALL BE INCLUDED IN THE BID SUBMITTAL AS A SEPARATE LINE ITEM.
 2. If the Contractor proposes to substitute the specified speaker system(s), the Contractor shall be responsible to provide the City & Engineer with an AMFG Electronic and Acoustic System Evaluation and Response Analysis (EASERA) model depicting equal or better performance in both uniformity of direct field response and Speech Transmission Index (STI) as compared to the specified speaker system.

3. In the event that written authorization is given for a substitution after award of contract, the Contractor shall submit to the Engineer quotations from suppliers/distributors of both the specified and proposed equal material for price comparison, as well as a verification of delivery dates that conform to the project schedule.
 4. In the event of cost reduction, the City shall be credited with 100 percent of the reduction, arranged by Change Order.
 5. The Contractor warrants those substitutions proposed for specified items shall fully perform the functions required.
- D. Alternates/Alternatives: For the purposes of specifying products, "alternatives/alternates" may be established to enable the City/Architect/Engineer to compare costs where alternative materials or methods might be used. An alternate price shall be submitted in addition to the base bid for consideration. If the alternate is deemed acceptable, written authorization will be issued.
- E. No Known Equal: For the purposes of specifying products, "No Known Equal" shall mean that the City/Architect/Engineer is not aware of an equivalent product. The Contractor will need to submit a "Substitution" item, per the requirements listed above, if a different product is proposed to be utilized.

1.8 SHOP DRAWINGS/SUBMITTALS

- A. Shop Drawings/Submittals shall be submitted within 20 working days of a notice to proceed, in digital sets accompanied by Letter of Transmittal, which shall give a list of the number and dates of the drawings submitted. Drawings shall be complete in every respect and bound in sets.
- B. The Shop Drawings/Submittals submitted shall be marked with the name of the project, numbered consecutively and bear the approval of the Contractor as evidence that the Contractor has checked the Drawings. Any Drawings submitted without this approval will be returned to the Contractor for resubmission.
- C. If the shop drawings show variations from the requirements of the Contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in the Contractor's letter of transmittal. If the substitution is accepted, the Contractor shall be responsible for proper adjustment that may be caused by the substitution. Samples shall be submitted when requested.
- D. Only products listed as "Equal" within the contract documents, along with formally approved "Substitutions" will be reviewed. Products not conforming to these items will not be reviewed and will be returned to the Contractor for re-submittal.
- E. Review comments used in response to shop drawings/submittals are:
1. "No Exception Taken" - Product approved as submitted.
 2. "Furnish as Corrected" - Re-submittal not required, although the Contractor shall provide the submitted product with corrections as noted.
 3. "Revise and Resubmit" - Re-submittal required with corrections as noted.

4. "Rejected" - Re-submittal required based upon the originally specified product.
- F. Original, Contractor provided shop drawings shall be submitted on the following but not limited to: Note: AutoCad backgrounds will be provided.
 1. Audio, Video, and Control System one-line diagrams with cable type and cable numbering provided.
 2. AV Equipment Rack Elevations
 3. AV Floor, Ceiling and Elevation Plans.
 4. Control Panel & Touch Panel screen layouts
 5. AV equipment attachment drawings with structural engineer's stamp if required.
 6. All other products called out on drawings that call for shop drawing submittal.
- G. All equipment specified an/or required for a complete and operational AV and Control system shall be listed in the projects equipment list submittal.
 1. Provide the AV and Control equipment list divided into room/area sections with the AV device Manufacturer in alphabetical order.
 2. For Example:
 - a. Classroom 125
 - 1) Extron TLP1025 Touch Panel
 - 2) FSR PL-500 Floor Box.

1.9 MAINTENANCE, SERVICING, INSTRUCTION MANUALS AND WIRING DIAGRAMS

- A. Prior to final acceptance of the job, the Contractor shall furnish to the City at least four (4) copies of operating and maintenance and servicing instructions, as well as four (4) complete AV System wiring diagrams for the following, but not limited to, items or equipment:
 1. Audio, Video, and Control Systems.
 2. Rack Elevations.
 3. Touch panel layout pages
 4. Current Programming source code.
- B. All wiring diagrams shall specifically cover the system supplied. Typical drawings or consultant supplied drawings will not be accepted. Four (4) copies shall be presented to the City.

PART 2 - SYSTEM EQUIPMENT SPECIFICATION

2.1 MATERIALS

- A. **Materials and Equipment:** All AVS materials and equipment, including custom-made equipment, shall be new and shall be listed by Underwriter's Laboratories (UL) and bear their label or be listed and certified by a Nationally Recognized Testing Lab (NTRL) that is also recognized by the local Authority-Having-Jurisdiction (AHJ).
- B. **Frequency Coordination.** Prior to ordering equipment, the Installing Contractor shall coordinate the frequencies of all wireless devices to prevent unwanted interaction between devices and rooms. This includes, but is not limited to, wireless microphones, assisted listening system devices, wireless control panels, etc. Verification of Frequency coordination shall take place with the use of a spectrum analyzer and frequency allocation/analysis software.

2.2 SYSTEM FUNCTIONS AND CAPABILITIES:

- A. The AVS (If applicable) shall be utilized for presenting, viewing and listening to multimedia presentations. The system shall utilize/integrate where indicated, computer, microphone, and other inputs for output to the Video Projector, LCD/LED Displays, and Sound Reinforcement Systems. The AV system shall be controlled by a Touch Panel interface with DSP system processors. The control system shall be able to control the required functions of the AV equipment, audio volume, audio switching, paging and control. See AV drawings for more detailed information regarding specific system functionality.
- B. The AVS shall provide clear, natural sound uniformly distributed throughout the designated areas. The system shall utilize speakers as shown on the plans. The AV system shall also be able to display High-Definition Video to the Native Resolution of all displays without any distortion or artifacts.
- C. The system shall have adequate dynamic range without audible clipping or distortion to accommodate all types of program material. Audio, Digital Signal Processing shall be employed in the designated rooms to insure smooth frequency response, high acoustical gain before feedback. When at maximum level, the system shall operate without audible distortion, rattles and buzzes. All switching shall be silent and without pops and or transients.
- D. The system frequency response shall:
 - 1. Be within +/- 1.5 dB from a curve which is flat from 80Hz to 10 kHz.
 - 2. There shall be a minimum 12dB per octave roll-off below 32 Hz.
 - 3. Uniformity of coverage of the system at seated ear height (42") shall be within +/- 1.5dB in the 4 kHz 1/3 octave band at any seat location using pink noise as a test signal.
- E. System noise shall not exceed an equivalent input noise of -120dB based on a 20 KHz-noise bandwidth. The predominant noise component in the system output under any operating condition shall be that of the input stage.
- F. The sound level capability of program material levels produced in all seats shall be at

least 98 dB when measured with a scaled filter, set at "C Weighting". There shall be at least 6dB of amplifier headroom.

- G. The system shall provide clear audio to all areas covered by the system. All side, Left & Right and any stage lip, or under balcony speakers shall be wired discretely to the correct channel on the amplifier. See AVS drawings for exact location.
- H. EDID and Color Space Management. EDID data exchange is a standardized means for a display to communicate its capabilities to a source device. It is the AVS contractor's responsibility to address and resolve and manage all EDID and Color Space issues.
- I. HDCP (High-bandwidth Digital Content) is an encryption protocol for copy protected video content as Blu-Ray Disc, HD movie downloads, Cable TV & Satellite TV. It is the Contractor's responsibility for proper HDCP 2.2 and Digital Rights Management (DRM) in all systems listed in plans and this specification. This shall apply to all HDMI, DVI or Display Port signals. HDCP is not applicable to SDI signal lines, and no attempt to pass encrypted material through these signal paths shall be attempted.
- J. CEC (Consumer Electronics Control) is device control functions between all connected HDMI devices. It is the AVS contractor's responsibility for proper CEC Management in all systems listed in plans and this specification.

2.3 SOFTWARE PROGRAMMING

- A. General: Except when otherwise agreed in writing the client shall retain legal and beneficial Cityship of all Intellectual Property, including source code, created by the Contractor, their employees and sub-contractors.
- B. The Contractor must allow sufficient time for the programming of all software configurable audio, video and control systems. Contractors must evaluate the systems functional requirements and user interface and then allow time in their bid accordingly. The system description as well as the end user interview will provide the Contractor with the necessary information needed to proceed with the programming. Any questions as to the systems functional requirements must be sent in written RFI form to the Consultant. All programming schemes must be submitted to the Consultant for approval before programming starts. This includes the appearance of all user interfaces, touch panel layouts, preset and sub-preset information (acquired through client interviews), and speaker control schemes. The Contractor shall also submit a narrative for the control system concept to the Consultant for approval. The Contractor is to interview the City and their representatives to acquire the necessary information needed to allow for the proper programming of this system. The Contractor, after interviewing the City, shall then submit a written report stating his interpretation of the client's requirements for approval by Consultant. Only after the Client and Consultant have approved the programming report may the Contractor proceed with the programming of this system.
- C. All equipment that is connected to the Client's local area network and is configurable via the local area network must have its equipment software installed onto dedicated computers provided by the Client. The Contractor is to allot time to install and test equipment software onto a minimum of two of the Client's computers which are to be identified by the Client and/or Consultant. The computers shall be programmed to

emulate user interfaces throughout the facility. The Contractor shall coordinate all software deployment over IP with the Client's Information technology department.

- D. A user-friendly/easy to use graphical interface programmed by the Contractor shall allow for easy operation of the system. This interface shall allow novice users the control of the system components without having to access the digital schematic diagram. These main system components shall include master volume control, zone volume control, room combining, routing, switching, source-equipment level control and any other control necessary for the system to function properly from a user standpoint.
- E. Control system minimum programming outlined below:
 - 1. The Contractor shall allot as many hours as required for on-site control system programming with the Client's representative.
 - 2. The Control System in this project may connect to the Client's Local Area Network (LAN). This connection will provide desktop computers control of the audio-visual system as well as make available remote troubleshooting via the internet and (If applicable) Extron Global Configurator Plus and/or Global Configurator Professional. The Contractor shall provide time to install control system interface software on at least three desktop computers. Coordinate work with Client's Information Services personnel.
 - 3. Provide password protection to each control surface in this facility.
 - 4. Touch panels shall be activated and deactivated by password. Upon start up a password dialog box shall be presented to the user to enter his/her password. Only after entering a password will the user have access to the system. The system shall be programmed to shut down automatically after being idle for a time to be specified by the user.
 - 5. Touch panel layout design shall conform to the InfoComm International "Dashboard for Controls" and programming guidelines. Touch panel designs are to be custom to this project. Re-purposed touch panel designs are not acceptable.
 - 6. Control Help File: Each touch panel shall include a help file that will explain each layer of the touch-panel control scheme.
 - 7. Control system shall utilize help desk software to provide:
 - a. Real-time monitoring (If Possible) of: Control system, Device monitoring, Projector lamp life, System online status, Room activity, Remote system diagnostics via Contractors help desk, Remote system control, Fault reporting via email alert, Logging of help request, User access control via password protection, Event logging, report and chart generation.
 - 8. All serial controlled devices must have bi-directional communication with the control system. All control functions locally available on each device must be accessible via the remote-control system. All locally gestured control functions must mirror on the control system user interface. In other words, if a volume control is adjusted on a DSP interface that adjustment must register on the control interface.

9. Control system shall be used to power up and down connected equipment if required.
10. All projectors shall be monitored and report lamp hours remaining and lamp failure if required.

F. Complexity of Programming:

1. It is required that the Contractor be experienced in the specified Control System. and shall have experience in Professional programming and programming systems of this complexity. Contractors shall allow enough time in their bid to permit extensive programming of all software configurable audio, video and control systems to the requirements of the client and consultant. Contractor shall break out cost associated with programming of these systems for review by the Consultant. By submitting this bid, the Contractor agrees that they understand systems of this type and that all programming services are included to the satisfaction of the City and Consultant. The Contractor further agrees that they shall not make any claim for additional monies because of misinterpretation of programming requirements.
2. It is imperative for the AV Contractor to interview the IVC staff to gather and document the various operational modes including signal routing of the DSP-Control System, IP Video Systems and Dante Device Control Requirements to ensure any controlled device is properly integrated into the Control system. Control via the QSC Touch Panels, Control Room Computer and other Existing System must be integrated as required.
3. The Dante Network will be quite extensive and must be labeled and organized. Dante routing presets will be provided, as necessary.
4. The IP Video and all AV network switches must be configured properly for trouble free operation. Pay particular attention to the IP Video network switch programming. Proper switch CONFIGURATION and VLANS MUST be provided as required.

G. Control System Programming. Minimum Touch Panel Functions. Coordinate all functional programming with the City before final programming sign off.

2.4 PROJECT AUDIO VISUAL SYSTEM DESCRIPTION

A. Conference Room 104

1. Provide AV equipment, installation, and programming to provide AV content for local presentations, soft codec video conferencing and discussions.
2. A floor box will be provided for local HDMI and AV system touch panel control.
3. Provide a LED display for video content. Provide a "Soundbar" with room speakers, microphone and camera beneath the display.
4. An City furnished, contractor installed computer, NUK or Mac Mini will provide the soft codec video conferencing functions.

5. The microphone, speakers and camera will connect to the local computer for video conferencing functions.
6. Most of the room's AV electronics will fit in the AV contractor provided display back box. The remainder of the AV electronics will be mounted to the back of the display. Mount the local computer so it can be accessed without removing the display.

2.5 AUDIO/VISUAL SYSTEM PRODUCTS

- A. The system shall utilize AV products as shown on the Plans and listed below shall be unless otherwise specified. The products listed below shall be considered to be the minimum quantity, performance, functionality and quality levels. If additional and/or upgraded components are needed to meet the performance requirements of this final design-build specification, the contractor shall include all costs for such added and/or upgraded components in the base bid.

2.6 GENERAL PRODUCTS FOR SYSTEMS

A. SHE SHEET AV0.02 FOR MAJOR EQUIPMENT LIST

1. PROVIDE ALL REQUIRED COMPONENT FOR A COMPLETE OPERATIONAL AV AND CONTROL SYSTEM AS DESCRIBED IN THIS DOCUMENT AND ON THE AV DRAWINGS

2.7 CABLE – ALL SPACES

- A. Speaker Cable, 70-Volt distribution, Plenum Rated 2-Conductor, 14 AWG, unshielded pair: Extron, West Penn, Belden or equal.
- B. Loudspeaker Cable Plenum Rated 2-Conductor, 12 AWG, unshielded pair: Extron, West Penn, Belden or equal.
- C. Loudspeaker Cable Plenum Rated 2-Conductor, 14 AWG, unshielded pair: Extron, West Penn, Belden or equal.
- D. Analog Microphone/Line Level Installation Cable, 22 AWG conductor, jacketed, shielded, twisted-pair, Plenum Rated: Extron, West Penn, Belden or equal.
- E. Control System Device Control (RS232, Relay or Contact Closure): (Dual 22 AWG shielded twisted pairs with individual drain wires, each pair is color-coded Red/Black and Green/White to simplify identification.) Plenum Rated: Extron, West Penn, Belden or equivalent.
- F. Data Network: Plenum-rated Category 6, see Structured Cabling Specifications for additional requirements.
- G. Serial Digital Interface Cable RG6/U, 75 Ohm Coaxial Cable Belden 4694R or equal. 12G-SDI up to 258'. Provide the correct BNC connector for the specified cable. Provide 12G-HD-SDI extension if cable runs are longer than 225'.
- H. Provide plenum rated cable for all cable where required by code. Any cable changes or substitutions must be submitted and approved prior to installation. Non-compliant cable that has been installed without approval shall be replaced at the Contractor's

expense.

- I. Fiber, OM4. MM, 50 micron / 6 strand or strands as required.
- J. Video over IP, CAT6 Belden, West Penn or equal.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION DESCRIPTION

- A. The installation, configuration and wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's installation instructions and guidelines. Should any variations in these requirements occur, the Contractor shall notify the architect before making any changes. It shall be the responsibility of the factory-authorized installer of the approved equipment to install the equipment and guarantee the system to operate as per plans and specifications.
- B. Workmanship on the installed systems shall be of professional quality, best commercial practice and accomplished by persons experienced in the techniques and standards of the particular industries involved.
- C. Furnish all Additional conduits, AV Back-boxes, conductors, equipment plugs, terminal strips, etc., and labor to install a complete and operable system.
- D. The cables within the rack or cabinets shall be carefully cabled and laced with Velcro wraps. All cables shall be numbered for identification. Cables should have enough slack to allow removal of equipment for service without having to cut multiple Velcro ties or wire wraps. Power plugs need to be labeled at PDU.
- E. Splices of conductors in underground pull boxes are not permitted.
- F. All communications cabling used throughout this project shall comply with the requirements as outlined in the NEC Articles 725, 760, 770, and 800 and the appropriate local codes. All copper cabling shall bear UL listed type CMP (Plenum Rated) and/or CM/G (General Purpose) and/or CMR (Riser Rated). All fiber optic cabling shall bear OFNP (Plenum Rated) and/or OFNR (Riser Rated) and/or OFN/G (General Purpose). Contractor is responsible for installing appropriately rated cable for the environment in which it is installed.
- G. The Contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc., The Contractor shall remove all debris and rubbish occasioned by the work from the site. The Contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., Caused by the performance of this work.
- H. The Conduit System. Each conduit shall contain wires or cables of the same signal level or the same type of circuitry only. Low Level Lines, medium level lines, video level lines, high level lines and data and control circuits should be run in their respective separate conduits.
- I. Wiring and Cabling. During installation both ends of all single wires or cables shall be

marked with consecutive approved number markers, and a careful running log kept of route and terminations. After attachment at terminations these markers shall be accessible and readable for identification. A detailed wiring diagram shall be furnished with these numbers shown. At the operational level (i.e., Audio-Visual equipment receptacle boxes, etc.) all receptacles shall be clearly marked by function and number (when there are many of the same function). For example, where a given microphone line may appear at several locations, the same label shall show.

- J. Power distribution cables shall not be installed adjacent to signal cables. Power distribution cabling shall be on the opposite side of the equipment enclosure from signal cables and shall be uniformly located throughout the installation.
- K. Wherever signal lines entering the equipment areas must be connected into the racks, the use of intermediate terminal strips shall be used. This shall also facilitate the testing of maximum increments of the systems in the Contractor's shop. UTP Cables shall terminate in a Patch Panel and / or Switch. All connections of lines at terminal strips, as well as at signal receptacles, shall be mechanically secured and then soldered. No unsoldered connections shall be permitted.
- L. Where lines approach the racks and terminal strips they shall also be mechanically anchored at the rack, and provided with sufficient slack length to avoid strain, abrasion or wear. All cable entry shall be through the tops of racks or through entrance holes in the base of the rack. No cable shall enter racks through front, rear or side panel openings. For equipment mounted in drawers or on slides, the interconnecting cables shall be provided with a service loop of appropriate length. Cables shall not protrude from the back of racks. All system wire, after being cut and stripped, shall have the wire strands twisted back to their original lay and be terminated by approved soldered or mechanical means.
- M. System Grounding.
 - 1. The "spider" concept is designed to avoid ground loops and inductive coupling.
 - 2. The systems shall be hum free, stable and free of oscillation with the earth ground temporarily disconnected.
 - 3. The earth ground shall be made at only one point in the system as indicated and shall be in accordance with National Fire Protection Association 70-2014.
 - 4. The grounding method shall insure that the system is free of the following problems under any mode of operation:
 - a. RF oscillation, pickup and interference.
 - b. Distortion.
 - c. Crosstalk.
 - d. Signal Leakage.
 - e. Very high frequency feedback.
 - f. Audio Hum.

5. The equipment racks shall be isolated from, and not electrically connected to, the building grounding system. This means that the conduit system shall not be electrically connected to the equipment racks and that the equipment racks shall be installed so that they are electrically isolated from the building structural steel. The racks shall be electrically connected at only one point to the isolated grounding system.
6. In order to ensure the least amount of cable un-twisting, it is required that all cables shall be stripped using a special tool.
7. The use of lubricants (i.e., Yellow 77) to facilitate the installation of cables in conduits is highly discouraged. If such a lubricant must be used, the Contractor shall verify the acceptability of the lubricant to be used with the cable manufacturer, prior to using such a lubricant.
8. Under no circumstance are "channel locks" or other pliers to be used.
9. Plenum rated cable may be run exposed above ceilings, provided the cabling is supported independent of other utilities such as conduits, pipes, and the ceiling support systems. The cables shall not be laid directly on the ceiling panels. The use of cable ties shall be done in accordance with the cable manufacturer's requirements. The cable jacket composition must meet local and all other prevailing fire and safety codes.
10. Labeling
11. Wiring Labels: At all connection points for all types of cable & wiring, a label strip shall be attached indicating the name/number of that cable or wire as follows:
 - a. At internal locations (inside racks, cabinets, or boxes), a pressure sensitive label shall be used.
 - b. At external locations, a printed label covered with clear shrink wrap or approved labeling system shall be used.
12. Equipment Labels: All active components shall have labels at the front and rear. Labels shall be applied plumb and neat and shall not cover any equipment lights, recessed controls, or control labels.
 - a. Front labels shall indicate functional use of equipment.
 - b. Rear labels shall indicate system schematic reference designation.

3.2 PERFORMANCE TESTS OF THE COMPLETE SYSTEM. (SEE SECTION 3.08 FOR FINAL INSPECTION)

- A. Verify that all wiring is correctly and completely installed.
- B. Verify that the entire system performance is in accordance with the design requirements.
- C. All these tests, and any others that the Contractor may wish for his own satisfaction, shall have been performed and successfully achieved before observation is requested. The City's representative may request repetition and demonstration during observation of

certain of these tests or other critical tests if problems become apparent. If specifications are not met, further observations shall be at the Contractor's expense.

- D. Sealing of openings between floors, into or through rated fire and smoke walls, existing or created by the contractor for placement of new or removal of old cable into or through shall be the responsibility of the contractor. Sealing material (Approved UL listed system) and application of this material shall be accomplished in such a manner that is acceptable to the local fire and building authorities having jurisdiction over this work. Creation of such openings as are necessary for cable passage between locations as shown on the drawings shall be the responsibility of the contractor's work. Any openings created by or for the contractor and left unused shall also be sealed as part of this work.
- E. Firestopping work shall be performed by a single contractor to maintain consistency and accountability on the project.
 - 1. The Contractor shall install penetration firestop seal materials in accordance with design requirements, and manufacturer's instructions.
 - 2. The Contractor's installer shall be certified, licensed or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements.
 - 3. All installed through penetration firestops shall be identified via label, or stencil. Label shall state that the fill material around the penetrating item is a firestop, and that it shall not be disturbed unless by an authorized contractor. The label shall include the firestop brand name, and the classified system number for which it was installed.
 - 4. Sample Label:
 - a. MANUFACTURER'S NAME
 - b. ATTENTION
 - c. Fire Rated Assembly
 - d. For Any Changes to This System, Please Refer to UL System Listed Below
 - e. PRODUCT
 - f. HOUR RATING
 - g. UL SYSTEM
 - h. INSTALLATION DATE
 - i. INSTALLED BY
 - j. LICENSE NUMBER
 - k. PHONE

I. FAX

- F. Equipment Rack and Equipment Testing and Adjusting Procedures: Conduct procedures in fabrication shop. Verify safe and proper operation of all components, devices, or equipment, establish nominal signal levels within the systems and verify the absence of extraneous or degrading signals. Make all preliminary adjustments and document the setting of all controls, parameters of all corrective networks, voltages at key system interconnection points, gains and losses, as applicable. Submit test report with color photographs of each equipment rack, front and back. Perform at least the following procedures:
 - G. Preliminary: Verify: Grounding of devices and equipment. Integrity of signal and Audiovisual system ground connections. Proper provision of power to devices and equipment. Integrity of all insulation, shield terminations and connections.
 - H. Integrity of soldered connections. Absence of solder splatter, solder bridges. Absence of debris of any kind, tools, etc. Routing and dressing of wire and cable.
 - 1. All wiring, including polarity and continuity, including conformance with wire designations on running sheets, field and shop drawings.
 - 2. Mechanical integrity of all support provisions.
 - I. All new equipment racks shall be bolted to the floor/millwork by the Contractor once the City determines the exact location for new rack. Contractor to verify the original Middle Atlantic racks are bolted to floor and seismic bracing are installed to code. The earthquake mounting brackets for each rack kit shall be screwed to studs, not drywall. All equipment shall be serviceable in the rack's final location – the need to unbolt racking equipment to access or service equipment is not acceptable.
- J. Cleaning
 - 1. Clean each section or area of where the work was conducted after completion to permit immediate use of the area.
 - 2. Remove and discard all refuse, rubbish, and debris.
 - 3. The Contractor shall ensure that all recyclable and environmentally hazardous waste materials are disposed properly.
 - 4. Make good all existing structures, surfaces, and utilities affected by cutting, coring, mounting, drilling, or other new work.
 - 5. Clean all furnished equipment of dust, dirt, fingerprints, smudge, and other material prior to calling for a Substantial Performance of Work Review or Completion of Work Review.

3.3 PROTECTION

- A. During the installation phase and up to the date of achieving Substantial Performance of Work, protect finished or unfinished work against damage or loss. In the event of such damage or loss, immediately replace or repair such work or equipment at no cost to the City.

3.4 SPECIFIC SYSTEM INSTALLATION REQUIREMENTS

- A. The installer shall, upon completion of the system, orient all antennas, speakers, align all projectors, screens and displays, adjust all controls, etc., to provide a system operating at maximum capability. Submit block diagram and shop drawing of equipment.

3.5 GENERAL TESTING REQUIREMENTS

- A. Provide all instruments for testing and demonstrating in the presence of the City's inspector that the all audio, digital video and control parameters are as stated in the factory data sheets. Check all circuits and wiring to verify they are free of shorts and grounds.
 - 1. EQUIPMENT AND COMPONENTS IN NEED OF ADJUSTMENT, REPAIR OR REPLACEMENT AND DISCOVERED DURING SUCH TESTING, SHALL BE IMMEDIATELY ADJUSTED, REPAIRED OR REPLACED WITH ALL NEW EQUIPMENT AND THAT PART OF THE SYSTEM SHALL THEN BE RETESTED. ALL SUCH REPLACEMENT OR REPAIR SHALL BE DONE AT NO ADDITIONAL COST TO THE CITY.

3.6 SPECIFIC AUDIO TESTING REQUIREMENTS

- A. Furnish all laptops, software, equipment and personnel to conduct these tests in accordance with the performance specification requirements. ANSI and EIA Standards.
 - 1. Audio testing and adjustment:
 - 2. Adjust all audio levels. Measure and record absolute impedance at 400 Hz and 1 kHz for each and every speaker line. Correct polarity of all speaker lines.
 - 3. Each "leg" of every individual speaker line shall be measured using a voltmeter to ensure that there are no shorts to ground.
 - 4. When the system is brought to full power, there shall be no hums, buzzes, rattles, or indication of any abnormal speaker noise.
 - 5. Audio check for continuity, polarity, cold solder connections, shorts and opens.
- B. Provide full flat panel monitor display calibration and adjustments for optimal picture quality for a single HDMI input. Provide proper aspect ratio configuration for both 16:9 and 16:10 sources. Use a test generator (I.E. Extron VTG or equal): for all setup verification and verify proper image configuration with all inputs. (Contract the City's Technical Representative prior to final adjustment to coordinate).
 - 1. Controls: Adjust all controls to achieve the specified performance. Provide shaft-locks or covers for all level controls, as appropriate to prevent unauthorized gain changes. Contractor shall confirm that all control system operations are properly programmed and repeatable.
 - 2. Contractor shall review and assess the appropriate Lens Throw length between all video projectors and the projection screens to ensure optimum picture sizing and focus. Make all adjustments necessary, including projector keystone correction

and lens shift to achieve the image size and shape required.

3. Provide full video projector calibration and adjustments for optimal picture quality for all used inputs. Provide proper aspect ratio configuration for 4:3, 16:9 and 16:10 sources. Set all projector configuration presets required for control system recall coordination and provide with final system documentation.
4. Testing Report: Provide a letter/report documenting the results of these preliminary tests, including amplifier gain/level settings, DSP EQ filter settings, and AV equalization curves for review by the AV Design Consultant and City.
5. The Contractor is fully responsible align, program, and test the sound speaker system to include the left, right, and center arrays as well as subwoofer speakers where these occur, to the respective speaker manufacturer specifications as required to achieve required uniformity of coverage as specified herein.
6. Contractor shall and utilize provide the following Calibrated Test Instruments as a minimum during commissioning and acceptance testing:
 7. Sensitive AC voltmeter, -80dBu sensitivity or more, 20Hz -30KHz response, able to measure signal to noise ratio, THD, electrical levels within the system. Note that some systems require measurements up to 100 volts and may require an external pad.
 8. Sound Pressure Level Meter, ANSI Type I with A and C weighting filters, fast or time averaged.
 9. Audio Signal Generator, 20Hz-30kHz, sine wave, pink noise, and continuous sine wave sweep.
 10. Amplified Loudspeaker 100 mm producing 60 dBa at one meter, and 70 dBa at one-meter, pink noise, sine wave, and speech files.
 11. 200Mhz Oscilloscope, with TV sync (analog video only). Analog Signal Generator NTSC/PAL, plus computer patterns at all required resolutions and refresh rates required for the systems under test. For systems with composite video, include Pluge pattern. (analog video only)
 12. Digital Signal Video Generator for computer patterns for all resolutions and refresh rates required for the systems under test, HDMI/DVI/HD-SDI with and without HDCP.
 13. The ability to measure STI-PA (source analyzer).
 14. Colorimeter/luminance meter, 10% accuracy.
 15. Infrared thermometer.
- C. Test media with known levels (audio, video, etc.): Cd's, VS, DVD's etc.
 1. AD/DC multimeter.
 2. Light meter, lux/foot-candles.

- a. Outlet tester (to test power outlet wiring).
- b. The ability to measure electrical power (watt meter, clamp meter, etc.).
- c. Cable sets, cable assemblies, adapters as required to sample and measure in-or-out of circuit as req'd.
- d. Computer with Smaart v8 or Systune. Outboard Dual Channel Preamplifier and Calibrated microphones. Earthworks M23 or equal.
- e. All equalization shall be accomplished using FFT Transfer Function. No real time analysis methodology shall be allowed.
- f. Verification of Frequency coordination shall take place with the use of a spectrum analyzer and frequency allocation/analysis software.
- g. Testing Report: Provide a letter/report documenting the results of these preliminary tests, including amplifier gain/level settings, crossover filter settings, and AVS equalization curves for review by the AV Design Consultant.

3.7 SPECIFIC AUDIOVISUAL SYSTEM NETWORK CABLING TESTING REQUIREMENTS

A. Category 6x Cable Testing.

1. The Contractor shall provide competent, factory-trained engineers and/or technicians, authorized by the manufacturer of the cabling system, to technically supervise and participate during all tests for the systems.
2. The Contractor shall test and certify the cabling system to minimum standards as set forth in the ANSI/TIA/EIA-568-C specifications for Category 6A cable as appropriate.
3. General Requirements – Category 6A.
 - a. Every cabling link in the installation shall be tested for:
 - 1) Wire Map
 - 2) Length
 - 3) Insertion Loss
 - 4) NEXT Loss
 - 5) PS NEXT Loss
 - 6) ELFEXT Loss
 - 7) PS ELFEXT Loss
 - 8) Return Loss
 - 9) Propagation Delay

- 10) Delay Skew in accordance with the field test specifications defined in ANSI/TIA/EIA-568-C. This document will be referred to as the "TIA Cat 6A Standard."
 - b. In addition to testing the "In-link" performance parameters detailed in 3.a above, Alien Crosstalk testing or "Between-link" testing shall be carried out in accordance with Annex E of the TIA Cat 6A Standard. Alien crosstalk testing includes the PS ANEXT and PS AACR-F (Power sum alien attenuation-to-crosstalk ratio from the far end) performance parameters. The standards refer to the link-under-test for Alien Crosstalk as the disturbed link.
 - c. PS ANEXT and PS AACR-F shall meet or exceed the limits defined in Section 7.8 of the TIA Cat 6A Standard.
4. The installed twisted-pair horizontal links shall be tested from the Switch located in the equipment rack to all end points throughout the AV System for compliance with the "Permanent Link" performance specification as defined in the TIA Cat 6A Standard.
5. One hundred percent of the installed cabling links must pass the requirements of the standards mentioned in 3.a above and as further detailed in Section B. Any failing link must be diagnosed and corrected. The corrective action shall be followed with a new test to prove that the corrected link meets the performance requirements. The final and passing result of the tests for all links shall be provided in the test results documentation in accordance with Section C below.
6. Trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof shall execute the tests. Appropriate training programs include but are not limited to installation certification programs provided by BiCSi or the ACP (Association of Cabling Professionals).
7. The test equipment (tester) shall comply with the accuracy requirements for level IIIe field testers as defined in the TIA Cat 6A Standard. The tester including the appropriate interface adapter must meet the specified accuracy requirements. The accuracy requirements for the permanent link test configuration (baseline accuracy plus adapter contribution) are specified in Table I.1 of Annex I of the TIA Cat 6A Standard. (Table I.1 in this TIA document also specifies the accuracy requirements for the Channel configuration.)
8. The test plug shall fall within the values specified in test plug NEXT loss requirements of the TIA Cat 6A Standard.
9. The tester shall be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy.
10. The tester interface adapters must be of high quality and the cable shall not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. In order to deliver optimum accuracy, preference is given to a permanent link interface adapter for the tester that can be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface. The contractor shall provide proof that the interface has been calibrated within the period recommended by the vendor. To ensure that normal handling on the job

does not cause measurable Return Loss change, the adapter cord cable shall not be of twisted-pair construction.

11. The Pass or Fail condition for the link-under-test is determined by the results of the required individual tests (detailed in ANSI/TIA/EIA-568-C). Any Fail or Fail* result yields a Fail for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must Pass or Pass*.
 12. A Pass or Fail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter. The test result of a parameter shall be marked with an asterisk (*) when the result is closer to the test limit than the accuracy of the field tester. The field tester manufacturer must provide documentation as an aid to interpret results marked with asterisks. To which extent "*" results shall determine approval or disapproval of the element under test shall be defined in the relevant detail specification, or agreed on as a part of a contractual specification.
 13. City or City's representative shall be invited to witness field testing. The representative shall be notified of the start date of the testing phase five business days before testing commences.
- B. Category 6A – Performance Test Parameters: The test parameters for Cat 6A are defined in the TIA Cat 6A standard. The test of each link shall contain all of the following parameters as detailed below. In order to pass the test, all measurements (at each frequency in the range from 1 MHz through 500 MHz) must meet or exceed the limit value determined in the above-mentioned standard.
1. Wire Map: Shall report Pass if the wiring of each wire-pair from end to end is determined to be correct. The Wire Map results shall include the continuity of the shield connection if present.
 2. Length: The field tester shall be capable of measuring length of all pairs of a basic link or channel based on the propagation delay measurement and the average value for NVP (1). The physical length of the link shall be calculated using the pair with the shortest electrical delay. This length figure shall be reported and shall be used for making the Pass/Fail decision. The Pass/Fail criteria are based on the maximum length allowed for the Permanent Link configuration (90 meters – 295 feet) plus 10% to allow for the variation and uncertainty of NVP.
 3. Insertion Loss (Attenuation): Insertion Loss is a measure of signal loss in the permanent link or channel. The term "Attenuation" has been used to designate "Insertion Loss." Insertion Loss shall be tested from 1 MHz through 500 MHz in maximum step size of 1 MHz. It is preferred to measure insertion loss at the same frequency intervals as NEXT Loss in order to provide a more accurate calculation of the Attenuation-to-Crosstalk ratio (ACR) parameter. Minimum test results documentation (summary results): Identify the worst wire pair (1 of 4 possible). The test results for the worst wire pair must show the highest attenuation value measured (worst case), the frequency at which this worst case value occurs, and the test limit value at this frequency.
 4. NEXT Loss: Pair-to-pair near-end crosstalk loss (abbreviated as NEXT Loss) shall be tested for each wire pair combination from each end of the link (a total of 12

pair combinations). This parameter is to be measured from 1 through 500 MHz. NEXT Loss measures the crosstalk disturbance on a wire pair at the end from which the disturbance signal is transmitted (near-end) on the disturbing pair. The maximum step size for NEXT Loss measurements shall not exceed the maximum step size defined in the standard as shown in Table 1. Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst case NEXT margin and the wire pair combination that exhibits the worst value of NEXT (worst case). NEXT is to be measured from each end of the link-under-test. These wire pair combinations must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.

Table 1 -- Maximum frequency step size as defined in

Frequency Range (MHz)	Maximum Step size (MHz)
1 – 31.25	0.15
31.26 – 100	0.25
100 – 250	0.50
250 – 500	1.00

5. PSNEXT Loss: Power Sum NEXT Loss shall be evaluated and reported for each wire pair from both ends of the link under-test (a total of eight results). PSNEXT Loss captures the combined near-end crosstalk effect (statistical) on a wire pair when all other pairs actively transmit signals. Like NEXT this test parameter must be evaluated from 1 through 500 MHz and the step size may not exceed the maximum step size defined in the standard as shown in Table 1. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for PSNEXT. These wire pairs must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.
6. ELFEXT Loss, pair-to-pair: Pair-to-pair FEXT Loss shall be measured for each wire-pair combination from both ends of the link under-test. FEXT Loss measures the crosstalk disturbance on a wire pair at the opposite end (far-end) from which the transmitter emits the disturbing signal on the disturbing pair. FEXT is measured to compute ELFEXT Loss that must be evaluated and reported in the test results. ELFEXT measures the relative strength of the far-end crosstalk disturbance relative to the attenuated signal that arrives at the end of the link. This test yields 24 wire pair combinations. ELFEXT is to be measured from 1 through 500 MHz and the maximum step size for FEXT Loss measurements shall not exceed the maximum step size defined in the standard as in Table 1. Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst-case margin and the wire pair combination that exhibits the worst value for ELFEXT. These wire pairs must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.

7. PSELFEXT Loss: Power Sum ELFEXT is a calculated parameter that combines the effect of the FEXT disturbance from three wire pairs on the fourth one. This test yields eight wire-pair combinations. Each wire-pair is evaluated from 1 through 500 MHz in frequency increments that do not exceed the maximum step size defined in the standard as shown in Table 1. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst pair combinations must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.
8. Return Loss: Return Loss (RL) measures the total energy reflected on each wire pair. Return Loss is to be measured from both ends of the link-under-test for each wire pair. This parameter is also to be measured from 1 through 500 MHz in frequency increments that do not exceed the maximum step size defined in the standard as shown in Table 1. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for Return Loss. These wire pairs must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.
9. Propagation Delay: Propagation delay is the time required for the signal to travel from one of the link to the other. This measurement is to be performed for each of the four wire pairs. Minimum test results documentation (summary results): Identify the wire pair with the worst-case propagation delay. The report shall include the propagation delay value measured as well as the test limit value.
10. Delay Skew [as defined in the TIA Cat 6A Standard; Section 7.5] This parameter shows the difference in propagation delay between the four wire pairs. The pair with the shortest propagation delay is the reference pair with a delay skew value of zero. Minimum test results documentation (summary results): Identify the wire pair with the worst-case propagation delay (the longest propagation delay). The report shall include the delay skew value measured as well as the test limit value.
11. PS ANEXT: Pair-to-pair Alien NEXT (ANEXT) contributions is measured by applying the stimulus signal at the near end to one wire pair of a disturbing link and measuring the coupled signal at the near end of a wire pair in a disturbed link. This process is repeated for every wire pair in a disturbing link. The PS ANEXT for each wire pair in a disturbed link is obtained by the power sum addition of all the pair-to-pair ANEXT results to that wire pair from all wire pairs in disturbing links. All the links that are bundles with the disturbed link need to be included as disturbing links. In addition, links that are terminated in adjacent positions in a patch panel or interconnect panel must also be included as disturbing links in this test.
12. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for PS ANEXT. These wire pairs must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.
13. PS AACR-F: The pair-to-pair Alien Far End crosstalk (AFEXT) contributions is measured by applying the signal at the near end to one wire pair of a disturbing channel or permanent link and measuring the coupled signal at the far end of a

wire pair in a disturbed channel or permanent link. This process is repeated for every wire pair in a disturbing link and for all links in close proximity. A normalization, which is dependent on the relative length of disturbing and disturbed link, is applied to each pair-to-pair alien FEXT measurement. Then the PS Alien Attenuation-to-Crosstalk Ratio from the Far end (PS AACR-F) for each wire pair in a disturbed channel or permanent link is obtained by the power sum addition of all the normalized pair-to-pair far end alien crosstalk results to that wire pair from all wire pairs in disturbing links in close proximity.

14. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for PS AACR-F. If the link or channel connects two patch panels (data center), these wire pairs must be identified for the tests performed from both ends. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.

C. Category 6/6A Test Result Documentation

1. The test results/measurements shall be transferred into a Windows™-based database utility that allows for the maintenance, inspection and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered, i.e., "as saved in the tester" at the end of each test and that these results cannot be modified at a later time.
2. The database for the completed job shall be stored and delivered on CD-ROM including the software tools required to view, inspect, and print any selection of test reports.
3. A paper copy of the test results shall be provided that lists all the links that have been tested with the following summary information
 - a. The identification of the link in accordance with the naming convention defined in the overall system documentation
 - b. The overall Pass/Fail evaluation of the link-under-test including the NEXT Headroom (overall worst case) number
 - c. The date and time the test results were saved in the memory of the tester.
4. General Information to be provided in the electronic data base with the test results information for each link:
 - a. The identification of the customer site as specified by the end-user
 - b. The identification of the link in accordance with the naming convention defined in the overall system documentation
 - c. The overall Pass/Fail evaluation of the link-under-test
 - d. The name of the standard selected to execute the stored test results
 - e. The cable type and the value of NVP used for length calculations

- f. The date and time the test results were saved in the memory of the tester
 - g. The brand name, model and serial number of the tester
 - h. The identification of the tester interface
 - i. The revision of the tester software and the revision of the test standards database in the tester
 - j. The test results information must contain information on each of the required test parameters that are listed in Section B and as further detailed below under paragraph C6.
- 5. In-link (In-Channel) detailed test results. The detailed test results data to be provided in the electronic database for must contain the following information:
 - a. For each of the frequency-dependent test parameters, the value measured at every frequency during the test is stored. The PC-resident database program must be able to process the stored results to display and print a color graph of the measured parameters. The PC-resident software must also provide a summary numeric format in which some critical information is provided numerically as defined by the summary results (minimum numeric test results documentation) as outlined above for each of the test parameters.
 - b. Length: Identify the wire-pair with the shortest electrical length, the value of the length rounded to the nearest 0.1 m and the test limit value
 - c. Propagation delay: Identify the pair with the shortest propagation delay, the value measured in nanoseconds (ns) and the test limit value
 - d. Delay Skew: Identify the pair with the largest value for delay skew, the value calculated in nanoseconds (ns) and the test limit value
 - e. Insertion Loss (Attenuation): Minimum test results documentation as explained in Section B for the worst pair
 - f. Return Loss: Minimum test results documentation as explained in Section B for the worst pair as measured from each end of the link
 - g. NEXT, ELFEXT: Minimum test results documentation as explained in Section B for the worst pair combination as measured from each end of the link
 - h. PSNEXT and PSELFEXT: Minimum test results documentation as explained in Section B for the worst pair as measured from each end of the link
- 6. Between-Link (Between-Channel) Test Results Data. A test report shall be provided for each disturbed link included in the Alien Crosstalk sample test. This test report must contain
- 7. PS ANEXT results at each frequency (See Table 1) for each wire pair in a victim link as well as the PS ANEXT results for the average of these four wire pairs. The worst case margin and the worst values shall be provided for each wire pair and the average of the four wire pairs. PSANEXT shall be measured and tested from

the end of the link or channel where all cables are terminated at a distribution panel. In case the cabling runs from panel to panel (data center), the PS ANEXT test results for each disturbed link shall be collected and saved from both ends (both panels) of the disturbed link.

8. PS AACR-F results at each frequency tested (See Table 1) for each wire pair in a disturbed link as well as the PS AACR-F results for the average of the four wire pairs. The worst case margin and the worst values shall be provided for each wire pair and the average of the four wire pairs. PS AACRF only needs to be measured and tested from one end of the link or channel. Connect the main DTX-1800 unit (measurement of PS AACR-F disturbance) to the disturbed link or channel at the end where all cabling links are terminated at a distribution panel. Select End 1 in the AxTalk Analyzer Software.
- D. Optical Fiber Cable Testing: All fiber testing shall be performed on all fibers in the completed end to end system. There shall be no splices unless clearly defined in Section 3 of this specification. Testing shall consist of a bi-directional end to end OTDR trace performed per ANSI/TIA/EIA 455-61 & ANSI/TIA/EIA 526 and a bi-directional end to end power meter test performed per ANSI/TIA/EIA 455-53A. The system loss measurements shall be provided at 850 and 1300 nanometers for multimode fibers and 1310 and 1550 for single mode fibers.
1. Pre-installation cable testing: The Contractor shall test all lightguide cable prior to the installation of the cable. The Contractor shall assume all liability for the replacement of the cable should it be found defective during the warranty period.
 2. Loss Budget: Fiber links shall have a maximum loss of: (allowable cable loss per km)(km of fiber in link) + (.4dB)(number of connectors) = maximum allowable loss.
 3. Any link not meeting the requirements of the standard shall be brought into compliance by the contractor, at no charge to City.
- E. HD-SDI coax cable testing
1. 12G HD-SDI – Adhear to SMPTE OV2082-0.2018 Standards.
 2. 11.88 Ghz Support.
- F. The Contractor shall provide test documentation to the City's Project manager in a three ring binder(s) and CD format within three weeks after the completion of a specific project. The binder(s) shall be clearly marked on the outside front cover and spine with the words "Test Results", the project name, and the date of completion (month and year). The binder shall be divided by test type. Test data within each section shall be presented in the sequence listed in the administration records. The test equipment by name, manufacturer, model number, and last calibration date shall also be provided at the end of the document. Unless a more frequent calibration cycle is specified by the manufacturer, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test.
- G. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be collocated in the

binder.

3.8 FINAL INSPECTION AND ACCEPTANCE (SEE SECTION 3.02 FOR ADDITIONAL REQUIREMENTS)

- A. After all requirements of the Specifications and/or the Drawings have been fully completed, representatives of the City will inspect the work. Contractor shall provide competent personnel to demonstrate the operation of any item or system to the full satisfaction of each representative.
- B. Final acceptance of the work will be made by the City after receipt of approval and recommendation of acceptance from each representative.
- C. Upon testing by City's Representative (Consultant) any deficiencies shall be noted. If the deficiencies are not correctable at the time of testing, any retesting costs by the Consultant, including any travel and lodging expenses shall be borne solely by the Contractor.

3.9 ACCEPTANCE TESTS – PUNCH LIST JOB WALKS

- A. Qualification for Acceptance: After completing preliminary testing, the Contractor shall furnish the Construction Manager with the letter/report documenting the results of the preliminary tests and two (2) copies of "as-built" wiring diagrams of the entire system including the connection numbers, and their locations. The receipt of this documentation shall constitute the Contractor's acknowledgment that the installation is complete and conforms to this specification and is ready to be reviewed and tested by the AV Design Consultant.
- B. Acceptance Test: The Consultant, City's Representative and/or Construction Manager will be present during the acceptance testing and require the assistance and cooperation of the AV Installation Contractor. Provide personnel who participated in the actual installation and preliminary testing and adjustment of the audiovisual systems.
- C. Equipment cabinet keys and any tamper-proof fastener tools must be available to the AV Design Consultant. Delays associated with failure to access the equipment shall be back charged to the Contractor at the AV Design Consultant's current hourly rates.
- D. Each major component shall be demonstrated to function, as specified.
- E. The AV Contractor shall provide a laptop computer with all manufacturers supplied configuration software necessary for communicating with Control Systems, DSP Audio Matrix Mixers, and the Audiovisual System Switchers. A review of system settings may be required for either of the programmable units at the AV Design Consultant's request, and settings may be adjusted if necessary.
- F. Such tests may be performed on any piece of equipment or system. If any test shows the equipment or system is defective or does not comply with the specifications, the Contractor shall perform any remedies at his expense and pay the subsequent expenses of any retesting required.
- G. Delays: If system acceptance is delayed because the system is found to not meet the specification requirements, the Contractor shall reimburse the City for all consultant

expenses related to re-testing. This shall include costs associated with travel to the site and any associated business travel expenses.

3.10 SYSTEM DOCUMENTATION, TRAINING, AND FIELD SUPPORT

- A. Operation and Maintenance Manuals: For each system, provide three (3) copies of system manuals per system, two (2) for the City and one (1) for the AV Design Consultant. Manuals shall be in adequately sized three-ring binders, clearly labeled on spine. Manuals shall contain the following:
- B. Service Reference Cover Sheet: Provide a cover sheet with Contractor name, address, Email, WEB Address, telephone and Fax numbers.
- C. System Operation Instructions: Step-by-step operating instructions for the basic day-to-day use of the system including power activation, connection of source devices, adjustment of volume levels, selection of sources, etc. Include illustrations and references to individual equipment manuals, as necessary.
- D. Equipment Manuals: Include copies of individual equipment operation manuals separated by tabbed dividers. Arrange the manuals in nominal signal path order (i.e., sources first, amplifiers/loudspeakers last), followed by control system manuals, followed by miscellaneous manuals.
- E. Equipment List: List all system equipment including, connectors and specialty hardware, by manufacturer and model and serial number.
 - 1. As-built Drawings: Provide one set, reduced 11"x17" foldout "as built" functional diagrams in clear plastic binder sleeves. Fold and insert drawings so that drawing title is clearly visible at the front of the sleeve. In addition, provide 2 full-size drawing sets.
 - 2. Provide current software programmable device configuration files to the City for all control system interfaces and computer-based files, and the DSP Audio Matrix Mixer. Store files on site in the system documentation binders in disk sleeves. Provide the files on USB.
 - 3. Complete spreadsheet lists of IP network devices, protocols used, and IP and MAC Address lists and required ranges for coordination with the City's IT department.
 - 4. Provide all network switch configuration files. Identify which configuration file is loaded into each switch
 - 5. Provide Ip Network diagram with all interconnections and VLANs programmed into the network.
- F. Lists shall include information regarding location on the City's network or dedicated audiovisual physical subnet, VPN requirements, and other pertinent information for integration of IP networked audiovisual equipment into the City's Enterprise network
- G. Training: Provide hours as needed of system training to operator(s) designated by the City. Training time is to be non-contiguous, in multiple separate sessions. Training sessions are to be digitally recorded upon City request.

- H. All training shall take place after the systems are operational, but before the acceptance tests.
- I. Operational Training:
 - 1. In the event the Installing Contractor does not have qualified instructors on staff for certain sophisticated equipment, the Installing Contractor, at no additional cost to City, shall provide a manufacturer's representative for such instruction to the City.
- J. Training Materials Supplied:
 - 1. System operational manual (not equipment operation manuals) that explains how to fully operate the system; from start-up to shut down, and all operational steps in-between, in a step-by-step description, with pictures and other visuals to help convey information.
 - 2. The Installing Contractor shall video record training session(s) for City's reference (to help limit minor follow up phone calls in the future).
- K. Maintenance Training:
 - 1. A session with City's designated technical personnel for routine and preventive maintenance shall be given.
 - a. This training is for scheduled preventative maintenance for such items as filter and lens cleaning, minor equipment checks and "user" adjustments.
 - 1) This training is not meant to teach City's representatives how to use commercial test equipment and/or do sophisticated equipment/system alignment.
- L. Training Materials Supplied:
 - 1. Utilizing the equipment manuals and flow diagrams of the required in contract closeout submittals supply a listing with suggested preventative maintenance schedule of the system equipment.
 - 2. Training Format
- M. Presenter: The presenter of the training sessions to have been directly involved with the project and have intimate knowledge of the installed systems and its operation. The presenter to be experience operating similar systems of similar complexity.
- N. Attendees: The End User to determine who shall attend Audio & Video Training. Group to be limited to 10 persons. Training to occur at building site and be coordinate with City's Schedule and Calendar.
- O. Classroom presentation: PowerPoint Presentation covering items indicated in syllabus. Duration of classroom training not to exceed 4 hours.
- P. Field Instruction: Hands On presentation covering items indicated in syllabus. Minimum duration of field instruction:

1. Video System Operation – 6 hours
2. Audio System Operation – 6 hours
3. One month follow up – 4 hours.

Q. Audio Systems Training Syllabus

R. Section 1 - Introduction to Audio Systems

1. Decibels – Explain the concept of Decibels and its application in dBu and dBSPL. Provide references of each.
2. Frequency – Explain the concept of Frequencies and a relationship to octaves and musical notes.
3. Voltage – Provide description of microphone, line and speaker levels.
4. Gain Structure – Provide description and example of proper gain structure along with an explanation of clipping and headroom.

S. Section 2 – Introduction to Project Systems (Provide the following for each system in project)

1. Inputs – Present floor plans indicating location of technical panels with brief description of input connectors.
2. Controls – Present floor plans indicating location of wall controls and mix locations.
3. Review the setup and adjustment of the output devices.
4. Review the maintenance of the video equipment.

T. Section 3 – Microphone Selection and Application

1. Provide explanation of proper microphone selection to include:
 - a. Type of microphone: Boundary, Condenser, Dynamic, etc.
 - b. Type of coverage: Omni, Cardioid, Semi Cardioid, etc.

U. Provide explanation of proper microphone application to include:

1. General Handling and placement for handheld applications
2. General Handling and placement for stand applications
3. 3 to 1 rule with respect to interference
4. 3 dB rule with respect to headroom

V. Section 4 – Field Instruction

1. Mixing Console Operation
2. Explanation of signal path
3. Review of Aux sends
4. Review of Groups
5. Explanation of Mute Groups
6. Explanation of Matrix
7. Review of Main Section
8. Review of Metering
9. Tie Line Description

W. Video System Training Syllabus

X. Section 1 – Introduction to Video Systems

1. Provide description of digital and analog video signal types.
2. Discuss the properties of a quality video image.

Y. Section 2 – Introduction to project systems

1. Inputs – Present floor plans indicating location of technical panels with description of input connectors.
2. Controls – Present floor plans indicating location of wall controls and mix locations.
3. Components – Present Schematic diagram (based on shop drawings) indicating description of signal flow and components of the system.

Z. Section 3 – Field Instruction

1. Demonstrate the process of inputting media.
2. Review the process of routing the signals through distribution.
3. Review the setup and adjustment of the output devices.
4. Review the maintenance of the video equipment.

AA. Support Materials

1. Training Manuals - Provide three ring binders for each attendee with the following:
 - a. Cover sheet indicating Audio Training.
 - b. Contact information for Audio Contractor and Audio Consultant

- c. Table of Contents
 - d. Printed copy of PowerPoint presentation
 - e. Copy of Materials List
 - f. Copy of Loose Equipment Materials List and Product Cut Sheets
 - g. Citys and Instruction Manuals. Make Citys and Instruction manuals available and complete for reference during training.
 - h. Record Documents Make Record Document available and complete for reference during training.
 - i. Submit training support material binder to AV Consultant for approval prior to training sessions.
- BB. Follow-up training within sixty (60) days shall also be provided.
- CC. Single Point of Contact: Contractor shall provide an English proficient, single point of contact, i.e., Project Manager, to speak for the Contractor and to provide the following functions:
- DD. Initiate and coordinate tasks with City's Project Manager, and others as specified by City's Project Manager.
- EE. Provide day-to-day direction and on-site supervision of Contractor personnel.
- FF. Ensure conformance with all Contract provisions.
- GG. Participate in weekly site project meetings as needed.
- HH. This individual shall remain as Project Manager for the duration of the project. The Contractor may change Project Managers only with the City's Project Manager's written approval.
- II. Planning meetings and schedule: Within thirty (30) calendar days after the date of award of the Contract, an initial planning meeting shall be held with the successful bidder to clarify all requirements (systems, services, distribution methods, etc.), identify responsibilities, and schedule the events that shall transpire during the implementation of the project. Within one (1) week of this initial meeting, the Contractor shall provide a written report and project schedule to clearly document the events and responsibilities associated with the project.
- JJ. Site Cleaning: Throughout the progress of the plant construction, the Contractor shall keep the working area free from debris of all types and remove from the premises all rubbish resulting from any work done by Contractor. On a daily basis and at the completion of its work, the Contractor shall, to the extent possible, leave the premises in a clean and finished condition.
- KK. Safety Requirements: Contractor shall utilize appropriate personnel and display warning signs, signals, flags and/or barricades at the work site to ensure adherence to safety regulations and as prudence requires.

- LL. Specification/Drawing Status: All specifications and drawings related to this project shall be “frozen” after shop drawing approval. The City reserves the right to negotiate any future changes with the Contractor at any time.
- MM. Upon approval of shop drawings, Contractor shall immediately place orders for all required materials, components, and supplies. In addition, Contractor shall secure and forward written confirmations (including orders and shipping dates) direct from each manufacturer/vendor to the City’s Project Manager.
- NN. Contractor shall expedite shipment of all materials, components and supplies, as necessary to ensure the successful completion of the Project by the date required. All costs for expediting shall be included within Contractor’s pricing as provided below.
- OO. The system cost herein shall include administration/maintenance training for at least ten City’s representatives with a minimum allotment of sixteen (16) hours. Additional hours of training shall be as required at no additional expense to the City. All training shall include written and/or video materials that shall remain the property of City. If materials are written, they shall be provided in quantities sufficient for each person trained; if materials are video, one copy of each shall be required. The administration/maintenance training shall include, but not be limited to, the following:
- PP. Review of as-built documentation, including a site demonstration.
- QQ. All warranty information.

3.11 DAMAGES

- A. The Contractor shall be held responsible for any and all damages to portions of the building caused by it, its employees or sub-contractors; including but not limited to:
- B. Damage to any portion of the building caused by the movement of tools, materials or equipment.
- C. Damage to any component of the construction of spaces.
- D. Damage to the electrical, mechanical and/or life safety or other systems caused by inappropriate operation or connections made by the Contractor or other actions of Contractor.
- E. Damage to the materials, tools and / or equipment of the City, its consultants, agents and tenants.

3.12 INSPECTIONS

- A. On-going inspections shall be performed during construction by the City’s Project Manager. All work shall be performed in a high-quality manner and the overall appearance shall be clean, neat and orderly. The following points will be examined and must be satisfactorily complied with:
- B. Are all cables properly labeled, from end-to-end?
- C. Have all terminated cables been properly tested in accordance with the specifications for the specific category as well as tested for opens, shorts, polarity reversals,

transposition and presence of AC and/or DC voltage?

- D. Have the pathway guidelines been followed? Are all cable penetrations installed properly and fire stopped according to code?
- E. Has the Contractor avoided excessive cable bending?
- F. Is Cable fill correct?
- G. Are terminations compatible with applications equipment?
- H. Are connectors properly turned right side up in the Jack Panels or faceplates without cables wrapped or twisted?
- I. Is the jacket maintained right up to the termination?
- J. Are identification markings uniform, permanent and readable?

3.13 COMPLETION OF WORK

- A. At the completion of the System, the Contractor shall restore to its former condition, all aspects of the project site and on a daily basis, shall remove all waste and excess materials, rubbish debris, tools and equipment resulting from or used in the services provided under this Contract. All clean up, restoration, and removal noted above shall be by the Contractor and at no cost to City. If the Contractor fails in its duties under this paragraph, City may upon notice to the Contractor perform the necessary clean up and deduct the costs thereof from any amounts due or to become due to the Contractor. It shall be the Contractor's responsibility to remove trash from the areas it is working in and bring trash and debris to the Contractor provided dumpster.
- B. Final Punch Walk: The Contractor and City shall complete a final inspection to determinate if all conditions of the scope of work are completed to the City's satisfaction. A "punch list" shall be formulated within (2) days of the punch walk and be presented to the Contractor for completion prior to final project sign-off by the City. If an item is missed during the punch walk or not included on the "punch list" for any reason, it does not release the Contractor from completing the scope of work as defined in the specification or drawings.
- C. Contractor shall submit complete Record Documentation as outlined in submittals section prior to project sign-off by City.

3.14 SYSTEM AND/OR NETWORK TESTING

- A. Upon completion of installation, Contractor shall execute all of the required tests as summarized in this specification. When all such tests have been completed to City's satisfaction and Manufacturer's specifications, Contractor shall give the City written notice thereof.
- B. Contractor must assume responsibility of assuring that the system and network interface installed operates properly, including any required coordination with other suppliers.

3.15 FINAL ACCEPTANCE

- A. The City or City's representative may visit the site during the installation of the system to ensure that correct installation practices are being followed.
- B. The City or City's representative will conduct a final job review once the Contractor has finished the job. This review will take place within one week after the Contractor notifies the City.
- C. Two copies of all certification data and drawings for all identifications shall be provided to the City before the City's review.
- D. The City or City's representative will review the installation and certification data prior to the system acceptance.
- E. The City or City's representative may test some of the systems features to ensure that the certification data is correct. If a substantial discrepancy is found, the City reserves the right to have an independent consultant perform a certification of the entire system. If such a procedure is undertaken, the cost of the testing shall be billed back to the Contractor.
- F. In the event that repairs, or adjustments are necessary, the Contractor shall make these repairs at his own expense. All repairs shall be completed within 5 days from the time they are discovered.
- G. The Contractor shall hand to the City a copy of any applicable installation specific software configurations in USB format.

END OF SECTION

SECTION 28 10 00

ELECTRONIC ACCESS CONTROL SYSTEM

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The work under this section includes all final design, all labor, material, equipment, supplies, labor, testing, and accessories required to furnish and install a complete Access Control/System Alarm System as indicated on the drawings and as specified herein.
- B. It is the intent of the Drawings and Specifications, which are presented in a "design-build" format, for the Contractor to design, provide and install a complete, fully operational, and tested system.
- C. All miscellaneous system components including, but not limited to, cables, termination equipment, punch blocks, patch panels, backboards, hardware, firmware, software, servers, client workstations, monitor workstations, licenses, databases, and any other related items shall be furnished and installed complete under this section, such that the system shall perform all functions listed herein in compliance with all of the specified requirements.
- D. The System shall include, but not limited to, the following subsystems/products:
 - 1. See Products Section.

1.2 RELATED WORK

- A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections of Divisions 1 of these specifications.
- B. All applicable portions of Section 260000 shall apply to this section as though written herein completely.
- C. Coordinate with Finish Hardware Contractor to provide and install all Electrified Door Hardware as specified herein. Finish Hardware (door) Contractor shall pre-drill for the listed hardware and certify as required all doors.

1.3 GENERAL REQUIREMENTS

- A. The contractor shall hold a current State of California C10 Low-Voltage licenses, shall have completed at least 20 projects of equal scope, shall have been in business of furnishing and installing systems of this scope and magnitude for at least five years, and capable of being bonded to assure the City of performance and satisfactory service during the guarantee period.

- B. The contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work.
- C. Contractor shall be an GENETEC Value Added Reseller (VAR) with the following qualifications. Documentation of all qualifications below shall be provided with bid:
 - 1. Contractor employs and maintains a minimum of (2) GENETEC Certified Professionals and (2) GENETEC Certified Associates concentrated in the area of access control. Certified professionals must be staffed in their Southern California Location.
 - 2. Three (3) consecutive years as a Certified GENETEC VAR
- D. The installing contractor shall be a factory authorized distributor and warrantee station for the brand of equipment offered and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The installing contractor shall maintain a spare set of all major parts for the system at all times. All circuit boards, amplifiers and control sub systems shall be 100% backed up with stock at contractor's shop.
- E. All of the equipment in this specification shall be furnished and installed by the Authorized Factory Distributor of the equipment. The Contractor shall furnish a letter from the manufacturer of all major equipment, which certifies that the installing contractor is the Authorized Distributor and that the equipment has been installed according to factory intended practices. The Contractor shall also furnish a written guarantee from the manufacturer that they will have a service representative assigned to this area for the life of the equipment.
- F. All communication systems supplied shall be listed by Underwriter's Laboratories under UL Standard 1459. A copy of the UL listing card for the proposed system shall be included with the contractor's submittal.
- G. At the time of City Acceptance of the installation, all equipment shall include any and all updated software revisions. In addition, when the software is available in disk format, a backup copy of the most up to date revision, in disk format, shall be handed to the City at the completion of the project.
- H. The contractor shall pay all charges (including travel, lodging, meals, etc.) required to provide factory certification, equal to that of a Factory Authorized Distributor for two (2) selected City's representatives. This training shall occur at the primary factory or suitable training site and shall allow the selected City's representatives to provide any and all Factory/Manufacturer Approved repairs, services, software upgrades, etc. without affecting any available or applicable Manufacturer Warranties.
- I. The CONTRACTOR shall install all access control related hardware including, but not limited, to access panels, reader modules, Input/Output panels, alarm panels, wireless door receivers and openers, proximity readers, diodes for door supervision, request to exit devices, door contacts, various types of electrified door locking hardware, power supplies, wiring and incidental materials.
 - 1. Door envelopes shall be fully complimented (reader, electronic lock, door position switch, request to exit device and any incidental conduit and mounting hardware)

- J. The access control system contractor shall provide all necessary permits and install all materials and labor in compliance with local codes and UL 294.
 - 1. Applicable doors and frames shall retain fire rating
- K. Power supplies shall be hard wired in conduit on an isolated circuit when possible, with a tamper resistant key (blade style) switch.
 - 1. Battery and AC supervision shall be connected to the GENETEC access panel or reader module to indicate loss of AC power and report low battery conditions
- L. Miscellaneous:
 - 1. Resistors shall be used at each reader door to effect door supervision
 - 2. Tamper switches shall be installed and wired at all access panel or reader module enclosures and power supply enclosures
 - 3. Readers, access panels, power supplies and cabling shall be labeled to the CITY OF IRVINE's naming convention standards
- a. Tests of access control hardware and installation shall be performed to the approval of the CITY OF IRVINE's access control

1.4 QUALITY ASSURANCE

- A. In order to maintain a high degree of quality assurance, the Contractor shall, without exception, use the parts and supplies as specified on the drawings and in this specification.
- B. For any proposed product substitution or when the Contractor intends to include an "or equal" product in the bid pricing, provide a substitution request submittal to the City's Project Manager for review no later than fifteen (15) calendar days prior to Bid submittal. This report shall include:
 - 1. Description of how the proposed product(s) will impact meeting the project completion date, indicate item(s) with lead times and expected delivery date(s).
 - 2. Itemized cost comparisons between the proposed product(s) and the listed product(s).
 - 3. Detailed technical analysis of the electrical and mechanical specification differences between the proposed product(s) and the listed product(s).
 - 4. ETL "Verified" or UL "Verified" test lab documentation for the proposed product(s), component(s) and assemblies.
 - 5. Proposed product identification, manufacturer literature (specifications and cut sheets).
 - 6. Name, address and contact information of several similar projects where the proposed product(s) have been used.

7. Name, address and contact information of the proposed product(s) manufacturer's local representative.
 8. Sample proposed product(s) manufacturer's warranty.
- C. The City's Design Team/Project Manager must approve any proposed product(s) substitution item in writing. The City's Design Team/Project Manager reserves the right to require a complete sample of any proposed product(s) and may request a sample tested by an independent testing consultant to prove equality. The decision of the City's Design Team/Project Manager regarding equality of proposed product(s) items will be final.
- D. If a proposed product(s) is given final acceptance by the City's Project Manager, the Contractor shall reimburse the City's Design Team/Project Manager for the costs to review the proposed product(s) substitution(s), and for any additional engineering charges, and shall pay all charges of other trades resulting from this product(s) use, at no cost to the City.
- E. It is a mandatory requirement that a single Contractor perform the work described in this specification.

1.5 BID SUBMITTAL

- A. Pre-Qualification Certificates: Contractor shall submit current training certificates for design, engineering, installation and testing of the specified products.
- B. Bid Forms: Contractor shall submit completed any detailed bid forms provided with this specification or elsewhere in the RFP Package. Quoted price shall be broken down and categorized per the bid forms. All unit prices and alternates shall be included. Responses with incomplete or omitted bid forms shall be rejected.
- C. Material and System Installation Guarantees
1. Complete documentation regarding the manufacturer's warranty shall be submitted as part of the bid. This shall include, but is not limited to, a sample of the warranty that would be provided to the customer when the installation is complete and documentation of the support procedure for warranty issues.
 2. A systems application assurance manual documenting the vendor supported applications and application guidelines shall be provided as part of the submittals.
- D. Project Narrative: Contractor shall submit a summary of the scope of work, in their own words, illustrating a complete and thorough understanding of the project.
- E. Hours: Provide the total number of estimated man-hours used to calculate the Base Bid.
- F. Resume: A resume of qualification shall be submitted with the Contractor's bid indicating the following:
1. A copy of their valid State of California C10 license.

2. Summaries of at least ten (10) projects of equal scope completed within the last (5) years whereas at least one (1) shall be a warranted project from the manufacturer of the proposed solution. Project Summary to include a project description, project size, duration, date completed, and complete contact information for a representative of the customer familiar with the contractor's work.
 3. A technical resume of experience for the contractor's Project Manager who will be assigned to this project. This individual will remain as Project Manager for the duration of the project. The Contractor may change Project Managers only with the City's Project Manager's written approval.
 4. A list of technical product installation training attended by the contractor's personnel within the past two (2) years that will install the system shall be submitted with the response.
 5. All of the above for any sub-contractor, who will assist the contractor in performance of this work.
- G. Manufacturer's Letter: The Contractor shall furnish a letter from the manufacturer, which certifies that the contractor is the Authorized/Certified Installer and that the equipment shall be installed according to manufacturer's recommendations.
- H. Bill of Materials: The bill of materials shall contain a complete list of major components, part or device by part description, manufacturer and manufacturer's part number, quantity and unit of measure.
1. This information may be used by the City to evaluate the Contractor's general understanding of the project scope during the bid evaluation. Errors/Omissions from this bill of material do not relieve the contractor from providing all material, components, labor, etc., as outlined in this specification and on the drawings to provide a complete and useable structured cabling system.
- I. Copies: Provide 2 copies of the above information at bid time.

1.6 PRODUCT SUBMITTALS AND SHOP DRAWINGS

- A. Within fifteen (15) calendar days after the date of award of the Contract, the Contractor shall submit the following:
1. Submittal Binder: Submit five (5) copies of the complete Submittal Binder to the City for review. The binder shall consist of four major sections with each section separated by index tabs. Each page in the binder shall be numbered sequentially and shall be summarized in the index.
 - a. The first section shall be the "title sheet" which shall include the submittal date, project title and address, name of the contractor, and name of the City.
 - b. The second section shall contain an index including the page number, product Manufacturer, product part number, product description, and corresponding specification section number or drawing sheet number where that product is referenced.

- c. The third section shall contain original manufacturer cut sheets for all of the materials that meet the requirements listed in Section 2 of this specification and all materials described on the construction drawings. Also include manufacturer's cut sheets for all testing equipment to be used for completion of the project. All pages shall be numbered sequentially corresponding to the index. On each cut-sheet, provide an indicating arrow next to each part number of proposed material.
- d. The fourth section shall contain a Cabling Diagram. The diagram shall be based on the drawings included in the Construction Documents. It shall be updated to show quantities and part numbers for all components.
- e. Failure to comply with any of the requirements listed above may result in the rejection of the entire submittal package.

1.7 O&M MANUAL

- A. Within thirty (30) days of final acceptance, the Contractor shall provide three (3) copies of an "Operating and Servicing Manual" for the system. In addition, the contractor shall provide (1) reproducible copy on the manuals on DVD or flash drive.

1.8 GENERAL SYSTEM PRODUCT INSTALLATION AND OVERALL SYSTEM WARRANTY

- A. Prior to City acceptance, the contractor shall provide to City, a manufacturers product and performance warranty. This will require a submittal of the required pre-job certification registration forms as well as the required project closing information. The City will only acknowledge acceptance upon submittal of a valid manufacturer's warranty.
- B. The warranty shall commence from the date of final written acceptance by the City.
- C. All conditions for obtaining the manufacturer's warranty shall be the sole responsibility of the contractor.
- D. The contractor shall maintain a competent service organization and shall, if requested, submit a service maintenance agreement to the City after the end of the guarantee period.
- E. A typewritten notice shall be posted at the equipment rack that shall indicate the firm, address and telephone number to call when service is necessary. The notice shall be mounted in a neatly finished metal frame with a clear plastic window and securely attached to the inside of the door.
- F. The CONTRACTOR shall follow all manufacture installation specifications.
- G. The CONTRACTOR shall provide a project manager to manage the entire access control project including, but not limited to, access control hardware, hardware/software programming, wiring, electrified door hardware, electrical, testing and documentation.
- H. The CONTRACTOR shall have advanced GENETEC software engineering resources that can support the CITY OF IRVINES all GENETEC applications. CONTRACTOR

engineering resources shall be trained and certified in Microsoft SQL database administration and be able to support the GENETEC Access Control SQL database.

- I. The CONTRACTOR shall perform final sequence testing of the GENETEC access control equipment. CONTRACTOR shall repair any failures identified during testing. Testing sequences shall include, but is not limited to circuitry, controls, switches, readers, locks, inputs/outputs, accurate event alarms at each door including 'alarm active', 'request-to-exit', 'door held', 'door forced', 'access granted', and 'access denied'. CITY OF IRVINE will be present during all testing sequences to validate accuracy and testing completion.
- J. In accordance with CITY OF IRVINE's naming conventions, the CONTRACTOR shall label all equipment, including, but not limited to enclosures, reader panels, power supplies, wiring, readers, and lock power.
- K. CONTRACTOR shall wire GENETEC power fault (FLT) with Lifesafety® AC power and battery status monitoring in accordance with the GENETEC wiring standards.
- L. CONTRACTOR shall maintain organized and documented cable management within panel enclosures and closets. Enclosure type, enclosure layout design, wire duct, wire ties, and conduit type and locations must be approved by the CITY OF IRVINE's prior to installation.
- M. CONTRACTOR shall provide and install conduit to conceal all visible wire. EMT conduit shall be used (no flex conduit).
- N. CONTRACTOR shall install supervised circuits unless otherwise requested by the CITY OF IRVINE.

1.9 SPECIFIC SYSTEM PRODUCT INSTALLATION AND OVERALL SYSTEM WARRANTY

- A. The entire system shall be warranted free of mechanical or electrical defects for a period of one (1) year after final acceptance of the installation. Any material showing mechanical or electrical defects shall be replaced promptly at no expense to the City.

2.1 ACCEPTABLE MANUFACTURERS

- A. Material, Equipment and Software shall be products of a single manufacturer. All material, equipment and software shall be the latest technology and currently in production. Each major component of equipment shall have the manufacturer's model and serial number in a conspicuous place. Major hardware components shall be manufactured in the USA using nationally recognized quality processes such as Six Sigma. Acceptable manufacturers include:
 - 1. GENETEC Software for Access Control and VMS (Citi of Irvine standard).
 - 2. Mercury Security Controllers, I/O
 - 3. DMP or equal Intrusion alarm
- B. The equipment shall be available through Authorized, factory-trained and certified Business Partners or Dealers.

- C. Hardware Manufacturer Experience: All system hardware and firmware shall be produced by manufacturers regularly engaged in the production of electronic security management systems and application software for at least 5 years.
- D. Software Manufacturer Experience: All system and application software shall be produced by manufacturers regularly engaged in the production of electronic security management systems and application software for at least 5 years.
- E. System Installer Experience: The system shall be installed by a factory-trained contractor who has been regularly engaged in the installation of electronic security management system equipment for at least 5 years.
- F. System Component Design: Electronic security management system components shall be designed for continuous operation. Electronic components shall be of SMT manufactured process. All connections to the intelligent system controllers, intelligent reader controllers, and intelligent control modules shall be protected by SMT type TVS (Transient Voltage Suppressors).
 - 1. Modularity: The contractor shall provide equipment designed for increase of system capability and capacity. System components shall be designed to facilitate easy maintenance and replacement of components and devices. The system shall auto-configure new and replacement controllers for address, baud rate and communication type. Systems using controller hardware with rotary switches, dipswitches and jumpers for address, baud rate and communication type are not acceptable.
 - 2. Maintainability: Components shall be designed to be maintained using commercially available tools and equipment. Components shall be arranged and assembled so they are accessible to maintenance personnel. There shall be no degradation in tamper protection, structural integrity, EMI/RFI attenuation, or line supervision capability after maintenance when it is performed in accordance with manufacturer's instructions.

2.2 ACCESS CONTROL AND INTRUSION ALARM

- A. Provide latest version of Genetec Software licenses as required. Verify current version with City of Irvine IT.
- B. Genetec Synergis Cloud Link appliance
- C. Mercury EP1501 Intelligent Controller (manages 16 i/o modules or 17 doors)
- D. Mercury MR52 Interface Module (IO module for up to 2 doors)
- E. Wall mount enclosures as required.
- F. Expansion Boards as required.
- G. Power supplies for alarm devices and electrified locks, if not provided by door hardware vendor, shall supply 125% of required load of both locks and devices with quantity as required. Power supplies shall be equipped with 7ah 12V backup batteries, as required for up to 8 hours of operation in case of power failure.

2.3 Field COMPONENTS

- A. Request-to-Exit (REX), Door Position Switch (DPS), electronic door hardware
 - 1. Each door envelope shall receive a REX, DPS, and electronic door hardware. These items shall be determined specific to each location to match building aesthetics and meet required code(s).
- B. Readers
 - 1. All HID MultiClass SE Readers shall accommodate 13.56MHz and OSDP.
 - 2. R40 iClass SE OSDP Reader single gang black for wall mounted applications.
 - 3. RP15 iClass OSDP Reader for mullion mounted applications or other applications that cannot accommodate the width of the R40.
- C. Provide and connect RJ-31X jacks for security systems and connect to 110 connection block pairs as directed by the City.
- D. Request-to-exit sensors (as required for exterior doors without REX integral to lock hardware) shall be Bosch DS160.
- E. Door Hardware. See Architectural plans and door hardware schedule.
- F. Cabling.
 - 1. Use Cat 6 patch cord to connect with a network switch.
 - 2. Reader Interface Modules and Multiplexers shall use RS485 cabling. RS-485 shall be a 2-pair, 24 AWG tinned copper individually shielded pairs, RS-485 low-capacitance communication, instrumentation, and special application plenum rated cable (see appendix A).
 - 3. Readers shall use a plenum composite cable specification for access control use.
 - a. Contact wire shall have minimum 1 pair 22 gauge
 - b. Lock power wire shall have minimum 1 pair 18 gauge
 - c. REX wire shall have minimum 2 pair 22 gauge
 - d. OSDP readers shall use RS-485 cabling, 4 conductor twisted pair over-all shielded and UL listed, Belden 82841/89841 or equal. OSDP rated RS485 cable shall be enclosed within the bundle
 - e. General input devices shall be wired with 22 gauge 4 conductor plenum rated cable.
- G. Enclosures.
 - 1. Typical 8-reader / 8-lock enclosure: Power supply board 150W, 12A/12V or 6A/24V | Secondary voltage power supply, 5-18V adjustable @ 4A max, class 2

power limited output | Network communication module 2nd Gen. | 8 auxiliary CD class 2 power limited at 2.5A per output | * relay lock control outputs class 2 power limited at 2.5A per output | Enclosure, (20W x 24H x 4.5D)

- H. It is the responsibility of the bidder to insure that the proposed product meets or exceeds every standard set forth in these specifications and the equipment's technical data sheets.
- I. The functions and features specified are vital to the operation of this facility. Therefore, inclusion of a component's manufacturer in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

3.1 GENERAL INSTALLATION REQUIREMENTS

- A. The CONTRACTOR shall install all access control related hardware including, but not limited, to access panels, reader modules, Input/Output panels, alarm panels, wireless door receivers and openers, proximity readers, diodes for door supervision, request to exit devices, door contacts, various types of electrified door locking hardware, power supplies, wiring and incidental materials. Door envelopes shall be fully complimented (reader, electronic lock, door position switch, request to exit device and any incidental conduit and mounting hardware)
- B. The contractor shall provide all necessary permits and install all materials and labor in compliance with local codes and UL 294. Applicable doors and frames shall retain fire rating.
- C. Power supplies shall be hard wired in conduit on an isolated circuit when possible with a tamper resistant key (blade style) switch. Battery and AC supervision shall be connected to the Mercury access panel or reader module to indicate loss of AC power and report low battery conditions.
- D. Resistors shall be used at each reader door to effect door supervision.
- E. Tamper switches shall be installed and wired at all access panel or reader module enclosures and power supply enclosures.
- F. Readers, access panels, power supplies and cabling shall be labeled to the CITY OF IRVINE's naming convention standards.
- G. Tests of access control hardware and installation shall be performed to the approval of the CITY OF IRVINE's access control.
- H. The CONTRACTOR shall follow all manufacture installation specifications.
- I. The CONTRACTOR shall provide a project manager to manage the entire access control project including, but not limited to, access control hardware, hardware/software programming, wiring, electrified door hardware, electrical, testing and documentation.
- J. The CONTRACTOR shall have advanced GENETEC software engineering resources that can support the CITY OF IRVINE's GENETEC applications. CONTRACTOR

engineering resources shall be trained and certified in Microsoft SQL database administration and be able to support the GENETEC Access Control SQL database.

- K. The CONTRACTOR shall perform final sequence testing of the GENETEC access control equipment. CONTRACTOR shall repair any failures identified during testing. Testing sequences shall include, but is not limited to circuitry, controls, switches, readers, locks, inputs/outputs, accurate event alarms at each door including 'alarm active', 'request-to-exit', 'door held', 'door forced', 'access granted', and 'access denied'. CITY OF IRVINE will be present during all testing sequences to validate accuracy and testing completion.
- L. In accordance with CITY OF IRVINE's naming conventions, the CONTRACTOR shall label all equipment, including, but not limited to enclosures, reader panels, power supplies, wiring, readers, and lock power.
- M. CONTRACTOR shall wire GENETEC power fault (FLT) with Life Safety Power AC power and battery status monitoring in accordance with the GENETEC wiring standards.
- N. CONTRACTOR shall maintain organized and documented cable management within panel enclosures and closets. Enclosure type, enclosure layout design, wire duct, wire ties, and conduit type and locations must be approved by the CITY OF IRVINE's prior to installation.
- O. CONTRACTOR shall provide and install conduit to conceal all visible wire. EMT conduit shall be used (no flex conduit).
- P. CONTRACTOR shall use CITY OF IRVINE's approved premium industrial quality connectors, wire duct, Velcro wire ties, industrial terminal blocks for wire splicing and/or wire interconnects points.
- Q. CONTRACTOR shall install supervised circuits unless otherwise requested by the CITY OF IRVINE.
- R. The CONTRACTOR will provide 1-year warranty on all GENETEC materials and labor.
- S. The wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's wiring diagrams. Should any variations in these requirements occur, the contractor shall notify the architect before making any changes. It shall be the responsibility of the factory-authorized distributor of the approved equipment to install the equipment and guarantee the system to operate as per plans and specifications.
- T. Furnish all conduit, junction boxes, conductors, equipment plugs, terminal strips, etc., and labor to install a complete and operable system.
- U. The cables within the rack or cabinets shall be carefully cabled and laced with Velcro. All cables shall be numbered for identification.
- V. Splices of conductors in underground pull boxes are not permitted.

- W. The labor employed by the contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the City and architect to engage in the installation and service of this system.
- X. The contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc., the Contractor shall remove all debris and rubbish occasioned by the electronic systems work from the site. The contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., Caused by the performance of this work.
- Y. The system must meet all local and other prevailing codes.
- Z. All cabling installations shall be performed by qualified technicians.
- AA. All cabling shall up to 1,000' be splice free. Any cable requiring field splices must be secured in a lockable NEMA4 (indoor), or NEMA 3 (outdoor) enclosure.
- BB. In order to ensure the least amount of cable untwisting, it is required that all cables shall be stripped using a special tool.
- CC. The use of lubricants (i.e. Yellow 77) to facilitate the installation of cables in conduits is highly discouraged. If such a lubricant must be used, the contractor shall verify the acceptability of the lubricant to be used with the cable manufacturer, prior to using such a lubricant.
- DD. Under no circumstance are "channel locks" or other pliers to be used.
- EE. All firewalls penetrated by security cabling shall be sealed by use a non-permanent fire blanket or other method in compliance with the current edition of National Fire Protection Association (NFPA) and the National Electric Code (NEC) or other prevailing code and must be a system listed by Underwriter's Laboratory (U.L.). The contractor must not use concrete or other non-removable substance for fire stopping on cable trays, raceways or conduits. Contractors who use this method will be required to replace all cables affected and provide the original specified access to each effected area.
- FF. Equipment racks shall be bolted to the floor by the contractor once the City determines the exact location for each rack. The earthquake mounting brackets that come with each relay rack kit shall be screwed to studs, not drywall. All equipment shall be serviceable in the racks final location – the need to unbolt racking equipment to access or service equipment is not acceptable.

3.2 SPECIFIC SYSTEM INSTALLATION REQUIREMENTS

- A. The installer shall, upon completion of the system installation, adjust all controls, etc., to provide a system operating at maximum capability.
- B. Submit block diagram and shop drawing of equipment.

- C. The system shall be programmed to annunciate, in alphanumeric format, the device type and device location (in room name format) for all alarm, trouble, service, and faulted conditions.

3.3 GENERAL TESTING REQUIREMENTS

- A. Provide all instruments for testing and demonstrating in the presence of the City's inspector that the frequency response is as stated in the factory data sheets. Check all circuits and wiring to verify they are free of shorts and grounds.

3.4 SPECIFIC SYSTEM TESTING AND VERIFICATION REQUIREMENTS

- A. System shall be complete and properly operating prior to calling for the test. The inspector, contractor and engineer shall walk test system at District's option and contractor shall make minor satisfactory adjustments to the system in the presence of the inspector. Contractor shall coordinate the time of test with the City's inspector. This test shall be performed during a time when there are no other persons on the site.

- B. Tests:

- 1. Notify architect and City's representative in writing, in advance of testing, at least ten (10) working days in advance of testing to prevent delays in construction schedules.
 - 2. Test all systems and place in proper and specified working order prior to demonstration of the system.
 - 3. Test system grounds to demonstrate that the ground resistance does not exceed the requirements of the Transient Voltage Surge Suppression (TVSS) or the National Electric Codes (NEC).
 - 4. Perform tests as required by authorities having jurisdiction over the site.
 - 5. Testing shall be in the presence of the City's representative, contractor, architect, construction manager and representatives of the authorities having jurisdiction.

- C. Verification of Performance:

- 1. Prior to acceptance of the work, the security system integrator/installer shall demonstrate to the City, contractor, architect, construction manager, and representatives of the authorities having jurisdiction, all subsystems, features and functions of the system, and shall instruct the City in the proper operation and event sequences of the system.
 - 2. Test each system and subsystem. The demonstration is to consist of not less than the following:
 - a. Designate actual location of each component of a system or subsystem and demonstrate its function and its relationship to other components within the system

- b. Test the system and subsystems operations by actual Start-Stop/On-Off, Open/Closing, Arming/Disarming cycling, showing how to work controls, how to reset devices and how to conduct emergency operating/operations procedures.
 - c. Test communication, signaling and intrusion detection equipment/devices by actual operation of such devices.
 3. Systems to be tested are to include, but are not limited to the following:
 - a. UPS or battery power and distribution system for standby operation during primary power failure
 - b. Motion detection equipment and access control panels
 - c. Door monitoring system
 - d. Access control system
 - e. Situation/panic alarms
 - f. ID Badging system
 - g. CCTV integration
 - h. Data Import utility
 - i. ASCII interface
 4. Furnish the necessary trained personnel to perform the testing and provide instructions. Allow 1 week of time for performing the prescribed testing.
 5. Arrange with the City's designated representative the date and times for performing the testing. The City will select date and time for demonstration and test.
 6. The contractor and a factory-trained technical representative shall test the completed system for proper operation. Testing of major equipment shall be done in accordance with manufacturer's instructions and the contractor's documented, and approved testing procedures. All equipment and power shall be operated and checked to ensure that operation conforms to the contractor's elementary diagrams, wiring diagrams, and specifications. The system shall be demonstrated to perform all the functions specified. Any system, equipment or wiring failures discovered during this test shall be repaired or replaced before scheduling the final test. All failures discovered during this test shall be reported to the construction manager/architect in writing. The report shall state the reason for the failure and the corrective action taken.
 7. The system shall be tested for final acceptance in the presence of the construction manager's and City's representative, architect's representative and contractor's representative. The contractor shall record and submit the test results to the construction manager and City's representatives.

8. Upon successful completion of all final tests and before formal system acceptance, the contractor's representative and security system integrator/installer shall each author and sign a letter confirming the successful completion of the testing. Two (2) copies of each letter shall be forwarded to the City's representative and the architect's representative. One copy of the test date shall be forwarded to the architect's representative.
9. Test equipment: Provide two portable radio transceivers to be used when walk testing the security detection system. The transceivers shall be capable of communication throughout the entire site.

3.5 FINAL ACCEPTANCE

- A. The City or City's representative may visit the site during the installation of the system to ensure that correct installation practices are being followed.
- B. The City or City's representative will conduct a final job review once the contractor has finished the job. This review will take place within one week after the contractor notifies the City.
- C. Two copies of all certification data and drawings for all identifications shall be provided to the City before the City's review.
- D. The City or City's representative will review the installation and certification data prior to the system acceptance.
- E. The City or City's representative may test some of the systems features to ensure that the certification data is correct. If a substantial discrepancy is found, the City reserves the right to have an independent consultant perform a certification of the entire system. If such a procedure is undertaken, the cost of the testing will be billed back to the contractor.
- F. In the event that repairs, or adjustments are necessary, the contractor shall make these repairs at his own expense. All repairs shall be completed within 10 days from the time they are discovered.
- G. The contractor shall provide not less than three (3) hours for site instruction of personnel in the operation and maintenance of the installed systems. This instruction time shall be divided as directed by the City.
- H. The contractor shall hand to the City a copy of any applicable installation specific software configurations in disk format.
- I. The contractor shall provide formal City training at the new facility consisting of a one (1) hour class for 15 people. The training shall cover use of security and alarm systems including such items as; alarm zone arming/de-arming, false alarm response procedures, programming, and local alarm sounder silencing.

END OF SECTION

SECTION 28 20 00

CLOSED CIRCUIT TELEVISION SYSTEM (CCTV)

PART 1 - - GENERAL

1.1 SCOPE OF WORK

- A. The work under this section includes all final design, all labor, material, equipment, supplies, labor, testing, and accessories required to furnish and install a complete Closed Circuit Television System as indicated on the drawings and as specified herein.
- B. It is the intent of the Drawings and Specifications, which are presented in a "design-build" format, for the Contractor to design, provide and install a complete, fully operational, and tested system.
- C. All miscellaneous system components including, but not limited to, cables, termination equipment, punch blocks, patch panels, backboards, and any other related items shall be furnished and installed complete under this section, such that the system shall perform all functions listed herein in compliance with all of the specified requirements.
- E. The CCTV System shall include, but not limited to, the following subsystems/products:
 - 1. See Products Section.

1.2 RELATED WORK

- A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections of Divisions 1 and 26 of these specifications.
- B. All applicable portions of Section 26000 shall apply to this section as though written herein completely.

1.3 GENERAL REQUIREMENTS

- A. The contractor shall hold a valid State of California C-7 Low-Voltage license, shall have completed at least 20 projects of equal scope, shall have been in business of furnishing and installing systems of this scope and magnitude for at least five years, and capable of being bonded to assure the City of performance and satisfactory service during the guarantee period.
- B. The contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work.

- C. All work shall be performed under the supervision of a company accredited by the basic equipment manufacturer and such accreditation must be presented.
- D. The installing contractor shall be a factory authorized distributor and warrantee station for the brand of equipment offered (Genetec and Lenel) and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The installing contractor shall maintain a spare set of all major parts for the system at all times. All circuit boards, amplifiers and control sub systems shall be 100% backed up with stock at contractor's shop.
- E. All of the equipment in this specification shall be furnished and installed by the Authorized Factory Distributor of the equipment. The Contractor shall furnish a letter from the manufacturer of all major equipment, which certifies that the installing contractor is the Authorized Distributor and that the equipment has been installed according to factory intended practices. The Contractor shall also furnish a written guarantee from the manufacturer that they will have a service representative assigned to this area for the life of the equipment.
- F. All communication systems supplied shall be listed by Underwriter's Laboratories under UL Standard 1459. A copy of the UL listing card for the proposed system shall be included with the contractor's submittal.
- G. All of the equipment in this specification shall be furnished and installed by the Authorized Factory Distributor of the equipment with the most current software package available at the time of installation. At the time of City Acceptance of the installation, all equipment shall include any and all updated software revisions. In addition, when the software is available in disk format, a backup copy of the most up to date revision, in disk format, shall be handed to the City at the completion of the project.
- H. The contractor shall pay all charges (including travel, lodging, meals, etc.) required to provide factory certification, equal to that of a Factory Authorized Distributor of the substituted item, for two (2) selected City's representatives. This training shall occur at the primary factory of the substituted item in question and shall allow the selected City's representatives to provide any and all Factory/Manufacturer Approved repairs, services, software upgrades, etc. without affecting any available or applicable Manufacturer Warranties.

1.4 QUALITY ASSURANCE

- A. In order to maintain a high degree of quality assurance, the contractor shall, without exception, use the parts and supplies as specified in this specification.
- B. For any proposed substitution, a complete descriptive, technical and cost comparison, and test report package shall be submitted to the City for review. Final approval of the substitution item shall be at the option of the City, and written notice of the status of the proposed alternative will be supplied to all bidders prior to the final bid date. The City or its representative must approve any proposed substitution item in writing. The City reserves the right to require a complete sample of any proposed equal item and may, if necessary, request a sample tested by an independent testing

consultant to prove equality. The decision of the City regarding equality of proposed equal items will be final.

- C. It is the intent of these specifications to establish a standard of quality for labor and material to be installed. The Base Bid shall include materials as specified - without exception. Proposed substitutions, if approved in writing by the City, shall be listed on the bid form in addition to the specified materials.
- D. Approved equal status does not imply final acceptance. Final acceptance of a substitution item shall be made by the City prior to the award of bid to the successful contractor, after reviewing the bid information.
- E. If a substitution item is given final acceptance by the City, the Contractor shall reimburse the Architect for any additional engineering charges and shall pay all charges of other trades resulting from the substitution, at no cost to the City.
- F. If a substitution item is given final acceptance by the City, the contractor shall pay all charges (including travel, lodging, meals, etc.) required to provide factory certification, equal to that of a Factory Authorized Distributor of the substituted item, for two (2) selected City's representatives. This training shall occur at the primary factory of the substituted item in question and shall allow the selected City's representatives to provide any and all Factory/Manufacturer Approved repairs, services, software upgrades, etc. without affecting any available or applicable Manufacturer Warranties.

1.5 GENERAL SUBMITTAL REQUIREMENT

- A. Submittals shall be presented and formatted per the guidelines in the Division 1 section of this RFP package.
- B. Submittal shall be furnished in an 8 ½" x 11" format in 3-ring loose-leaf binders. The cover and the title page shall bear the project name, capital project number, specification number, name of contractor and date. The document shall have a table of contents and page numbers on each of the pages including brochures and drawings.
- C. Drawings shall be no larger than 34" x 22". Drawings larger than 8 ½" x 11" shall be folded to 8 ½" x 11" so that the drawing's name and page number are visible and can be unfolded without being removed.
- D. Reproduced material shall not be subject to fading by light or heat and shall have high contrast for easy reading.
- E. All cut sheets shall represent the latest version, part number, and revision of the product. Where multiple products or part numbers appear on a page, a bold arrow or circle shall indicate which product or part numbers are to be used as part of the installation. The submittal shall include all descriptive pages associated with the product, not just the page showing the part number.

1.6 PRE INSTALLATION SUBMITTAL REQUIREMENTS

- A. Within thirty (30) calendar days after the date of award of the Contract, the Contractor shall submit the following:
1. Submittal Binder: Submit electronic copies of the complete Submittal Binder to the City for review. The binder shall consist of five major sections with each section separated by index tabs. Each page in the binder shall be numbered sequentially and shall be summarized in the index.
 - a. The first section shall be the "title sheet" which shall include the submittal date, project title and address, name of the contractor, and name of the City.
 - b. The second section shall contain proposed material list including manufacturer's name, model number and technical data for all equipment the contractor proposes to install. Items shall be identified by specification section and paragraph number. The technical data shall consist of copies of factory issued catalog sheets or brochures, which give ratings and specifications for the proposed items. Include statement describing exceptions being taken, if any, to the specifications wherein the submitted equipment or design varies from that originally specified.
 - c. The third section shall contain original manufacturer cut sheets for all of the materials that meet the requirements listed in Section 2 of this specification and all materials described on the construction drawings. Also include manufacturer's cut sheets for all testing equipment to be used for completion of the project. All pages shall be numbered sequentially corresponding to the index.
 - d. The fourth section shall contain Single line system diagram identifying and showing interrelationships between equipment items and how they are interconnected. The diagram shall be based on the drawings included in the Construction Documents. It shall be updated to show quantities and part numbers for all components including patch panels, cable, conduit, cabinets and equipment racks, splices, splice cases and all other associated components.
 - e. The fifth section shall contain shop drawings showing details of fabricated items, rack elevation drawings, console arrangements and schematics of custom designed items.
 - f. For any exceptions that are not approved by City, contractor shall resubmit the information in complete compliance with the specifications and drawings.
 - g. Failure to comply with any of the requirements listed above may result in the rejection of the entire submittal package.

1.7 POST INSTALLATION SUBMITTAL REQUIREMENTS

- A. Within fifteen (15) calendar days after the completion of work, the Contractor shall submit the following:
1. Record Documentation:

- a. Record drawings shall be made on separate clean blue line prints of the electrical drawings issued by the City or Architect and shall be reserved for the purpose of showing work as actually installed, including accurately dimensioned locations of all conduit stub-outs and pull boxes, routing of all conduits extending from or between buildings and locations of all telecommunications equipment not installed according to drawings.
 - b. Drawings shall be kept up to date with neat and legible annotations made thereon daily as work proceeds, showing work as actually installed. Additional sheets may be attached to show greater detail. Drawings shall be available at all times for inspection and shall be kept on the job at a location designated by the City.
2. Contractor at his option may use an additional set of drawings for daily field annotations. This set of drawings shall be kept at the site.
 3. Final record drawings shall be submitted with floor numbers, room numbers, panel directories and all other identification necessary to conform to number designations for occupancy rather than to construction numbers. All buried conduit and/or underground conduits stubs intended for future extension shall be accurately shown as to depth and exact measurement from a permanently established landmark, such as building or structural features.
 4. On completion, record drawings shall be signed, dated and returned to the City for inspection and approval before acceptance of any work.

B. Final Submittal

1. Three (3) complete sets of the Final Submittal including a full set of the drawings on vellum shall be delivered to the Library Capital Projects Section and two (2) complete sets to the City Telecommunications Systems Engineer prior to acceptance tests and as a condition for final payment for the project to the contractor. It shall include all the information necessary to maintain each system, and shall consist of the following:
 - a. Operators Instructions (as applicable).
 - b. Factory-issued Service Manuals for each piece of equipment installed. The manuals shall contain complete parts lists, detailed schematics, circuit descriptions, maintenance procedures and trouble-shooting methods. In the event such manuals are not available from the factory, it shall be the responsibility of the contractor to compile and submit the required information.
 - c. A System Manual for each system furnished. This manual shall complement the above service manuals with all necessary additional information unique to the system that is not otherwise provided, such as a list of applicable service manuals, options selected, jumper or strapping choices, modifications, and detailed wiring information. All manuals shall be bound in a 3-ring binder with tabs identifying each system.
 - d. Record Drawings (see Paragraph 1.07-A-5).

- e. Two (2) electronic copies of all drawings in AutoCAD 2000 format or as specified by the City Telecommunications System Engineer, shall be provided. One copy to the Library Capital Project Section and one copy to the City Telecommunications Systems Engineer.

1.8 GENERAL SYSTEM PRODUCT, INSTALLATION AND OVERALL SYSTEM WARRANTY

- A. Prior to City acceptance, the contractor shall provide to City, a manufacturers product and performance warranty. This will require a submittal of the required pre-job certification registration forms as well as the required project closing information. The City will only acknowledge acceptance upon submittal of a valid manufacturer's warranty.
- B. The warranty shall commence from the date of final written acceptance by the City.
- C. All conditions for obtaining the manufacturer's warranty shall be the sole responsibility of the contractor.
- D. The contractor shall maintain a competent service organization and shall, if requested, submit a service maintenance agreement to the City after the end of the guarantee period.
- E. A typewritten notice shall be posted at the equipment rack that shall indicate the firm, address and telephone number to call when service is necessary. The notice shall be mounted in a neatly finished metal frame with a clear plastic window and securely attached to the inside of the door.

1.9 SPECIFIC SYSTEM PRODUCT, INSTALLATION AND OVERALL SYSTEM WARRANTY

- A. The entire system shall be warranted free of mechanical or electrical defects for a period of one (1) year after final acceptance of the installation. Any material showing mechanical or electrical defects shall be replaced promptly at no expense to the City. The warranty shall be transferable to any person/persons at the discretion of the City

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Material, Equipment and Software shall be products of a single manufacturer. All material, equipment and software shall be the latest technology and currently in production. Each major component of equipment shall have the manufacturer's model and serial number in a conspicuous place. Acceptable manufacturers include:
 - 1. Genetec (Existing VMS, new camera licenses) – city Standard
 - 2. Axis (Cameras) City Standard
 - 3. Cisco Network Switches
- B. The equipment shall be available through Authorized, factory-trained and certified Business Partners or Dealers.

- C. Hardware Manufacturer Experience: All system hardware and firmware shall be produced by manufacturers regularly engaged in the production of electronic security management systems and application software for at least 5 years.
- D. Software Manufacturer Experience: All system and application software shall be produced by manufacturers regularly engaged in the production of electronic security management systems and application software for at least 5 years.
- E. System Installer Experience: The system shall be installed by a factory-trained contractor who has been regularly engaged in the installation of electronic security management system equipment for at least 5 years.
- F. System Component Design: Electronic security management system components shall be designed for continuous operation. Electronic components shall be of SMT manufactured process. All connections to the intelligent system controllers, intelligent reader controllers, and intelligent control modules shall be protected by SMT type TVS (Transient Voltage Suppressors).
 - 1. Modularity: The contractor shall provide equipment designed for increase of system capability and capacity. System components shall be designed to facilitate easy maintenance and replacement of components and devices. The system shall auto-configure new and replacement controllers for address, baud rate and communication type. Systems using controller hardware with rotary switches, dipswitches and jumpers for address, baud rate and communication type are not acceptable.
 - 2. Maintainability: Components shall be designed to be maintained using commercially available tools and equipment. Components shall be arranged and assembled so they are accessible to maintenance personnel. There shall be no degradation in tamper protection, structural integrity, EMI/RFI attenuation, or line supervision capability after maintenance when it is performed in accordance with manufacturer's instructions.
- G. It is the responsibility of the bidder to insure that the proposed product meets or exceeds every standard set forth in these specifications and the equipment's technical data sheets.
- H. The functions and features specified are vital to the operation of this facility. Therefore, inclusion of a component's manufacturer in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.
- I. The communication contractor shall furnish and install a Closed Circuit Television (CCTV) system. The CCTV system shall consist of fixed cameras, monitors, power supply, cabling, distribution amplifier, and associated equipment. The CCTV System shall be monitored and recorded on the VMS located in the City's Server Room.
- J. CCTV Contractor shall furnish and install a complete and fully functional CCTV system. CCTV Contractor shall furnish and install any and all materials whether or not specified to provide a complete and fully functional CCTV system. CCTV Contractor shall configure all settings and programming of the equipment including but not limited to camera titles, presets, recording schedules, and frame rates. CCTV

Contractor shall coordinate with the City's IT Project Manager in the system settings and configuration.

- K. CCTV Contractor shall meet or exceed all Federal, State, and local building codes including but not limited to the National Electric Code and Fire Codes. CCTV Contractor shall install all materials in accordance with manufacturer's instructions and specifications. CCTV Contractor shall install all materials in accordance with professional standards including EIA/TIA standards.
- L. CCTV Contractor and its subcontractors shall be an authorized manufacturer dealer/reseller and manufacturer's certified installer of the CCTV system and VMS equipment. The Contractor and subcontractors shall submit manufacturer's certification documentation at the time of bid submittal.
- M. Cabling – CCTV Contractor shall furnish and install all cabling for the CCTV system. CCTV Contractor shall furnish and install all cabling supports as per NEC and EIA/TIA requirements. Cable support shall be independent from ceiling and other equipment supports.
- N. Cabling installed in the interior of the building shall be plenum rated. Any cabling installed exterior to the building shall be installed in and protected with weatherproof and watertight conduit and enclosures.
- O. Cameras - The camera locations are shown on the plans. CCTV Contractor shall verify camera locations at the site. CCTV Contractor shall furnish and install cameras and mounts. CCTV contractor shall furnish and install appropriate mounting backboxes for the cameras. CCTV contractor shall secure and earthquake brace camera backboxes. CCTV contractor shall verify which appropriate camera back box to use with the camera manufacturer. CCTV contractor shall cut ceiling tiles in a neat and clean manner as necessary to install the camera backboxes and cameras. CCTV contractor shall ensure that no gaps are visible in the ceiling when the cameras are installed. CCTV Contractor shall adjust the camera lenses and settings to obtain the required views. CCTV Contractor shall coordinate with the City's project manager and end user to determine camera view. CCTV Contractor shall readjust the camera lenses and settings as necessary to obtain alternate views as requested by City's Project Manager. CCTV Contractor shall connect the cameras to the video inputs of the respective monitor.
- P. Monitors – No CCTV specific monitors will be required for this project. Monitoring will be done at the City's Central Security monitoring location and on select desktop computers.
- Q. CCTV Contractor shall configure all settings of the CCTV system including all parameters of the cameras and monitors. CCTV Contractor shall coordinate with the general contractor and City's project manager for the installation schedule and to deliver a fully functional system.
- R. The installation shall comply with ALL applicable National Electric Codes, Building, and Fire Codes. The CCTV Contractor shall apply section 271000 – Structured Cabling System (SCS) for all cabling infrastructure associated with the CCTV system.

2.2 VMS:

- A. Genetec High Performance Network Security Appliance
 - 1. The Genetec system shall be an expansion system to the City's existing Genetec system. The base bid shall include the following licenses to expand the existing system:
 - a. Genetec Security Center Base (GSC-BASE-current version). Qty. 1
 - b. Plan Manager Standard. (GSC-PM-STD). Qty 1
 - c. 1 Year Maintenance (ADV-CAM-E-1Y). Qty as required
 - d. Camera connections. (GSC-Om-E-1C). Qty. as required.
- B. Remote Access via mobile appliance and Web client.
- C. General:
 - 1. Shall operate on industry standard Microsoft Windows.
 - 2. System shall not include any proprietary hardware such as video capture or frame grabber cards that may cause System instability. System shall be based on industry standard hardware.
 - 3. All System configurations, changes, setups and operation shall be available to the System administrator for access and use.
 - 4. System configurations, changes, setups and operation shall be password protected.
 - 5. Preference will be given to plug-and-play, and maintenance free Systems.

2.3 HARDWARE

- A. Cameras
 - 1. Interior – 5MP HD
 - a. Axis P3247-LV IP fixed dome varifocal lens
 - 2. Exterior– 5MP HD
 - a. Axis P3247-LVE IP fixed dome varifocal lens IP66 and NEMA 4X-rated.
- B. Camera Mounting
 - 1. Camera Mounting Hardware – Ancillary hardware shall be provided by the contractor, if required, and shall be compatible and comparable in strength to other attached hardware. Contractor is responsible to securely mount all cameras and camera enclosures with appropriate fasteners required for the mounting surface. Follow all manufacturer recommended installation guidelines. See camera schedules on plans for desired mount.

2. Wall mount conduit backbox for exterior wall mount locations (Axis T94S01P). See drawings.
3. Flush ceiling mount for interior locations (Axis TP3201 Recessed Mount). See drawings.

C. Cabling

1. Category 6 cabling system. The following is project approved system. Provide Category 6 cabling system with 20 year Manufacturer's Warranty per specification section 271000. All cabling used throughout this project shall comply with the requirements as outlined in the National Electric Code (NEC®) Articles 725, 760, 770, and 800 and the appropriate local codes. All copper cabling shall bear CMP (Plenum Rated), CM/CMR (Riser Rated), OSP (Outside Plant) and/or appropriate markings for the environment in which they are installed.

D. Miscellaneous Connectors – as required.

E. Miscellaneous materials – All materials necessary to furnish and install a complete and fully functional system.

PART 3 – EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

- A. The wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's wiring diagrams. Should any variations in these requirements occur, the contractor shall notify the Architect before making any changes. It shall be the responsibility of the factory-authorized distributor of the approved equipment to install the equipment and guarantee the system to operate as per plans and specifications.
- B. Furnish all conduit, junction boxes, conductors, equipment plugs, terminal strips, etc., and labor to install a complete and operable system.
- C. The cables within the rack or cabinets shall be carefully cabled and laced with Velcro. All cables shall be numbered for identification.
- D. Splices of conductors in underground pull boxes are not permitted.
- E. The labor employed by the contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the City and architect to engage in the installation and service of this system.
- F. The contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc., the Contractor shall remove all debris and rubbish occasioned by the electronic systems work from the site. The contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., Caused by the performance of this work.

- G. The system must meet all local and other prevailing codes.
- H. All cabling installations shall be performed by qualified technicians.
- I. All cabling shall be splice free.
- J. In order to ensure the least amount of cable untwisting, it is required that all cables shall be stripped using a special tool.
- K. The use of lubricants (i.e. Yellow 77) to facilitate the installation of cables in conduits is highly discouraged. If such a lubricant must be used, the contractor shall verify the acceptability of the lubricant to be used with the cable manufacturer, prior to using such a lubricant.
- L. Under no circumstance are "channel locks" or other pliers to be used.
- M. Plenum rated cable may be run exposed above ceilings, provided the cabling is supported independent of other utilities such as conduits, pipes, and the ceiling support systems. The cables shall not be laid directly on the ceiling panels. The use of cable ties shall be done in accordance with the cable manufacturer's requirements. The cable jacket composition must meet local and all other prevailing fire and safety codes.
- N. All firewalls penetrated by CCTV contractor shall be sealed by use a non-permanent fire blanket or other method in compliance with the current edition of National Fire Protection Association (NFPA) and the National Electric Code (NEC) or other prevailing code and must be a system listed by Underwriter's Laboratory (U.L.). The contractor must not use concrete or other non-removable substance for fire stopping on cable trays, wire ways or conduits. Contractors who use this method will be required to replace all cables affected and provide the original specified access to each effected area.
- O. The contractor shall bolt all equipment racks to the floor/wall once the City determines the exact location for each rack. The earthquake mounting brackets that come with each relay rack kit shall be screwed to studs, not drywall. All equipment shall be serviceable in the rack's final location – the need to unbolt racking equipment to access or service equipment is not acceptable.
- P. In suspended ceiling areas and raised floor areas (if shown on drawings) where walker duct, cable trays or conduit are not available, the Contractor shall bundle station wiring with approved ties at distances not more than 6' intervals. The cable bundling shall be supported via "J" hooks attached to the existing building structure and framework. Plenum cable will be used in all appropriate areas.
- Q. Clearly mark security cable at 10' intervals with color-coded tags to differentiate it from surrounding cables.
- R. All cable, wires, wiring forms, terminal blocks and terminals shall be identified by labels, tags or other markings. The markings shall clearly indicate the function, source, or destination of all cablings, wiring and terminals. The wire marking format contained in the shop drawings shall be utilized for all conductors installed on the project. All cables and wires shall be identified, utilizing heat shrink, machine printed,

polyolefin wire markers (Brady Type B-321, WMS-#17-321 or equal). Handwritten tags are not acceptable. All cabinets and panels shall be provided with permanently attached lamicoid labels with 1" high white lettering on black background. Labels must contain the text name and alphanumeric identifier as called out on the single line.

3.2 SPECIFIC SYSTEM INSTALLATION REQUIREMENTS

- A. The installer shall, upon completion of the system installation, adjust all controls, etc., to provide a system operating at maximum capability.
- B. Submit block diagram and shop drawing of equipment.

3.3 GENERAL TESTING REQUIREMENTS

- A. Provide all instruments for testing and demonstrating in the presence of the City's inspector that the frequency response is as stated in the factory data sheets. Check all circuits and wiring to verify they are free of shorts and grounds.

3.4 SPECIFIC SYSTEM TESTING REQUIREMENTS

- A. System shall be complete and properly operating prior to calling for the test. The inspector, contractor and engineer shall walk test system at City's option and contractor shall make minor satisfactory adjustments to the system in the presence of the inspector. Contractor shall coordinate the time of test with the City's inspector. This test shall be performed during a time when there are no other persons on the site. The testing shall include:
 - 1. Demonstrate acceptable picture quality and camera views on each camera.
 - 2. Demonstrate acceptable picture quality on each video monitor.
 - 3. Demonstrate switching, recording and playback functions of the VMS.
- B. The City or City's representative may visit the site during the installation of the system to ensure that correct installation practices are being followed.
- C. The City or City's representative will conduct a final job review once the contractor has finished the job. This review will take place within one week after the contractor notifies the City.
- D. Two copies of all certification data and drawings for all identifications shall be provided to the City before the City's review.
- E. The City or City's representative will review the installation and certification data prior to the system acceptance.
- F. The City or City's representative may test some of the systems features to ensure that the certification data is correct. If a substantial discrepancy is found, the City reserves the right to have an independent consultant perform a certification of the entire system. If such a procedure is undertaken, the cost of the testing will be billed back to the contractor.

- G. In the event that repairs, or adjustments are necessary, the contractor shall make these repairs at his own expense. All repairs shall be completed within 10 days from the time they are discovered.
- H. The contractor shall provide not less than eight (8) hours for site instruction of personnel in the operation and maintenance of the installed systems. This instruction time shall be divided as directed by the City.

END OF SECTION